

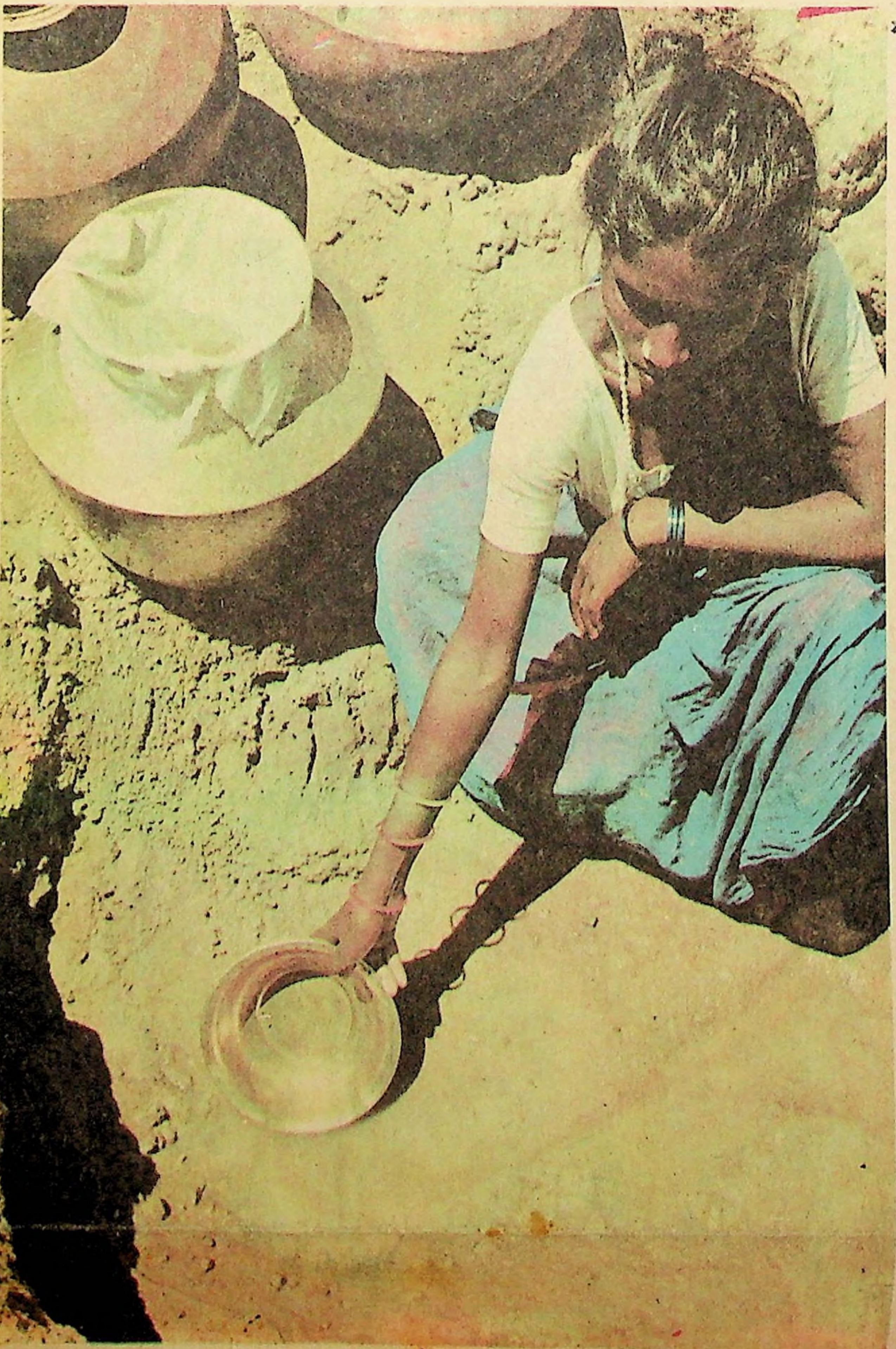
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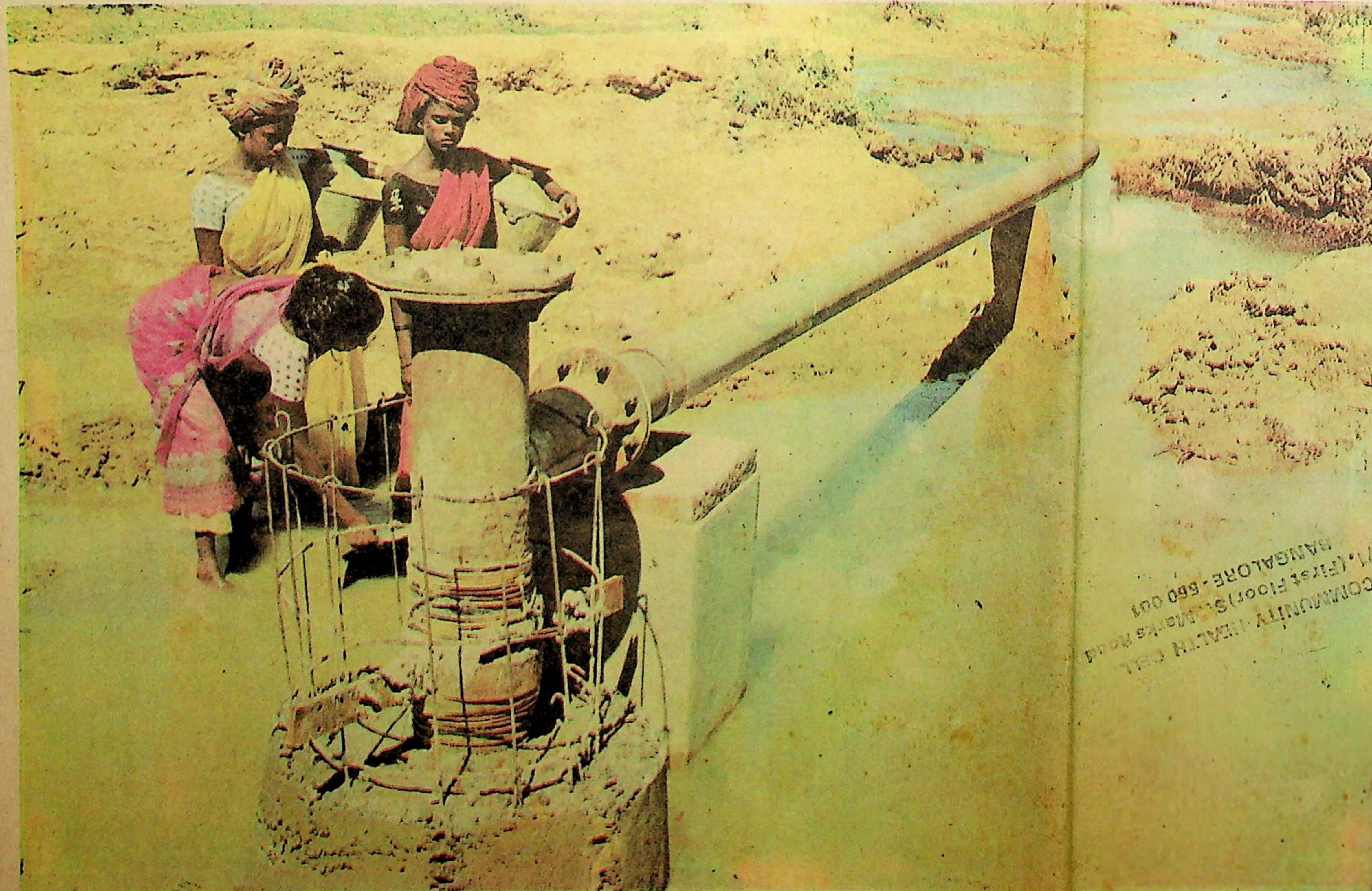


Water "mining" from a pit.

Artesian Wells Come to the Rescue

PROTECTED water supply, especially for those in the villages – whether they live on the banks of a perennial river or in coastal villages or in the arid zones – is still an unsolved problem.

Even in a town like Tiruchi, right on the banks of the Cauvery, where the cornerstone for the present water works was laid in 1892, people do not enjoy uninterrupted water supply – not to speak of a number of pockets within the municipal limits still not receiving drinking water.



In Pudukottai district, 1,140 hand pumps were provided to tap ground water under the aegis of the UNICEF. They very often go out of order. Putting them back to use is a major headache to the Water Board maintenance staff. An assessment has shown that it costs nearly Rs.140 a month to maintain a pump.

In Pudukottai district during the Sixties, the ONGC and a few Central agencies engaged themselves in exploring the ground water potential. The ground water cell of the State Government,

during the Seventies also made an intensive exploration and identified that in Tamil Nadu three zones – Neyveli belt, Aranthangi coastal belt and Tiruvadanaï belt in Ramnad district – have copious ground water potential. It has even mapped the transmission zones where the sea water and the ground water aquifers meet.

The cell suggested that in these areas, ground water could successfully be tapped through deep bores and that this water, after treatment, could be made potable.

In the villages in Aranthangi, Aavudayar-koil and Arimalam panchayat union limits, water in open wells is saline because of sea water intrusion. The mainstay for them is the water from the tanks and ponds which receive replenishments during the monsoon.

The people draw water at the "drinking water ghats" as distinguished from the "bathing ghats" of the tanks. They take the water in pots and allow the mud to settle.

Twelve comprehensive water supply schemes (CWSS) were drawn up by the TWAD Board for the benefit of the coastal residents in the region covering a population of nearly one lakh.

Mr. M. Subramaniam, Executive Engineer, TWAD (Rural Water Supply Division), Pudukottai, said that 12 bore wells had been sunk to a depth ranging between 600 and 1,700 ft.

There is at present the curious practice called "mining". Water is first collected from the pit in a small brass utensil and transferred to a pot. It takes about 30 minutes to fill a pot of water.

All the deep bore wells of the CWSS are artesian wells, Mr. Subramaniam pointed out. A sum of about Rs. Three crores has been earmarked for the 12 schemes, but maintenance strategies have not been worked out. Water from the artesian wells has more hydrogen sulphide than surface water. Through aeration, sedimentation and filtration the impurities were removed and only treated water was being pumped into the distribution mains.

Supply from an artesian well.

Tiruchi Staff Reporter.

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Pall of Pollutants Over a City

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HYDERABAD is one of the nine cities in the country where the national air monitoring programme has been undertaken by the National Environmental Engineering Research Institute (NEERI), in accordance with the World Health Organisation's suggestion to assess air quality within the framework of selected parameters. Madras, Bombay, Delhi, Calcutta, Kanpur, Ahmedabad, Jaipur and Cochin are the other centres.

WHO chose India in 1978 as the nodal point in South-East Asia for air monitoring. The main purpose of the programme is to alert the public and authorities about any abnormal increase in pollution levels and to ultimately enthuse local agencies to take the programme into their hands.

Four parameters are chosen for monitoring pollution levels. The programme covers the determination of the quantum of suspended particles and that of sulphur dioxide, an assessment of sulphation rate and of dust fall. The programme includes collection of meteorological information for data interpretation.

Increasing evidence the world over seems to prove that certain concentrations of particulate matter, sulphur dioxide, carbon monoxide, photochemicals, oxidants and hydrocarbons produce serious tetraogenic, carcinogenic, mutagenic and other effects.

Besides affecting health, pollutants have been found to be responsible for the decrease in atmospheric visibility damage to buildings and corrosion.

In order to limit the deterioration in air quality and improve it further, scientists and technologists have been formulating control measures and ascertaining the magnitude of air pollution from time to time.

This necessitates the establishment of a continuous air quality monitoring network to obtain concurrent and comparable data on both gas and dust levels in the atmosphere.

In Hyderabad, NEERI has selected three places for air monitoring—the Abids commercial area, Tarnaka and Moulali residential areas. Air monitoring, a pilot programme in Hyderabad, will continue till 1983.

Yet, the problem of pollution is occasioned by the lack of adequate sewer lines and improper location of industries.

For the location of industries, the authorities do not have base line data about air quality, the scientists say.

A systematic planning for the location of industries will foster the establishment of more industries without fouling the atmosphere.

NEERI has briefed the Hyderabad Urban Development Authority on air quality survey in Hyderabad to determine the level of pollution, to define the areas of pollution according to the levels, and finally to develop mathematical models to predict pollution levels, identify the pollution sources and suggest control measures.

NEERI proposes to prepare air quality maps which will help decide the proper location of industries. NEERI also proposes to take up air quality monitoring programme in Visakhapatnam where industrialisation is apace.

Environmental scientists suggest that air filters should be used to reduce the vehicular emission of carbon monoxide and carbon dioxide. They also suggest that autocatalytic convertors should be used, as in the U.S., to reduce effectively the carbon dioxide and carbon monoxide emission.

At coal-based thermal plants and cement factories, the scientists say, electrostatic precipitators should be installed to absorb dust particles. Similarly, for chemical industries, bag filters and wet scrubbers should be used to dilute the gases.

Mr. A. Shyamasunder Rao, MLC, recently raised in the State Council question of air pollution in Mancheri town (Adilabad district) where a cement factory is located, with a coal mine nearby. The Minister for Municipal Administration, Mrs. Sarojini Pulla Reddi, said that it was proved that pollution was high in Mancheri town.

The cement factory had set up a dust collecting equipment. The factory would be advised to take effective steps to prevent the dust from escaping into the atmosphere.

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A Scientist measuring the presence of Gases entering the High Volume Sampler with the help of Manometer at Abid's Centre, Hyderabad, where the air pollution effects are found to be very high

NEERI has fabricated sampling gadgets adaptable to local conditions. Sulphur dioxide and samples of suspended particles are collected every tenth day; a sampling frequency of three times a month.

About ten years ago, the air quality in Hyderabad was good, in the light of U.S. standards. But industrialisation in some pockets of the city and the increase in vehicular traffic have contributed to the deterioration of air quality over the city.

A hue and cry has been raised against further industrialisation in and around Hyderabad. At one time, some officials even suggested a ban on further industrialisation in the city and the shifting of industries to other parts of the State.

But, environmental scientists were not sure that these reasons attributed for pollution were indeed correct. Compared to the industrialisation of other big cities like Bombay, Calcutta and Bangalore, the number of industries located in Hyderabad is not significant.

There was, however, no pollution problem in Mancherial due to the coal mine. NEERI would be approached to conduct a survey of pollution levels in Mancherial.

Recently, some people working in the drainage galleries of the Nagarjunasagar dam, complained of suffocation, fatigue, bronchitis and breathing trouble. The project authorities requested NEERI to find out the cause.

The NEERI scientists conducted experiments and analysed the levels of hydrogen sulphide, carbon monoxide and carbon dioxide for eight days in September and concluded that in certain parts of the galleries, humidity was extremely high. One of the remedies suggested by the scientists is more ventilation at various levels of the galleries.

After laboratory and pilot plant studies, NEERI has designed effluent treatment plants for all major industries in the State.

**Hyderabad Staff
Reporter**

**Colour
Transparency
by
Our Staff
Photographer**

44-2

COMMUNITY HEALTH CELL
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ENVIRONMENTAL PLANNING

Concepts Background

Proposals

July, 1976

ENVIRONMENTAL PLANNING

A. Historical background and definition:

Robert Owen was among the first to see that, unless controlled, machines producing within a modern market economy would have socially harmful consequences; and he wrote in 1815:

"The general diffusion of manufactures throughout a country generates a new character in its inhabitants; and as this character is formed upon a principle quite unfavourable to individual and general happiness, it will produce the most lamentable and permanent evils, unless its tendency be counteracted by legislative interference and direction the governing principle of trade manufactures, and commerce is immediate pecuniary gain, to which on the great scale every other is made to give way."

When Owen failed to persuade the government of his day to listen to his arguments he demonstrated the beneficial effect that the secure environment of a welfare-oriented textile mill had on the workers and their productivity at New Lanark. The mill made consistent profits in an era when other mills were closing down or incurring losses even though Owen paid out £ 7000 in wages for four months when the mill was closed. Thus, as early as the beginning of the nineteenth century, 185 years ago, farsighted individuals were recognising the not-so-welcome effects of industrialisation. From this point on the nature of man's concern for the environment may be traced.

The example of England is instructive:

1800 - 1824: Robert Owen managed the pioneering but eventually short-lived textile mill at New Lanark.

1844 - 1845 : Frederic Engels investigated the slum conditions and wrote "The Condition of the Working Class in England" describing the poverty and the terrible physical conditions.

1848 : The Government passed the first Public Health Act regulating the sanitation and sewage arrangements in the newly sprung up industrial townships.

1868 : The Artisans and Labourers Dwellings Act was passed to regulate the individual housing.

1875 : The Artisans and Labourers Dwellings Improvements Act was passed to further control the development of housing. The Public Health Act was amended to give the municipalities permission to set up separate departments for dealing with sewage and sanitation.

1878 - 1890 : Different industrialists adopted the 'garden town' approach to plan their industrial townships in order to make life more livable for their industrial workers. Cadbury set up Bournville in 1878, Lever set up Port Sunlight in 1887, and Rowntree set up a township in York in 1890.

1909 : So far the attempts to control the environment had been mainly in the hands of the industrialists wishing to have a healthier working force or the State in keeping towns free of epidemics and disease. But during the Boer War it was discovered that recruits from working-class areas were very weak - sometimes too weak to even lift a rifle. A committee set up to investigate the reasons for this reported on the appalling living conditions of the working class and recommended the passing of legislation to control these conditions. Accordingly in 1909 the government passed the Town Planning Act which gave the State authorities the power, for the first time, dictate how private property in land was to be used.

1930s : The massive problems of the world-wide recession giving rise to crises in industrial production, employment, transport etc. gave rise to the first debates on regional disparities and government action to control these in a laissez-faire economy.

1947 : The first Labor government had come to power and it tried to implement the first steps of State control over planning through nationalisation and the Town and Country Planning Act which extended planning concepts from the city to the village areas.

1950 : World War II had by now devastated a large number of towns and these had to be rebuilt from scratch. In addition John Maynard Keynes had shown through his general theory how the State not only could but had to act with its enormous fiscal and political powers to control the economy. Thus the rationale for State planning was established.

1968 : With the complete breakdown of the colonial system and its consequent economic problems the government had to make additional efforts to organise and manage production, housing, transport, food etc. Hence the new Town and Country Planning Act was passed to control the environment.

1970 : With the increase in education and political consciousness various sections of the public began to fight both private and public enterprise on environmental issues of location, noise, pollution, etc. and so the State integrated environmental action by setting up the Department of the Environment.

All this is neither completely representative of developments in other countries nor unique. For instance, State Planning began in earnest in the USSR in 1920. Even the US and UK had extensive experience in control by Government during the two World Wars. India did not go through the same process of industrialisation as the UK nevertheless it adopted much of the social and planning legislation of Great Britain. But the trends are fairly clear. In the 1920s environmental issues were mainly raised as a protest against industrialisation and its despoilation of the countryside. In the 1960s it became fashionable to talk of pollution, ecology, and much else. But in the 1970s population and pollution have become pressing problems for governments everywhere.

What we learn from history then is that the degradation and control of the environment became public issues for governmental action only when they posed economic problems in the course of production for private profit and that governmental action had to take up increasingly stricter positions with regard to private property and its use so that the social fabric was not destroyed.

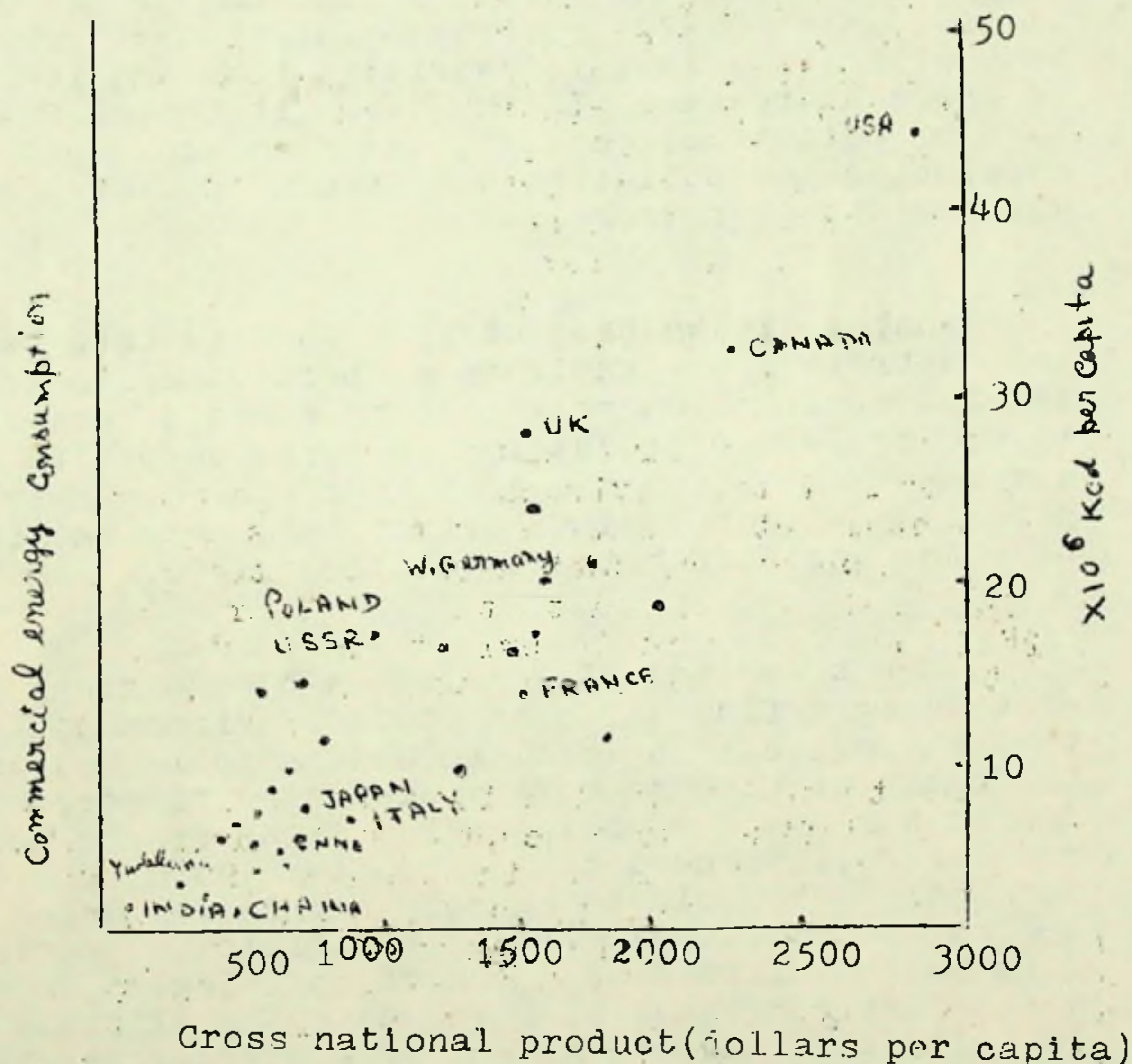
When these underlying issues become clear we can now proceed to define our concepts of Environmental Planning so that these become helpful in understanding our society and the tasks we have to take up in order to correct its ills. We may take as a starting point Frank Fraser Darling's comment: " .. we need to develop some yardstick for human content; to be able to measure the lesser degree of discontent and psychosomatic disease in rehabilitated environments. This is the ultimate concern of politics." We can now define Environmental Planning as that political exercise in allocation and management of resources which improves the well-being of those engaged in production, prevents the harmful by-products of industrialisation, and preserves the natural resources."

We have already dealt with the first two issues, we shall now take up the third.

B. Resources - human and material - and development:

We shall not enter here into the debate on the world ecological crisis - important though it may be - but shall concentrate on the case of India using underdevelopment as an illustration of the general problem of development.

Food, energy, and production are intimately related to the economic state of a nation. The following figure reveals with great clarity the position of India with respect to the rest of the world:



The US uses over 44×10^6 Kcal per capita of which 8.16×10^6 Kcal were used to provide food for an average US resident of which, further, 18% was used on the farm. If all the world had the same per capita energy bill for the entire food chain, a quantity equal to two-thirds of the 1970 world commercial energy use would have been consumed for this purpose.

Let us look at a few more relevant figures:

1. Between 1971-73 the industrialised countries with 30% of total world population produced 60% of the world's food.

2. The US supplied between 1965 and 1970 50% of the world's exports of cereals and its fellow industrialised countries took 2/3rd of these exports.
3. The cost of all commercial food exports was
 - £996 m in 1955
 - £3000 m in 1967
 - £4000 m in 1972
 - £9000 m in 1974
4. On present trends
 - (a) the annual increase of food supplies is
 - 2.8% in the industrialised world
 - 2.7% in the developing world
 - (b) the annual increase of food demand is
 - 1.5% in the industrialised world
 - 3.5% in the developing world.
5. The consumption of cereals is
 - 222 kg in the developing countries
 - 1000 kg in the industrialised world (per capita). Of this 1000 kg only 70 kg is consumed directly by human beings. The rest (930 kg) is either fed to cattle and consumed as beef or supplied as luxury food to pet animals.
6. 372 m tons of grain are used annually for livestock feed in the rich countries. This is approximately the total amount of grain now consumed directly by humans in China and India (total population 1400 million).

To illustrate further the dynamic relationship between food, energy, production and money, let us take the case of a typical hypothetical developing country:

It might be assumed that in country X 20% of the food requirements are being met by farmers using Green Revolution techniques, there is available only limited foreign exchange, and half of the fertiliser supply is imported. If a 100% increase in fertiliser price occurs, the following sequence of events may take place:

- i. Because of limited foreign exchange, fertiliser purchases must be halved, reducing total fertiliser supply to 75% of the original level.
- ii. Farmers using Green Revolution technology bid up the price of fertiliser discouraging other farmers from trying this practice.

- iii. The total foodgrains supply drops $2\frac{1}{2}\%$, but since farm families consume half the country's food, the shortfall in marketable surplus is 5%.
- iv. Persons anticipating the shortage enter the market trying to buy advance food supplies, consequently driving food prices up to perhaps double their original level.
- v. Persons with low incomes who must buy food are forced to starvation level diets.
- vi. The government in order to prevent starvation, buys grain on the world market and sells it internally at low prices.
- vii. Grain purchases consume the limited foreign exchange reserves being accumulated for energy resource development and fertiliser plant construction.

Food prices in such countries become linked to international energy, fertiliser, or food prices irrespective of the productive capacity of the people. With energy prices dependent on what the market will bear, affluent economies, which are already dependent on high energy use and stand to incur great losses if energy flow is cut, can afford to bid energy prices up to very high levels. One recent model of California agriculture shows shadow prices of diesel fuel of around \$550 per barrel. The impact of all this is basically to prevent countries such as X from using or expanding the use of Green Revolution technology.

Bearing in mind that industrial development depends upon surpluses accumulating from agriculture and upon adequate food supplies in an underdeveloped but developing economy let us also look at estimates of world resource depletion:

Number of years until total resource depletion based on current exponential rates of use:-

Aluminium	52	Molybdenum	62	Chromium	151
Coal	147	Cobalt	145	Copper	45
Gold	26	Iron	170	Lead	61
Manganese	91	Mercury	38	Natural gas	46
Nickel	93	Petroleum	47	Platinum	82

Within such a macroeconomic situation what are the specific problems that India faces and will have to face?

1. By 2000 A.D. the population will reach 70 crores.
2. With increasing population pressures land ownership will be fragmented making it all the more difficult to apply modern technology.
3. There will, therefore, be a decline in land productivity.
4. By the end of the century 210 million tonnes of foodgrains will be required to feed the population - an increase of 100 million in 25 years.
5. There will be the increased need to export goods at competitive prices in the world market.
6. Large scale under- and un-employment will exist in the agricultural sector.
7. Consequently, there will be large migrations to the cities.
8. Disparities in income, health, education, housing etc. etc. will continue to grow.
9. The quality of the environment will continue to deteriorate further adding to the vicious cycle of under-development and poverty.

The figures for agricultural and industrial growth rates reveal the dimensions of the struggle to grow:-

Agricultural growth rates - 56/57 to 70/71:

1. 5 to 6% with small variations -- Punjab, Haryana, Karnataka.
2. 5 to 7% with large variations -- Rajasthan, Gujarat.
3. $2\frac{1}{2}$ - 3% with small variations -- Tamilnadu, Kerala.
4. 3 - $3\frac{1}{2}$ % with large variations -- Orissa, West Bengal, Uttar Pradesh.
5. Under 2% with small variations -- Andhra, Assam.
6. under 2% with large variations -- Bihar, Madhya Pradesh, Maharashtra.

Rate of growth in large-scale manufacturing sector:

	target	realised % p.a.	(agriculture)
Plan I	7.00	6.00	4.2
Plan II	10.50	7.25	4.0
Plan III	10.75	8.00	- 1.4
Plan holiday		3.33	6.2
Plan IV	12.00	2.75	2.5
Plan V	8.00		

Here again it should be remembered that agriculture provides the base for national development. It both provides the purchasing capacity for manufactured goods in the rural areas, the raw materials for agroindustries, the market for agriindustries, and the surplus for industrial investment

in the initial stages. While the Green Revolution brought about some remarkable technological innovations it only raised the output of wheat, maize, and jowar, quite often at the expense of cotton, groundnut, and other cash crops from which land was taken away. Also the output rise levelled off after 5 years in 1970. The growth in agriculture has been limited because of (a) lack of cultivable land; (b) inefficient land and water management.

The incapability of the economy to grow rapidly is reflected in the social tensions and fears. A medical account puts it thus:

"Rising irreparable damage accompanies present industrial expansion in all sectors. In medicine these damages appear as iatrogenesis. Iatrogenesis can be direct: when pain, sickness, and death result from medical care; or it can be indirect: when health policies reinforce an industrial organisation which generates ill-health; it can be structural when medically sponsored behaviour and delusion restrict the vital autonomy of people by undermining their competence in growing up, curing, ageing; or when it nullifies the personal challenge arising from their pain, disability, and anguish. Most of the remedies proposed to reduce iatrogenesis are engineering interventions. They are therapeutically designed in their approach to the individual, the group, the institution, or the environment. These so-called remedies generate second-order iatrogenic ills by creating a new prejudice against the autonomy of the citizen."

Thus far the problems are clear. What about the solutions? In the next section we will deal with the solutions proposed by governmental and institutional authorities.

C. Planning for growth:

It is possible to approach social problems with Herbert Spencer's attitudes:-

"... suffering and evil are nature's admonitions; they cannot be got rid of; and the impatient attempts of benevolence to banish them from the world of legislation before benevolence has learned their object and end, have always been more productive than good."

or assert with Leon Trotsky:-

"Through the machine man in socialist society will command nature in its entirety, with its grouse and its sturgeons. He will point out places for mountains and for passes. He

will change the course of rivers, and he will lay down rules for the oceans. The idealist simpletons may say that this will be a bore, but that is why they are simpletons. Of course, this does not mean that the entire globe will be marked off into boxes, that the forests will be turned into parks and gardens. Most likely, thickets and forests and grouse and tigers will remain. And man will do it so well that the tiger won't even notice the machine, or feel the change, but will live as he lived in primeval times. The machine is not in opposition to the earth. The machine is the instrument of man in every field of life".

or to take positions in between.
History certainly seems to favour Trotsky.

Given the postulate that it is possible for men to change the reality through concerted action let us see what solutions are proposed by those who can influence national policy.

Outlining the Strategy for Integrated Rural Development, C. Subramaniam states that "The challenge facing us is for harnessing the potential of science and technology for the optimum use of all our natural assets - human, animal, and physical - for banishing poverty from our midst". For this he proposes that the focus be on the integrated use of resources and the provision of full employment. This is to be done by:-

1. Modernisation of agriculture through land reforms, community nurseries, water management, pest control, fish culture, and the use of post-harvest technology.
2. Emphasis on health and family planning.
3. Increased production of energy.
4. Setting up of agro-industrial complexes.
5. Improved management and marketing.
6. Setting down of minimum productivity standards.
7. Encouraging participation of local people so that public agencies perform efficiently.
8. Investing in research and scientific training.
9. Central coordination.

Thus, government is to take specific action in providing the infrastructure for development (water, transport, pesticides, health, family planning, power, panchayat boards, research, education, administration etc.) and to propose norms for private production.

Rajni Kothari, looking into the future at 2000 A.D. makes life styles, organisation of space, and organisation of production the central issues. Accordingly, he recommends that:

1. The principal focus be on the generation of employment.
2. This is to be done by catalysing the growth in agriculture through the application of modern technology and extensive land reforms.
3. Generation of employment in rural areas through large public works can be supported by agricultural growth resulting in restriction of the migration to the cities and provision of a base for rural industrialisation.
4. A social continuum has to be maintained by planning so as to reduce regional disparities.
5. Mass education is required for cultural changes to support growth.
6. An ethic of consumption has to be laid down to control the spending of the affluent classes.
7. The nature of production should be determined by the needs of the masses.
8. Social minima in health, nutrition, education have to be provided.
9. Participation by the people has to be encouraged at every level in every institution.

Here, too, the State is to take the initiative in the service sector and lay down production and social norms.

K.W. Raj, investigating the causes of Industrial Stagnation in India arrives at the following analysis:-

1. Growth of industry does not depend on an increase in the utilised capacity but the pattern of demand for the production.
2. The demand is of three types:- (a) private and domestic consumption; (b) from government and public enterprise; (c) for export.
3. Domestic demand is in turn dependent on the condition of agriculture. Growth in income from agriculture will increase domestic purchasing capacity.
4. Agricultural development will also affect agro-based industries.
5. Chemical and metallurgical-base industries mainly cater to the affluent sections and hence should be strictly controlled.
6. Therefore, it is necessary to focus on agricultural development.
7. This can be done by a package of land reforms, innovative technology, development of small scale rural industries, marketing infrastructure, appropriate fiscal and credit policies, and decentralisation of the decision-making powers to the people's institutions.

Once again, the State is to develop the infrastructure but not interfere in the production for private profit itself.

So we see that a broad consensus exists amongst policy-makers and economists on the scope and content of planning for growth. The consensus focusses on the need to provide an infrastructural base for the development of agriculture and rural industry so as to provide employment but not to interfere in private profit other than in laying down certain norms.

In order to assess the value of these proposals we need to analyse society and its structure more deeply and systematically to arrive at an understanding of the conflicting forces in society and their directions. Only then can we consciously choose the form of our intervention. In the following section we shall attempt to look at certain theoretical formulations of the nature of society and their practical correlations.

D. Who plans, who pays, who benefits?

As we have seen in Section A planning was undertaken as a deliberate State function in order to reduce, if not remove, the economic disparities between different sections of the population. Thus the cure for the problem of poverty was to be found in a redistribution of income and resources primarily through the provision of employment. Now employment obviously means that there is an employer and an employee. The employer works for profit and the employee for wages. Hence the essential relationship in all production becomes one of wage-employment, and the price paid for the product should recover both the cost of production as well as the profit of the owner. The mathematical functionality can best be described by:

$$p = c + v + s \quad \text{where } p = \text{price of unit product}$$

$$c = \text{fixed capital investment per unit product}$$

$$v = \text{Variable capital per unit product (including wages)}$$

$$\text{and } s = \text{surplus profit}$$

$$\text{or the rate of profit} \quad r = \frac{s}{c + v}$$

We shall now see how this equation from Marxian economic analysis helps us to understand the dynamics of development.

The equation expresses two fundamental principles:-

- a) Firstly, for the economy to develop the rate of profit must always be a positive quantity greater than 0. Moreover, in a competitive market it will try to maximise itself.

- b) Secondly, the surplus available s is dependent upon to what extent the cost of production $c+v$ can be decreased. This specifically indicates a decrease in v which includes the wage and is therefore likely to be resisted by the wage-earner.

The satisfaction of these two principles has been the task of planning as we shall now see.

1. Profit

- a) r can be increased by keeping the cost of production $c+v$ constant but increasing the price p thus increasing s . In a market economy the simplest method of doing this is to create a shortage in the supply. Such profits are by and large taken by merchant trade. The system of planned rationing of scarce goods while aimed at price and supply control indirectly assists the merchant who can take goods out of the rationing controls and sell them on the open market. Sugar is sold by the State to the authorised merchant at Rs. 2 per kilo who then, in collusion with government officials, falsifies his books and sells the sugar in the market at Rs. 6 per kilo.
- b) If v can be decreased then r will increase. The most common way of doing this is to increase the productivity of labour, or by technical innovations that reduce the need for labour. Both call for the correct management of technology. Since the Emergency of June 1975 the tightening of "discipline" has increased production in the entire public sector. Record targets, increased exports, and profits have been reported in coal, power, steel, fertiliser, mining - all under State control and essentially providing raw materials for private industry and private agriculture. At the same time layoffs are reported from many sectors of private industry. An indication of the drive for profits is that in 9 months in 74-75 the rise in industrial output was 3.2% after stagnation! In addition bonus and dearness allowances have been frozen to control inflation.
- c) Decrease in c in order to raise r takes a special importance in a country where capital is scarce. The objective of the conception of Appropriate Technology is to introduce "such processes and innovations which may not be capital intensive, should be able to generate employment and could be managed with local skill and competence, using local raw materials and

should lead to capital formation for further investment! Profit (surplus) is therefore to be increased by minimal investments in capital goods and infrastructural facilities such as education and transport.

- d) Capital availability is essential for further investment and growth. Capital is normally extracted from surplus but not all surplus has been invested in productive units. Much of it has been converted into wealth or used for luxury consumption. The government's drive to unhoard wealth, declare income, and control black money would be interpreted as an attempt to divert more capital into production. Foreign aid is another source of capital investment and various concessions have been proposed to invite foreign investment. Net flow of external assistance fell to Rs. 254 crores in 1973 but it is estimated to be well over Rs. 1000 crores in 75-76. The World Bank has recommended that gross aid to India should rise from Rs. 2098 crores in 75-76 to Rs. 3174 cr. in 1980 to Rs. 4720 cr. in 1985-86. This is to be looked at in the background of invitations to multi-nationals to invest in India and the fact that the rate of return on US manufacturing industries in India has increased from 7.5% in 1967 to 15.8% in 1972.

Fiscal policies reveal the real nature of investment distribution. The 1976 budget records the dramatic reduction in direct taxation on personal income and wealth tax in order to provide more purchasing capability. Tax reductions for private industry are also accompanied by an Investment Allowance of 25% for acquiring plant and machinery. This is in effect the reflection of the report last year that the Ministry of Industrial Development was considering a scheme to make it compulsory for all firms in selected industries, including larger industrial houses, to reinvest their profits in renovation, modernisation, and expansion of their existing units. Further incomes in the budget arise from the Rs. 480 cr. of impounded Dearness Allowances of wage earners for a year. Of the Rs. 7852 cr. of budgeted expenditure, two-third has been allocated to defense and the primary sector (petroleum, steel, transport, coal, fertilisers). Rs 15 cr. has been allotted to C. Subramanian's Integrated Rural Development. Credit policies have been specifically directed to provide funds for investment to increase production in rural areas while maintaining prices for agricultural products at the same level.

- e) Increases in population wipe out increases in production. To maintain growth and extract more surplus for investment it is essential that the number of mouths to feed be decreased relatively. Hence the heavy emphasis on Family

Planning. Apart from the earlier incentives being offered for sterilisations (cash rewards, transistors, etc.) and vasectomies etc. the Four-point programme has established the rationale for application of enormous administrative pressures. FP clinics have been set targets at the cost of their allowances; State governments have been announcing penalties for those government servants who do not undergo sterilisation; ration cards and employment are being tied up to family planning.

- f) Early capitalist growth had emphasised the concept of competition and hence ever increasing rates of profit. The new "Ethics of consumption" and monopoly control are attempts to put an end to run away competition. "The Indian case tends one to conclude that the volume of surplus product is not adequate to the scale of extended reproduction in the structure where the product originated. A large body of surplus product may exist side by side with the stagnation of the structure or it may be mainly expended to finance rapid expansion of production in another structure. In some cases the redistribution system acts as a brake on extended reproduction, thereby maintaining the dominance of those sections of society which live off the surplus product of a given structure. If the volume and material composition of the surplus product are well balanced with the numbers, demographic dynamics and aspirations of the dominant class, then this class for a long time experiences rather weak stimuli for change in the mode of production.

2. Resistance

Resistance to the process of growth would be encountered from those whose interests are harmed or not satisfied by economic development. Hence, this resistance has to be overcome.

- a) Land reforms are essential to agricultural growth as the older system of land ownership patterns is not conducive to the application of modern technology. Large tracts of land under the ownership of one family and rented out for subsistence farming to small farmers are not productive neither is there the incentive for greater production on the part of the shareholder or tenant. The determined application of land ceiling Acts reflects attempt to break the opposition of the large landowners.
- b) However, land redistribution of tiny plots to landless also does not make economic sense for these too are not viable for the application of technological inputs. The political rationale for this would, therefore, be to

ease the exploitation of bonded labour until such time as alternative employment becomes available through rural industries and public works.

- c) The major conflict between employer and employe is rooted in the ownership of the means of production. Wage agitations, strikes, bandhs, gheraos, representations are reflections of this conflict. It is not sufficient to ban the conflict and impose the ban by force. Other measures to wear down the resistance are important. One of the ways to do this is to make the worker a property owner too. The very process of education, training, and employment ensures that the worker comes from a background of petty ownership. Worker participation in management attempts to give selected workers a democratic chance to have a voice in a limited area of owner control. And there is the latest suggestion by the Industries Minister to invest the impounded Dearness Allowance of workers in public sector shares. Corruption, too, plays a major role in providing government servants with a vested interest in the existing process of development. In spite of the Emergency and the spate of transfers, the patwari, the peon, the office clerk, the administrative and executive officers continue to receive their 10% share so that they may supplement the salary offered by the State. Traders, merchants, contractors remark that corruption has not been removed, it has only become more expensive and hence less people can afford it. The structure of administration is also designed to decentralise the conflict. Large production and manufacturing units contract out portions of their work to large contractors who sub-contract to smaller contractors who further sub-contract to petty contractors who contract out to labour contractors and skilled workmen and so on. The total surplus extracted is, therefore, distributed in diminishing percentages over a wide range.
- d) Divisions within the opposition are also useful to overcome the resistance. The multipolarity of political parties, the diversity of trade and labour unions, the income gradations in the working class, the hierarchical relationship between workers in different sectors of industry, the conflict between the administrative apparatus and the productive labour force are all factors which divide the resistance and a unified central coordination body is capable of successfully manipulating these divisions. The 20 point programme provides the correct platform for establishing the centralisation.
- e) Mass education is advocated as the base for a democracy. But the cost of mass education is very high. Instead mass advertising provides a convenient method of building up an image and attitude while selective training reinforces

the mass consciousness. Every mass media, every bus, truck, and train carries the slogans of the 20-point programme. The commercial advertising firms were mobilised for this massive effort. In addition regular courses are being organised for union leaders, professionals, and party members on the form and content of the new economic initiatives. The point being constantly driven home is that production is being reorganised to provide for the needs of the masses, that structural transformations are being made to benefit the people. With a record output of foodgrains last year to permit the government to control food prices in the market these statements can be proved sufficiently true for the largely uneducated population. In this context the loss of democratic freedoms in some areas means little at the present time.

- f) Potential resistances to the system lie in the young people who enter the educational institutions expecting employment at the end of the course. Banning unions, rustications, and signed pledges are not in themselves enough. Cultural, attitudinal changes are necessary for their tolerance of the system. Publicity is valuable but still not enough. Hence, opportunities have to be provided to engage the youth in national action of some sort. The National Service Scheme for students and a plethora of other schemes for youth and social welfare offer the opportunities potential problem-makers to adjust to social realities. It is estimated that such schemes reach out to 6 to 7% of the student population and the importance of these programmes should not be underestimated.
- g) The industrial transition in Europe was influenced by and in turn encouraged the work ethic of Protestantism which broke away from the earlier Catholic fatalism. Neither Hinduism nor Islam have had such a break. Hinduism remained and developed as an ideology of developed feudalism which is why it forms the base of the backward-looking political parties today. While this offers problems for the industrial development of India - which offers a rationale for charismatic and autocratic leadership trends - nevertheless the system of caste institutions exhibiting features of tribal cohesion, slavish humility, and social estate organisation are useful in absorbing dissent and peaching conformity - for instance, in the appeal by Vinoba Bhave for an era of discipline.

The reader may be wondering how all this is related to Environmental Planning. We would refer back to the definition of Environmental Planning set out in Section A" .. the political

exercise in the allocation and management of resources which improves the well-being of those engaged in production, prevents the harmful by-products of industrialisation, and preserves the natural resources". (Here preservation is in the sense of regeneration rather than mere protection.) The point by now is quite clear:- all planning including environmental planning today, is undertaken under duress by the profit-making sections of society in order to preserve their dominance over society. The real question then is whether planning can be used in India to remedy this situation and what should be the direction of the remedy?

E. Ideals and examples:

That the problems of industrial society lie in the private ownership of the means of production and, thereby, production for private profit was recognised even by Robert Owen with whom we started this paper. Hence, in the abstract plane it is not so difficult to stipulate that if the motivation for private property were to be removed from society then social and economic ills would be amenable to solution. Thus the demand for socialisation of the means of production, i.e. social ownership and control.

To illustrate the point let us take the case of the Hukamchand Jute Mills (manufacturing Caustic Soda) at Anlai, run by private industry for private profit: Under law the Mill has to provide basic medical facilities for its 250 employees. Two years without a doctor in the health centre finally sparked off an agitation amongst the employees and within 24 hours a doctor was located and employed. The salary of the doctor was fixed at Rs. 800 p.m. and the budget for medical supplies at Rs. 1200 p.m. Within a year the doctor found that he was on duty practically 24 hours a day as he was resident in the Mill colony and that the budget for medical supplies was totally inadequate. For instance, chlorine gas leakages would occur frequently and up to a dozen asphyxiated workers would be brought in demanding immediate treatment. The first step in this would be to supply Oxygen but there was only one compressed Oxygen bottle to be shared between a dozen men. In other instances most workers would get the prescription from the doctor and then have to purchase the medicines from outside as the doctor has specific instructions not to issue drugs except to "important" persons such as union office-holders and supervisors. Finally the doctor asked for a salary increase to Rs. 1200 and a medical budget of Rs. 2500. After two months of indecision the management offered the doctor Rs. 1000 and no increment in the budget. The doctor resigned and the Mill is once again without medical facilities. The question to be asked is would the same have happened if the Mill had been under social (workers') control rather than under private ownership?

Here is another report:

"This plant, started in 1968, refines several million tons of oil a year. I walk out among pipes and red banners to the unlikely sight of pools of goldfish and ducks in cane pens. There are smiles when I ask how these can stand the polluted environment. "You have seen the point", says a worker with a knowing grin, "but upside down". The fish and ducks are the living fruit of ingenious effort to beat pollution. The plant emits waste water, the worker explains, which contains harmful sulfides and phenols. If allowed to run away it would damage crops and foul rivers. The best way to get rid of evil it was reasoned, is to turn evil into good. Here is a tower where sulfides are removed from waste water. Over there is a cement pool where the residue of oil is skimmed off it - and sent back for refining. Nearby, a clarification tank where compressed air and a flotation agent are added to the water. The water then flows into pools in which the emulsified oil and flotation agent are scooped off. Still left are the phenols, but with the aid of a rotary beater they are absorbed by micro-organisms. Now the water is ready for the fish and ducks, as well as vegetable plots which help to feed the plant's workers. Everyone grins with satisfaction as we survey this cunning sequence." The plant described is General Petrochemical in Peking.

In the UK dereliction, neglect and misuse of resources are found in all the old centres of the Industrial Revolution. Of all the abuses the river's require the most urgent action because of their far-reaching impact on land, air, wild life and people. Of the 30 per cent which need improvement, over 10 per cent are seriously polluted. The river Trent receives the sewage of the great midland cities. It could cost nearly 200 million to cleanse it to standards set 60 years ago, yet probably only a quarter more to treat the sewage so that the water is almost drinkable. Yet the UK government believes it to be significantly worthwhile to take up environmental restoration. For instance, the Nuffield Foundation, the Swansea City Council, and the Government initiated a study of the valley of the river Tawe in 1961. Over 1200 acres of this dead and derelict landscape bore witness to the depredations of nineteenth-century copper and zinc smelting. During the investigations it was established that the legal problems arising from multiple ownership were considerable. Other issues extended far beyond the valley. Reclaiming part of the site for light industry would affect employment in neighbouring valleys where coal-mining was on the decline. Its use for recreation would relieve pressures on unspoilt countryside. A formal report for the project was presented in 1967. Since then 544 acres have been reclaimed and much of the valley has been used for new development projects or landscaped. 150 acres have been

afforested. Flood prevention schemes have been undertaken on the river Tawe. But in order to resolve the multiple ownership problems the Swansea City Council had to acquire and amalgamate in land ownerships.

In the US Ralph Nader wrote in 1971: "The Federal role in water pollution control began in 1948 on a temporary trial basis and became permanent in 1956. ... Beginning with the drafting of the water pollution legislation, the Federal effort grew into a complex charade. The built-in procedural delays exceeded the professional avarice of the most adamant corporate lawyers. The generic delegation of initiatory moves to the states insured the availability of a 'divide-and-rule' tactic by industry vis-a-vis already subservient and underequipped state agencies. A 72 year old Federal law banning the dumping of industrial pollution into navigable waterways went almost completely unenforced until its 70th birthday when the first of some 30 injunctive actions were brought against a fraction of the approximately 40,000 daily violators. Hundreds of millions of dollars of construction grant subsidies flowed from Washington to local government for waste treatment plants which industry promptly used to dump more waste through. This subsidy to local industry turned into a subsidy to factories that increased water pollution. The Kafkaesque tapestry extends into the mockery of Federal enforcement conferences, the neverending deadline extensions for the weakest of pollution controls, the secured trade secrecy over what lethalties industries dump into the public's waterways, the clear evidence of serious and worsening contamination of drinking water, the damage to other people's property and property rights by industrial municipal, and agricultural pollution without even any compensation, the loss of livelihoods for thousands of commercial fishermen, and the emergence of water so laden with ignitable wastes that rivers such as the Buffalo and the Cuyahoga are declared official fire hazards Its (the Federal role's) effectiveness to date can be concisely assessed by the virtual absence of any evidence that the seven laws passed and more than three billion dollars spent by the Federal government has reduced the level of pollution in any of our country's major bodies of water, so that they are once again suitable for human use"

And, finally, some revealing data from Tachai, the pioneering commune in China:-

Production of grain

Individually (1949)	160 jin/mou
Mutual Aid Team member (48-52)	180 jin/mou
Cooperatives 1st year (53)	240 jin/mou
Advance cooperative 1st year (56)	337 jin/mou
Commune 1st year (58)	543 jin/mou
Present (74)	917 jin/mou

What are the lessons that we can draw from the historical experience of this and other countries about environmental control? --

1. The technical aspects of control, conservation, and regeneration are within the grasp of mankind.
2. The environmental economics is extremely important in the long run but not so visible when the objective is immediate profit.
3. What we despoil today somebody else will have to pay for tomorrow - at much higher cost.
4. Governments and agencies act on environmental issues only when there is sufficient pressure from organisations of people.
5. People organise on such issues when they have a direct vested interest in as also a consciousness of the preservation of the environment.
6. Thus action for and against environmental planning is essentially political.
7. The large-scale aspect of environmental action makes it imperative for the state to be involved.
8. Political action by those engaged in production is, therefore, the central issue of all environmental (and other) action and planning.

... Merely a theoretical perspective will not lead to the practical solution of the issues under consideration. The slogan of "Socialism" is, therefore not a panacea for all ills. It is a concept, a guide for action, a perception of the future - a possible future not a determined one. The possibilities of that future depend upon the realities of the present and the social forces that emanate from the present. It is the consciousness of me about their social fabric and environment that will determine how they shape their lives. As conscious individuals, therefore, we too have to set out specific tasks and goals.

F. Tasks:

The tasks before us, then, would seem to lie in three areas:

1. **Intellectual:** A detailed understanding of how the present planning process sustains and perpetuates an existential society and of what are the dynamic forces within that society interacting with planning is essential for extrapolating into the future. This is not merely an academic exercise for a few individuals. Rather it involves theoretically challenging the present system and organising a structure that will enlarge the body of individuals conscious of social contradictions and pose the issues for the larger society. The methodology of setting up such structures and the formation of cadres has been established in detail in another set of papers and hence we need not go into it here.
2. **Cultural:** A desire for change is rooted in the realities of life. If life is perceived to be unpleasant and full of deprivation then forces are released for bringing about a transformation in that way of life. However, perceptions are not absolute and what is unpleasant for one may be indifferent for another. Responses to environmental factors can be conditioned over periods of time. Those who have known nothing but dirt and hunger, for instance, in their daily lives are likely to accept these as unchangeable and given. Forms of communication (newspapers, drama, propaganda) are also intensively used by dominant classes to create attitudes and thought processes that are - at that moment of time - not aimed at changing society but rather at preserving what is bearable in it. The task would, therefore, be to examine what are the forms of culture that break away from the past and look into the future and what is the relationship of these with the technological forces extant in society. These issues have been dealt with separately and we shall have to consider in greater detail the methodological tools necessary.
3. **Economic:** Since material conditions form the base from which consciousness arises (if there were no poverty there would be no perception of poverty) and, hence, the culture and organisation of human beings; therefore we have to look into the economic forces and policies that dominate in society today and from this determine the way in which we would intervene. For instance, if the trader extracts large surpluses from the production process and does not invest it in productive ways then does not an intervention in the marketing organisations lead to a consciousness of how society operates and, thence, an attempt to control the environment?

We shall end this paper by noting that the concepts of environmental planning presented here differ in many details and definitions from what is commonly accepted by institutional structures but we have tried to establish the rationale of why we differ. Since the concepts are new the methodological tools are also to be evolved anew so that analytical treatment of data may be possible with different biases. We are on new ground and it is best that we are sure of what is under our feet before we take the next step.

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AIMS AND POTENTIAL BENEFITS OF WATER SUPPLY IMPROVEMENTS

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There is urgent need for understanding the health aspects in water supply and a programme launched for such a purpose must bestow top priority for health education regarding the importance of water. This education is important for not only the community but also the administrators and agencies involved in providing water supply to the community.

70% of our body is made up of water in the tissues and water is an universal solvent and but for its role, metabolic activities would come to a stop and life would not be possible.

The developed countries are fortunate since they do not have the problem of finding resources. From their standards providing water does not cost much and people can afford to pay. All they want is water should be readily available in abundance. The water provided thus is of a quality which has minimal risk of health hazard and people tend to take things for granted and they may not look at the Health aspect critically.

India is a vast country and resources are poor. People themselves are often too poor to pay for water and specially so for a filtered safe water supply in their homes.

Governments, Agencies - private and public including Plantation management who provide funds for supply of water to Community under their care need evidence of health benefits for their financial investment on a Water supply project.

Funds are provided for a project of safe water supply and it is too meagre for an ideal one. Alternatives have to be thought of. Improvements and innovations are called for. Few people get excellent water and a majority have either no water supply worth its name or they are substandard.

Diseases related to water supplies are numerous and distributed over a vast area. Decreasing the incidence and prevalence of these diseases is one of the important priority goals in any public health undertaking in our country.

The indirect effect of lack of a protected water supply is reflected in our health indicators which compares very unfavourably with those of developed countries.

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Table - I*

Some of the Health Indicators in
India compared with USA.

	INDIA	USA
CDR	15.0 (1976)	9.4
IMR	122 (1971)	18.0
MMR	3.6 (1976)	0.18 (1972)
Life Exp.	56.6 years	70 years

Out of 1000 live births 250 or 1/4 do not reach their 5th birthday. 150 of these do not even reach their first birthday. The wastage of human life is enormous and if we analyse the causes we find that water related diseases account for many.

Engineers and Administrators need to have a very clear understanding of these facts and figures to appreciate the enormity of the problem and the importance of providing adequate funds on a priority basis for water supply scheme. A large amount of misery, sickness and deaths related to water supply can be prevented by household tap systems of water supply.

The World Health Assembly in 1972 has set a new target - "25% of the rural population in developing countries to have reasonable access to safe water supply by 1980". Reasonable defined as disproportionate part of day not spent in water fetching. At present 86% of the rural population in India do not have reasonable access. Considered by Region, the numbers and percentages of people without reasonable access to safe water supply were as follows:

Table - II*

Region	Population	% without reasonable access to safe water
Africa	136.0 mil.	89
America	92.1 mil.	76
Eastern Meditaranian	139.5 mil.	82
Europe (Algeria Morocco & Turkey)	-	-
South East Asia	666.7 mil.	91
Western Pacific	59.0 mil.	79
All Regions	1111.6 mil.	86

*Source: Water, Wastes and health in hot climates.

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The problem of population explosion in the developing countries makes the situation worse. Merely to keep the unserved population constant, it is necessary to provide water for a population equal to 5 times the population of United Kingdom (280 million by 1980). This can be described as the everworsening situation or as crisis.

For majority of the World population there is no possibility that the needed financial and human resources for providing an ideal water supply would be forthcoming.

Efficient and rational allocation of financial and human resources, planning for water supply development with closely defined and agreed objectives so that scarce resources may be utilised to the best advantage appears to be the only possible solution.

Rational planning presupposes closely defined and agreed objectives. We do not have any at present for the low income communities. These objectives could be set forth having in view the short term aims and benefits as also long term aims and benefits.

Table - III*

Aims and Potential Benefits of Water Supply Improvements.

Immediate Aims	Stage I benefits	Stage II benefits	Stage III benefits
Improved water	Save time	Labour release	Higher cash incomes
Quality	Save energy	Crop innovation	Increased and more -
Quantity	Improved health	Crop improvement	Reliable subsistence
Availability	Animal husbandry	Animal husbandry innovation	Improved health
Reliability		Animal husbandry improvement	Increased leisure

At one of the spectrum of immediate aims we have in mind a high grade water service for a prosperous community, to provide water of high quality, abundant in quantity, complete availability and total reliability and at the other end we have communities with no water supply of any sort worth mentioning. In between we have various and different grades.

The Low Income Communities while they cannot afford the high grade water service which is unattainable, must think of some combination of improvements.

*Source: Water, Wastes and health in hot climates

The potential benefits of each type of water supply needs to be examined with a view to assess the degree to which different improvements will realise different levels of benefits. This will enable one to know the improvements with the most impact, at a given cost and the anticipated cost-effectiveness of alternative schemes can be compared.

It can be seen from the table III that the benefits from Stage I to Stage III are arranged chronologically and the complementary development inputs and initiatives required at each stage are indicated in Table - IV.

Table - IV *

Complementary inputs necessary for the achievement of the various aims and benefits set out.

Aim or benefit	Complementary inputs or prerequisite conditions
Immediate aims	Active community participation and support. Competent design Adequate facilities for operation and maintenance. Appropriate technology utilized
Stage I benefits	New supply used in preference to old. New supply closer to dwellings than old. Water use pattern changed to take advantage of improved quantity, availability and reliability Hygiene changed to utilize improved supply. Other environmental health measures taken Supply must not create new health hazards (e.g. mosquito breeding sites)
Stage II benefits	Good advice and extension services must be provided by government personnel concerned with agriculture, animal husbandry, cooperatives, marketing, education, credit etc.
Stage III benefits	Water supply development must be just a single component of an integrated rural development programme which has the active support of the local community.

*Source: Water, Wastes and health in hot climates.

Stage I complementary inputs are limited but more easy to attain whereas the Stage III complementary inputs are more complex, wider in scope and are interventions over which a water supply Engineer or agency has no control. It is more and more difficult to attain as one moves from Stage I to Stage III.

What is the need for complementary input is another question to be examined. Studies have revealed that water supply may be necessary but is never a sufficient condition for development as far as the community is concerned. Therefore water supply development must be accompanied by a carefully designed package of complementary inputs. The possible complementary inputs are shown in Table IV in relation to the realisation of the benefits listed in Table III. Even the immediate benefits requires specific complementary efforts.

Design benefit concept: Keeping in view the potential benefits one can design or evaluate a water supply scheme. If one decides on the goal with specific benefits of a proposed water supply scheme then the combination of different improvements to water quality, quantity, availability and reliability can be selected. The cost effectiveness can be worked out and compared with alternate design approaches taking into consideration the chosen design benefits. While attempting to achieve the defined goals the resource allocation will have to go along within the policy and rational frame work of National and Regional planning. Design benefits will depend on the specific scheme under consideration and need to be defined quite precisely if they are to be of value.

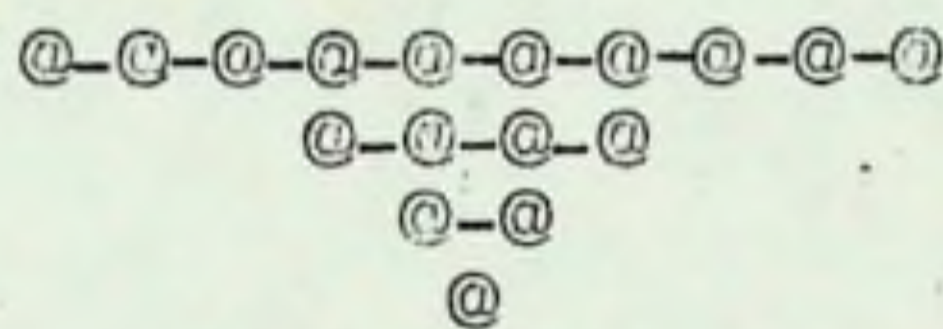
Stage I benefits is related to two factors namely changes in the water collection journey (Time and energy saving) and secondly to improvements in health. Therefore to start with design-benefits should be aimed at 'time and energy' savings and health improvements can be restated in more general terms. Fundamental aim of water supply improvements in low income communities should be to reduce the cost of water to the consumer. A design-benefit generally applicable to all should be cost reduction.

What goes to make up the cost of water? Any cash payment made to water authority, to the owner of a dwelling, a water carrier or vendor. In low income communities generally this type of direct payment may not arise. The value of time-energy expended by the house-holder to go to the water point for collection is a very important component which should be costed. Lastly the cost of sickness related to use of polluted water, use of insufficient water or to diseases acquired in the course of water collection have to be included while costing a water supply.

Therefore the two most important design-benefits which we have to keep as goals to be achieved are - shortening the water collection journey and improvement of health status of the community. The improvement in water supply thus achieved will take care of its quality, quantity, availability and reliability to a considerable extent.

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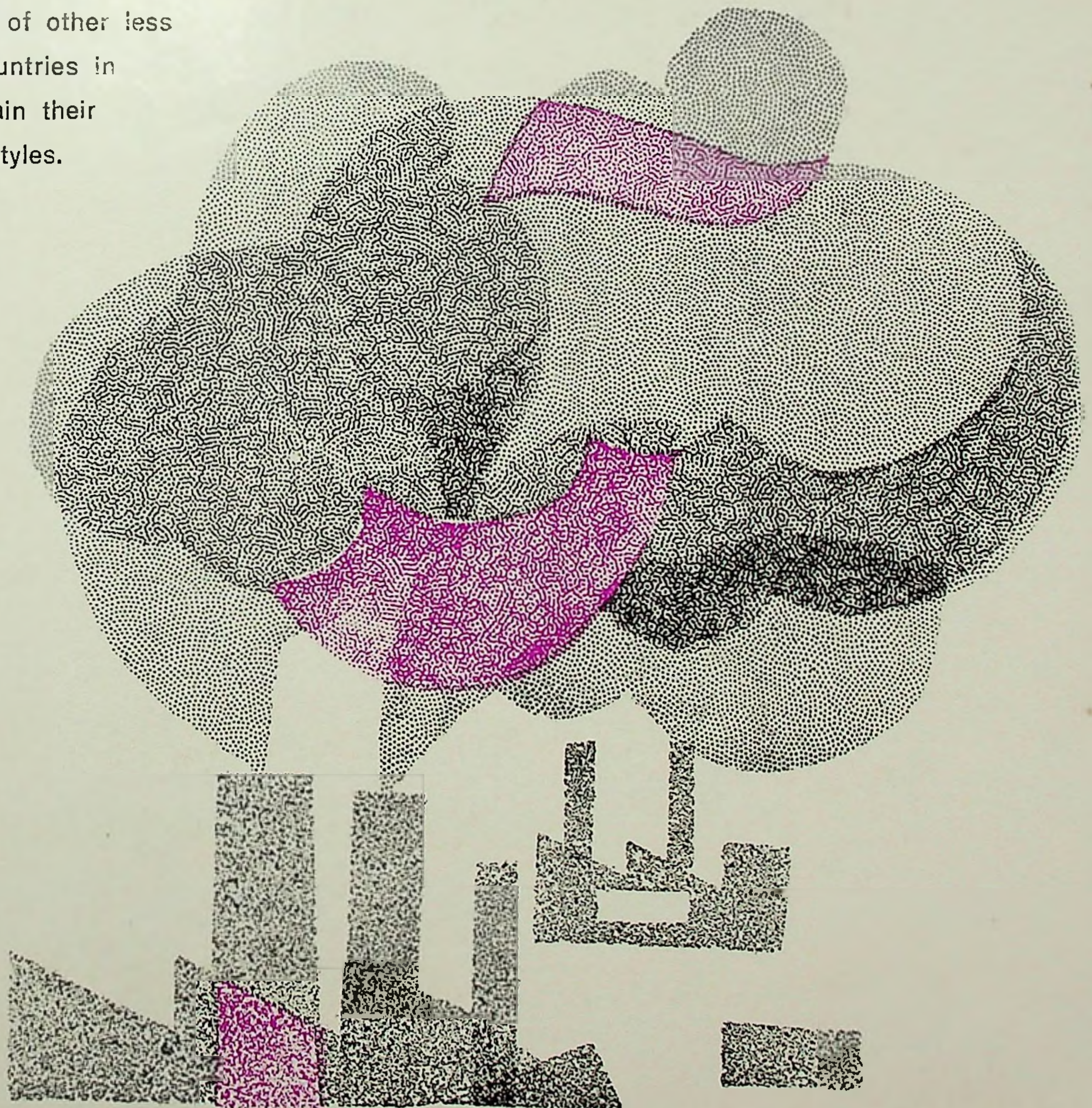
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important sources of pollution

- **HUMAN SETTLEMENTS**
- **INDUSTRIES**
- **ENERGY GENERATION**
- **LARGE SCALE ENGINEERING WORKS**
- **AGRICULTURAL OPERATIONS**

increase of population also adds to the environmental strain, because all men must satisfy their basic needs of food, energy, water, clothing and shelter. In the advanced countries, in many cases, the population is small and they have not only the ability to utilise disproportionately large amount of the earth's resources, they can also utilise the resources of other less developed countries in order to sustain their affluent life styles.



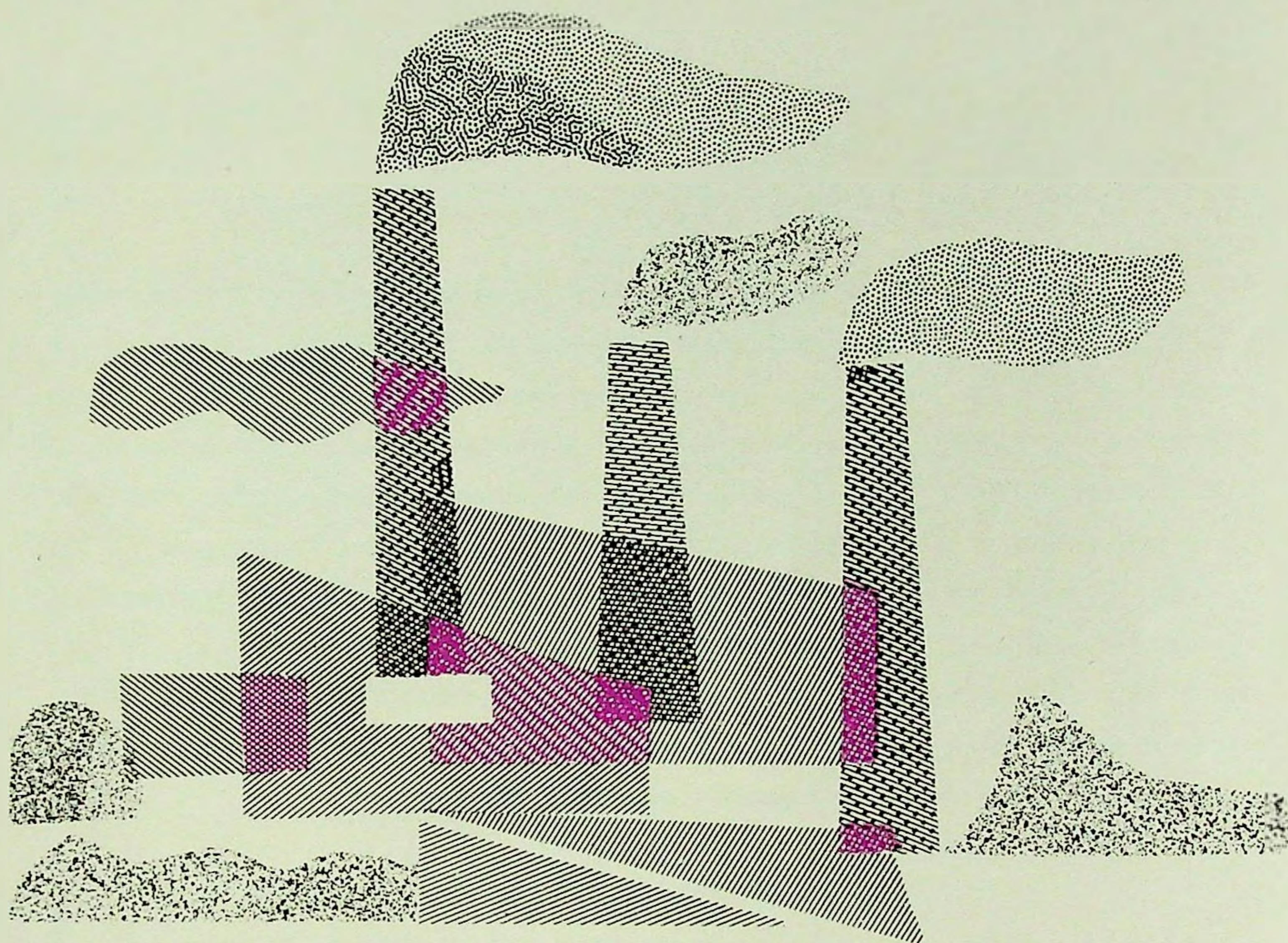
HUMAN SETTLEMENTS

We live in aggregations which may vary from a small village to a large metropolitan city. These human settlements, irrespective of their size, have to be so organised that their needs, such as, housing, food, education, employment, health care and transportation are catered to. If the organisation is not adequate to the population, or if there is not sufficient care, then, villages can be insanitary and towns and cities can become congested, noisy, disease-ridden, and full of slums. In both cases, the quality of life becomes poorer; man becomes unhappy. It is not only economic constraints that can lead to such situations but also a lack of civic consciousness amongst all citizens. Many of the factors that make life pleasant are not those that are obtained only through spending of money. **Human settlements should ensure better quality of life for the people.**

INDUSTRIES

Industries have often been called the big polluter. The impact on human environment is not restricted to highly industrialised countries only. India also has severe pollution problems of its own. Improper location of industries, the use of "polluting" technologies, and inadequate waste treatment facilities are chiefly responsible for deterioration in air and water quality in industrialised cities of our country. Other indirect stresses on the environment can come from creation of slum colonies of migrant workers from rural areas.

At the same time, industrial growth is vital for us. **Industrial development should, therefore, be carefully planned to include environmental considerations.**



ENERGY GENERATION

Energy is needed in almost every facet of our life. It is needed for cooking our food; it is needed to produce the utensils in which we keep our food or store our water, to produce our clothing, or bricks for the houses. While energy is very necessary, if not carefully tended, the generation and use of energy can be a polluter of environment. For instance, the mining, processing, transportation, burning of coal and disposal of consequent ash material could each pollute the environment heavily. The use of fuel in motor vehicles leads to exhaust emissions that can foul the air and cause smog. Even the ordinary cowdung cakes when burnt in congested areas can be severe health hazard due to air pollution. **Proper disposal of wastes needs consideration.**

LARGE SCALE ENGINEERING WORKS

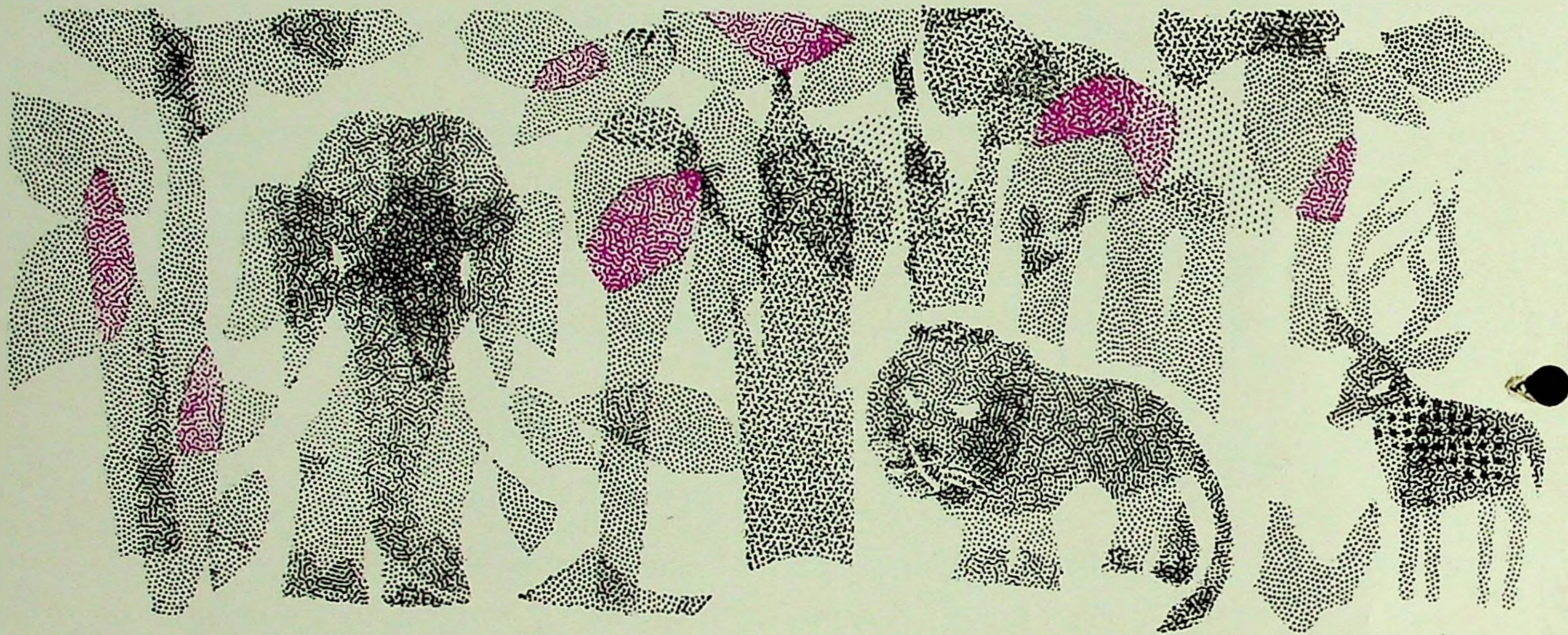
While multi-purpose projects such as dams and large irrigation projects, to give an instance, have important role to play, they can also adversely affect the ecology of the region if not properly planned or operated. Areas likely to be submerged could be dense forests, the habitat of wild life. Problems of water-logging could arise. Migration of fish could be similarly adversely affected.

AGRICULTURE

Excess fertilisers applied to the field naturally get washed away during draining operations or by rain into nearby watercourses. This causes uncontrolled growth of aquatic vegetation. If the same thing happens to pesticides applied on the fields, it can lead to toxic effects on aquatic life-effects that may in many ways be transmitted to man himself. Pesticides and weedicides can also poison man through an improper use through fruits and vegetables we eat.

NATURE CONSERVATION

Smt. Indira Gandhi: **“The environment in which animals and plants become extinct is not safe for the human beings either”**. There is a constant battle for accommodating the growing needs of our population. Increased demand for land for agriculture, settlements and other projects is usually met by clearing forest areas. This has resulted in many inter-linked adverse effects on our environment including increased soil erosion, landslides, flash floods and depletion of ground water resources. Deforestation has deprived wild life of its natural habitats and contributed to the depletion or extinction of many rare species.



MAN AND BIOSPHERE

The idea of Biosphere Reserves is based on **the concept of preservation of life in its totality *in situ*** so that it may serve as a natural referral system for the future and serve as a bench-mark. This enables preservation of total genetic diversity. This genetic diversity of plants and animals in a biosphere reserve is a great resource for mankind if properly looked after. Among the wild vegetations, there may be wild rice or other wild fruits and cereals which can be cross-bred to give new varieties which may be more resistant to diseases or give higher yields etc. Animals can provide a resource for experiments for medical and physiological research; research in this area has become more important to understand man himself. Here again, the wild species of animals become very important for study.

While considerable stress is laid on prohibiting the killing of wild animals, hardly anything appreciable has been attempted so far to preserve wild plants or a proper total environment for plants and animals.

ecological balance

Man is a part of nature, and not separate or independent; at the same time, man is unique in the influence he has over nature. Man derives all his food, clothing, shelter and other amenities from nature. In that process, if he does not take care to protect and cherish nature, but decreases or destroys nature, he will find that his own life and that of his children is in jeopardy.

In the words of our Prime Minister, "It is sad that, in country after country, progress should become synonymous with an assault on nature..... The higher standard of living must be achieved without alienating our people from their heritage and without despoiling nature of its beauty, freshness and purity essential to our lives."

what is pollution?

The air, water, soil, plants and trees, animals all constitute the environment. These constituents keep on interacting with each other to maintain a mutual balance, called "ecological balance". Man using nature in the process of development does cause certain changes in environment. If these changes are not fully orchestrated to preserve the harmony of nature and the ecological balance, he runs the risk not only of increasing the costs of development but of imbalances which may be so serious as to reduce his living conditions instead of enriching it. It is this imbalance which creates pollution.

Environmental Pollution

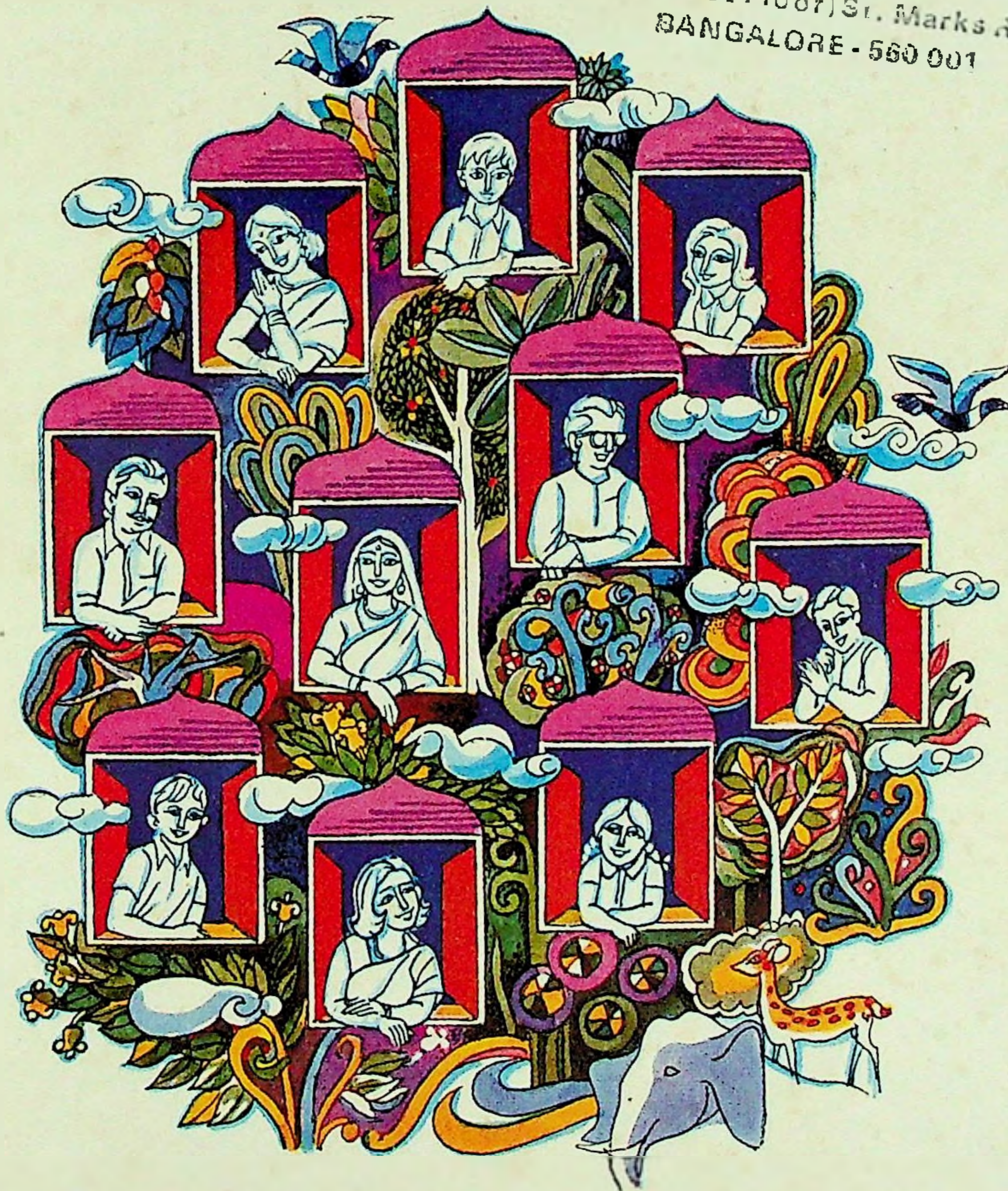
If populations are small, the effect on the environment also is proportionately reduced if other conditions remain the same. In developing countries like India, where the process of development puts a severe strain on the environment, the

44-15

YOU AND YOUR ENVIRONMENT

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44-6
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'SPACE SHIP EARTH' is an encapsulated planet within whose confines man and his fellow lodgers - the beasts and even the bugs have to live together. If we foul up that living space, vitiate the atmosphere, poison the water, restrict our food rations, tamper with the heating system and wallow in the excrement, domestic and industrial, our tenancy will be limited. We can irreversibly damage the biosphere on which all life depends.

(WORLD HEALTH AUG - SEPT 1971)

FOR CENTURIES WE HAVE TREATED LAND, SEA AND SKY
AS THOUGH THEY WERE LIMITLESS. THEY ARE NOT.

WE HAVE PUMPED MILLIONS OF TONS
OF PARTICULATE MATTER AND NOXIOUS
GASES INTO THE ATMOSPHERE
POLLUTED MOST OF OUR RIVERS AND
LAKES PRODUCED SO MUCH
TRASH THAT WE'RE RUNNING OUT OF
PLACES TO PUT IT ALLOWED
PESTICIDES TO TRAVEL ALL THROUGH
THE FOOD CHAIN ACCUMULATED
MERCURY, LEAD, DDT AND STRONTIUM
90 IN OUR BODIES

WE HAVE DISRUPTED NATURE'S SYSTEMS - THE SELF
RENEWING CYCLES THAT HAVE AUTOMATICALLY
REJUVENATED OUR LAND, WATER AND AIR. WHEN
WE TAMPER WITH THESE SYSTEMS WE THREATEN
THE BASIS OF LIFE ITSELF.

Is pollution the partner of economic progress ?

Must Man pay for his economic well-being with
foul water, noxious fumes and nerve jarring
noise ?

Can we achieve the material benefits of
industrialization for all the people of the
world without jeopardising our health and
despoiling our environmental heritage ?

(WORLD HEALTH MAY - 1972)

TOXIC CHEMICALS AND HEAVY METALS

1. In the U.S. 12,000 toxic compounds enter the natural water system via sewage discharge and only a portion is removed by normal sewage treatment.
 2. 14 States in the U.S. have reported cases of mercury poisoning to recent years.
 3. Minamata Bay, Japan - 112 cases of mercury poisoning (44 deaths) as a result of eating fish caught in the bay.
 4. Bristol University School of Chemistry recently reported 'exceedingly high levels of Cadmium' in the Bristol Channel (550 ppm in limpets).
 5. Symptoms of mercury poisoning - Low levels - headaches, fatigue, insomnia, anxiety, lethargy, loss of appetite. High levels - blindness, deafness, convulsions, coma, mental retardation.
 6. 6,000 poisonous products flow down the Rhine, including 16,150 tons of sulphates, every day. The river deposits 70 tons of mercury in Holland each year.
 7. In the North Sea recently a layer of dead fish was discovered stretching 80 miles and packed several yards thick. The fish had been killed by pollution.
 8. In 1970 the world catch of fish was lower than in 1969.
-

O I L

9. MAN PUTS AT LEAST 3 MILLION TONS OF CRUDE OIL INTO THE OCEANS EACH YEAR.
10. THERE IS AN ESTIMATED 1 MILLION TONS AT PRESENT FLOATING ON THE SURFACE OF OCEANS.
11. THE 'DO-IT-YOURSELF' MOTORIST USES OVER 20 MILLION GALLONS OF OIL EACH YEAR; 40% OF WHICH GOES DOWN DRAINS AND INTO RIVER SYSTEMS.

S E W A G E

12. BIGGEST POLLUTER OF FRESH WATER IS SEWAGE.
13. IT MAKES ENORMOUS DEMANDS ON THE OXYGEN CAPACITY OF THE WATER.
14. NITRATES FROM SEWAGE + FERTILISERS AND PHOSPHATES FROM SEWAGE AND DETERGENTS, OVERSTIMULATE PLANT GROWTH. THIS CAUSES DE-OXYGENATION OF THE WATER, WHICH KILLS MOST OF THE LIFE-FORMS PRESENT.
15. IN SWITZERLAND BATHING HAS BEEN BANNED IN LAKES LUGARNO, CONSTANCE, GENEVA, BIENNE, LUZERN, WECHATEL, THUN, ZURICH, ZUG BECAUSE OF POLLUTION.

CAR EXHAUST GASES

1. 150 different chemicals have been identified in car exhaust.
 2. Carbon Monoxide is the most abundant of these.
 3. In heavy city traffic concentrations of 500 ppm are common.
100 ppm is the accepted maximum concentration for working conditions.
 4. Lead Tetraethyl added to petrol is absorbed by the body and accumulates especially in brain tissue.
 5. Children are particularly sensitive to lead poisoning.
 6. Two British research workers have recently stated that average lead levels in urban dwellers are very close to the levels which cause enzyme inhibition in human metabolism.
 7. The lead industry in this country takes 80 mg per cent in the blood as the level at which to show concern.
 8. In Russia after extensive research the industrial limit has been reduced to 10 mg per cent.
 9. Polycyclic hydrocarbons are more abundant in diesel engine exhaust. They are amongst the most potent cancer causing chemicals known.
-

I N D U S T R I A L

1. COAL AND OIL ARE STILL MAJOR SOURCES OF POWER. ELECTRICAL GENERATING PLANTS USING THESE FUELS PRODUCE COLOURLESS SULPHUR DIOXIDE IN LARGE AMOUNTS. IT IS CLAIMED THAT THERE IS NOT AN ECONOMIC WAY OF REMOVING IT. BRICKWORKS + METALS MELTING ALSO PRODUCE SO_2 .
2. DISSOLVED IN WATER SULPHUR DIOXIDE PRODUCES AN ACIDIC SOLUTION.
3. AREAS OF NORTHERN ENGLAND ARE UN-CULTIVATABLE DUE TO ACIDIC RAINFALL. THE SULPHUR DIOXIDE COMES FROM THE MANCHESTER INDUSTRIAL COMPLEX.
4. SULPHUR DIOXIDE ALSO BLACKENS AND 'EATS' AWAY STONE BUILDINGS.
5. COMBUSTION OF ONE TON OF COAL RELEASES 150 lbs OF 'SOOT', 80 lbs OF SULPHUR DIOXIDE, 8 lbs NITROGEN DIOXIDE, 30 lbs OF ACIDS, 20 lbs MISCELLANEOUS SUBSTANCES.
6. NEW YORK CITY BURNS THE EQUIVALENT OF 32 MILLION TONS OF COAL EACH YEAR.

G E N E R A L

1. AIR POLLUTION HAS BEEN ESTABLISHED AS A MAJOR CONTRIBUTION TO ASTHMA, BRONCHITIS AND EMPHYSEMA.
2. RESPIRATORY DISEASES ARE THE BIGGEST KILLER DISEASES IN THIS COUNTRY.

ENVIRONMENTAL DETERIORATION

HAS CONTINUED AND ACCELERATED UNTIL IT HAS REACHED

THE POINT OF CRISIS. WE MUST UNDERSTAND THE

PROBLEMS WE FACE IF WE ARE TO SOLVE THEM. IT

ISN'T TOO LATE TO LEARN. THE MORE WE KNOW

ABOUT OUR WORLD, THE MORE EFFECTIVELY WE CAN

WORK TO SAVE IT

IT'S THE ONLY ONE WE HAVE . . .

NATIONAL GEOGRAPHIC

A N T I - P O L L U T I O N M E A S U R E S

ENVIRONMENT EDUCATION

ANTI-POLLUTION CHECKS/SURVEILLANCE

EXHAUST EMISSION CONTROL DEVICES IN
VEHICLES

CLEAN AIR/WATER/LAND LEGISLATION

ENVIRONMENTAL SANITATION MEASURES

REDUCTION OF USE OF PESTICIDES
FERTILISERS/DETERGENTS

ENVIRONMENTAL POLLUTION* - Health hazards and remedial measures.

BY

DR. V. PARAMESHVARA
PRESIDENT,
IMA BANGALORE BRANCH

COMMUNITY HEALTH CELL
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All around us the pollution is on the increase - in the air, in the water, on the land. It is mainly due to industrial technologies. Pollution has grown as the population has grown and people have become prosperous. Pollution studies are of a multidisciplinary nature and is the concern to people working in a number of fields - biology, medicine, engineering and legislature. Environmental pollution has been defined as any substance which changes the natural composition of the environment (since the world began the environment has been changing).

Every breath pollute the air. Decaying of an organic substance emits poisonous odours. Now that man, animals and vegetation have been joined by cars, ships, aeroplanes, houses and a host of industries as pollutants of the air. All the large cities of the world have problems created chiefly by overcrowding. More crowded the city more the likelihood of further pollution. Simple process of burning fuel to produce heat and energy is accompanied by the production of many pollutants. Combustion (incomplete) of fuels (coal, gas, oil, etc.,) in industry, internal combustion engine, electricity generation and domestic and commercial heating etc., leads to the production of carbon monoxide, sulphur dioxide and nitrogen oxides. Internal combustion of gasoline of motor vehicles produces unburnt hydrocarbons (HC), particles of carbon - soot and smuts. Ash is formed from non-combustible substances. Smoke is a fine suspension of ash and soot particles in air. It is estimated that 60 percent of city air pollution and 90 percent of the nitrogen oxides emissions are due to automobiles. Increased amounts of carbon dioxide affects photosynthesis and may affect world climate. Carbon monoxide in the air has adverse effect on health. Blood haemoglobin has 200 times more affinity for carbon monoxide than oxygen. The transport of oxygen from the lungs to the tissue is thus impaired.

Sulphur dioxide in higher concentrations produces respiratory problems. At a much lower concentration sulphur dioxide damages plants, limestone and marble, works of art (especially frescoes). Unpainted timber absorb sulphur dioxide and are susceptible to damage. Sulphur dioxide is shown to be the major contributor to the deterioration of books and papers. Sulphur dioxide damages leather, and corrodes metals.

Nitrous oxide (2 mg.kg^{-1}) are known to cause leaf damage in sensitive plants and may bleach certain dyes. In higher concentration nitrous oxide irritates mucous membranes.

* Lecture delivered at I.M.A., Bangalore Branch on the World Environment Day on 5.6.1980.

Photochemical oxidants are produced by a complex series of chemical reactions initiated when specific emissions (hydrocarbons and oxides of nitrogen) by internal combustion engines and other sources are exposed to sunlight. The result is the formation of ozone, peroxyacyl nitrate (PAN), formaldehyde, aerolein, nitrogen peroxide and organic peroxides. Pollutant ozone concentrations damage vegetation, motor vehicle tyres and asphalt and cause irritation of the respiratory system. PAN effects vegetation particularly young leaves, and alters cardiovascular functions and is an irritant to mucous membrane in human beings.

Air borne particulate matter in the ambient air have their origin from pollen grain, microorganisms, fungi, spores, insects, sand, dirt, smoke, dust, insecticides, aerosols, metallurgical operations, etc.,. These particulates injure the respiratory system and causes infection, cancer etc.,. Deposits of aerosol are unsightly and expensive to remove. Air odours arise from house hold and commercial garbages, harmful or not, present a problem of aesthetics. Indoor pollutants have their sources from outdoors and from within. Noise is wanted sound. As noise builds up to 60 decibels it begins to interfere with ordinary conversation. It disturbs sleep, learning, blood pressure rises, heart rate changes, pupils dilate, serum cholesterol increases and stomach acidity increases - heart burn. Noise may be continuous or intermittent and the sources of noise are motor vehicles, planes, trains, factories, machineries, constructions, sound of horns, loud speakers and human voice.

Urban Problems and Social Pathology

Problems of large cities are created by over-crowding created by housing, employment, education and recreation. Cumulative effects of spectrum of environmental hazards, by dust, dirt, noise, stagnat air, smog, CO, packs of stray dogs, etc., confuse the psyche and limit the efficiency of human performance. Long term exposure to urban stress can disturb psychological balances which leads to outburst of violence, vandalism, breaking and entering, robberies, assaults, arson, setting fires, suicide, homicide. The result is quality of individual's life style declines. Man needs nature more than ever.

Today 90 percent of air pollution comes from man made sources. The demand is great for clean air. Air pollution is costly. It ruins vegetation, makes paint peel off and discolour, cracks tyres and deteriorated nylon, rusts iron and tarnishes silver, kills cattle and blocks out the sun thus adding to house, clothes, cleaning, heating and lighting bills and reduces visibility and causes more automobile accidents.

Can we afford to reduce our industrial output or use of transport? or can we modify our existing methods without increasing penalties? or a totally different approach toward the same objectives?

Battle for the environment

An individual's awareness for change and determination to carry out the change are the key points in keeping our environment clean. Rich must treat the poor with generosity. The social reformers of seventy years ago, had objectives which were attained long after the pioneers died. Politics today is very short sighted. The press has a large role to play in educating the public and raising the public opinion. The public - (consumers) must make politicians answerable to the people of all aspects of environmental policy.

Patching up is good for the present, but the real solution has to be determined by civil servants, scientists, engineers and physicians.

Automobiles

Removing the cars from the city scene virtually eliminates the problem, reducing the dirtiness of the internal combustion engine and finding an alternate method of propulsion - e.g., battery powered cars. Automobile engines should be cleaned and tuned regularly and periodically. Use of automobiles with visible 'exhaust' should be made a punishable offense. Lorries and buses should be designed to have their exhaust pipes turned upwards so that 'exhaust' is discharged towards the sky. Stopping, starting and accelerating of idle vehicles should be minimised. Number of traffic lights should be minimised or done away with and substituted by traffic police. 'One way' has to be introduced wherever parallel roads exist. Sounding of horns should be made illegal except under special circumstances. Automobile traffic should be prohibited in congested and commercial areas. Lorry traffic should be diverted only through certain main roads preferably where police stations are situated. Outstation buses should start and stop at the outskirts of the City.

Building construction

Workers should be housed in proper lodges and provided with transport to the work spot. Water and toilet facilities for the workers should be made compulsory at the construction spot. Orientation courses on environmental pollution including the effect of garbage, excreta and noise should be arranged as a rule. Multi-storeyed buildings should have their own incinerators.

Industrial workers should be educated about the environmental pollutants. Orientation courses for workers in restaurants, hotels, and recreation clubs with regard to personal hygiene and communicable diseases should be compulsory. It is necessary to improve and increase the number of public toilets, bath rooms with good supervision and eliminate stray dogs and beggars. Indiscriminate throwing of letters in public and open spaces should be made illegal and open air fruit and vegetable selling should be abolished.

Construction of multistoreyed buildings in the centre of the city should be stopped. Smoking in public places should be prohibited. Planting of trees should be encouraged. Water drains should be covered and maintained properly. Use of public loud speakers and address system should be prohibited except in notified places. Processions and protest groups should not voice their grievances vocally. Advertisement on the importance of clean environment in lucid languages is imperative.

' K E E P T H E C I T Y C L E A N '

We earnestly hope that aesthetic and healthy planning of the city set by our far-sighted fore-fathers will not be ruined by the considerations other than the interest of the public health.

DR. M.L. SHANKAR
President,
I.A.O.H.,
(Karnataka Branch)

"WORLD ENVIRONMENT DAY"

5th JUNE, 1980

'POLLUTION FROM INDUSTRIES IN BANGALORE'

I am very happy to speak to this distinguished gathering on the occasion of 'World Environment Day'. We, in the city of Bangalore, have a greater responsibility to maintain and promote the fair atmosphere, our elders have established.

DEFINITION:

Pollution is defined as presence of contaminants in excess which may injure the health of human beings and their environment.

It is known that industries irrespective of the nature of products they produce do create problems of pollution of air, water, noise etc. The causes have been physical and chemical like effluents, fumes, gases, smoke, dust, heat and noise. Radioactive materials have added to the list of pollutants in recent years.

SOURCES OF POLLUTION:

Air pollution is caused by industrial solvents, sulphur and its products, acids and alkalis, carbon monoxide, carbon dioxide, hydrocarbons, halogens and radioactive substances. Industries contribute to pollution with the use of coal, coal gas, tar, oils and other fuel. The waste products of iron and steel industry, metallurgy, oil and petro-chemical industries contribute largely to the cause of pollution. Industrial air pollution stands second, only next to automobile air pollution.

The various industrial processes have contributed to the reduction of concentration of particulate matter throughout the world. The industrial pollutants like aromatic compounds, sulphur and its products, fluorides, oxides of nitrogen, ammonia, carbon monoxide, carbon dioxide, lead and lead fumes, products of phosphorous, arsenic, manganese, chromium

mercury are known causes of various ailments like irritation of the eyes, nose, respiratory passages. They cause congestion of the lungs, pneumonia, anaemia, affections of the stomach, liver bones, skin, vision, brain and nervous system. Cancer lesions are known to occur.

POLLUTION CONTROL:

A constant problem closely associated with industrial development is the question of disposal of industrial waste products into the general atmosphere in both urban and rural areas without creating health and other problems. At present much of the air pollution in towns is not directly related to industry but is rather a result of urbanisation and growing use of gasoline powered vehicles, crowded living etc. Health problems due to industrialisation implies transformation of peasant society into a community dependent upon industry. In short industrialisation means a social and economic revolution in the culture of a nation. Any such revolution is bound to carry with it hazards.

Control measures are contemplated by:

1. reduction of contaminants at the source, use of protective equipments, operation in specific enclosures, adequate light, ventilation and arrestors.
2. modification of equipments, timely replacements, changes in the modes of operation good maintenance to avoid leakages, treatment of effluents adequately to dilute and neutralise before discharge into natural drainage systems.
3. Cost consideration and continuancy
4. Legislation
5. Co-operation with regard to Research and Development with the world organisations like W.H.O., I.L.O.
6. Environmental monitoring and suitable action.

AS WE ARE TO-DAY:

The industries in Bangalore handle wide range of products to cover all fields of industry. The Public Sector undertakings like, HMT, HAL, ITI and BEL, The

Private Undertakings like, MICO, Kirloskars, GKW, AMCO, International Instruments, Binnys, Government undertakings like, NGEF, the various industrial estates have all taken up to measures to contain 'POLLUTION'. Some control measures taken up by these units in Sewage and effluent disposal have been exemplary. The plant establishments in Foundry, Painting, Heat Treatment have been above the level of standards stipulated. All the industries are under the purview of the Inspectorate of Factories who ensure all measures of safety.

Evaluations indicate that the levels of pollution of air is low in the townships of the Public Sector undertakings. This is due to the fact that these townships are away from the crowded and busy areas. The industries have taken adequate measures against pollution. The ecology of the areas are maintained well.

The fact that evaluation of pollution levels of many of the residential areas in the city are high, should concern the people in position in the Government, the corporation, the BDA and private voluntary organisations. It is their moral responsibility to consider, advise and implement measures to ensure life in the city of Bangalore acceptable, desirable and healthy.



ICMR

BULLETIN

44/10

Editor: Dr. N. Medappa
Research Information Bulletin

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AUTO-EXHAUST POLLUTION SURVEY AND ITS EFFECTS ON EXPOSED OCCUPATIONAL GROUPS

Although the first automotive vehicle as a mode of transport made its appearance as early as 1898 in the West, it was not till the nineteen fifties that automobile activity emerged as a source of community air pollution. In India recognition of the magnitude of the air pollution problem originating from automobiles, is a recent phenomenon. The experience gained in Western countries can only serve as a guideline for the formulation of Indian air pollution control programmes, for which the epidemiological data pertinent to local conditions should be used. The growth of urban centres and increase in urban traffic is an accompaniment of industrialisation. While the rate of growth in size of an urban area indicates its dynamic qualities the movements within it are the features that sustain and accelerate such dynamism. In India, while the bullock cart as a means of transport still prevails, the growth of automated traffic in urban centres, including Ahmedabad, has far outstripped the normal expectations. The results are reflected in our urban scene *viz.* increasing congestion on the roads, growing delays, excessive pollution build-up in the road side atmosphere and high accident rate.

The paucity of data on health related studies in India led to a cross sectional study being carried out at various traffic junctions of Ahmedabad city in order to elucidate the role of local conditions (traffic density and micrometeorology) in auto-exhaust pollution build-up and its health hazards on occupationally exposed high risk population

groups like traffic policemen and shopkeepers stationed at the traffic corners. The study attempted to:

- (i) measure the atmospheric concentration of major auto-exhaust pollutants like carbon monoxide (CO), lead (Pb), oxides of nitrogen (NO_x) and 3,4 benzopyrene B(a)P;
- (ii) elucidate the role of traffic density of different types of automobiles along with local meteorological conditions in pollution accumulation in the atmosphere of preselected traffic junctions;
- (iii) establish the level of association between the urban exposure concentrations of carbon monoxide, lead, oxides of nitrogen and 3,4 benzopyrene with respective body absorption indicators of pollutants in high exposure groups like traffic policemen and shopkeepers; and
- (iv) generate data for the prevention programme in order to minimise the health risk from this urban source of pollution.

The initial selection of traffic junctions was done on the basis of the information available from the local traffic cell and thereafter a pilot survey was carried out to determine the concentration of each pollutant separately. The purpose of this pilot survey was to select traffic junctions with different exposure conditions (from low to high) so that the relationship obtained between inhalation concentration and body burden is validated

over a wide range of field exposure conditions.

Two traffic corners from each of the three categories of high, medium and low exposure conditions for all pollutants (CO, Pb, NO_x and B(a)P) were finally selected for this survey. One pollutant at a time was taken up for physical as well as biological monitoring and in one season at least two sets of observations were recorded for each sampling location and traffic junction. The traffic density was always obtained by manual counting at the time of atmospheric sampling.

ATMOSPHERIC SAMPLING

The traffic junctions were selected, as mentioned earlier, on the basis of the pilot atmospheric pollution survey because it was seen that the local ventilation conditions varied from traffic junction to junction as the atmospheric pollution build-up is not purely a function of traffic density. The concentrations were observed to be higher for a few traffic junctions, located in density built-up residential areas, because of "cannons" formed by multistoried buildings on all sides of the cross roads, thereby restricting air dilution.

The location for air sampling was decided purely on the basis of working places of selected subjects during their duty hours and the height of sampling was invariably fixed in the breathing zone of the subjects on duty. Some differences in sampling duration occurred and were due to the limitation of detection limits of analytical methods used or low air concentrations for different auto-exhaust pollutants.

A separate sampling train was designed for each pollutant and was fixed at the monitoring site on prefixed sampling days. The collected samples were transferred to the laboratory and were quantitatively analysed for CO, Pb, NO_x and B(a)P levels.

MONITORING OF HEALTH EFFECTS

At the onset of the study 100 policemen were selected and out of them 70 belonged to occupationally exposed traffic policemen with varied exposure history (5 to 20 years) and age groups (25 to 45 years). The remaining 30 policemen served as a control group as they belonged to the same socio-economic status but were stationed at a police station and never worked on the busy streets.

Based on an interview, clinical examination and haematological analysis, 40 out of the 70 exposed and 20 out of 30 non-exposed police personnel were selected for further study.

Shopkeepers at the preselected traffic junctions who volunteered for study formed the other exposed group.

The investigations carried out included (i) estimation of carboxy haemoglobin in blood; (ii) electroencephalogram; (iii) psychological tests including general aptitude test battery (finger dexterity, manual dexterity and motor coordination), speed and accuracy, and tool matching. Every test was administered before and after their duty hours according to standard procedure and scored according to standard keys; and (iv) estimation of lead absorption indicators *viz.* blood and urine lead levels.

ENVIRONMENTAL DATA

The cumulative frequency distributions of ambient CO concentrations at 95, 90 and 85 per cent hourly average observations (from 06.00 to 22.00 hours) were more than 9 ppm (EPA standard for 24 hour average) at relatively heavy, medium and low polluted corners respectively.

When all the observations at traffic corners were taken collectively it was seen that more than 85 per cent of half hourly readings crossed this community air standard of 9 ppm. As far as occupational exposure standards (8 hourly average) of Western countries are concerned, 25 per cent of the observations at heavy polluted junctions crossed even the 35 ppm mark. While for medium and low polluted corners these percentages were eight and zero. As regards the association of atmospheric CO pollution to traffic density, a highly significant linear relationship for winter months was observed.

The TLV for the inorganic lead concentration of an industrial atmosphere (8 hours exposure) ranges from 150 to 200 $\mu\text{g}/\text{m}^3$ in Western Europe and America but the countries of Eastern Europe have set much lower maxima, ranging from 10 to 50 $\mu\text{g}/\text{m}^3$. Only 25-40 per cent of the total atmospheric lead levels observed in this study crossed the 10 $\mu\text{g}/\text{m}^3$ levels. However, it is important to note that exposure is not confined to the occupational group alone but also to the community in general, for which even the Western standards

are in the range of 2-4 $\mu\text{g}/\text{m}^3$ (East European standard is of the order of 0.7 $\mu\text{g}/\text{m}^3$) for 3 months average. In this study 75 per cent of the observation time air lead concentrations exceeded even the maximum ambient standard of 4 $\mu\text{g}/\text{m}^3$. As far as the relationship between traffic density and air lead build-up is concerned, it was seen that in winter conditions of calm and stable atmosphere the relationship was positively associated and the regression coefficient was found to be significant.

The current EPA standard for NO_2 is 100 $\mu\text{g}/\text{m}^3$ (yearly arithmetic mean) while the Japanese standard is only 40 $\mu\text{g}/\text{m}^3$ (24 hourly average). The ambient assessment of this study indicated that more than 75 per cent of one hourly average readings for NO_x were more than 100 $\mu\text{g}/\text{m}^3$. The condition at the medium and low polluted corners was equally bad if the Japanese standard was taken into consideration. In fact the Japanese standard for oxides of nitrogen is more applicable for Indian climatic conditions, as both India and Japan fall within the global tropical range where meteorological conditions are favourable for oxidant formation.

The highest correlation coefficient indicating a positive relationship, was observed between the ratios of heavy vehicular density & total density with NO & NO_x (0.46). The correlation coefficients with heavy as well as medium type of vehicular traffic as a source of air NO concentration were 0.29 and 0.22 respectively.

In the larger urban centres of the world B(a)P concentration ranges from 0 to 400 ng/m^3 with the majority of these urban centres experiencing less than 25 ng/m^3 . The concentrations resulting from natural atmospheric processes are usually accepted as permissible levels, however due to its carcinogenic effect the Russians have recommended a maximum permissible concentration of 1.0 ng/m^3 for community air. In this study the range of urban B(a)P concentration was 15 to 32.6 ng/m^3 in the summer season in comparison to winter range of 25 to 1300 ng/m^3 . These results suggest that the road side atmosphere (at breathing levels) is highly polluted by B(a)P.

BIOLOGICAL EFFECTS

Carbon monoxide

The various health hazard parameters which are related to carbon monoxide were

monitored in exposed as well as control group of subjects. 87 per cent of the traffic policemen complained of eye irritation during their working hours, while 65 per cent complained of headache, 33 per cent of giddiness and 33 per cent of body pain at the end of the day after traffic control duty. The non-exposed persons did not have any such complaints. The carboxyhaemoglobin (COHb) analysis of exposed non-smokers showed a small significant rise in early morning COHb levels in comparison to non-exposed non-smokers. A significant correlation was also observed for four hour exposure periods between COHb levels and average atmospheric CO concentration. In 18 per cent of exposed subjects the evening COHb level crossed even 5 per cent saturation mark. Further, it was seen that during the rest period of four hours (1200 to 1600 hours) there was a drop of 44.3 ± 13.2 per cent in COHb levels in the case of exposed non-smoker traffic policemen. While for exposed smokers, there was rise or fall in COHb levels depending upon the smoking habits. Observations of this study confirm the view that the low ambient exposure to CO in heavy smokers is not additive as far as the rise in blood COHb level is concerned.

The psychological test performance of exposed subjects revealed that the traffic policemen were of average intelligence (T-score range of 50-62 for Non-Reading Aptitude test battery) and no significant difference was noted in their psychological test performance before and after duty hours. As regards the spontaneous electroencephalogram (EEG), two out of six volunteers (33 per cent) showed a low voltage tracing with fast alpha rhythm at COHb levels of the order of 5 per cent. However, it is difficult to draw any firm conclusion from such changes because of the limited number of subjects and the effect of other environmental stresses. Furthermore, the adverse climatic conditions (WBGT index was significantly higher than OSHA limits of 30.6°C for moderate work and wind velocity of more than 300 fpm) and effect of other associated pollutants do not allow a conclusion that carbon monoxide exposure is the only factor responsible for such EEG changes.

Lead

The comparative picture of variations observed in lead absorption indices, possibly caused by occupational exposure to airborne lead concentrations indicated that rise in the blood and urine lead levels of the policemen and shopkeepers on duty in comparison to

the general non-exposed population was significant ($P < 0.05$).

When the blood and urine lead levels were compared to the currently accepted limits for non-occupationally exposed people (blood lead 40 $\mu\text{g}/100\text{ ml}$, urine lead 80 $\mu\text{g}/\text{lit}$ and Δ amino levulinic acid dehydrase (ALA-D) 0.6 $\text{mg}/100\text{ ml}$) it was found that 10-15 per cent of the total subjects had higher levels. The mean values of the observed lead indices, however, were not statistically different from these normal limits.

Correlation analysis indicated a lack of any significant correlation between daily average air lead exposure at different traffic junctions and corresponding blood lead of the volunteers stationed at the respective corners by virtue of their occupation on the corresponding day of air sampling.

The correlation coefficient between log Pb-U (urine lead) and Pb-B (blood lead) was observed to be significant. A non-significant negative correlation was found between Pb-B and ALA-D activity. But there was a definite indication that the blood ALA-D activity of occupationally exposed population to even ambient lead pollution, was significantly lower than general non-exposed population. A non-significant correlation was observed between ALA excretion in urine and Pb-U for these exposed groups.

Oxides of nitrogen

From the analysis of intergroup comparison of clinical manifestations it was seen that the subjects in the age group of 30-59 years in high exposure group showed an apparently greater tendency for positive respiratory symptoms as compared to their counterparts in medium or low exposure groups. Similar trends were also found in non-smokers and in the subjects who had been working in that area for more than 5 years. However, the 't' tests applied for inter subgroup comparison indicated a non-significance.

Haematological and urine examination did not reveal any unusual differences. Incidence of hypertension was 18.39 per cent in the study population. After adjusting for the age factor no significant differences were observed among the various subgroups. In a few hypertensive subjects the electrocardiogram showed changes of left ventricular hypertrophy and strain.

For lung function tests, the statistical intergroup comparison revealed that in general there was no significant impairment due to the existing levels of NO_x along with other auto-exhaust pollutants. Although no significant variation was noted, the comparison between low and high exposure groups indicated a definite trend towards lowering of the lung function test values (VC, $\text{FEV}_1\%$ and PFR) for non-smoking population. The reduction in pulmonary function for heavy exposure population was about 0.6 lit, 4% and 10 lit/min, for VC, $\text{FEV}_1\%$ and PFR respectively. No uniform trend was observed for smokers because the smoking habits and its nature were not comparable.

Only a significant variation for PFR test was noted in heavy exposure group as compared to low exposure subjects. It may perhaps, be due to the synergistic effects of high dust lead along with a number of other auto-exhaust gaseous pollutants, which are known to produce upper respiratory tract irritation.

In addition, the comparison of pulmonary function tests with the normal standards available for North Indian population showed that for the same age groups VC and $\text{FEV}_1\%$ were considerably lower for all exposure groups in this study. However, such comparison is of very limited value unless the normals are established for matched population of the local region.

3.4 Benzopyrene

The four hourly mean B(a)P levels showed that 60 per cent observations were higher than 15 $\mu\text{g}/1000\text{m}^3$ which is the recommended MAC in USSR. The total B(a)P intake during 8 hours working period per day was equal to 1.75 μg (taking the mean B(a)P level of traffic junction atmosphere as 425 $\mu\text{g}/1000\text{m}^3$ with 82 per cent as respirable fraction which was observed in Bombay and 15 m^3 as inspired air volume per day).

In epidemiological surveys of lung cancer for establishing the association with urban B(a)P concentrations, it has been observed internationally that lung cancer is characterised by large variations in incidence rate which is further influenced by the special variations concerning urban-rural and male-female differences. The local cancer hospital records indicate that male:female ratio in rural areas of Ahmedabad district is higher (10:1) in comparison to urban city area (5:1). While such ratios in major international studies vary from 4 to 5. The lung cancer

cases per 100000 are also 2 to 3 times more in Ahmedabad city than the surrounding rural area.

The general epidemiological data on lung cancer from many countries prove that air pollution as an etiological factor is only secondary to cigarette smoking, but the role of smoking is possible enhanced in the presence of air pollution. However in India, females in the low or even middle income

groups are also exposed to high B(a)P levels during cooking (along with urban air exposure) due to the use of local cooking fuels like cattle dung cake, wood and hard or soft coke.

This write-up is based on the Monograph entitled 'Ahmedabad Auto-exhaust Pollution Survey and its Effects on Exposed Occupational Groups', published by the Director, National Institute of Occupational Health, Ahmedabad.

SUMMARY OF DR. J. B. SHRIVASTAV MEMORIAL LECTURE

Dr. U.C. Chaturvedi, Reader, Department of Pathology and Bacteriology, K.G. Medical College, Lucknow, delivered the Dr. J.B. Shrivastav Memorial Lecture on 'Immune Mechanism in Viral Infections' at the Indian Council of Medical Research, New Delhi, on 6th September, 1979.

Most viral infections elicit immune response in the host; even infections initiated in utero or at birth generate immune response. Host immune responses against virus and the virus-infected cells operate at three levels, (i) humoral (antiviral antibody and complement); (ii) cellular (sensitized T-cells and macrophages); and (iii) combined humoral-cellular (K-cells, macrophages and polymorphonuclear leucocytes).

Dengue virus is endemic in our country and has caused many extensive epidemics. As not much information is available on the immune mechanisms in this infection, the immune response of Swiss albino mice to dengue virus type 2 (DV) was studied. When the virus was inoculated i.c. into adult mice, all of them died by 8 to 12 days but the virus did not cause morbidity or mortality when inoculated i.p. or i.v. It was further noted that the immune response of mice administered DV by different routes did not differ materially. Adoptive transfer of serum obtained from mice 3 to 5 weeks after the third i.p. dose of DV protected recipient mice against intracerebral challenge with DV, whereas the serum obtained after 1 and 2 weeks provided minimum protection.

Immunosuppression has been used as a means to assess the role of the immune response in acute viral infections. The immunosuppression converts sublethal experimental infection into lethal infection. A single dose of cyclophosphamide (CY) given 24 hours after DV i.p. or i.c. substantially reduced

the number of antibody forming cells in the spleen. Three doses of DV, each followed by CY 24 hours later, produced specific hyporesponsiveness to DV but not to a heterologous virus (Coxsackie B₄) with a reduction in antibody forming cells in the spleen of such animals against DV but not against Coxsackie B₄ virus. Adoptive immunity to DV by passive transfer of specific antiserum was abolished along with increased titres of the virus in the brain of immunosuppressed mice. But the protection could be restored by a second dose of antiserum given 72 hours later. Thus the findings show that humoral antibodies play a crucially important role in protecting mice against DV infection.

The cell-mediated immune response was investigated in DV infected or immunized mice using leucocyte migration inhibition (LMI) test. Out of four experiments using different doses and routes of the virus, a significant LMI was observed only on two occasions, with borderline values. Adoptive i.v. transfer of immune spleen cells obtained from mice 1 to 5 weeks after immunization did not protect recipient mice against even a small dose (IOLD₅₀) of DV. Reconstitution of immunosuppressed mice by immune spleen cells had no protective effect. Depletion of T-cells by treatment of mice with antithymocyte serum did not potentiate DV infection. It was therefore, concluded that CMI plays no protective role in DV infection.

Absence of CMI and poor protection by early phase immune serum in DV infection prompted a search for the cause. It was observed that adoptive transfer of immune spleen cells suppressed the DV specific antibody forming cells in the spleen of mice. The suppression was maximum in early phases of immunization but declined to negligible values by 5th week. The suppressor activity may be due to T or B lymphocytes or macrophages. In further experi-

ments it was observed that the glass-adherent cells had no suppressor activity. Immune spleen cells depleted of macrophages by carbonyl iron treatment had higher suppressor activity. The pure B-lymphocytes had no suppressor activity. Almost all the suppressor activity was present in T-lymphocytes. Pretreatment of immune spleen cells with antithymocyte serum and complement abrogated suppressor activity. It was also noted that the activity could be transmitted by cell homogenate thus indicating that the activity was mediated through soluble factors. The suppressor activity was also present in mice infected i.c. by DV. Thus during DV infection suppressor activity was present in the spleen of mice.

Some of the T-cell functions in DV infected mice were studied. Following the i.c. inoculation of DV the spleen weight of infected mice was reduced as was the proportion of T-lymphocytes in the spleen-cell suspensions. In DV infected mice the mean haemolysin titre, 16 days after i.p. inoculation of 4×10^8 SRBC (a thymus-dependent antigen), was 47 compared

with 406 in normal mice. Spleen cells from DV infected mice produced significantly reduced direct GVH reactivity in Parker strain (PS) infant mice. Thus DV selectively depleted T-lymphocyte sub-populations responsible for helper and effector functions and spared suppressor T-cells in the spleen of infected mice. This explains the absence of CMI in DV infected mice and also the poor protective effect of early phase immune serum.

The relative importance of humoral or cellular factors depends upon the nature of the virus and the type of host reaction. All the membrane associated viruses have CMI. In 'cytolytic type' of host-virus infection humoral antibodies are more important while in 'steady state' CMI is important and in 'integrated' type of host-virus infection both may play a role. Both type of responses may complement each other in restricting the spread of the virus and elimination of virus infected cells. At times there may be an over-reaction which may result in pathological lesions in the body.

ABSTRACTS

Some Research Projects completed recently

Cytogenetic studies in mental retardation

Cytogenetic investigations were done on 215 mentally retarded patients. These patients were screened to rule out certain metabolic and organic disorders. Patients with more than 2 congenital abnormalities (including abnormal dermatoglyphics) were investigated.

Cytogenetic investigations included buccal smear for 'X' chromatin, blood smear for presence or absence of drumsticks, fluorescence study of buccal smear for 'Y' chromatin (whenever necessary), dermatoglyphics and blood culture for chromosomal analysis. In about 75 cases chromosomal analysis was done using ASG banding technique.

For each case, twenty five or more metaphase spreads were counted, 5 drawn, 5 photographed and 3 karyotypes were made.

The results showed numerical and structural abnormalities. There were 10 cases of sex chromosomal abnormalities. Of these, one was Klinefelter syndrome, three were Klinefelter mosaic, 3 were Turner mosaics and 3 had long 'Y' chromosome.

Of the autosomal anomalies, one case had 'G' monosomy, one had 21 ring chromosome, 2 cases were of 13/14 translocation and one was of 1/3 translocation.

There were 12 other cases with minor deletions and additions.

Out of the 32 cases of Down's syndrome, 3 were D/G translocation. There was a case with typical Down's syndrome features with normal chromosomal complement of 46 XX.

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Publication:

Thomas, Manorama, Narayanan, H.S., Jayakumari, R.N. and Victor, R. D/D translocation: Report of two cases. Medical Genetics in India, Vol. 1, 1978, pp. 162-166, Edited by Ishwar C. Verma, Publishers Aurcma Enterprises, Pondicherry.

Study of prevalence of anterior segment ocular pathology in children due to xerophthalmia in Assam

A survey was carried out from June, 1977 to May, 1979 amongst 6000 children 0-12 years of age, at 20 sample sites in rural and urban areas and tea garden labour colonies in 3 districts of Assam, to study the prevalence of anterior segment ocular pathology due to xerophthalmia. This was also assessed during the same period by a random study in children attending the eye and paediatric out-patient departments of the Gauhati Medical College Hospital.

The overall prevalence of anterior segment ocular lesions due to vitamin A deficiency in the children was found to be 10.6 per cent. The prevalence was found to be more in tea gardens (19.2 per cent) than the rural (9.1 per cent) and urban (8.0 per cent) areas. The prevalence in children attending the eye and paediatric out-patient departments was found to be 32.7 per cent and 7.03 per cent respectively.

Male children were found to have suffered more than female children.

Xerophthalmia was found to be more prevalent in the 3-12 years age group at these sample sites as well as at the paediatric out-patient department. Children attending the eye out-patient department suffered more in the age group of 3-5 years.

As regards the different grades of xerophthalmia in all the sample sites, it was observed that more than 90.0 per cent of the affected cases belonged to X0 and XI grades. There was not a single case of active keratomalacia (X3B) detected in the entire 20 sample sites. However, in the eye out-patients 45.4 per cent of cases had severe degrees of xerophthalmia (X3A, X3B and X4).

It was observed in this survey that the incidence of xerophthalmia was more in children coming from poor families.

Regarding the seasonal variation, it was seen that more cases of xerophthalmia were detected during the period from May to October (summer and autumn seasons) than in the period from November to April (winter and spring seasons) in rural and tea garden areas. But

in the urban areas two peaks of incidence of xerophthalmia were found - one in the months of May to July (summer season) and the other in the months of February to April (spring season).

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Hepatic carcinogenesis in the monkey and its modification by enzyme inducers

In this study, an attempt was made to determine the protective effect of two known enzyme inducers namely DDT and sodium phenobarbitone against the acute toxic effect and tumourgenesis of a hepatocarcinogen, diethylnitrosamine (DNA). The effect of the first inducer *i.e.* DDT could not be worked out as the animals treated with DDT died 2 and 10 weeks after the first injection. Autopsy in these animals did not reveal any apparent abnormality. The second inducer, phenobarbitone was tolerated well for more than 7 months. However, the high mortality observed in the animals made it impossible to draw any logical conclusion as regards carcinogenesis.

Phenobarbitone treatment concurrent with dosing by DNA seemed to protect the liver against chronic damage induced by the carcinogen. It may be assumed that this regimen will also help in reducing the oncogenic potential of DNA and the resultant tumour induction regarding the number and frequency. On the other hand pretreatment with phenobarbitone seemed to have no effect on the hepatic injury produced by DNA. It is thus reasonable to assume that induction of hepatic microsomal enzymes brought about by phenobarbitone administration detoxifies DNA in the liver and thus protects the organ against the injuring action of this agent. It is well known that many substances are detoxified in the liver cell by the microsomal enzymes, particularly the ones incorporating functional P450. The beneficial effects of phenobarbitone with regard to DNA toxicity may be based on this mechanism.

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ICMR NEWS

The Scientific Advisory Committees of the following Institutes of the Council met during the month:

National Institute of Occupational Health, Ahmedabad.	September 24, 1979
Indian Registry of Pathology, New Delhi.	September 27, 1979
Cytology Research Centre, New Delhi.	September 27, 1979
Malaria Research Centre, Delhi.	September 28, 1979

Meetings of the following Expert Groups/Task Forces were held at ICMR, New Delhi:

ICMR Task Force on Acute Respiratory Diseases.	September 1, 1979
ICMR Task Force on Kala-azar.	September 3, 1979
ICMR Task Force on Encephalopathy in Children	September 7, 1979
ICMR Task Force on Microbiology	September 11-12, 1979
ICMR Advisory Committee on Health Care Delivery Systems.	September 14-15, 1979
ICMR Task Force on IUDs	September 20-21, 1979
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Conferences/Seminars/Workshops:

Dr. G.V. Satyavati, Deputy Director-General, ICMR participated in the International Conference on Traditional Asian Medicine, held at Canberra, Australia, between September 2-7, 1979.

Shri V. Ramadas Murthy, National Institute of Nutrition, Hyderabad, participated in the X International Conference on Health Education held at London between September 2-9, 1979.

Dr. C.V. Ramakrishnan, Deputy Director-Tuberculosis Research Centre, Madras, participated in the International Conference on Atypical Mycobacteria, held at Denver, Colorado, USA, between September 5-8, 1979.

Dr. V. Ramalingaswami, Director-General, ICMR delivered the Keynote address on the Role of ICMR in Community Health with Special Reference to MCH and Family Welfare at the workshop on Involvement of the Rural Community in Family Welfare Programmes, at the Institute for Research in Reproduction, Bombay on September 10, 1979.

Dr. Badri N. Saxena, Deputy Director-General, ICMR, participated in the third meeting of agencies conducting or directly supporting research on the Biomedical Aspects of Family Planning held at Geneva on September 10-11, 1979. He also participated in a symposium on Steroid Contraception and Mechanisms of Endometrial Bleeding, held between September 12-14, 1979 at Geneva.

PROGRAMME OF SCIENTIFIC LECTURES AT THE INDIAN COUNCIL OF MEDICAL RESEARCH, NEW DELHI

Date	Topic	Speaker
6.9.1979	Studies on Virology (Dr. J.B. Shrivastav Memorial Lecture)	Dr. U.C. Chaturvedi, Lucknow.
20.9.1979	Tuberculosis in Children (Dr. Kamala Menon Medical Research Award Oration, 1978)	Dr. P.M. Udani, Bombay.
18.10.1979	Nutrition and Immunity (Shakuntala Amir Chand Prize Lecture, 1978)	Dr. P. Bhaskaran, Hyderabad.
25.10.1979	Molecular Basis of Host-Virus Interaction (Kshanika Award Oration, 1978)	Dr. Maharani Chakrabarti, Varanasi.

ICMR AIDED SYMPOSIA/SEMINARS/WORKSHOPS/CONFERENCES

Symposium/Seminar/Workshop/ Conference	Date	Institution/Department
National Seminar on Neuro-oncology	August 8-10, 1979	National Institute of Mental Health and Neurosciences, Bangalore.
Seminar on Potentialities of High Energy X-ray Machines in the Treatment of Malignant Diseases	September 21-22, 1979	Department of Radiotherapy, Postgraduate Institute of Medical Education and Research, Chandigarh.
Workshop on Immunodiagnostic Methods in Parasitology.	October 29- November 10, 1979	Department of Parasitology, Postgraduate Institute of Medical Education and Research, Chandigarh.
Symposium on Newly Emerging Diseases of Man and Animals	November 1-3, 1979	Haryana Agricultural University, Hissar (Association of Microbiologists of India).
Workshop on Investigative Procedures in Haemorrhagic Disorders	November 5-6, 1979	Pasteur Institute, Shillong (Indian Association of Pathologists and Microbiologists).
Workshop on Biomedical Information and Libraries	November 26-30, 1979	Institute for Research in Reproduction, Bombay.
First National Conference on Yoga, Science and Society.	December 4-7, 1979	Institute of Medical Sciences, Banaras Hindu University, Varanasi.
Symposium on Environmental Carcinogenesis	December 9-11, 1979	Cancer Research Institute, Tata Memorial Centre, Bombay.
National Symposium on Child with Genetic Defects	December 27-30, 1979	Institute of Genetics and Hospital for Genetic Diseases, Hyderabad (Indian Society of Human Genetics).
Symposia on Viral Encephalitis and Recent Advances in Blood Transfusion and a Slide Seminar on Non-tumorous lesions of CNS.	January 3-5, 1980	Postgraduate Institute of Medical Education and Research, Chandigarh (Association of Pathologists and Microbiologists).
Winter School on Crystallographic Computing Techniques	January 4-14, 1980	Indian Institute of Science, Bangalore.

Symposium/Seminar/Workshop, Conference	Date	Institution/Department
Workshop on Microbial Procedures in Antibiotic Resistance in Bacteria	January 16-18, 1980	Department of Microbiology, Lady Hardinge Medical College, New Delhi.
International Symposium on Hundred Years of Malaria Research	January 17-19, 1980	Institute of Postgraduate Medical Education and Research, Calcutta.

COUNCIL'S TRAINING PROGRAMMES FOR 1979

Leprosy:

At the Central Jalma Institute for Leprosy, Agra.

Training course in Leprosy for medical officers: (February 15 to March 30, 1979, and September 3 to October 13, 1979).

Virology:

At the National Institute of Virology, Pune.

- (1) Short-term training course on Laboratory Diagnosis of JE: (February 1 to 15, 1979).
- (2) Short-term course in Tissue Culture and Cell Biology: (June 18 to 30, 1979).
- (3) Diploma course in Medical Virology of Poona University: (July, 1979).

Reproductive Biology:

At the Institute for Research in Reproduction, Bombay.

- (1) Training course in Reproductive Biology: (January to March, 1979).
- (2) Radioimmunoassay of Protein and Steroid Hormones: (January to March, 1979).
- (3) Training course in Genetics: (January to February, 1979).
- (4) Training course in Basic Immunology: (January, 1979).

- (5) Training course in Contraceptive Research and Reproductive Endocrinology: (March, 1979).

Nutrition and Endocrinology:

At the National Institute of Nutrition, Hyderabad.

- (1) M.Sc. (Applied Nutrition) course: (June, 1979 to February, 1980).
- (2) Annual certificate course in Human Nutrition for teachers in agricultural universities: (June to August, 1979).
- (3) Annual certificate course in Endocrinological Techniques and their Application: (September to October, 1979).
- (4) Annual certificate course in Nutrition: (December, 1979 to February, 1980).

Haematology:

At the Blood Group Reference Centre, Bombay.

- (1) A certificate course in Blood Banking Technology and Basic Haematology for medical officers: (February 1 to March 15, 1979).
- (2) Training course in Blood Banking Methodology for Technicians: (May 17 to June 7, 1979).

Occupational Health:

At the National Institute of Occupational Health, Ahmedabad.

(1) Training course in Hazards in Chemical Industry: (February, 1979).

(2) Refresher course in Occupational Health for E.S.I. medical officers: (September, 1979).

Clinical Pharmacology:

At the Postgraduate Institute of Medical Education & Research, Chandigarh. (January, 1979).

Biostatistics

At the Institute for Research in Medical Statistics, New Delhi.

(1) Diploma course in Biostatistics: (September, 1979).

(2) Certificate course in Orientation to Biostatistics: (September 1 to November 30, 1979).

(3) Certificate course in Statistical Techniques in Medical Research: (January 1 to March 31, 1980).

(4) Certificate course in Planning and Evaluation of Health Programmes: (April 1 to 30, 1980).

Laboratory Animal Technology:

At the National Institute of Nutrition, Hyderabad.

Laboratory Animal Technicians Training Course: Junior level: (June 4 to July 15, 1979), Senior level: (August 1 to September 30, 1979).

COURSES FOR TALENT SEARCH SCHEME FELLOWS

Cell-Biology and Cyto-Genetics:

At the Indian Institute of Science, Bangalore: (December 27, 1978 to January, 1979).

Immunological Techniques:

At the Central Jalma Institute for Leprosy, Agra: (February 1 to 15, 1979).

Clinical Chemistry and Medical Instrumentation:

At the National Institute of Nutrition, Hyderabad: (July 6-14, 1979).

Use of Radioisotopes in Medicine:

At the National Institute of Nutrition, Hyderabad: (July 16-25, 1979).

Clinical Pharmacology:

At the Department of Pharmacology, Postgraduate Institute of Medical Education & Research, Chandigarh. (November, 1979).

Principles and Methods in Medical Statistics:

At the Tuberculosis Research Centre, Madras: (December, 1979).

Haematological Techniques:

*At the Department of Pathology, Christian Medical College, Vellore.

*Dates to be announced later.

SOME ICMR PUBLICATIONS

TECHNICAL REPORTS

	Price Rs.
Research in Medical Education (1970)	4.00
Research in Health Practices (1970)	4.00
Acute Encephalopathy Syndrome in Children (1970)	4.00
Exfoliative Cytology (1971)	4.00
Developments in Industrial Psychology in India (1971)	4.00
Proceedings of Seminar on Immunity and Immunoprophylaxis in Cholera (1971)	4.00

	Price Rs.
Symposium on Clinical Evaluation of New Drugs (1972)	4.00
Laboratory Methods in Investigation of Thyroid Diseases (1972)	4.00
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Review of Work Done in Rural Water Supply in India (1972)	4.00
Genetics and our Health (1972)	4.00
All India Conference on Research in Reproduction and Fertility (1973)	4.00
A Study of Morbidity Patterns and Standard of Medical Care in the Rural Centres of West Bengal (1973)	4.00
Seminar on Infectious Hepatitis and Study Group on Australia Antigen (1973)	4.00
Atlas of Histopathology of Liver: Hepatitis and Cirrhosis (1974)	10.00
Studies on Pre-school Children (1974), Reprinted 1977	3.50
Studies on Weaning and Supplementary Foods (1974), Reprinted 1977	4.00
Medicinal Plants of India - Vol. I (1976)	30.00
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Research in Malaria - An Outline (1977)	Gratis
Health Hazards of Mycotoxins in India (1978)	5.00

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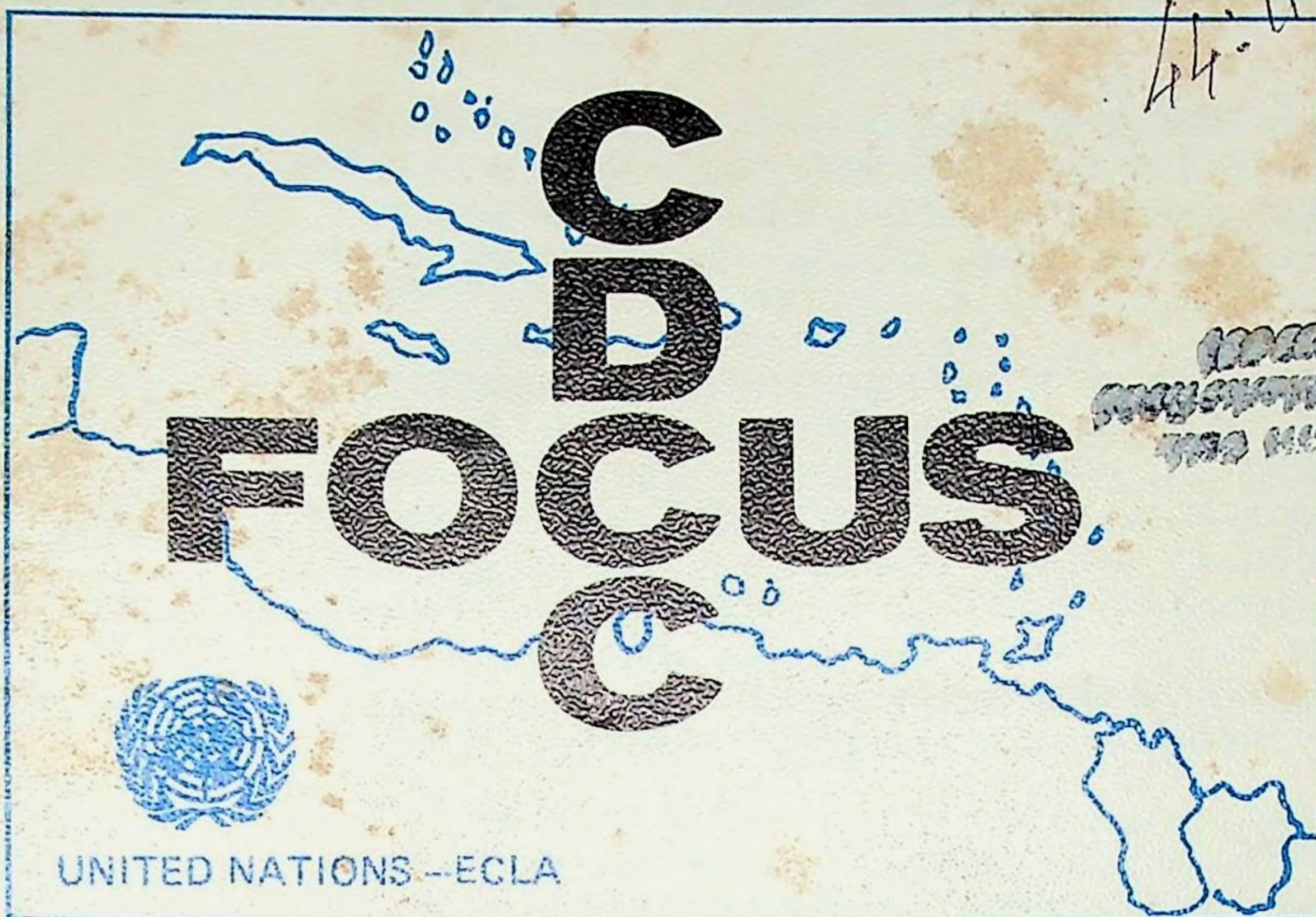
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NEWSLETTER OF THE CARIBBEAN DEVELOPMENT AND CO-OPERATION COMMITTEE: Published by the ECLA Office for the Caribbean, Port-of-Spain.

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The Caribbean Development and Co-operation Committee (CDCC) is a permanent subsidiary body at the ministerial level of the Economic Commission for Latin America. The Committee acts as a co-ordinating body for activities relating to development and co-operation in the Caribbean sub-region and serves as an advisory and consultative body to the Executive Secretary of ECLA in respect of Caribbean issues. Members include: the Commonwealth of the Bahamas, Barbados, Republic of Cuba, Suriname, Dominican Republic, Grenada, Guyana, Jamaica, Haiti and Trinidad and Tobago. Representatives of Belize and the West Indies Associated States and observers from the Netherlands Antilles also attend the Committee sessions.

**THE DIRECTOR SPEAKS
AT
WORLD FOOD COUNCIL REGIONAL CONSULTATION MEETING
February 19-20, 1979
Port of Spain, Trinidad**

Need For Balanced Concept Of Development

There is deep concern within CEPAL about policies which relegate agriculture to second best position in national programmes while other sectors of the economy benefit from such a partial approach to development.

A more balanced concept of development is needed to achieve the objective of rapid industrialization for Latin America on a solid agricultural base. These were some of the observations, Mr. Silbourne Clarke, Director of the CEPAL Office for the Caribbean, made, speaking on behalf of Mr. Enrique Iglesias, United Nations Assistant Secretary General and Executive Secretary of CEPAL at the opening session of the regional consultation meeting, organized jointly by the World Food Council and the Inter-American Development Bank.

The observations were aimed, Mr. Clarke said, at identifying a limited number of practical measures which could produce short-range impact. They were presented, he said, from the standpoint of a regional institution focusing on the Latin American scene.

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There have been significant changes, he added, in the social structure of rural and agricultural areas of Latin America, related, no doubt, to the dynamic growth of the modern sector of Latin American agriculture. However, there were still unsolved social problems and those have in some instances worsened.

Best Use Of Planning Capacity

Stable agricultural policies, he felt, were realised when emphasis was placed on making the best use of the planning capacity of the State to anticipate and give continuity to agricultural policies. The provision of incentives that were coherent and rational would also, in his view, permit agricultural programmes to be implemented on clear and firm bases. In that way, temptations to alter programmes indiscriminately might be considerably minimised.

A realistic view, he urged, must be taken about root problems affecting the structure of agricultural development, bearing in mind, he added, that each country must solve in its own way the problem of access to land by underemployed family groups.

Concentration On Peasant Farmers

There was also a need, he felt, for governments to concentrate resources in favour of the agricultural sector for the benefit in particular of peasant farmers, who had to compete with modern agricultural systems which had a great capacity to absorb and negotiate resources to the disadvantage of peasant farmers.

Attention, he believed, ought to be paid to the types of foreign technology which have been or were to be utilised in the making of agricultural products. Foreign technology, he stressed, should be examined to determine their substantive relevance as a resource endowment that could also be applied beneficially to the social problems of Latin America.

While international financial agencies, he pointed out, should be urged to modify their acceptance and approval procedures, governments, he felt, should complete as quickly as possible the preparation of agricultural investment projects which already satisfied the requirements of the agencies.

Widening Participation In Development

The agricultural population, he stated, should be encouraged and given more opportunities to participate in the development of the sector, emphasis being placed on providing training for them, as well as improving and extending social services in rural areas.

Income Redistribution

Income Redistribution policies, he noted, gave renewed stimulus to agricultural production because they influenced the size and growth of domestic demand for agricultural products.

MAJOR FOCUS REPORT

SOME SOCIAL ASPECTS OF ENVIRONMENTAL MANAGEMENT

Limited Research

Many countries of the Caribbean are embarking on major industrialization programmes — Barbados, Jamaica, St. Lucia, Trinidad and Tobago among them —

without, perhaps, perceiving a need to give major emphasis to the social aspects of environmental management. With the notable exception of Jamaica, many of these countries are without governmental agencies equipped to deal with environmental management. In fact, very limited research has been done in the Caribbean on the effects of industrialization on the local population. Interestingly, the Report of the Second Conference of Ministers responsible for Health, emanating from the CARICOM Conference held in Montserrat in 1976, states *inter alia* that "the greatest hazards to human health in the Caribbean are to be found in the environment and in particular, in factors related to the quality and quantity of drinking water supplies and the disposal of wastes". According to a WHO report, approximately 400 million persons in developing countries are affected by gastro-enteritis, caused by polluted drinking water. It is estimated that about the same number of persons suffer from other water-related diseases.

Serious Environmental Problems

According to a paper prepared for the joint UNEP/ECLA Caribbean Environment Project, entitled: *Policy Issues Relating to Environmental Management*, the limited number of studies which have been carried out in the region indicate that environmental problems are becoming very serious, particularly in the more developed countries. There are serious problems relating to: liquid and solid waste disposal (domestic and industrial); the increasing use of inorganic fertilizers and pesticides, resulting in accelerated aquatic and marine weed growth, a dramatic increase in the level of nitrates in subterranean water and fish kills; poor agricultural and other land use practices, resulting in erosion of the soil and siltation of rivers; deforestation, leading to erosion and siltation problems as well as to the loss of water-shed protection, increased flash flooding and reduction in aquifer recharge; the placing of valuable agricultural land under buildings and roads to cope with the proliferation of the private motor vehicle and the process of urban and suburban spread.

Investigating Effects Of Pesticides

It is worth noting here that the Government of Colombia has adopted a programme to investigate the effects of pesticides on the health of the population. The cost of the programme is approximately US \$3 million. It was adopted in response to complaints from farmers, agronomists and doctors about the danger to human health resulting from the indiscriminate use of pesticides. As indicated in the World Environment Report of January 15, 1979, Colombia used 17 million kilograms of pesticides in 1978 at a cost of US \$140 million.

Among the 638 pesticides on the market are a variety of products based on DDT, Aldrin, Dieldrin and Parathion. Fifty-five of this number contain 2-4-D and 2-4-5-T, popularly known as the "orange agent", used to destroy forests and plantations during the Viet Nam War. To avoid creating severe imbalance in the natural environment, strict control is required in the application of these chemical agents. The substance 2-4-D is considered 700 times more dangerous than Thalidomide. Studies in the rice-growing region of El Espinal in Central Colombia indicate that farmers there suffer from various illnesses due to the pesticides used in the spraying of crops.

Toxic Elements

A report on *Environmental Health Strategy* issued by PAHO/CARICOM, March 1978 states that there is a wide variety of pesticides, weedicides and herbicides in use throughout the CARICOM region. Some of these are known to be toxic.

Beach Pollution

Beach pollution is also an area of priority concern to students of Caribbean environmental problems. The main source of beach pollution in the Caribbean Islands is sewage. Raw sewage is often discharged into the sea. Few countries in the region have facilities for sewage treatment. The discharge of industrial wastes into the sea also compounds the beach pollution problem. The social effects of this discharge on tourism in the region have not been fully assessed and systematically documented. In the English-speaking Caribbean, for instance, Owen Jefferson estimates that tourism accounts for 77 per cent of the Gross Domestic Product in the Bahamas, 50 per cent in Antigua, 20 per cent in Barbados, and 6 per cent in Jamaica.

Social Effects Of Tourism

An important area of study is the related question of the impact of tourism on the social relations and psychological health of the population. Joyce Cole, who has done one of the few empirical studies on the sociological impact of tourism on the Caribbean observed that there was little contact between local inhabitants of Tobago and tourists to that country. Although she found in general a favourable attitude to tourists, a substantial number of students held unfavourable attitudes to them. However, her report noted that the individual Tobagonian developed a more favourable attitude towards tourists as he became more exposed to them.

Impact On Local Culture

There appears to be a need for further research on the impact of tourism on the local culture of the Caribbean. For instance, is there a tendency towards greater dependence, and a reinforcement of attitudes of racial and cultural inferiority among Caribbean communities, which have to rely on tourism as one of their main sources of revenue? In what ways does the host country or community affect the tourist? Attempts should be made to record and assess the values and attitudes of tourists *before* and *after* their visits to the host countries. It is evident, states the UNDP Report of July 1975 on *Regional Aspects of Tourism Development in the Eastern Caribbean*, that there are more speculations than answers in the questions that pertain to social impact of tourism in the Caribbean. The problem, the Report continues, is not confined to the region. It has world-wide scope. The 'cause-effect' relationships between tourism development and the host societies need to be better understood. For planning as well as for action, the Report concludes, governments and private sector alike aspire for better decision-making tools. This subject requires sustained basic research for a number of years.

Action Plan

It is expected that the Action Plan being developed by the Caribbean Environment Project for Sound Environmental Management in the Wider Caribbean Area will include some of the social considerations raised here. The Caribbean Environment Project is an element of the Regional Seas Programme of the United Nations Environment Programme (UNEP), which, however, goes beyond consideration of purely marine affairs to encompass many sectors and related multi-disciplinary activities in areas such as natural resources and ecosystems, industry and technology. A description of the Caribbean Environment Project has already been outlined in CDCC/FOCUS Volume 1, Number 4 of November 1978.

Aim of Paper

The aim of this paper is to focus in a two-part presentation on an understanding of our actions and their effects in selected areas of development such as environmental health; tourism; human settlements and habitat. Other aspects of the Caribbean Environment Project will be examined in forthcoming issues of CDCC/FOCUS.

REPORT ON PROGRESS

CIVIL AVIATION

The Second Meeting of Civil Aviation Experts was held in the Offices of the International Civil Aviation Organization (ICAO) in Mexico City from 24–26 January, 1979. The meeting produced a series of recommendations for consideration by the Fourth Session of CDCC, that are designed to improve civil aviation in the region.

The recommendations included the establishment of a Standing Committee of Ministers responsible for Civil Aviation in the CDCC, an ongoing programme of work, regular meetings of the CDCC Directors of Civil Aviation, consideration of a multilateral agreement, and improvements in air freight, facilitation of commercial and technical co-operation between regional airlines.

MARITIME TRANSPORT

The Third Session of CDCC gave high priority to the Maritime Transport Programme, (E/CEPAL/CDCC 35), and this has been actively pursued; however, one item of that programme was cancelled owing to lack of support on the part of CDCC member-countries, namely, the meeting on Search and Rescue that was scheduled to be held in December 1978. The purpose of that meeting was for the Inter-Governmental Maritime Consultative Organisation (IMCO) to explain the Search and Rescue Convention, and to provide an opportunity for CDCC members to prepare a Caribbean position in this vital area. Despite several maritime accidents and losses in the region in 1978, especially involving inter-island small vessels, the situation was that most CDCC members did not designate representatives to the meeting.

Other parts of the programme are proceeding according to plan. The Shipping Traffic Survey is underway; the United Nations Conference On Trade And Development (UNCTAD) and the the Inter-Governmental Maritime Consultative Organisation (IMCO) have fulfilled their commitments and revised proposals to deal with small-vessel and schooner problems; and proposals concerning regional co-operation in shipping development will be presented to the Fourth Session of CDCC in Suriname.

POSTAL SERVICES

No CDCC member has accepted the offer of assistance to establish a Postal Users Council. However, progress has been made towards the formation of a Caribbean Restricted Postal Union, and the advanced preparatory work permits for the establishment of a Union during 1979. There is acceptance that such a development would lead to marked improvement in postal services.

There may be some urgency in this matter since there is some uncertainty about participation of non-independent countries in the Universal Postal Union. Several territories in the Caribbean are affected, including the Netherlands Antilles, Belize, Antigua, St. Kitts-Nevis-Anguilla, Montserrat and St. Vincent within CDCC, as well as the Cayman Islands, Turks and Caicos Islands, the British Virgin Islands and Bermuda with respect to the movement of international mail. It is probable that membership in a Restricted Union would overcome such difficulties.

THE POSSIBILITIES OF CREATING MULTINATIONAL MARKETING ENTERPRISES

During the months of September and October, 1978, the Economic Commission for Latin America, Office for the Caribbean and the United Nations Conference on Trade and Development jointly undertook a survey to detect the possibilities of establishing multinational marketing enterprises. A report was submitted which is described as follows:

The introduction to the report describes the objective of the study namely, to identify the possibilities for co-operation open to the establishment of multinational Marketing Enterprises for semi and fully manufactured products in the Caribbean region. The first part of the report is concerned with a technical analysis of the problem as a preliminary basis for the survey. The analysis is done within the framework of the New International Economic Order and includes a survey of Latin American countries in this perspective.

A study is also made of the effects of rapid industrialisation and export diversification on economic growth with particular reference to LAFTA, the Andean Group, and the Central American Common Market. An examination is also made of the evolution of these integration systems and of the conflict of interests which emerged in some of the multinational projects being developed in the region.

The second part of the study deals with country reports for the following: Barbados, Republic of Cuba, Dominican Republic, Guyana, Haiti, Jamaica, Suriname, and Trinidad and Tobago. Identification is made of the type of products which have maximum export potential in a multinational marketing enterprise. At the end of this section is a summary of conclusions drawn from a study of interviews conducted for this exercise, emphasis being placed on points of common interests and divergence. Strategies and suggestions from each country are also outlined in this segment. Finally, proposals are formulated for the following sectors: textiles and garments, footwear, food processes, machine tools and raw materials, furniture and wood products, fertilizers, aluminium, fish and derivatives.

The third part of the Report incorporates recommendations by sectors into a specific strategy. In fact, such a strategy, conceived in a political and economic context, necessarily involves at the first stage the organization of a Task Force to support joint marketing enterprises and to lay the basis for the task of defining, identifying products, co-ordinating different participatory projects and drafting the statutes of the Company to be established.

The strategy proposed in the report is organized in three stages. The first stage involves the development of multinational enterprises in the form of co-operatives or joint export efforts. All the countries visited in the survey are in a position to participate in the first stage. The second stage will reinforce the first stage as well as involve co-operation at the level of production.

The third stage will concentrate on the integration of the preceding stages, creating a concrete multinational enterprise. This phase will be the culmination of the processes of awareness and the political will to undertake joint ventures at the regional level.

THE CARIBBEAN DOCUMENTATION CENTRE

The Third Session of the CDCC endorsed the Report of the Meeting of Librarians and Documentalists and requested the Secretariat to concentrate its efforts on the following main recommendations emanating from the Report:

- (a) Appointment of a Working Party to accelerate the establishment of a Caribbean Information System and formation of a Congress of Librarians;
- (b) Encouragement of member governments to strengthen their national information infrastructure by formulating national information policies, supported by the introduction of suitable legislation, continuing budgetary support and adequate machinery for implementation of such policies; and
- (c) Creation of adequate programmes designed to train information specialists at all levels.

Agricultural Information Network

The Secretariat initiated development of the Caribbean Information System in the fields of agriculture and socio-economic planning. With assistance from UNESCO's Regional Adviser for Information Services, guidelines for the establishment and operation of an agricultural sub-regional network were prepared and distributed to agricultural librarians and Ministries of Agriculture for their consideration.

Socio-Economic Information Network

In order to provide decision-makers, planners and project implementers with effective information services, the Secretariat has taken positive steps to establish a regional information network for socio-economic planning designed to allow for the smooth transfer from manual to automated procedures. The network will strengthen information infrastructure at the national level and secure compatibility among socio-economic information units in the region. Funds have been secured for training courses to assist library and information personnel in the Ministries of Planning and Development in the use of modern techniques which would standardize bibliographic procedures and secure bibliographic control of socio-economic information, especially government documents and technical assistance reports, thereby strengthening intra-Caribbean technical co-operation. The first training course will be held in May 1979, after which an information specialist from the CDCC Secretariat will travel to the various member states to assist where necessary in the setting up of specialized libraries.

Computer-Based System

Under its Regular Programme for the Working Party, the Secretariat has sought assistance from UNESCO to design and cost a decentralized computer-based regional information system, initially covering planning, agriculture, science and technology, industry and trade sectors. Among other tasks, the system will take immediate steps to improve services offered to the region through current manual operations.

UNESCO Adviser

In consultation with the CDCC Secretariat, the UNESCO Regional Adviser for Information Services, has to date visited five member states and assisted these governments in formulating requests for assistance through UNESCO's Participation Programme.

Congress of Librarians

The Statutes for the Congress of Librarians have been drafted for consideration by a meeting of Caribbean experts.

VIEWPOINT WITH A FOCUS ON CARIBBEAN WOMEN IN DEVELOPMENT

"Hear their cries without name".

Hear their cries of knotted watersap.....
Hear the urine dripping from an immense bladder.....
Hear the metal knife on the cord
Where the navel still burn burn.....burn.....

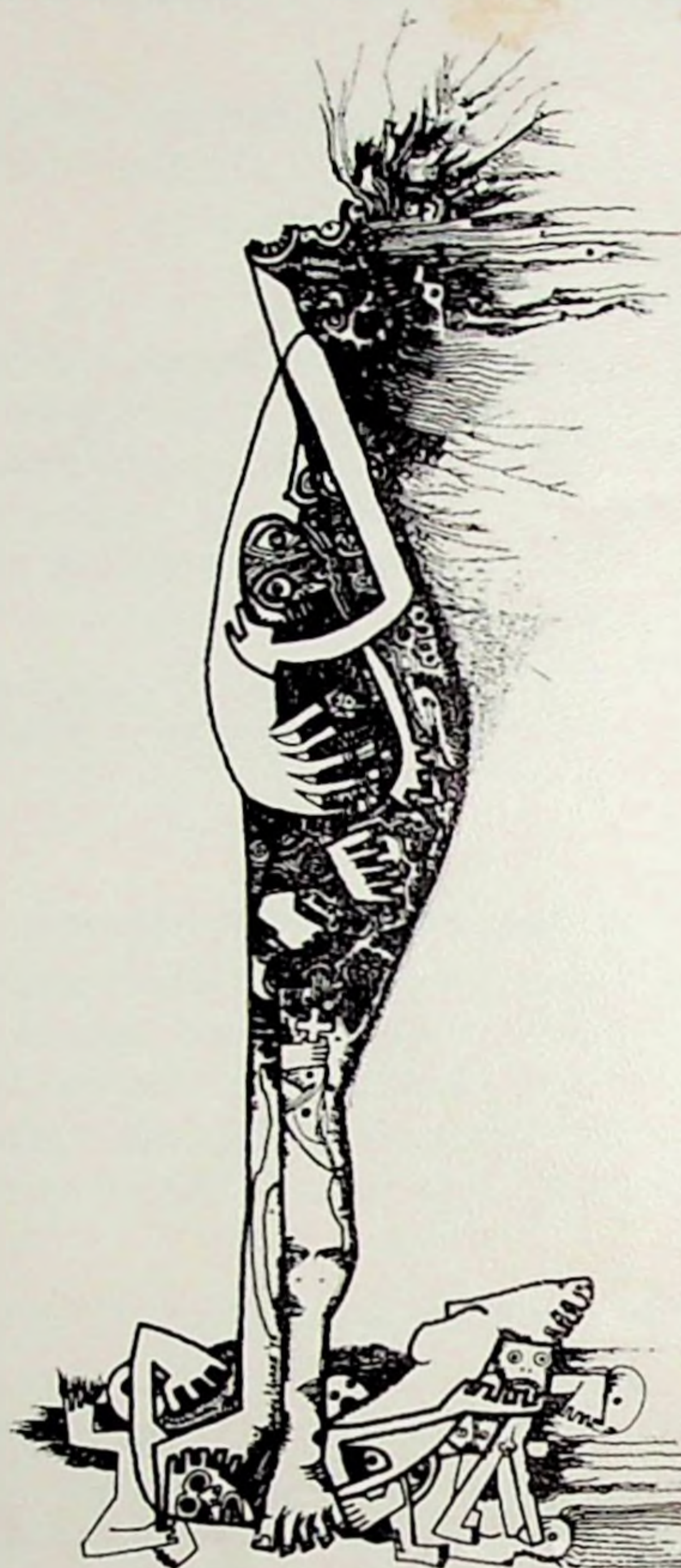
LEROY CLARKE

"It is not useful to try to consider separately the
problems of the Caribbean mother and those
of her child."

*Dr. Phillip Boyd
Chief of the Health section
Caribbean Community Secretariat*

"We are guilty of many errors and many faults, but
our worst crime is abandoning the children, neglecting
the fountain of life. Many of the things we need can
wait. The Child cannot. Right now is the time his
bones are being formed, his blood is being made
and his senses are being developed. To him we cannot
answer, "Tomorrow". His name is "Today".

*Gabriel Mistral
Chilean Poet and Nobel Prize Winner.*



*Painting by LEROY CLARKE
of Trinidad and Tobago*

OUR WOMEN AND CHILDREN NEED CARE AND ATTENTION

Priority – Women's Participation In Development

At the Third Session of CDCC, Member Governments accorded priority to **Participation of Caribbean Women in Development**. At the First Regional Conference on the Integration of Women in the Economic and Social Development of Latin America, held in Havana in June 1977, the representatives of the governments of Latin America and the Caribbean adopted a regional plan of action which established CEPAL's responsibilities in this field.

Purpose Of Regional Plan

The purpose of the Regional Plan of action is "to present a minimum action programme aimed at the promotion of equality of opportunity and responsibility for women in the common effort to overcome obstacles which hinder the development of both men and women as individuals and as members of a society".

Practical And Immediate Solutions

The programme, known as: **Participation of Caribbean Women in development; training and income generating programme**, is an integrated set of projects which are designed to produce practical and immediate solutions to the problems of integrating women in Development in the Caribbean sub-region.

A project has been submitted to the Voluntary Fund for the Decade of Women; this project includes both national and regional programmes on surveys, training, and research. The project has been approved in principle; but to date funds have not been released.

Inseparable Problems Of Mother And Child

It seems important to point here to an observation made recently by Dr. Phillip Boyd, Chief of the Health Section, CARICOM, that it is not useful to try to consider separately the problems of the Caribbean mother and those of her child.

When the United Nations proclaimed 1979 THE INTERNATIONAL YEAR OF THE CHILD, Mr. Kurt Waldheim, Secretary General of the United Nations, invited member countries of the organization to make the physical and mental welfare of the child an integral part of their programmes for social and economic development. Mankind, Mr. Waldheim said, must give the best it can to its children. All peoples, he stressed, have a responsibility to participate in joint activities which are designed to create a secure and joyful future for our children.

Mr. Carlos Martinez Sotomayor, Regional Director of UNICEF in the Americas urged the Latin American and Caribbean Region to give high priority to the future developers of the region. This is particularly important for the region, where a great deal of emphasis is placed in the development process on improving the quality of life of its peoples, and where the young numerically constitute a most important human resource. Dr. Boyd's recent report to CARIBBEAN CONTACT on the deplorable state of health of our women, children and young adults as well as a concern we share for our traditional family life values make it necessary, it seems, for us to seek a synthesis of the technical and human aspects of the healing process as a matter of urgency. In this approach emphasis is placed on the difference between curing the disease and healing the patient.

The International Year of The Child may well help us to foster family co-operation in strengthening individual responsibility for health, in achieving wholeness through self-regulation.

Limitations Of Conventional Medicine

Our medical systems have little to do with the whole person, with wholeness, health; but is, primarily, a disease care system. Our medical practice, it would appear, does not give enough consideration to the relationship of the individual person to the family, to the relationship of a person's physical condition to his/her oral and other cultural traditions, life and work.

Realistic Approach

A realistic approach to women's concern in the region seems to demand a restoration of wholeness in these areas and in the remainder of contemporary life. In essence, we are invited in International Year Of The Child to make an appointment with the Family of Man in the New World, perceived as a whole person.

Specifically, this means that we should strive for a new synthesis which combines a traditional knowledge of human self-mastery and the most sophisticated tools of modern science and technology in the integrated areas of health, communication, and family life.

The new synthesis may extend significantly our personal and collective capacities for orienting the development process in a single direction — the reciprocal maintenance of peoples and their environments in the region based on the creation of sound health practice and policies, designed to foster harmonious and socially constructive individual and family life.

In this way, we may ensure a healthy continuity of human life in the region and provide a basis for meaningful education of the children in the New World.



UNITED NATIONS – ECLA

FOCUS

Occasional Document - 12/3/79

WHAT IS CDCC?

CDCC is primarily an attempt to make obvious, within CEPAL for the first time, and also within the United Nations, a very first beautiful challenge for the countries of this region to make the concept of self-reliance a concrete way to mobilise resources, and to make these resources available for the purpose of development in all the countries.

The second concept on which we must focus is the question of the regional structure of the United Nations. We need very much to rely on regional and sub-regional bodies (such as the CDCC) in order to bring the United Nations closer to the countries, and closer to the needs of our people; thereby making it more efficient and more responsive to the hopes that were inherent in the creation of this institution.

Mr. Enrique Iglesias,
Executive Secretary,
CEPAL, Santiago, Chile.

FUNDAMENTAL AIM OF CDCC

The fundamental aim behind the creation of the Committee and its activities is the social and economic development and solidarity of our countries of our region.

Mr. Pedro Padilla Tonos,
Under-Secretary of State for Foreign Affairs,
Dominican Republic.

CDCC NEGOTIATING NEW ECONOMIC RELATIONS

The establishment of the Caribbean Development and Co-operation Committee is in line with the struggle of the underdeveloped countries to pool efforts for implementing the postulates contained in the Declaration and Plan of Action for the establishment of a New International Order, and in the Charter of Economic Rights and Duties of States.

CDCC forms part of the present overall tendency of the so-called Third World to adopt its own co-operation schemes and serves as an instrument to improve the negotiating power of Latin America and the Caribbean with third countries or groups of countries.

Mr. Ernesto Melendez Bachs,
Vice President of the State Committee of
Economic Collaboration,
Cuba.

KEY DATES

13 May 1975 – CDCC established by Resolutions 358 (XVI) which was adopted at the Sixteenth Session of the Economic Commission for Latin America.

31 October - 4 November 1975 - First Session of the CDCC, held in Havana, Cuba.

16-22 March 1977 - Second Session of the CDCC held in Santo Domingo

12-18 April 1978 - Third Session of the CDCC held in Belize City, Belize.

21-27 March 1979 - Fourth Session scheduled to be held in Suriname.

CDCC MEMBER COUNTRIES

Commonwealth of the Bahamas, Barbados, Republic of Cuba, Dominican Republic, Grenada, Guyana, Jamaica, Republic of Haiti, Republic of Trinidad and Tobago, and Suriname. Representatives of Belize and the West Indies Associated States and observers from the Netherlands Antilles also attend session of the CDCC.

THE CDCC SECRETARIAT

ECLA (CEPAL) Office for the Caribbean, Port-of-Spain – Director, Mr. Silbourne St. A. Clarke.

PRIORITY CONCERNS FOR UPCOMING FOURTH SESSION IN SURINAME

Caribbean Information Systems; Science and Technology; Council for Social and Economic Development; Elimination of Language Barriers; Development of Sub-regional Strategy for Third Development Decade.

WHO PROPOSED THE CREATION OF CDCC?

His Excellency Dr. Eric Williams proposed the creation of this Committee.

44012



Connect

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UNESCO-UNEP ENVIRONMENTAL EDUCATION NEWSLETTER

Vol. IV, No. 2. June 1979

National Training Activities in Environmental Education

Together with the organization of regional workshops, described in the previous issue of *Connect*, initiation and support of training activities at the national level constitute one of the major areas for action of the Unesco-UNEP International Programme for Environmental Education. They form part of the concerted follow-up to recommendations of the Intergovernmental Conference on Environmental Education, convened in Tbilisi (USSR), October 1977.

Specifically the Tbilisi Conference stated that:

"The training of qualified personnel is considered to be a priority activity. This holds good for both initial and in-service training, for the purpose of familiarizing teachers in formal education, organizers in nonformal activities for young people and adults, administrative personnel and educational planners and researchers with environment-linked subject matter and educational and methodological guidelines."

Thus far, support of national training activities in environmental education has been initiated with a number of Member States.

This procedure has been followed: Training activities to be undertaken are identified by Member States according to their perceived needs, whether inside or outside the formal school system. Then a project is drawn up for submission to the Unesco-UNEP Environmental Education Programme, stating goals and objectives, character and number of participants, institutions involved, planned schedule for preparation, implementation and evaluation of the proposed training activity, and details of the finances requested as well as those provided locally.

Qualified personnel for such training activities are considered to include teachers, teacher educators, curriculum developers, educational planners, administrators and supervisors. The aim, as stated at the Tbilisi Conference, is, on the one hand, to acquaint such participants with different aspects and problems of the environment and, on the other, to provide them with a basic training which could enable them to incorporate environmental education (EE) effectively into their respective activities.

Additional aims include acquainting participants with the widest possible range of educational aids, emphasizing low-cost materials and their adaptation to local conditions; stimulating institutions involved in teacher training to prepare EE training materials suitable for local urban and rural situations in both formal and nonformal education; and the exchange and diffusion of EE training materials and information.

Reports on completed national training activities will appear in Connect as they are received

Republic of Korea

The first national EE training workshop for which a report has been received was held in Seoul, Korea, 11-15 December 1978. It was organized by the Korean National Commission for Unesco following a recommendation to this effect at a previous National Seminar on the Development of Human Environmental Studies. It was also conceived as one of the steps to implement recommendations adopted at the Tbilisi Conference.

Two domestic factors accelerated the need for a national training workshop. One factor has been the new Charter for the Protection of Nature, proclaimed by the government, which has resulted in a country-wide movement aimed at raising general awareness of the environment among the public and impressing it with the importance of active participation in the solution of environmental problems. A second factor is the current governmental effort to revise school curricula during 1979 and 1980, involving a major expansion of education in environmental matters with emphasis on a new interdisciplinary approach.

There was a total of 64 participants at the Korean National EE Training Workshop: 9 from various government agencies, 10 from the Graduate School of Environment, Seoul National University, 25 from 11 provincial Boards of Education and primary and secondary schools, 15 from teacher-training and research institutes, and 5 from the press and broadcasting media.

Programme and discussions were divided into two parts: 1. Analysis of Environmental Problems. 2. Basic Direction of Environmental Education. The first part involved such themes as the natural ecosystem and economic development and efforts on the part of the government and international organizations to improve the environment. The second part dealt directly with environmental education: its goals and contents, methodologies and instructional resources, the present situation in Korean primary and secondary schools and out-of-school EE for the general public. To aid discussion on the last theme, a special report was prepared for the workshop on a survey of environmental perception and attitudes of Korean peoples.

Philippines

Organized by the Science Education Center of the University of the Philippines, a national training workshop on environmental education was held at the University's Center in Quezon City, 26-31 March 1979. The specific theme of the workshop was: Water Resources. There were 26 participants, representing 11 of the 12 Regional Offices of the Ministry of Education and Culture, 10 Regional Science Teaching Centers or Regional Staff Development Centers, and two secondary schools of Metro Manila.

The objectives of the workshop were to provide practical experiences for the teacher-participants which would enable them to: (1) learn concepts and principles of water resource protection, conservation and management as they apply to the Philippine environment; and (2) develop competence in using the immediate environment in teaching these science concepts and principles. Accordingly the six-day workshop was conducted around field and laboratory activities as well as talks and lecture-discussions, which gave participants an opportunity to ask questions clarifying the activities they had just undergone and how best adapt the knowledge acquired to their own local situations.

Stream tables were constructed in the gardens of the Science Education Center to demonstrate stream formation, channel erosion and silt deposition. Similarly the chemistry laboratory provided experience in observation and measurement of such conditions as water pH and hardness, the determination of dissolved oxygen and the biodegradability of locally manufactured detergents. At the campus lagoon, participants learned to record atmospheric and water conditions, to collect freshwater microorganisms using an improvised plankton net made of ordinary wire, local cloth material and a plastic vial, and to identify plankton. There was also a field visit to a nearby water filtration and treatment plant.

Evaluation of the workshop was obtained both quantitatively, in terms of pre-workshop and post-workshop test scores, and qualitatively, in terms of the nominal ratings, comments and suggestions of participants recorded on an evaluation sheet. On the whole the response was positive. As for future plans, the intention is to hold two more such EE workshops by the University of the Philippines' Science Education Center, one stressing soil and the second air.

Workshop on Environmental Education and Training in African Universities

A workshop on environmental education, training and research in African universities was held in Nairobi, Kenya, from 3 to 9 December 1978. It was convened by the Association of African Universities, hosted by the University of Nairobi and sponsored by the UN Environment Programme (UNEP), the Agence de



coopération culturelle et technique, the Commonwealth Secretariat and the Association des universités partiellement ou entièrement de langue française.

The workshop was conceived as one of the follow-up activities of the Tbilisi Conference and had these long-

term objectives: (1) to further environmental education, training and research in the African region at the university (or post-secondary) level through action-oriented programmes and by establishing networks of institutions; and (2) to help develop and provide personnel in the various countries knowledgeable in the principles and practise of environmental management and environmentally sound development.

The immediate objectives were to bring together a group of selected experts and key personnel in the fields of environmental education, training and research from African universities; to review the present situation of these areas in African universities; to identify the best measures for the collection, exchange and dissemination of information about environmental

education, training and research and ways of encouraging and supporting their development in African universities.

The workshop was attended by 161 participants. Ninety-six came from 50 universities, 19 from UN agencies and organizations, 16 from governments and 30 from various bodies and post-secondary educational institutions. University participation included vice-chancellors, deans of faculties, directors of research institutes, senior professors and scientists.

The work was primarily organized by plenary sessions and task forces, the latter bringing forward recommendations on specific themes dealt with in plenary session for consideration, amendment and adoption at the closing meeting. These themes were dealt with and discussed: (1) the conceptual and philosophical basis for environmental education, training and research; (2) problems and prospects in these areas, especially concerning learning about environmental systems, human and other natural resources and human intervention in the environment; and (3) institutional and pedagogical approaches to environmental education, training and research in African universities.

A total of 85 recommendations were adopted by the workshop in Nairobi. They were related to these central topics: teaching and research; institutional

frameworks for teaching and research; linkages between teaching and research and policy-making systems; and institutional networks in Africa for environmental education, training and research. They were addressed to these "target sectors": African governments and universities, international agencies and organizations and nongovernmental bodies.

Recommendations directed to African universities referred to: (1) the need for environmental education and training, stressing interdisciplinarity; (2) institutionalizing environmental education and training within and between universities; (3) content and methods of teaching with an emphasis on participation in a problem-solving approach to local environmental problems; (4) potential audiences for university EE programmes from the general public to specialized professional groups; and (5) research with an accent on the real environmental needs of society.

Workshop participants brought papers on the state of environmental education, training and research in their universities and countries. These will be compiled and published. Copies of the report and other publications concerning the African workshop may be obtained from: Secretary General, Association of African Universities, P.O. Box 5744, Accra-North, Ghana; and EETU, UNEP, P.O. Box 30552, Nairobi, Kenya.

Science Education and the Environment

A three-day conference on the theme "Science Education for Progress - a Regional Perspective" was organized, with Unesco support, in Barbados, 20-22 April 1979. The meeting was attended by a total of about 130 participants from countries in the Caribbean subregion, from North, Central and South America and from a few countries in Europe and Africa. It was cosponsored by the International Council of Associations for Science Education (ICASE), the Caribbean Regional Organization of Associations for Science Education (CROASE) and the National Science Teachers Association (NSTA) of the USA.

The main focus of the conference was on science education for development and on the educational significance of the social implications of science and technology. The conference gave considerable attention to environmental themes. One whole day was devoted to a study in depth of the topic « Energy » with particular reference to the needs and possibilities of countries in the Caribbean.

The conference went on to discuss the teaching of a theme such as "energy" in a context which brings out its social relevance and the importance, for national development, of wise policy- and decision-

making. It was agreed that, in the context of social relevance, a more interdisciplinary approach to the curriculum was essential, especially in the fields of natural science and social studies.

One discussion group of the conference was devoted to the topic "Using the Environment to Teach Science". A series of practical activities were reviewed which could be carried out in the school grounds. Each of these was an attempt to contribute to an understanding of one or more fundamental concepts in environmental education.

Integrated science curricula for primary and secondary levels developed in the Caribbean were reviewed during other conference sessions. Some of these courses, such as the Belize project "Environmental Approach to Primary Science", include many environmental themes related especially to local agricultural and industrial development.

A full report of the conference will be published, later in 1979, by the International Council of Associations for Science Education. It will be obtainable from Mr. W. King, School of Education, University of the West Indies, Cave Hill, Barbados.

With the report below, Connect continues its series on national EE activities and invites similar reports from other Member countries

Environmental Education in the United States

The roots of environmental education in the United States grew out of educational movements concerned with appreciation of nature, conservation of natural resources and use of the outdoors for teaching. It received national attention in 1970, when the U.S.

proclaimed one week in May as "National Teach-In on the Environment".

In the same year, the U.S. Congress passed the Environmental Education Act and established the Office of Environmental Education within the Department of

Health, Education and Welfare to administer the Act. This legislation helped to provide the leadership and funds for local, state and national initiatives in the field of environmental education. Specifically, the Environmental Education Act has financed over 500 projects since 1971 in the areas of community awareness, instruction and curriculum, personnel training and evaluation and dissemination. The Office of Environmental Education has identified a key governmental individual in each of the fifty states as the contact for environmental education. Periodically they are brought together for exchanging ideas on furthering EE throughout the country.

In addition to the national legislation for environmental education, several states have had similar legislative success in stimulating EE activities at the state level. The California EE Act, for instance, empowers the State Department of Education to encourage the development of educational opportunities specifically related to environmental education. The New Jersey EE Act provides for school district programmes, regional facilities for students and teachers, and curriculum research and development centers. In Florida, the Environmental Education Act was passed to stimulate awareness and understanding of the environment and develop problem-solving skills among students, teachers and administrators in the state. The Wisconsin statutes require that the conservation of natural resources be taught in every elementary and secondary school. In addition, adequate instruction in the conservation of natural resources is required for teacher certification.

Since 1970 there have been six national conferences, each with a different EE focus. The sixth and most recent was a national leadership conference on environmental education, which was a follow-up to the Tbilisi Conference, to review recommendations from all of the previous national and international meetings. The outcome was the drafting of 16 definitive recommendations relating to a national strategy for environmental education with each recommendation targeted for implementation along an es-

tablished timeline. (See *Connect*, Vol. III, No. 3, September 1978.)

In addition, three major professional organizations have sponsored annual conferences and provided an arena for the exchange of information. They are the Conservation Education Association, the National Association for Environmental Education and the American Society for Environmental Education.

In order to obtain better communication and coordination among all federal agencies with an EE interest, the Federal Interagency Committee on Education formed a subcommittee on environmental education. This subcommittee has served to bring agency representatives together several times a year to exchange information on their EE approaches and activities. It has also played an important role in helping to prepare the U.S. Delegation to the Intergovernmental EE Conference at Tbilisi.

A consortium of nongovernmental organizations has also been formed to link groups involved in environmental education. It is called the Alliance for Environmental Education, has a combined membership of 30 organizations and 12,000 individuals, and meets regularly to discuss environmental education issues of mutual concern and to take joint action when appropriate. Regional coalitions have also been formed to exchange ideas of common interest. These include the Western Regional EE Council, the Great Lakes EE Council, the Southern Regional Council and the Northeast EE Development.

A *Journal of Environmental Education*, dedicated to the publication of research activities in environmental education, has been created. In addition, there has been established a computerized EE diffusion system, Educational Resources Information Center (ERIC) (see p. 8), in which all relevant EE activities are available on microfilm at centers located throughout the country or by mail for a reasonable price.

For additional information on EE activities in the U.S., write: International Organization Division, Department of State, Washington, D.C. 20520, U.S.

Ekofilm Festival

The sixth international Ekofilm Festival, whose theme was "Technology in the Service of the Human Environment", was held in Ostrava, Czechoslovak Socialist Republic, 21-25 May 1979. One hundred and fourteen films had been submitted to the environmental film festival's organizers from which 100 films representing 19 countries were selected for the competition. The principal prizes were rewarded, in this order, to documentary films of the following countries: Federal Republic of Germany, Czechoslovak Socialist Republic, USSR, Bulgaria, Poland, Netherlands, Finland, UK and USA.

A regular feature of the Ekofilm Festival has been its panel discussions and seminars accompanying the showing of the documentary films. This year's panels were devoted to the subject and film treatment of: (1) protection of the atmosphere from industrial pollution; (2) noise in the human environment; (3) current problems in the preservation of water quality; and (4) the impact of large-scale agriculture on the environment.

The festival's seminar was of special interest, since it concerned the role of films and television in environmental education of both specialists and the general public. Over 50 educators, filmmakers, TV producers, journalists and other media specialists par-

ticipated. They concentrated on constructive criticism of the environmental films shown from the point of view of their educational effectiveness vis-à-vis youth and adult audiences inside and outside the formal school system. Emphasis was placed on a clear statement of the problem coupled with its solution reached through an interdisciplinary as well as a problem-solving approach.

In addition there was a professional discussion at the seminar on the techniques of documentary filmmaking - appropriate lengths for different age levels, proper mix of entertainment and instruction, audio and visual, etc. - with the goal of improving pedagogical and educational content without loss of general appeal. The encouragement and improvement of TV programmes on the environment, which all participants stressed as being of major importance in public education, was similarly discussed in terms of form, content and techniques. Lastly ways and means for improving the international exchange of EE films and TV programmes were also discussed and explored.

For information about procurement of movies shown at the Ekofilm Festival, write: RAPID, Czechoslovak Publicity Agency, Tyršova 7, 701 43 Ostrava 1, Czechoslovakia.



EE Institutions and Communications

Directories on environmental education institutions and programmes are being prepared as part of the International EE Programme which is devoted to promotion of the exchange of information and experience in this field. Please send details and documentation to *Connect*, address on back page. The following items have lately been received.

Fondation Universitaire Luxembourgeoise, rue des Déportés 140, 6700 Arlon, Belgium. This institution's stated aim is "to stimulate and coordinate applied scientific research and some forms of postgraduate studies, namely in the field of environmental studies and psychopedagogy, in cooperation with other Belgian universities and equivalent institutions." The Environment Department of its Interuniversity Centre for Environmental Studies offers a research programme based on problems of the quality of life, economic development and promotion of the rural environment with an emphasis on inter- and multidisciplinary. Studies can lead to a doctorate, a master's degree or a certificate in environmental studies.

Université Catholique de Louvain, Belgium. Since 1971, this university has had courses, seminars and field work on the environment, particularly pollution, for both general and specialized educational purposes. The instruction is highly inter- and multidisciplinary. A 26-page descriptive brochure in French is available from the university's Service d'études, Krakenstraat 3, 3000 Louvain, Belgium.

Environmental Studies Association of Victoria, 324 William Street, Melbourne 3000, Australia. This association is nonprofit and nongovernmental and has been involved in EE since 1972. It offers a variety of study courses ranging from one to three days, which are generally open to all. However there is a special emphasis on teachers and their in-service education needs. Further information as well as the newsletter *ESAV News* are available from the association at the address above.

Partners for Livable Space, 2120 P Street NW, Washington, D.C. 20037, U.S.A. Nonprofit and nongovernmental, this coalition of organizations and individuals is dedicated to improving the quality of life of

its nation's communities. One major area of action is promotion of public awareness by means of publications, mass media, a syndicated newspaper column, a newsletter for members and a news magazine titled "Livability".

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From Dr. Kiew Bong Heang, Malayan Nature Society, P.O. Box 750, Kuala Lumpur, Malaysia: "The Malayan Nature Society, a nonprofit, nongovernmental organization formed in 1940, is deeply interested in promoting environmental education in Malaysia and its neighboring countries, in addition to nature studies and conservation education. The Council of the Society has set up an Education Committee for this purpose. The programme is planned for a three-year period (1979-1982). Phase I will involve a workshop of teachers and scientists to identify EE problem areas for Malaysia. Phase 2 will involve soliciting of relevant scientific personnel to develop needed resource materials which will be tested in the state of Selangor. Phase 3 will involve the production and distribution of the tested materials. If funds permit, the materials will be sent on request to other ASEAN countries. In planning this ambitious programme the Malayan Nature Society takes the view that if it is willing to do the work, there will be other organisations which will come forward with funds to support it."

From Mr. J.H.P. Sankey, Liaison Officer, Field Studies Council (International), Preston Montford, Montford Bridge, Shrewsbury SY4 1DX, U.K.: "The Field Studies Council runs short residential courses in nine centres in England and Wales on such environmental subjects as conservation, plant and animal ecology, birds, soils, geography, geology and many others for groups from schools and colleges as well as for amateurs of all ages. Special courses are organized on request for groups from the Continent and visits can be arranged to places of interest near a centre. Special fee arrangements are made for groups. The Field Studies Council is a private, nonprofit organization involved with environmental education since 1946."

A note of clarification has been received from Dr. Nilay Chaudhuri, Chairman, Central Board for the Prevention and Control of Water Pollution, New Delhi, India, regarding an item appearing in *Connect*, Vol. III, No. 4. The item quoted *Development Forum*, which is published by the UN's Centre for Economic and Social Information, to the effect that "a government committee reported that the water in New Delhi is so badly polluted it should not even be used for watering gardens." Dr. Chaudhuri kindly re-

quests that the item be clarified. "The fact is," he writes, "the water being supplied to New Delhi by the Municipal Corporation of Delhi is wholesome and safe, because the water is obtained from the River Jamuna upstream of the Wazirabad Barrage and is adequately treated before it is supplied to the public. It is the raw water of the River Jamuna downstream of the Barrage which is very much polluted and the quality of this raw water at times does not permit its use even for gardening."

EE Publications and News

Tropical Forest Ecosystems: a State-of-Knowledge Report Prepared by Unesco/UNEP/FAO. Paris, Unesco, 1978. 684. Hard cover, 180 F; soft cover, 144 F. (Natural Resources Research, XIV).

This report aims at providing a clear summary of knowledge of the structure, functioning and evolution of tropical forest ecosystems and of the human populations that live within and around these ecosystems. It also describes some of the main patterns of use of these ecosystems. In presenting this information, the report attempts to identify gaps in knowledge, to present recommendations for future research, to indicate appropriate methodologies for problem-oriented studies on tropical forest ecosystems, to describe examples of land and resources management and examine some of the reasons for success or failure in specific concrete situations, and thus to highlight needs for future orientation in land-use and management strategies.

The report comprises three principal parts. Part I chiefly contains the research results of biologists and other natural scientists. Fourteen chapters deal with the description, functioning and evolution of tropical forest ecosystems, covering both disturbed and undisturbed situations. It includes information on composition, structure, biomass, primary and secondary productivity, water budgets, nutrients cycling, energy flow, stability, species interactions, succession, growth, regeneration, pests and diseases.

Part II is of particular interest to demographers, social anthropologists, ethnologists and other scientists, as well as resource managers and land planners. It is mainly concerned with the biological behaviour and socio-cultural aspects of the human populations living in and around tropical forest ecosystems and with their patterns of use and management.

Part III of the report contains eight regional case studies, which describe specific tropical forest ecosystems from various viewpoints (either basic research or utilization and management) to illustrate the kind and orientation of research.

— From *Nature and Resources*, Vol. XIV, No. 3, July-September 1978.

Man and His Environment: An overview of Unesco's involvement, 1979, 65 pp.

The content of this brochure, as indicated in the Preface, "has been extracted from *Thinking Ahead*, a book which explains the Medium-Term Plan of Unesco for the period 1977-82. Each of the brochure's seven sections is devoted to one of the objectives of the Medium-Term Plan concerning Man and his Environment" — namely, (1) Knowledge of the earth's crust and of its resources; (2) The biosphere: man's influence on his environment; (3) Sharing water resources; (4) Man and the sea; (5) Man and the city; (6) Safeguarding the heritage of mankind and preserving the natural environment; and (7) Knowing how to live: education on the environment. "The texts give a comprehensive account not only of the main guidelines for the Organization's activities in the coming years for each objective, but also of the reasons which dictated their choice and of the evolution of relevant action. No attempt is made here to give detailed descriptions of current or planned projects, nor of the ways and means by which these projects are implemented." For a more detailed description of Unesco's involvement in environmental education (Section 7) through the Unesco-UNEP International EE Programme, see *Connect*, Vol. III, No 4, December 1978.

For information about the above items, write: Unesco Press, 7, place de Fontenoy, 75700 Paris, France.

"*People, Water and Sanitation*" is the title and subject matter of the 191-page Spring 1979 issue of Unicef's *Assignment Children*, a journal concerned with children, women and youth in development. Part I concerns lessons learned from past experiences in water supply and sanitation for all. Part II deals with urban slums, "the sector left out of planning". These dossiers are followed by specific case studies: "Methodology — Paraguay", "The Village Level — Colombia", "The National Level — Bangladesh", "Training — Malawi", "Maintenance — Tamil Nadu, India", "Shared Technology — Mali" and "Women — Kenya". Lastly there is a report on a WHO meeting concerning "Appropriate Technology for Improvement of Environmental Health at the Village Level", held in New Delhi, India, 16-20 October 1978. For further information, write: Unicef — *Assignment Children*, Villa Le Bocage, Palais des Nations, Geneva 10, Switzerland.

The State of the Environment in OECD Countries is a 15-page reprint summarizing a report published by the Organisation for Economic Cooperation and Development. It covers a 10-year period (1969-1979) and is available in English or French from the OECD Observer, 2, rue André-Pascal, 75775 Paris, France.

At the close of a meeting of the Ministers for Environment of OECD countries, 7-8 May 1979, a declaration was adopted stating that Member governments "will support the promotion of environmental objectives and awareness in the field of education" and "they will encourage public participation, where possible, in the preparation of decisions with significant environmental consequences, inter alia, by providing, as appropriate, information on the risks, costs and benefits associated with the decisions."

Forum, No. 4/78, published by the Council of Europe in English, French, German and Italian, includes a 12-page section on "Environmental Education" for both rural and urban areas. Address: 67006 Strasbourg Cedex, France. A memorandum in English and French on the second meeting of the Committee of Experts on Environmental Education and Training, 26-27 September 1978, is also available.

Parks and People is a 28-page report on a European Conference for Naturparke/Parcs Naturels/National Parks (UK)/and Equivalent Reserves, 25-29 September 1978. An entire day was devoted to "Interpretation/animation/and Environmental Education" with special reference to the German experience and on the day following to the French écomusées. Write: Principal, Losehill Hall, Castleton, Derbyshire S30 2WB, UK.

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Urban Management Processes is a 154-page report, complete with background papers, on the proceedings of a seminar of the same name which was sponsored by the Australian National Commission for Unesco and held in Adelaide, Australia, 22-25 August 1977. It may be procured by writing the Commission, care of Department of Education, Woden ACT, Australia 2606.

Development of Environmental Education in Australia: Key Issues is a 104-page publication with sections on: (1) the definition and aims of environmental education; (2) a strategy for the development of EE in Australian schools; (3) the role of supporting organizations in this development, such as government authorities, teacher associations, tertiary education in-

stitutions and community organizations; and (4) a survey of EE needs in Australia. *Report of the Curriculum Development Centre Study Group on Environmental Education*, 48 pp., contains the views, recommendations and suggestions of members of the EE Study Group on current needs and future actions. For further information on both publications, write: Ms. Annette Greenall, EE Coordinator, Curriculum Development Centre, P.O. Box 632, Manuka ACT, Australia 2603.

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JEP 4: Teacher's Manual is a spiral-bound trial edition in English only of a text designed for the joint purpose of teaching English and the principles of ecology to young people. JEP stands for Junior English Programme, which was created by the Centro de Linguística Aplicada of the Instituto de Idiomas Yazigi, Ave. 9 de Julho, 3.166 São Paulo, Brazil, to whom requests for the comic-book style teacher's manual should be addressed.

* * *

De Toute Urgence is a magazine devoted to the rational use of the environment and its resources, published by the Conseil québécois de l'environnement with the support of IUCN. Vol. 10, No. 1, March 1979, includes articles on the accident at the Three Mile Island nuclear installation near Harrisburg, Pa., U.S., as well as other articles and book reviews of environmental education interest. For further information, write to the Conseil québécois de l'environnement, C.P. 39, Sillery, Québec, G1T 2P7, Canada.

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Three publications have been received from Universidad EAFIT (Escuela de Administración y Finanzas y Tecnologías), Medellín, Colombia: (1) *Documento de Estudio sobre Educación Ambiental - 4 Modelos*; (2) *Temas Administrativos 30* (largely on environmental management); and (3) *Ensayo sobre Eco-Administración*. For information, write Universidad EAFIT at the address given.

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The Educational System Applied by the Administration of the Krkonoše National Park is a small pamphlet describing the many EE activities of the well-known national park of Czechoslovakia involving schools, nature groups, lectures and meetings, a museum, library and documentation center.

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A 162-page *Report on Environmental Education in Denmark* in the light of the Tbilisi Intergovernmental EE Conference, which is also reported on in length, is now available in Danish from: Ministry of National Education, Frederiksholms Kanal 21-25, 1220 Copenhagen, Denmark.

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Nouvelles de l'écodéveloppement is a quarterly in French only which has been appearing since February 1977. It is edited by the Centre international de recherche sur l'environnement et le développement of the Ecole de hautes études en sciences sociales and published by the Maison des sciences de l'homme with the financial support of UNEP. As the title suggests, news and articles concerning ecodesvelopment, or ecologically sound development, constitute the focus of the magazine. It is distributed freely to institutions

and individuals such as libraries, documentation centers, researchers and the like. For information, write: *Nouvelles de l'écodéveloppement*, 54, boulevard Raspail, Bureau 309, 75270 Paris Cedex 06, France.

Campagne d'information et d'action éducative sur l'environnement: Région Provence-Alpes-Côte d'Azur (1977-1978) is an interesting folio-size 74-page brochure prepared by the Collège méditerranéen de réflexion et d'échanges sur l'environnement, 2 rue Beauvau, 13001 Marseille, France. Chapters deal with "Environment and Educational Activities", "Environment and the General Public" and "Environment and the Commune".

* * *

Zeitschrift für Umweltpolitik (Journal for Environmental Policy) is a new quarterly "intended to work as a creative force in environmental policy by virtue of both its problem-oriented approach and its high theoretical standards." Articles are primarily in German with up to a third in English. All articles have a German and an English résumé. For information, write the publisher: Deutscher Fachverlag GmbH, Schumannstrasse 27, 6000 Frankfurt/Main, Federal Republic of Germany.

Leben und Umwelt (Life and Environment) is normally a bimonthly publication (monthly on occasion) devoted to biology and the protection of the environment, both natural and built. For further information, write: Prof. Dr. H. Bruns, Editor, Weiherallee 29, D 6229 Schlangenbad 5, Federal Republic of Germany.

A series of publications in German has been received from the University of Essen. Four have been issued since September 1977. They deal with: (1) the university's EE materials centre; (2) national and international EE conferences from Stockholm to Tbilisi and afterward, interdisciplinarity, etc.; (3) EE trends in the Federal Republic of Germany and the promotion of EE in schools of the EEC countries; and (4) the specific contribution of the earth sciences to an interdisciplinary EE university curriculum. For information, write: Prof. Dr. Peter Schneider, Zentralstelle für Umwelterziehung, Universität Essen - GHS, FB 9, Universitätsstrasse 5, 4300 Essen 1, Federal Republic of Germany.

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The Dakar-based Environment Training Programme known as ENDA is publishing an interesting series of documents on appropriate technologies for the developing world - windmills, tractors, village mechanization, natural fertilizers, etc. They are appearing as supplements of the organization's quarterly magazine *African Environment*. For information or literature, write: ENDA, B.P. 3370, Dakar, Senegal.

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La Escuela y Su Medio (The School and its Environment) is a 54-page booklet on school experiences in the Spanish province of Alicante, 1976-1978, which involved use of the local environment for pedagogical purposes. It has been printed by Sucesor de Such, Serra y Compañía, Avenida de Orihuela, 51, Alicante, Spain.

* * *

REED (Review of Environmental Education Developments) is a newsletter in its seventh year, particularly useful for its information on environmental education in Great Britain. It is produced and

published by the Directorate of the Council for Environmental Education at the School of Education University of Reading, London Road, Reading RG1 5AQ, U.K.

* * *

ERIC (Educational Resources Information Center) is a national information system, a source for obtaining documents on education (environmental and other) and a network of decentralized information centers. It collects, screens, organizes and disseminates educational reports, furnishes copies of educational documents at nominal cost, prepares interpretative summaries, research reviews and bibliographies on critical topics in education and services decentralized information centers throughout the U.S. *ERIC* "clearinghouses" monitor, acquire, evaluate, abstract, index and list current information relevant to their particular educational area. The "clearinghouse" for science, mathematics and environmental education (*ERIC/SMEAC*) may be addressed at The Ohio State University, 1200 Chambers Road, 3rd Floor, Columbus, Ohio 43212, U.S. It distributes its own *EE* newsletter.

Environmental Awareness Through the Arts is a spiral-bound, 198-page teacher's guide to the use of art for awakening environmental awareness in students. It has a carefully planned core of curriculum activities with some illustrative materials. For information, write: Ms. Myrtle Kerr, Supervisor, Art/Humanities, Department of Education, P.O. Box 44064, Baton Rouge, Louisiana, U.S.

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A collection of colorful wall posters and other materials has been received from the Chief Conservator of Forests, Forest Department, P.O. Box 228, Ndola, Zambia, together with this communication: "We in the Forest Department of Zambia spend a good deal of time producing materials, posters, wall teaching features and pamphlets on the need for forest conservation in particular and environmental conservation in general. Naturally much of the material is Zambia-oriented, but much is applicable to most developing countries in tropical and semi-tropical conditions and might also be of value to others."



MAB in Thailand

A National Seminar on Planning and Management of Environmental Research Projects was held in Bangkok, Thailand, from 11 to 22 December 1978, with the support of Unesco. The seminar was convened by the Thai National Committee for the Man and the Biosphere (MAB) Programme, assisted by Unesco consultant Dr. R.A. Hynes of Griffith University, Australia. The overall aim of the seminar was to help increase the effectiveness of research in contributing to pragmatic solutions to environmental problems in Thailand. The seminar involved lectures and practical exercises. It

concentrated on such major issues as identification of field projects through systematic analysis of problems, techniques for selection of projects, the design of research projects, guidelines for writing of project proposals and techniques of project control and management. A 390-page book of seminar materials was compiled for use by seminar participants. The seminar was organized within the framework of MAB Project A on tropical forests and the UNEP-Unesco Programme for the development of ecological pilot projects in tropical forest areas.



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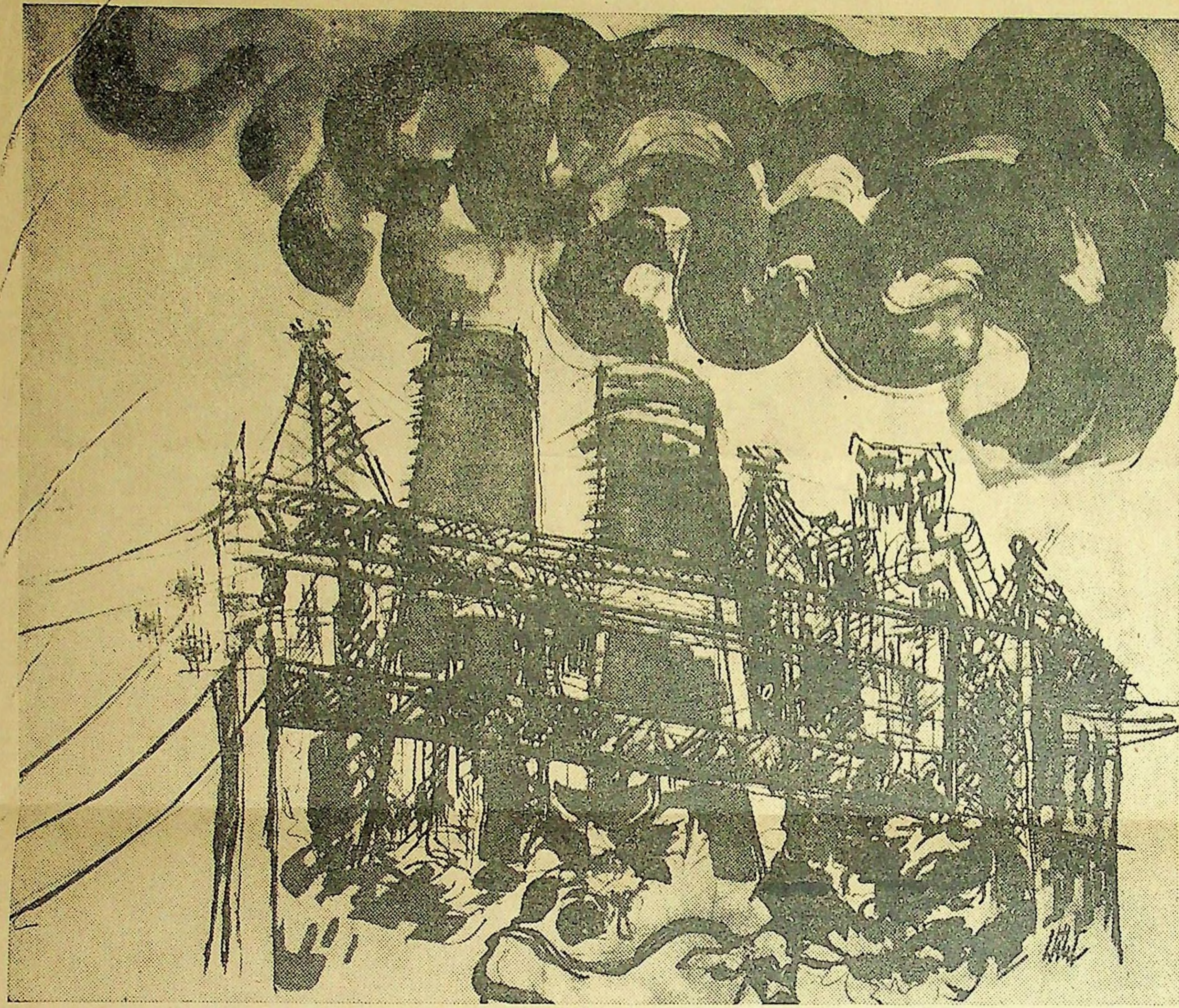
Connect is also published in French as *Connexion*, in Spanish as *Contacto*, in Russian as *Kontakt* and in Arabic as *Arrabita*. Contents are exactly the same in all editions. *Connect* is free. Reproduction of its contents is not only permitted, it is solicited and encouraged.

Connect

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POLLUTION



The Air We Breathe The Noise We Hear

by G. S. 'George' and Ancy Abraham

AIR pollution is a relatively recent phenomenon even in the advanced countries of the world. In India, the magnitude of the problem has not been fully assessed, except in a few regions like Chembur (Bombay). On the whole, pollution from industry appears to pass unnoticed. One explanation for this is the restricted spatial spread of industry, another could be the absence or ineffective functioning of air monitoring stations in major cities and towns. The air monitoring stations set up by the National Environmental Engineering Research Institute (NEERI) in Bombay, Calcutta, Delhi, Madras, Hyderabad, Kanpur, Jaipur, Ahmedabad and Nagpur are unable to formulate 'realistic standards' for permissible levels of air pollutants and lack sophisticated monitoring and tracking instruments. Above all, there is little enthusiasm for such concepts as environment and ecology.

This was borne out in an interview we had with Dr B. D. Nag Chaudhuri, Vice-Chancellor of Jawaharlal Nehru University and former Chairman of the National Committee on Environmental Planning and Co-ordination, who expressed regret over the purely recommendatory role of the Committee. "It is only in the case of new industries that the Committee has been able to get its recommendations implemented." For instance, a condition for establishing new paper mills is that no mercury filters should be used. However, nothing could be done in the case of earlier industries and plants. The Committee, for instance, had gone into the working of the Indraprastha power station, but due to the heavy cost involved in modifying the plant and installing anti-pollution devices, nothing came out of the investigative exercise, except a long list of recommendations that are gathering dust.

In India today, major urban areas and even the countryside are exposed to air, water and noise pollution, leading to health hazards and extinction of plants and animals. The common pollution parameters in Delhi are sulphur dioxide, nitrogen dioxide, hydrogen sulphide, oxidants, and suspended particulate matter. To determine the pollution effects of industrial plants and power stations on the lives of workers employed in them and people in the surrounding areas, we studied the functioning of the Indraprastha power station, a unit under the Delhi Electric Supply Undertaking (DESU). It is a 38,000 KW installation set up in financial co-operation with the US Government. It was commissioned in September 1973. Power is transmitted to the plant from Punjab, as also to Haryana and Uttar Pradesh.

The main complaint against the Indraprastha power station is about the significant quantities of fly ash emanating from its three chimneys. Smoke from the chimneys (205 ft, 200 ft and 200 ft high) keeps pouring out from early in the morning till late in the evening. The fly ash from the chimneys is carried by air currents to the offices and residential complexes of Indraprastha, Nizamuddin, Bengali Market, the trans-Jamuna colonies, and, on certain days, even to far-away South Delhi colonies right up to Vasant Vihar.

Besides settling down on public buildings and residential areas, the fly ash also pollutes water, causes skin irritation and may even lead to tuberculosis among the workers employed at the power station.

In order to study the effects of the fly ash and loud noise produced by the power plant, we interviewed various categories of employees including those belonging to Classes III and IV,

the supervisory staff (middle-rung technicians and engineers) and members of the senior management comprising highly qualified engineers. The response patterns showed a marked divergence at the two ends of the continuum. There was, however, a greater convergence of views between the supervisory staff and the middle-rung engineers, and the ordinary workers at the plant. Among the employees, the coal-yard workers (at the adjoining Rajghat power house which is a part of the Indraprastha plant complex) and the boiler workers were more seriously affected by the fly ash and high noise levels.

Hari Chand, a Class IV employee, looks what he is—a boiler worker who is a tuberculosis patient, lean, gaunt, and flat chested, eyes full of anguish. Hari Chand's story is a sad one. He joined the power station in 1971 when he was in normal health. Within three years, he began having spells of cough and chest pain. In 1976, when all the workers were X-rayed, he was found to have developed tuberculosis. He was one among 60 who had caught the disease. Most of them were Class III and IV employees. Many secondary cases of TB were also detected.

According to the vice-president of the workers' union, of the 1,000 workers at the complex, nearly 300 have contracted tuberculosis. The workers believe that most of the TB cases are the result of fly ash inhalation for long periods. The workers support this view by saying that such a correlation was established by the Irwin Hospital doctors who conducted the X-ray examination in 1976. Besides the TB cases, a large number of workers have developed breathing difficulties. Many more suffer from varying degrees of deafness and high blood pressure.

The very high noise level which caused these troubles was experienced by us. There was a numbness about our ears which lasted over 15 minutes after emerging from the power station. Nowhere did we see a worker equipped with protective ear-masks or face-masks.

Why were the workers not examined at regular intervals at a much earlier stage? Are the protective masks provided for the coal-yard and boiler workers effective? Why are the workers not provided with protective ear-plugs? Do the power station authorities provide free medical facilities and/or compensation for workers affected by fly ash. According to the workers, their demand for a periodical examination was conceded by the management only in 1976. "The face-masks are defective and outdated. Most of us also suffer from eye ailments. No protective ear-masks or plugs have been supplied to us despite repeated requests."

According to the workmen, no compensation, except treatment of the affected workers, is provided by the power station authorities, and even this depends on the availability of beds at the Mehrauli TB hospital. Only six beds have been reserved by DESU for its power plant employees.

Could the high fly ash output and the extremely high noise levels be due to the design of the plant, its defective functioning, outdatedness, the quality of the coal used, or lack of efficient anti-pollution and anti-noise measures? Most of the workers and middle level supervisory and management staff feel it is so. Part of the high fly ash output is also due to the quality of the coal used in the plant—the bituminous variety containing 30-33% ash. The better quality coal goes to the steel plants. However, while it is true that the ash con-

tent is high. Its 'nuisance effect', the employees said, is due to lack of effective anti-pollution measures. Another reason is that the power plant was initially designed for operation on coal of an ash content of around 40-45%. Thus, with the low sulphur coal used here, the electrostatic precipitator was not in a position to function effectively to trap most of the outgoing ash. The electrodes placed just after the boiler and below the chimneys are also not cleaned frequently.

About the extremely high noise levels, nothing at all seems to have been done. In many foreign countries there are laws against excessive noise levels at power stations, but not in India. While the noise affects workers within the plant, the fly ash hazard is shared by both the workers and people outside the plant. People interviewed in the immediate vicinity of the power station—office-goers, shopkeepers, students at the nearby Delhi School of Architecture—complained about the fly ash. Most of the offices there keep their windows shut. "Often we are forced to open them for a few minutes despite the fly ash, since the air inside the office gets stale and stuffy." On certain days, when the smoke is particularly strong, the surrounding areas are overlaid by a fine mist-like canopy.

Senior members of the management admit that some sectors of the power station, especially Unit-1 of the thermal power generating unit (Japanese), were functioning below par, because of wear and tear of the machinery affecting its mechanical precipitator. This unit causes the maximum pollution. Since Unit-1 has run most of its life, it is not economical to incur much expenditure on it. A new electrostatic precipitator, they said, was to be installed soon. It would be supplied by BHEL. As for Units 2, 3 and 4, the original suppliers of the machinery had agreed to effect improvements in it and a sum of Rs 2 crore had been sanctioned for this purpose.

To clean the electrodes, they explained, the temperature of the boiler had to be brought down from a level of about 2,000°F, when under full operation, to about 30-40°C. The cooling took time and hence the difficulty in cleaning the electrodes frequently. Besides, the electrostatic equipment, which incorporates the electrodes, cannot function much better with the type of low sulphur coal which is used at the power station, unless the capacity of the electrostatic precipitator is increased by about four times. This would cost DESU about Rs 6-7 crore. When it was pointed out that this difficulty could be overcome by equipping the plant with fabric dust collectors which are particularly efficient in the case of low sulphur coal (which is used at this plant) and operating at constant efficiency, the management staff seemed to be at a loss for words. The cost of equipment and operation of a fabric filter compares favourably with that of an electrostatic precipitator. Moreover, it will greatly reduce the levels of fly ash in the atmosphere.

The measures taken to control the pollution level at the power station reflect a lack of imagination and, probably, resources to back it up. The authorities say they are constantly monitoring pollution levels and testing the efficiency of the electrostatic precipitator. Nothing, however, seems to be happening beyond the monitoring stage, since statements about having "increased the frequency of cleaning the electrodes to make it more effective in trapping fly ash," are belied by earlier ones about the difficulty of frequent reduction of boiler temperature in order to clean the electrodes.

Regarding replacement of defective or worn-out electrodes, it had been decided to replace the electrostatic precipitator of Unit-1 of the thermal generating unit and to effect improvements in the rest of the equipment. But till now, no positive steps have been taken. The wiremesh installed in three chimneys to stop the ash particles does not seem to be very effective. At one time, say the authorities, there was a plan to construct one big chimney in which the three existing chimneys would be merged, but this was not considered quite practical and the plan was shelved. Further measures within the power plant to keep down fly-ash levels include installation of more draft fans and ducts. Water is periodically sprinkled by workers within the power station premises to prevent the fly-ash coating the cement surfaces from floating.

About the detrimental effects of the fly-ash and high noise levels on workers and people staying or working outside the plant environment, the power house authorities expressed the view that "fly ash has nothing to do with TB among workers. The disease is solely due to their unhygienic living conditions." When it was pointed out that the doctors who had conducted the X-ray examination of the workers had established a high correlation between the fly ash intake and TB among the workers, they dismissed it as ridiculous and untrue.

44-16

Pollutants damage plants

NEW DELHI, July 31.

Industrial air pollutants affect plants, particularly mango trees, considerably.

According to a University Grants Commission sponsored study conducted in Bombay for three years, the damage ranges from 20 to 30 per cent during early post-monsoon period to about 100 per cent behind a chemical factory situated in front of a hill range during summer.

The study, conducted by Dr. S. B. Chaphekar, Associate Professor of Ecology, Department of Botany, Institute of Science, Bombay, and two others, revealed that mango trees were consistently affected by the quality of air, irrespective of the type of pollutants, i.e. auto-exhausts of road-sides or effluents from chemical factories or

petroleum refineries.

According to the study, industries in greater Bombay region throw about 1,000 tonnes of pollutants per day into the atmosphere. Of these, 38.4 per cent is carbon monoxide, 34.4 per cent sulphur dioxide, and the rest is made up of particulates, oxides of nitrogen and others.

On human beings, "the air pollutants" cause mainly respiratory irritation and in extreme cases serious lung congestion leading to death. Hydrogen fluoride causes respiratory diseases, fluorosis, teeth mottling and irritation. "Reduced visibility is also associated with air pollution".

Dr. Chaphekar and his associate investigators, Dr. D. B. Boralkar and Mr. R. P. Shetye, also conducted their research on other plants includ-

ing thespesia (Bhendi), erythrina (Pangara) and polyalthia (asupala).

The maximum damage estimated on leaves of thespesia in and around Bombay was 20 per cent. Compared to mango, this plant appeared to be more resistant, with less than five per cent damage at most of the spots.

At one spot near a refinery, the damage, though small, was present throughout the year.

Amongst the plant species used for estimating the damage to foliage, only mango was consistently reliable, the study says. It showed high foliar damage in industrially polluted areas as well as along road-sides.

Hence it is concluded that only mango trees can prove a reliable and consistent air pollution monitoring instrument.—PTI.

AIR POLLUTION

1. Introduction - technology, coal, social prob¹⁴, scientific Revolt
2. Importance of - (i) Health (ii) veg⁺, animals, bldg etc (iii) new tech⁺ (epidemic, asthma, bronchitis, Ca, well being)
3. Definition - toxic, irritant, causing hardship
4. Pollutants - CO₂, CO, SO₂, H₂S, F₂, N₂ + NH₃, radioactive subs, carcinogens
5. Common Sources - (i) combustion - domestic + industrial
 - (i) Industries
 - (ii) Motor vehicles - CO, hydrocarbons, Pb, NOxides, particulate matter
 - (iii) Misc - refuse burning, agri activities - crop spraying, pesticides, nuclear energy programmes.
6. Influencing factors - weather - wind, temperature,

7. Air pollution in India -

Bombay	→ 238	} ug/m ³ of suspended particulate matter.
Cal	→ 527	
Delhi	→ 700	
Kanpur	→ 488	
London	→ 221	
N. York	→ 134	

NEERI

8. Indicators of air pollⁿ
 - (i) SO₂
 - (ii) Smoke/soiling index
 - (iii) Suspended particles.

Others - (i) CO. (ii) Oxidants (iii) N. dioxides (iv) Pb.
9. Health effects of air pollⁿ
 - (i) Bacterial/Viral
 - (ii) Allergic
 - (iii) Poisonous pollutants

Pollutants - (i) Acute - London episode

 - (ii) Chronic effects
 - (iii) Systemic "
 10. Other effects of air pollⁿ
 - (i) Plants + animals
 - (ii) Social + economic.

11. Prevention + control

- (i) containment - enclosure, ventilⁿ, air cleanup.
- (ii) Replacement.
- (iii) Dilution
- (iv) Legislation

12. Disinfection of air

- (i) Mech. ventilation
- (ii) Ultraviolet radiation
- (iii) Chemical mists - triethylene glycol.
- (iv) Dust control - cleanup

44° 17

WASTES FROM COFFEE PROCESSING AND TREATMENT

Prof. V. CHANDRASEKHAR

With the steady urbanisation and industrialisation of this country in recent years the problem of pollution of the rivers and streams has assumed considerable importance. Since the untreated wastes from industries when discharged into any water course may pollute the water beside producing bad taste and odour in water, endanger fish life and create insanitary conditions in the local environment, a study of the characteristics of industrial waste and their disposal is justified. The rapid tempo of the expansion of industries in the recent times has necessitated an intelligent and rational approach to understand and appreciate the problems involved in successful disposal of industrial wastes.

Almost all industries make use of water in some process or other and discharge it back as waste water at some stage or other. Almost inevitably these waste waters find their way into natural water courses or streams. It is undisputed that irrespective of immediate or present effects, wastes discharged into a stream cause pollution and continuous and indiscriminate addition of waste waters will eventually spoil the stream. There may be as many problems of treatment of waste as there are industries.

It has been reported about the problems of water pollution in plantation area. The coffee industries is quite a major one in Mysore State. The data regarding the extent of coffee grown in India and the number of coffee curing centres is collected from the Director, Coffee Research Station. I have come to know that curing of coffee does not require or involve use of water and as such problem of water pollution is caused before coffee is sent for curing.

Meaningful characterisation information can only be obtained through proper analysis of representative samples. Once the waste has been adequately characterised the treatment requirement can be established by comparing the quantity of pollutants to be discharged with the assimilative capacity of the receiving body of water.

The common effects of waste waters on receiving systems viz natural bodies of water are

- Oxygen depletion
- Interference with aquatic life (Toxicity)
- Danger to public health and safety
- (Pathogenous) & Miscellaneous economic damage

Industrial wastes are complex, highly individual in composition contain often substances difficult to remove.

Further it is reported that there is not so much of water pollution in the coffee growing regions in Mysore State due to pulping of coffee which extends from Dec-March. Usually it seems the Estate owners take precaution to see that the water which is used for washing coffee is not let in the stream directly but let into large pits.

Extent of coffee area in India in Hectares

Mysore	78192
Tamil Nadu	23756
Kerala	27839
A.P.	469
Other areas	437
	<hr/>
Total	130693
	<hr/>

As earlier stated coffee curing is a dry process and water is not used at any stage of the process. Actually the problems of wa pollution so far as coffee industry is concerned is mainly confined to the coffee growing area or regions. Coffee berries after being separated from the plants are pulped at the estate level with the use of water for separating and cleaning of the coffee beans from the outer skin and mucilage of fruit. The effluent of this process flows down and invariably finds its way into a stream or a river thus polluting.

The process involved in the preparation of coffee from the stage of picking till it is marketed is furnished by planter from Harley Estate Sakleshpur.

1. a) Picking:

If the aim is to have the parchment coffee it is considered th quality coffee, only the ripe fruits if picked inadvertently are sorted out before taking for pulping.

b) If coffee is to be sent as Cherry the fruits as well as slightly under or over ripe are picked and dried without the removal of skin and pulp. It is considered a little bit inferior coffee as the fruity smell is passed on to the beans.

2. Pulping :

Pulping is the removal of outer skin and pulp from the seeds. The fruits have to pass from the Pulper along with the required quantity of water, nearly 2 to 3 thousand gallons of water per tonne of coffee. The skin and the pulp go to the 'SippiPits' and the beans are collected in the vats.

3. Fermentation :

The beans thus collected in the vats undergo fermentation for 36 hours. Thus the mucilage attached to the beans is removed. (In my opinion it is this process which makes the waste really smelly and dark in colour).

4. Washing :

The beans are washed with clean water 2 or 3 times till

this turns white in colour. The requirement of water is nearly at the rate of 5000 to 6000 gallons per tonne.

5. Drying :

Washed beans are brought into the drying yard for drying. Either it is spread on the flooring tiles or on the wire net mesh 3 feet above the ground. The moisture before bagging must not be more than 15.5 kg. per forty litres (forty litres).

6. Curing :

The coffee is then transported to the curing works. The white skin of the parchment coffee of the outer layer of the cherry coffee is then removed. After proper grading and grading, the coffee is ready for marketing.

Arabica coffee picking starts from Dec and ends in Jan and Robusta coffee starts in Jan and ends by the beginning of March.

The best quality coffee is grown at higher altitudes 3000' and above. Larger mills are located at the lower elevations near rail roads and highways where coffee cherries may be easily transported from producing areas.

The ultimate discharge of the liquid wastes from the coffee mills has become an important problem to solve. Wastes are discharged into dry channels where decomposition occurs and an odor nuisance develops affecting those in the immediate vicinity. Fortunately during rainy seasons these channels are flushed. Many plants due to scarcity of water have to collect and store rain water for use during the milling season.

I have seen huge big storage tanks in some estates to store water during rainy season located at higher levels.

MANUFACTURING PROCESS AND SOURCES OF WASTES

The various steps during the processing of coffee cherries are listed below. A flow diagram showing the steps, along with points of water use and waste sources, is presented in Fig. 1.

1. The coffee cherry is dumped into a receiving vat from which it is conveyed to the pulpers by water
2. During the conveyance, stones, etc. are separated by traps and 'floaters' the unsound cherries, are diverted to separate pulpers.
3. The pulper removes the skin and a large portion of the flesh from the coffee bean.
4. The hulled bean is then transported by water to a fermentation vat where it is allowed to remain and ferment in a moist state, the excess water being drained off after conveyance, and reused if desired. The period of

	5-day 20°C BOD (ppm)	Settleable solids (ml. per liter)	Total solids (ppm)	Suspended Solids (ppm)
Pulp	47000	--	--	--
Fermentation wastes	1250-2220	600-700	4200	2000
Fulping wastes	1800-2920	60-137	4960	848
Combined pulp and fermentation wastes	6150-134000	160	3220	--

FACTORY-KIAMBU-EAST AFRICA

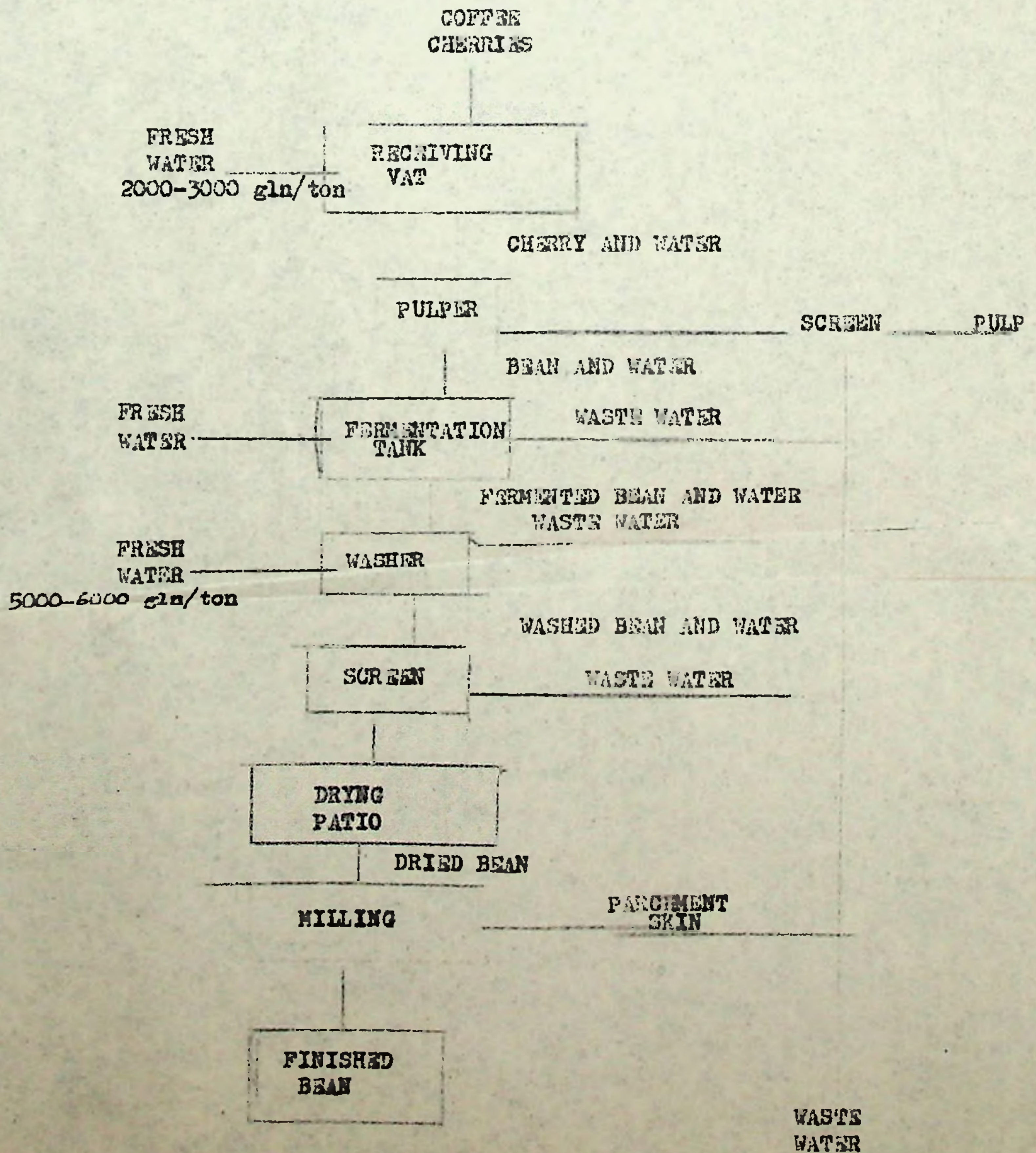
	Volume, gl/ton clean coffee	Proportion of total volume, %	BOD 3-day at 26.7 C. ppm	Proportion of total BOD %
Fulping wastes:				
Pulp water	4490	34)	2400	45)
Main tank effluent	2220	17) 57	3900	35) 85
Repasser-tank effluent	840	6)	1540	5)
Tank-washing wastes:				
First tank	260	2)	2800	4)
Second tank	270	2) 5	1300	1) 6
Third Repasser tank	165	1)	1900	1)
Channel washing:				
Main	4700	35) 38	40	8) 9
Repasser	440	3)		1) 9
Total	13445	100		100

In another study in El Salvador the average characteristics of pulping and fermentation waters were as follows:

	Fermentation wash water			Depulping water			Combined waste		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
5-day 20°C, BOD	295	3600	1700	3220	1500	9400	2500	8000	4250
Rk	0.42	0.55	0.48	0.42	0.48	0.48	0.42	0.48	0.48
Ph	4.1	5.5	4.5	4.1	4.7	4.4	4.3	4.7	4.5
Turbidity ppm	250	4000	1750	1500	4000	2900	1500	2500	2250
Suspended Solids ppm	235	2385	900	625	1055	790	530	810	640
Total solids ppm	885	3140	2100	10090	12340	11300	6000	7240	7040

fermentation may be as little as 12 hours or as much as two days depending on fermentation conditions. Fermentation of the bean is required before all the flesh of the cherry can be satisfactorily removed from the parchment which immediately surrounds the silver skin of the coffee bean. The fermentation process enables the bean to be dried in a clean parchment which guarantees its quality.

5. The fermented bean is then washed, by draulically classified, and conveyed to the drying patio, again by water. The beans are screened from the water and spread out to dry in the sun for several days. Sometimes mechanical driers are used subsequent to sun drying.
6. When the coffee has dried sufficiently to insure colour and flavour, it is milled to remove the parchment. The coffee bean is then graded, sacked, and shipped to the market.



Picture-1 Flow diagram of typical coffee washing

FLOW SHEET OF TYPICAL COFFEE WASHING MILL

Therefore, the principal uses of water and the origin of wastes in the coffee mills are as follows:

- (a) To transport the coffee to the pulpers
- (b) To transport the pulp to a hopper or pile
- (c) To transport the beans to the fermentation vats
- (d) To wash fermented bean
- (e) To transport the fermented bean to the drying patio
- (f) Miscellaneous operations:
 - Traps for stones, etc.
 - Separation of "floaters"
 - Hydraulic classification of beans
 - Boiler water

The water requirement is in the order of 260 gallons per 100 lbs of finished coffee, in those plants where the water is used only once. This quantity is reduced to 100 gallons per quintal of finished coffee in those plants which recirculate as much water as possible.

CHARACTERISTICS OF THE WASTES

The main wastes from coffee mills are:

- 1. Solid wastes :
 - (a) Pulp
 - (b) Parchment
- 2. Liquid wastes:
 - (a) Pulping water
 - (b) Fermentation wash water (tank water)

The pulp is the most potentially damaging waste from the mills, but it is generally recovered and used for fuel or fertilizer. When the fresh pulp is stored in open piles its sugar is attractive to flies and a bad nuisance develops. When the pulp begins to ferment, a foul, repulsive odour is emitted. There is no fly breeding in the pulp, probably because of the acid nature of its decomposition. The pulping water contains a relatively high amount of settleable solids, and as it contains sugar and other soluble materials, it is a large contributor to stream pollution. The fermentation wastes are very bulky with colloidal gels of pectine and the other products of

from the coffee parchment by fermentation. The strength of this waste is small when compared with that of the pulping water, and its products of decomposition are relatively stable and inoffensive. The parchment from the dry milling of the dried bean has no sanitary significance. It is nearly pure cellulose, and is generally used for fuel in the steam boilers that power the mills). The following table presents the average sanitary characteristics of wastes from three coffee plants at El Salvador using different amounts of water.

The results are more significant when calculated on a unit basis, and they more nearly approach the strengths expected when the mills are operating at capacity.

Lbs. of 5-day, 20°C BOD per quintal of coffee cherry milled:

Average, fermentation water 0.56

Average, fermentation water 0.08

Disregarding the pulp, which is usually removed, the expected 5-day 20°C. BOD load per quintal of coffee cherries milled would be the sum of the two other components of the waste or a total of 0.64 pounds.

5 day 20°C B.O.D. load/100 lbs of coffee cherry milled would represent a population equivalent of that mills 100 quintals would contribute the same BOD load to a stream as would a town of 4000 people.

The following tables shows the average results of examination of waste waters produced at a Kiambu factory in East Africa.

The Coffee Pollution Committee (Kenya Colony) carried out investigations at four different coffee factories to measure the amount of pollution occurring in each of the various divisions of the water used in the factory. From their studies it was quite obvious that the pollution arising from pulping operations was more serious than that arising from coffee washing.

METHOD OF TREATMENT OR DISPOSAL

PULP:

Pulp is ~~xxx~~ valuable as a fuel or fertilizer, and after removal from the conveying water by screens it may be handled in one of the following ways:

1. When there are no facilities to carry the pulp immediately, it may be stored in a pile; but the fresh pulp, because of its sugar content, creates a fly nuisance. Also, if it is allowed to remain in a moist condition, fermentation occurs which yields foul odours. Flies and odours are sometimes controlled by sprinkling lime over the pile. After the milling season, the pulp is usually taken to the farms where it is used as fertilizer.
2. Immediately hauled by trucks or carts to the farms where it is put into in the ground and covered.
3. Immediately dried upon patios and used for fuel. Filter presses have been used very satisfactorily to yield a cake that may be burned after a few hours drying. Dried pulp is also used

One analysis made on dried pulp is as follows:

	Content(per cent)
Protein	1.30
Fiber	19.70
Nitrogen-free Extract	50.10
Ash	9.00

The value of pulp as fuel and ~~nutr~~ fertilizer is well established but the most important reason for removing the pulp from the wastes is to reduce the possibility of a serious pollution problem. BOD of approximately 47000 ppm a severe demand would be placed on the oxygen resources of the stream.

Pulp mullage has been suggested for animal feed, and controlled feeding experiments have been conducted in some Central American forms.

Parchment :

The parchment is merely pure cellulose and has no sanitary significance. It may be used as a fuel.

Liquid wastes:

The combined wastes from depulping operation(after removal of pulp by screening) and fermentation wash water is generally treated by any one of the following methods:

1. Lagooning and/or irrigation:

According to Paul C. Ward there exists a good possibility of disposing coffee processing wastes by irrigation. Observations of dry stream channels which conducted the waste with reasonable sedimentation, showed no evidence that the wastes was toxic to plant life. Damage was only observed where plant life was subjected to waste, high in solids, that had been ponded. This method of disposal would be practicable and beneficial in those areas where contour irrigation ditches would be utilized. Lime could be added if needed for pH control, and its application would enhance the value of the waste for land use. Further more, reductions in the 5-day BOD averaging 20% can be obtained by doses of 2 to 10 grains/gallon. Chemical precipitation using lime and alum as coagulant did not materially reduce the BOD of the waste to a greater extent than did the use of lime alone.

Lagooning of the liquid wastes is an easy solution of the problem in those instances where the mills are in isolated areas. The liquid wastes can be later discharged during the rainy season when streams are flooded.

Lagooning and Spray irrigation system has proved itself to be a simple low-cost and efficient method for the disposal of the "instant coffee plant" effluent of Nestle Company plant of Sunbury.

2. Stabilisation Ponds :

Use of stabilization pond for the treatment of coffee processing waters has been suggested by Pahren and Saens and it appears to be quite promising. Available information indicates that there is sufficient nitrogen, but there may be an insufficient amount of phosphates to support algal growth. Calculations have shown that addition of an equal volume of domestic waste would be quite sufficient to provide the necessary phosphate. Since the pH of the combined wastes (depulping and fermentation wastes) is approximately 4.5, the wastes must be neutralized before entering the pond. Lime may be used for this purpose.

3. Biological Filtration

Biological filtration with high rates of application and recirculation, preceded by chemical precipitation and sedimentation has proved itself to be the best method for treatment of liquid coffee wastes from plants in El Salvador and Kiambu (East Africa). Loadings range between 20 and 100 mgad. Number of recirculations between 2 and 15 per hour. BOD reductions are as follows:

53.7% and 82.1% after 2 hours sedimentation
63.6% and 86.4% after 4 hours sedimentation
75.7% and 92.0% after 6 hours sedimentation

Best results are obtained with 10 recirculations per hour and a filter loading of 60 mgad.

The effluent from biological filter can be used for irrigation. Tests have shown that wastes with small quantities of solids are not toxic to vegetable life.

Environmental Pollution due to pesticides in coffee plantation:

Coffee plantations consume about 7% of the total pesticides consumed in India for plant protection measures. This consumption is distributed almost equally between chlorinated hydrocarbons, parathion and copper fungicide of these the chlorinated hydrocarbons persist for a longer duration in the soil and human health hazards and environmental pollution due to their residues are of interest in assessing the level of residues and measuring required to avoid them.

Preliminary investigations conducted reveal that these insecticides accumulate in the soil and are slowly leached out to the ponds and tanks which form the normal source of drinking water for people and animals. The grazing of the animals in contaminated areas in and near the vicinity of treated areas has increased the problem of the residues.

Chlorinated hydrocarbon residues are noticed in drinking water from 0.02 ppm and the traces in milk and eggs. Higher concentrations of copper are noticed in drinking water. With the adoption of low volume and ultra low volume application of these pesticides in plant protection measures,

the effect of the concentrated pesticides on the workers, the aerial contamination, the drift of the low volume sprays spreading and settling on larger areas and at other places far away from the applied spot are other problems which need further studies.

Thus there is a need for immediate investigations on pesticide residue problems on the present methods followed and thorough investigations of all these aspects before any new method or chemical is adopted for large scale application.

Conclusion :

There has not been much work done in the field of treatment and disposal of Coffee wastes, however an attempt is made to get relevant information from the persons concerned and the information from the literature survey is furnished. It will be worth while considering a pilot plant study in any of the plantation area. I gratefully acknowledge the help extended by the Director, Coffee Research Station Balehonnur in providing statistical information and Dr. N. C. Ravindranath from Harley Estate Sakleshpur for the information regarding processing and Mr. G. H. Venkataramiah Junior Scientific Officer, Coffee Research Station for the information on pollution due to pesticides and Dr. Malay Chowdhani of I. I. T. Kanpur for furnishing other information.

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Sampling schedule
for RB5 or RB2
months

44/18

GOVERNMENT OF INDIA
BHABHA ATOMIC RESEARCH CENTRE
AIR MONITORING SECTION

COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road
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INSTRUCTIONS
FOR THE OPERATION OF ATMOSPHERIC
PARTICULATE SAMPLES FOR RADIOACTIVITY
AND OTHER MEASUREMENTS

I. INTRODUCTION

The air particulate sampler consists of, (a) a suction device for drawing air through a suitable filter media and, (b) the filter paper for collecting the particulates in the atmospheric air.

The suction device consists of a blower of either low capacity of the order of ten to hundred liters of air per minute (figure 1) or, of high capacity in the range of 500-2000 liters of air per minute. (figure 2). Generally, these blowers are also attached to a flow measuring device, normally a "rotameter" to measure the flow rate of air through the collecting filter media. This will enable the calculation of the total volume of air sampled during operation from which the specific concentration, i.e., concentration of pollutants per unit volume of air can be calculated.

The filters used are of various types and sizes depending on the pollutants being sampled. For low volume samples, circular discs of a few inches diameter are used, while for the high activity samples, rectangular pieces of area ranging upto five hundred square centimeters are to be used. The filters are fixed in a suction head which is either of the circular type with a screw cap containing the filter to be screwed on to the main body, or a rectangular box with a lid which can be clamped on to the main body depending on the size and the shape of the filter used (figure 3). The filters are backed by a wire mesh or metallic grid to prevent rupture during suction. Rubber washers or "O" rings are used to prevent leakage of air around the filters. The suction head with filter is connected to the inlet of the blower by rubber tubes or hoses. The flow measuring device can be placed at the inlet or outlet side of the pump, (figure 1 & 2).

The operation of the sampler consists of fixing the filter paper in the suction head and switching on the blower. Depending on the pollutant being measured, the filters can be changed several times in a day or once in a few days after allowing a cooling period of a few hours to prevent overheating of the pump motor. After the specified period of operation, the blower can be put-off and the filter removed. If required, the filter can be immediately counted for the required time. The filter can then be folded so that the collection area is not exposed to the outside environment and the dust does not fall out. It can then be despatched to this centre in the envelopes with address printed on them. The information to be written on the cover has been printed on them and is (a) place of sample collection, (b) dates and times of sample collection, (c) time duration of collection in hours and minutes, (d) the counts recorded and the counting time, if the sample activity has been measured, (e) flow rates at the beginning and end of the collection period, and (f) any meteorological data, viz., rainfall, wind direction etc., available.

II. OPERATING INSTRUCTIONS FOR ATMOSPHERIC PARTICULATES SAMPLER

1. UNITS : (a) Suction head, (b) rubber tube or hose, (c) suction pump, (see figure 1,2, 3).

2. CONNECTIONS

(i) Connect one end of the rubber tube or hose pipe to the nozzle of the suction head, using oil to press the tube into the nozzle. The connection should be air tight. (Figure-1).

(ii) Fix suction head in a place with free access of air, preferably in the horizontal position. The filter should be sheltered from rainfall.

(iii) Connect the other end of rubber tube to the air in-let nozzle of the pump. This connection should also be air tight . The air out-let nozzle can be either left free or connected to a rotameter, if available. (Inlet and outlet nozzle can be determined by operating the pump)

3. OPERATION OF THE SAMPLER

(i) Unscrew the suction-head-cap or cover. Place the filter paper inside and **fix** it back by screwing or clamping, depending on the type of suction head used. Check that there is no leak (The "O" rings or washers fixed in proper position will ensure that there is no air leak).

(ii) Put on the pump and operate for the required time. At the end, stop the pump and unscrew suction-head cap, remove collected filter and put a new one for the next collection. Do not touch dust collection area of filter.

(iii) The filter can now be counted if required. After counting, put filter paper, folded inside (i.e., with dust collection inside) in the sample cover.

(iv) Enter dust collection data on sample cover or the data sheet as required.

4. PRECAUTIONS

(i) The suction-head cap with filter paper should be properly screwed or fixed on the suction-head assembly to avoid air leaks.

(ii) The flow rate of the sampling unit should be periodically measured using a rotameter and changes in flow rates, if any, should be noted and reported. (It is important to measure the flow rate and time of operation correctly as the accuracy of the measurements depends on them)

(iii) The pump should be switched off for an hour or two everyday to avoid over heating from continuous operation. This period can be adjusted between the termination of one collection and the start of the next.

(iv) The oiling schedule of the pump should be strictly followed to avoid pump damage.

(v) The tube connecting the suction head to pump should be straight as far as possible to avoid air flow obstructions due to sharp bends or foldings in the tube.

III OPERATING INSTRUCTIONS FOR RADIOACTIVITY COUNTER

1. UNITS (a) Electronics scalar and High - voltage units, (b) Radioactivity detector assembly, (c) Connectors and cables, (d) Batteries and cells or eliminators.

2. CONNECTIONS

(a)

(b)

(c)

(d)

3. OPERATION OF COUNTER

(a) Put on the counting unit and check the voltages and other settings (The scalar should be put on first, and then the High voltage unit)

(b) Put filter into counter (Collection area facing counter) by pulling out the sample shelf, fixing the filter in sample hole (with tape if necessary), and pushing back the shelf to original position. Do not put tape over the collection area of filter paper but fix covering the edges only.

(c) Reset the scalar to obtain zero readings in the registers and

start counting by putting on the count switch of scalar. The stop watch should be started simultaneously in case there is no automatic timer control in the scalar.

(d) Stop counting by putting off the count switch at the end of the counting time (with automatic time control this is not necessary).

Note counts recorded in the counter.

(e) Do the second counting at the required time. Then the filter can be removed and the source counting or background counting can be carried out. If necessary the unit can be put on the test mode to keep the scalar operating.

3. PRECAUTIONS

(a) Care should be taken to see that during operation the personnel do not touch the High voltage points:

(b) The cables should be connected and disconnected only with the mains and other cables removed from the power points.

(c) The specified operating voltage should always be maintained.

(d) In moist atmospheres, it is preferable to keep the unit on continuously. The unit can be kept on in the test mode or background counting carried out when sample counting is not being done. (This may not be possible in battery units, where power has to be conserved).

(e) Proper operation of the instrument should be checked by taking standard source and background counts periodically. The same count rates should be obtained in both cases within the limits of the standard deviations of the counts measured. If results are not agreeing, the "Plateau" of the counter should be checked.

(f) The filter paper should be properly placed in the position assigned to it in the holder. It should cover the circular area indicating

the filter paper position. Placing it in the wrong position will give erroneous results. The filter paper need be removed from counter only after all the readings have been taken.

(g) The readings should be started and terminated at the exact time specified for the various readings.

(h) The sample holder should not be withdrawn completely out of the probe unit. It should be pulled out only sufficiently to allow the filter paper to be fixed in the assigned position. If the holder has to be completely removed, it should be done only after putting off the High voltage.

4. TAKING THE PLATEAU OF THE COUNTER

(a) Place the source in the counter.

(b) Reduce voltage till there are no counts recorded in the scalar.

(c) Increase the voltage by steps of 25 or 50 volts and record the counts per minute at each voltage. Counting time should be adjusted to accumulate a few thousand counts at each voltage to reduce errors in counting.

(d) Plot the curve of counts against voltage. A curve of the type shown in figure 4 should be obtained if the system is operating properly. If a fairly flat (Plateau) portion is not obtained in the curve it indicates that the counting system is defective.

(e) The operating voltage of the counter should be fixed some-where in the middle of the curve (figure 4). This voltage should always be maintained.

(f) Precaution:- Towards the end of the plateau the count rate will begin to increase very fast. The counter should not be operated in this "discharge region" and the voltage should immediately be brought back

to the original value.

IV. SAMPLING AND COUNTING SCHEDULE OF THE AIR FILTER SAMPLES

FOR ~~THE~~ RBZ pump

1. SAMPLING SCHEDULE

(a) 1st sample should be collected for 14.....hours from 18:00 hrs to 8:00 hrs
7:00

(b) 2nd sample should be collected for 4.....hours from 08:00 to 12:00 hrs
11 140

2. COUNTING SCHEDULE

(a) 1st counting should be for 30.....minutes from 5.....minute after collection end of sample to 35..... minutes after end of sample collection.

(b) 2nd counting should be for 60.....minutes from 180.....minutes after end of sample collection to 240.....minutes after end of sample collection.

3. ADDITIONAL REQUIREMENTS

3rd Sample for 4 hours from 12:00 hrs to 16:00 hrs.
14 17:00

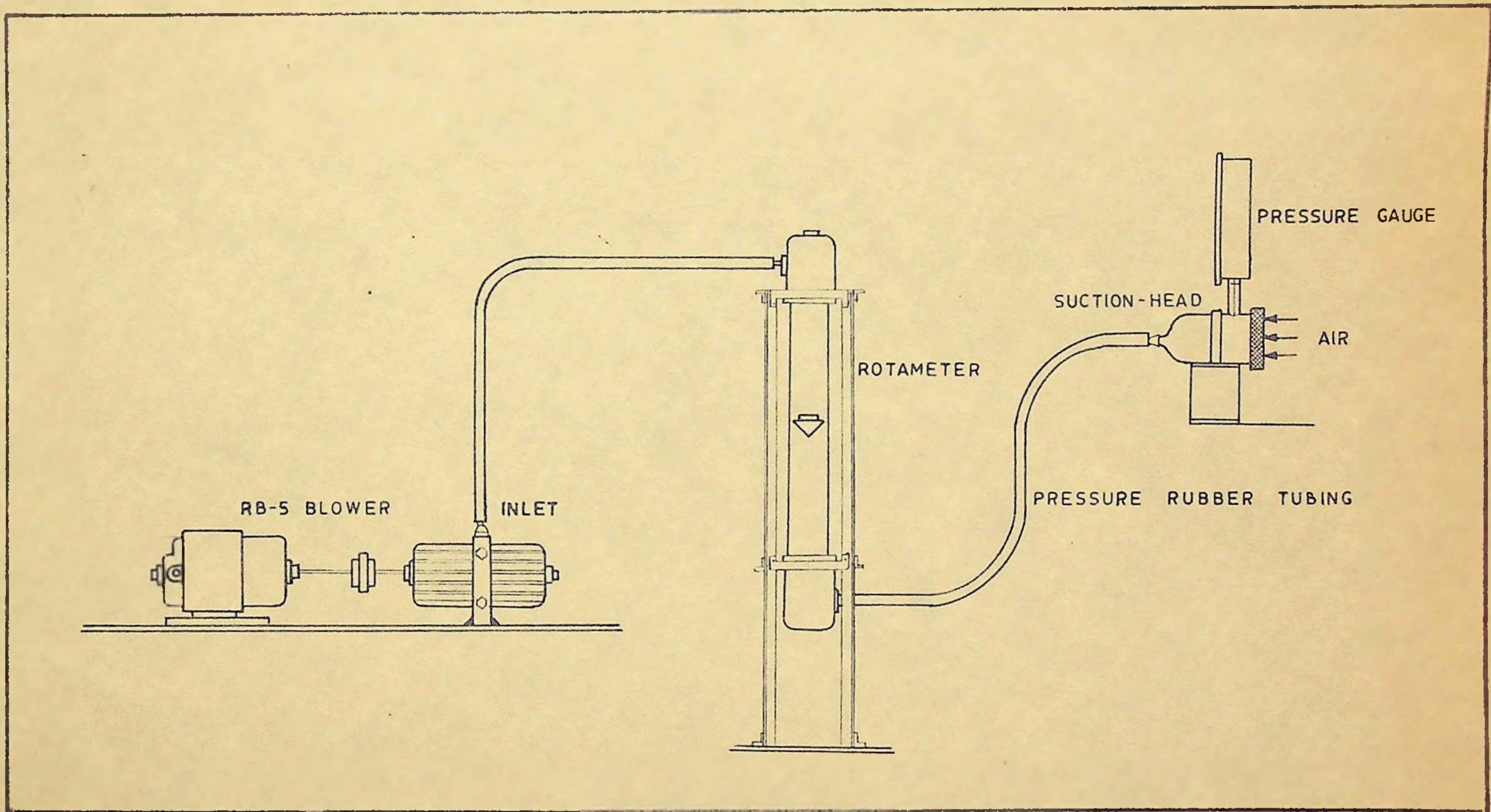


FIGURE 1. DIAGRAM OF AIR SAMPLING SYSTEM USING RB-5 BLOWER AND 5cms DIA. FILTER.

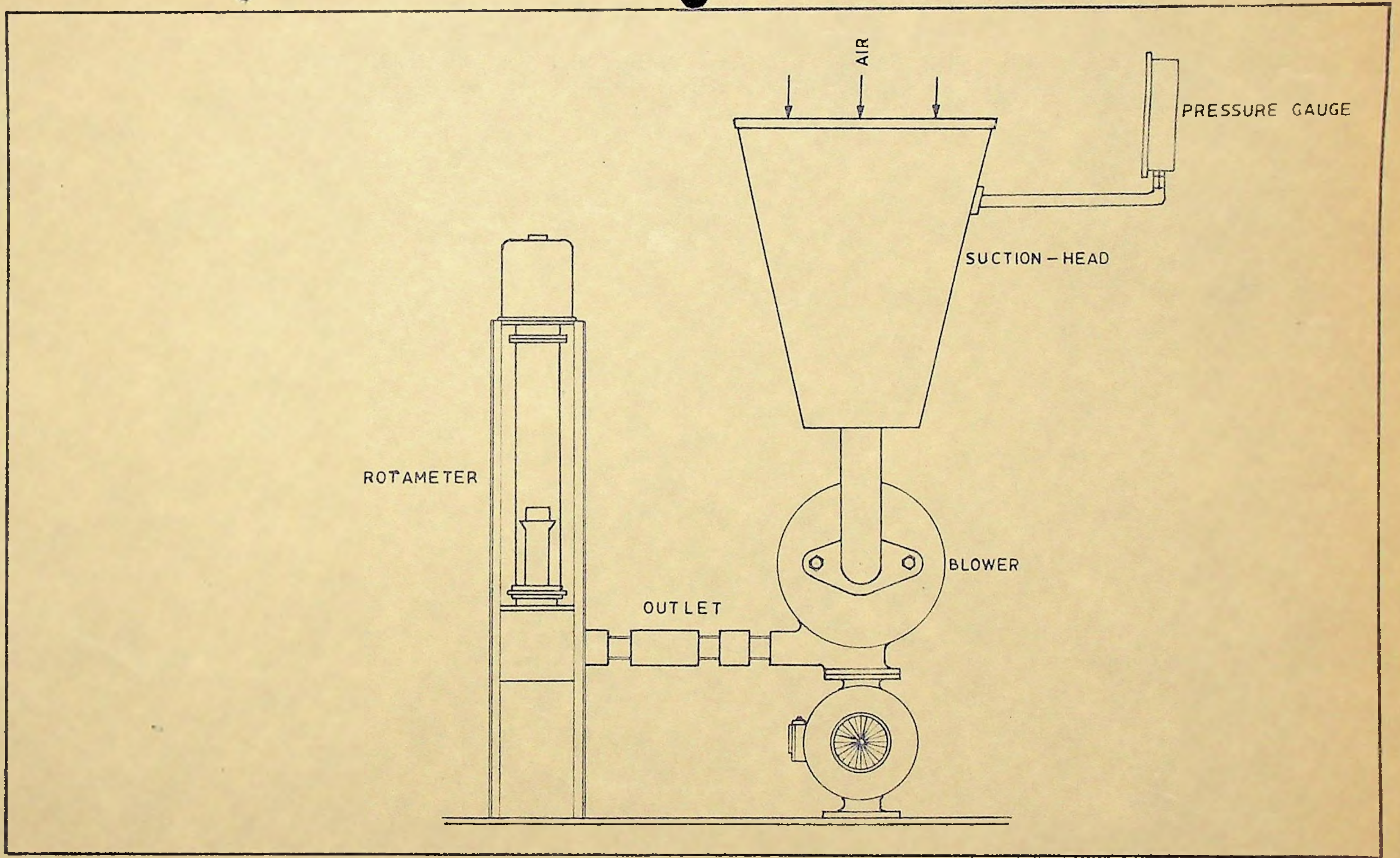


FIGURE : 2 . DIAGRAM OF AIR SAMPLING SYSTEM USING HIGH CAPACITY BLOWER AND 30 cms x 15 cms FILTER .

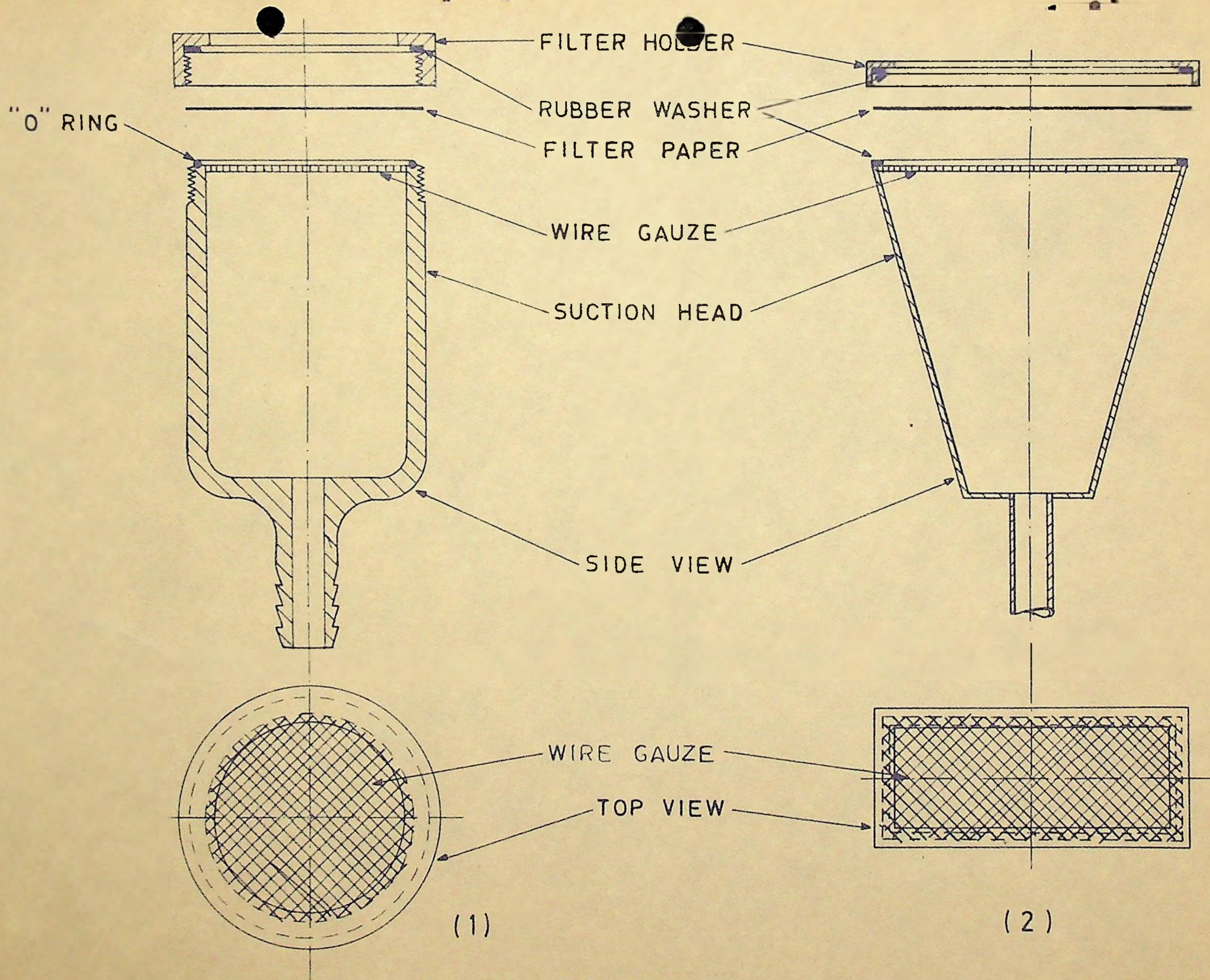


FIGURE 3. DIAGRAM OF SUCTION HEADS (1) CIRCULAR TYPE (2) RECTANGULAR TYPE. (NOT TO SCALE)

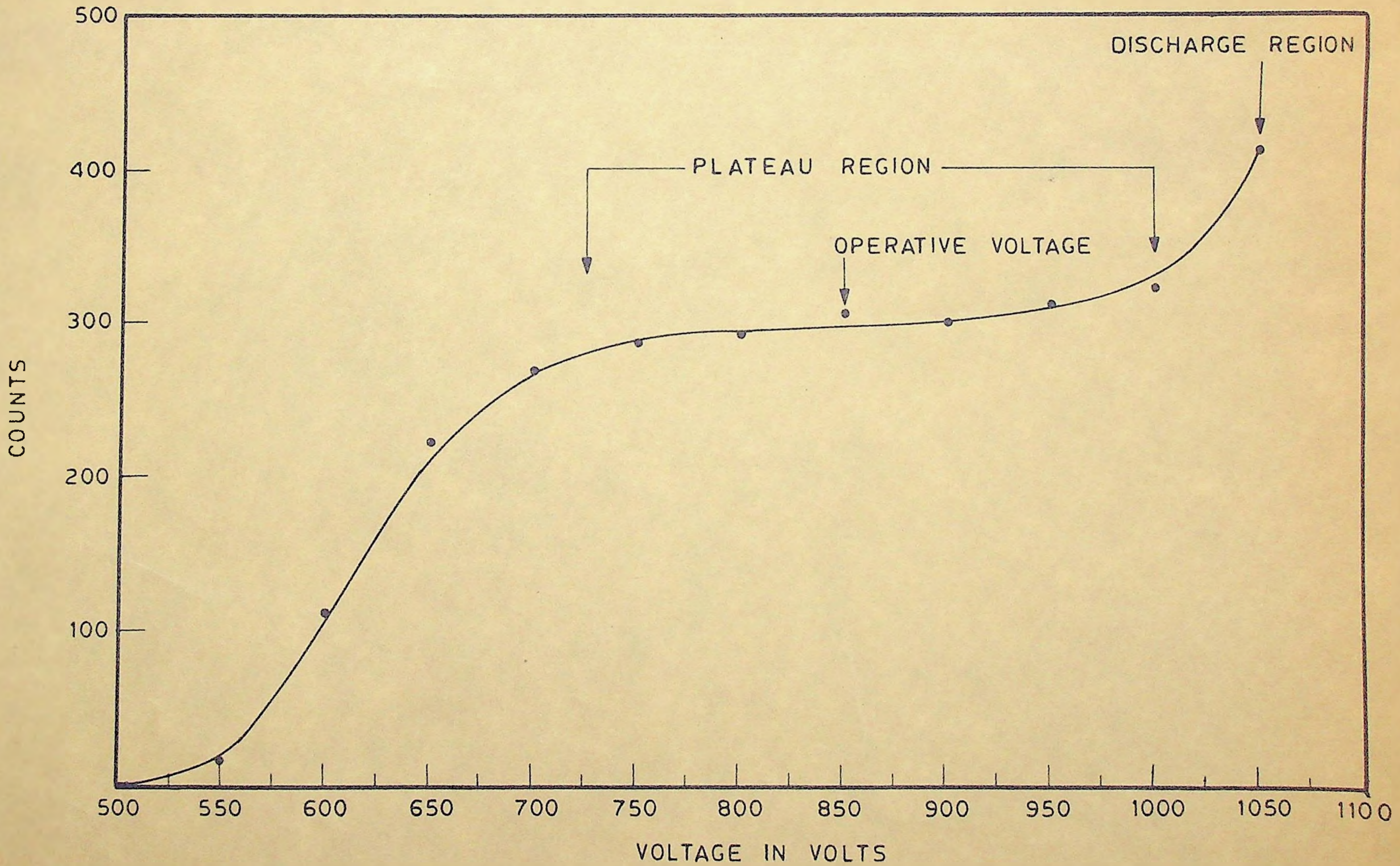


FIGURE 4 . COUNTS AGAINST VOLTAGE OF ALPHA COUNTER .

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THE ROLE OF THE MECHANICAL ENGINEER IN PUBLIC HEALTH

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THE ROLE OF THE MECHANICAL ENGINEER IN PUBLIC HEALTH¹

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In recent years, the field of public health has experienced a great influx of specialists. Prior to 1910, medicine and nursing were almost the sole professions within the health department. At that time medicine was almost entirely clinical. As preventive medicine developed it was imperative to enlist the services of many scientific disciplines in a cooperative attack upon the complex problems of modern public health. Thus we now find that the dentist, the sanitary engineer, the bacteriologist, the mycologist, the virologist, the physicist and many others have a definite place in the field of preventive medicine.

As each of these professions has increased its activity in research and field operations for the control and prevention of disease, it has had to reach for new tools with which to perform its task. Today an examination will show that a surprising proportion of these tools are not biological, statistical or diagnostic in nature but are instead purely physical tools, apparatus and equipment. Today, who could envisage a modern health department without x-ray apparatus, autoclaves, scales, forceps, hypodermic needles, refrigeration, examination tables, microscopes, animal traps, insecticide sprayers and countless other items which contribute to its efficiency? Similarly, what modern public health research project could be made progress without drawing upon the resources of a scientific supply organization, an enterprise whose catalog is a veritable encyclopedia of the physical requirements of research? The modern concept of public health does not limit the field to the health department. When we consider the hospitals and the vast network of sanitary services protecting the modern city, the list of complex mechanical equipment is enormously lengthened.

Having become accustomed in our daily lives to the assistance of mechanical appliances, we frequently lose sight of the contribution of specialized physical equipment to the solution of problems in public health. With the realization of this dependence upon mechanical aids, we must in turn give credit to a hitherto largely anonymous benefactor in public health, the mechanical engineer. His is a profession trained in the design and production of mechanical equipment, in the operation of mechanical processes and in the attainment of maximum efficiency in the work of men and machines.

This is in contrast to the sanitary engineer whose work with the problems of air, water, food and shelter has long been recognized. The sanitary and the mechanical engineer may have a common goal, the betterment of public health, but they utilize different avenues of approach. The sanitary engineer works and thinks

¹ One of four papers composing a Symposium on Sanitary Engineering in the Tropics held on November 15, 1952, during the Annual Meeting of the American Society of Tropical Medicine and Hygiene at Galveston, Texas.

² Senior Sanitary Engineer

³ Scientist Director

largely in terms of the utilization of processes, labor and equipment to accomplish his goals. The mechanical engineer, on the other hand, is concerned primarily with the design, development and production of the equipment and tools required. He is the engineer you would call upon to design a new insecticide sprayer, a laboratory shaking machine, an autoclave, an automatic injection apparatus, a garbage grinder, an ultracentrifuge or similar devices. The design, production and testing of equipment such as this is the activity in which the mechanical engineer can and has made his contribution. We need not expect to find a mechanical engineer in every local health department, but today there is recognized an increasing need for men trained in mechanical engineering, with a background of public health experience. Such experience is required in order to interpret the needs of public health for industry and to produce the specialized apparatus for public health research. Today there is probably no such engineer on the payroll of any state health department. However, the World Health Organization has recognized the need for this discipline by appointing several mechanical engineers as expert panel members. The Expert Panel on Insecticides includes several such experts. Mechanical engineers were not eligible for the Regular Corps of the Public Health Service prior to 1947. However, there are at present throughout the world a few mechanical engineers employed in various governments at the federal level and the number is increasing. Nevertheless, the greatest contributions of the mechanical engineer to public health will continue to be made in industry, but his integration into major health units is increasingly indicated since it is here his talent can be employed to design specialized apparatus and equipment for specific operational and research programs for which tools are not available.

It should be borne in mind that these contributions are not limited to highly industrialized countries, for mechanical equipment is frequently much more vital to sanitation and other public health activities in under-developed areas than in those that are more advanced. In each case, but particularly when equipment is to be used in remote areas, careful engineering is required to assure durability, simplicity of design and maintenance, and low cost. Now let us examine in more detail a few of the activities and accomplishments of the mechanical engineer in this field.

For many years the mechanical engineer has been actively engaged in industries which are noted for polluting the air with smoke, tarry products and corrosive gases that in turn may menace the public health. An increased awareness of responsibility for this problem is now apparent among the mechanical engineers. Similarly, the exhausts of our millions of internal combustion engines have contributed to air pollution in metropolitan centers. Improved combustion design by the mechanical engineer can reduce this problem and has done so. A long step in this direction appears to have been taken with the recent report of the development of equipment which completes the combustion of fuel components normally wasted up the stack.

For many years, in these same plants, a war for survival has been waged between men and machines. During the industrial revolution the need for safety

in factories was hardly recognized, but since that time the mechanical engineer has taken the lead in the correction of unsafe situations, in building safety into machines and in training for safety.

In the production of optimum artificial environments the mechanical engineer has taken a leading role and, in so doing, has exerted an influence on the fringe factors affecting the total physical well-being of man. Further research on these problems is under way in an environmental laboratory in which almost any artificial environment can be established and its influence on man evaluated.

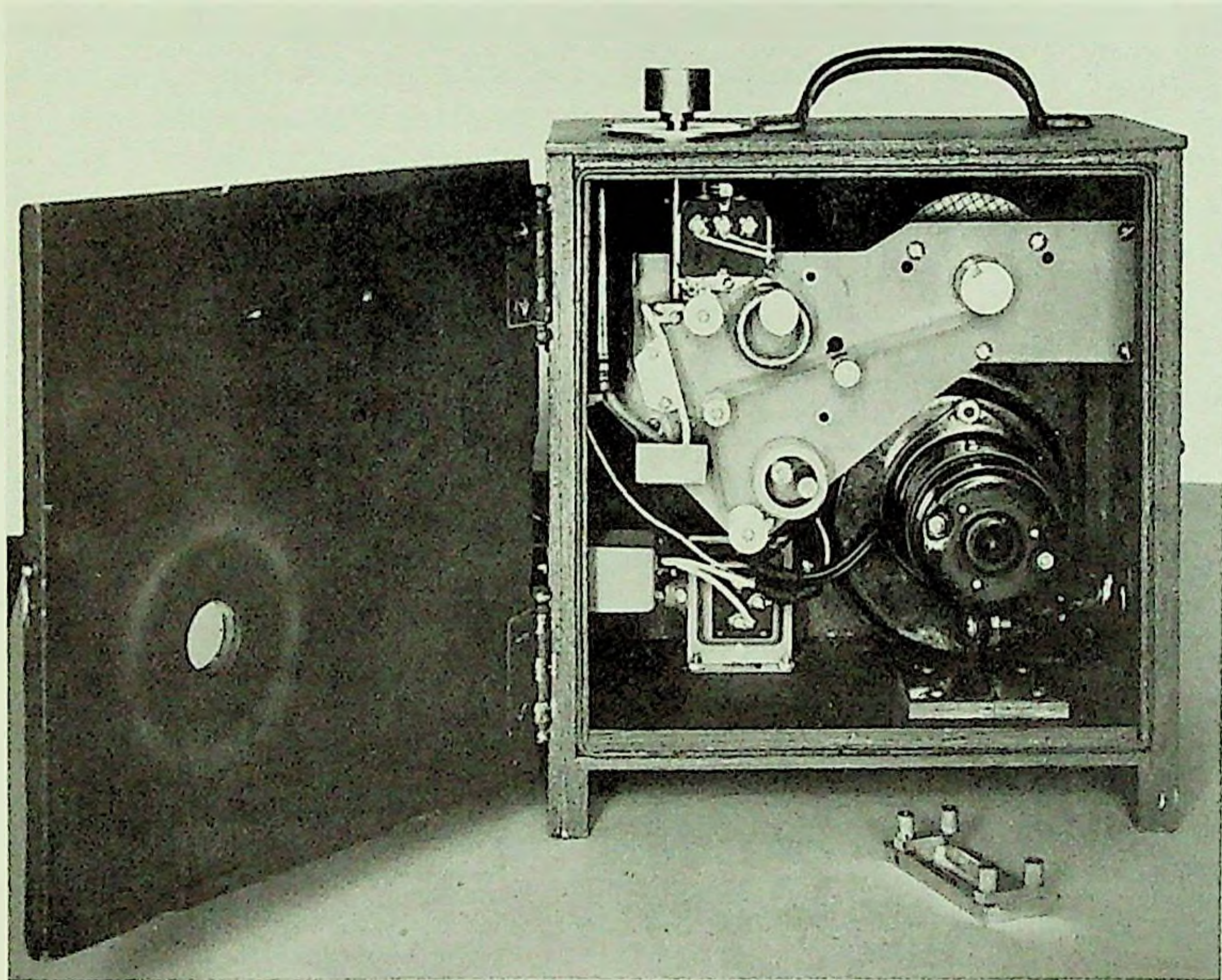


FIG. 1. A continuous recording dust sampler. Particulates in the air are impinged on the adhesive side of scotch tape, the tape moves through a staining bath and then meets a facing tape. The tapes, with the particles sandwiched between them, are stretched in a frame for examination under a microscope.

Preventive medicine, in its increasingly effective fight to control the vectors of disease, has leaned heavily on the mechanical engineer for tools to accomplish the end result. From the initial use of kerosene for the control of mosquitoes to the present day application of residual insecticides, the equipment for the application of vector poisons has been of crucial importance. In the early days of mosquito control, knapsack and compression sprayers for the application of oil and dusters for Paris green, were borrowed from agricultural designs. With the advent of the use of residual insecticides on the walls of sleeping rooms, there developed a need for specialized spraying equipment to implement the new tech-

niques. Designs were evolved in step with the development of new methods for the use of DDT and related insecticides until many of the requirements were crystallized by the World Health Organization's Expert Committee on Insecticides in establishing specifications for hand, compression, knapsack, and stirrup-pump type sprayers, hand dusters, chemical resistant materials, cut-off valves and hose connections. Mechanical engineers in public health are working closely with the manufacturers of spraying equipment to bring their products into compliance with the specifications.

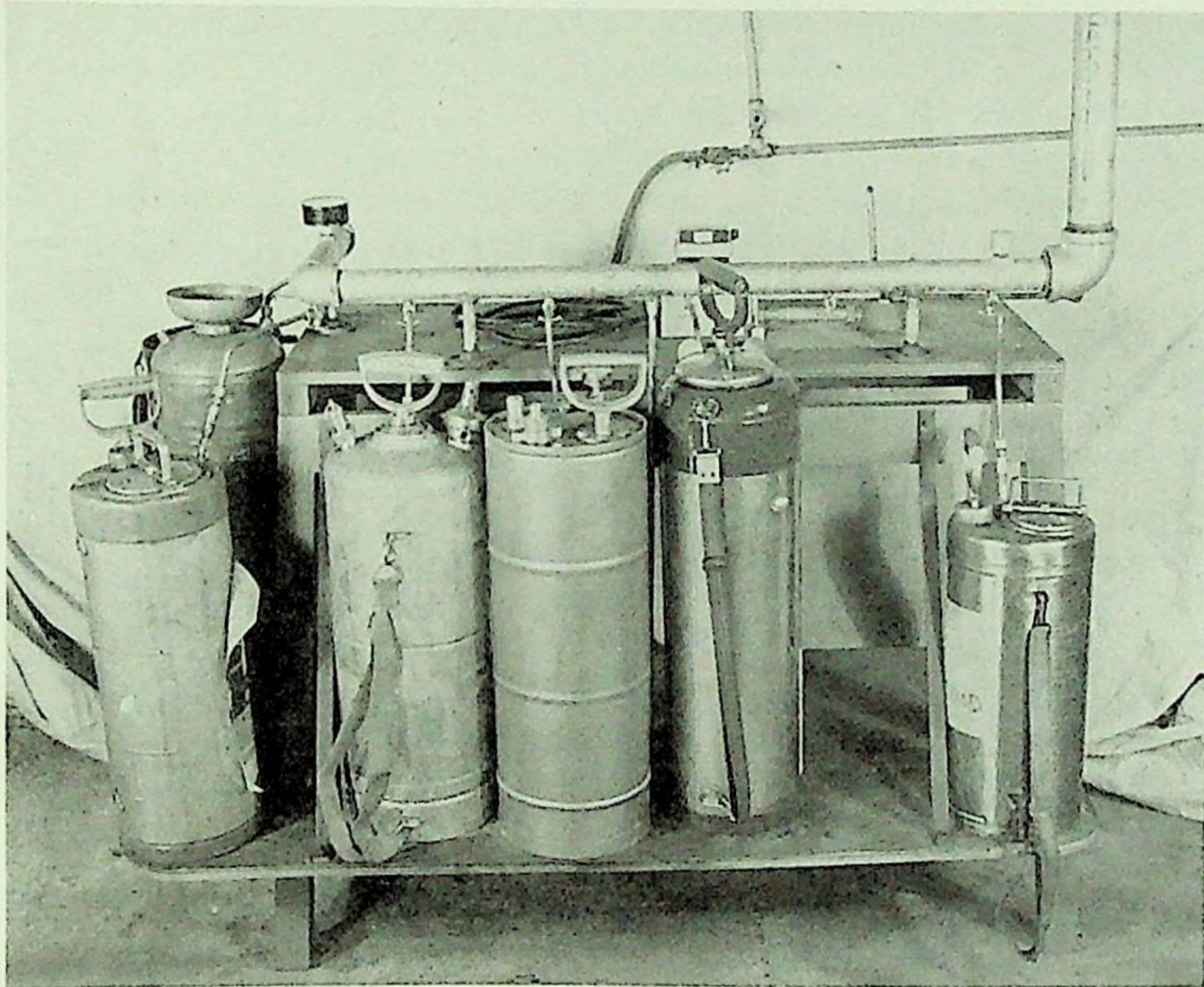


FIG. 2. A fatigue testing apparatus for compression sprayer tanks. To determine weak points in the tanks pressure is applied and released until 7,500 cycles have been accomplished or until failure results.

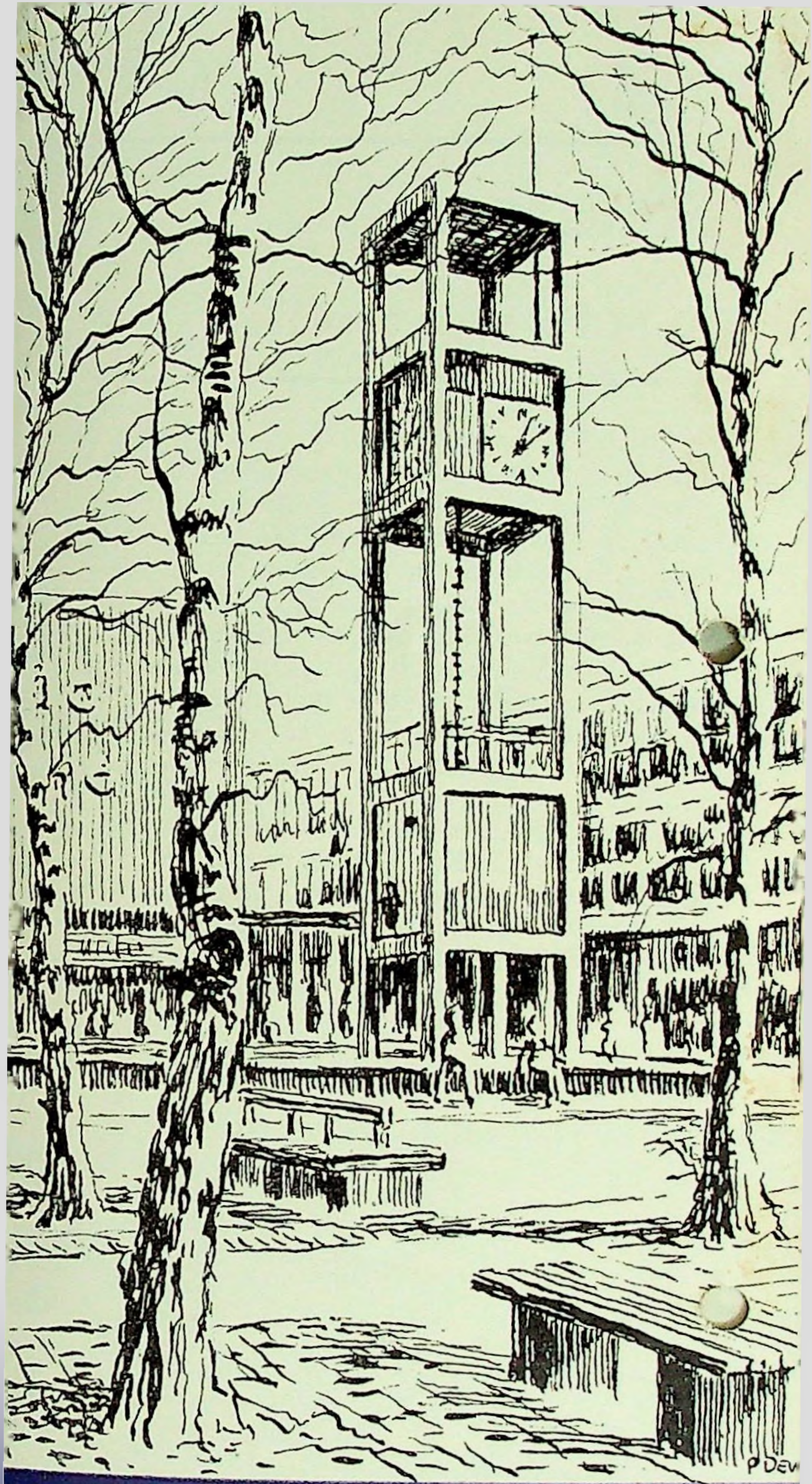
Currently, improvements in application equipment are moving forward. A constant delivery sprayer was introduced in 1948 and as a result of the recognition of its advantages commercial models are now being developed and produced in Italy, France, and the United States.

Application of the principles of mechanical engineering to the production of specialized research equipment has proved highly advantageous to the Technical Development Branch of the Communicable Disease Center in Savannah, Georgia. There the Equipment Development Section, staffed largely by mechanical engineers, has produced animal exposure chambers, electronic respirometers and metabolism rockers for studies on the toxicology of economic poisons. For re-

search on insecticides, a device has been produced which semi-automatically cements short threads to the backs of live flies for identification purposes; another has been constructed which automatically records the time of death and the number of flies killed by a formulation under test. For investigation in the field of air-borne pathogens, continuous recording dust samplers have been built (Figure 1), air flow meters have been improved and the relative efficiencies of a number of air samplers have been determined.

Contributions have also been made to the efficiency of field operations by a study of the ratproofing characteristics of various construction materials, by the improvement of rat guards, by the design of a new type of aerosol generator, by improved systems for the dispersal of insecticides by aircraft and by the testing of insecticide sprayers (Figure 2). This list by no means exhausts the specific contributions made by the Equipment Development Section. The list could be expanded indefinitely if one were to consider the contributions of the mechanical engineer to other fields of environmental health protection including water supply, sewerage, sewage treatment and the collection and disposal of solid wastes.

Thus the mechanical engineer is contributing his small bit to the public health. He does not ask to supplant any of the well known scientific disciplines now engaged in the field, nor for more renown, but he does ask that, when advantageous, his particular training and capabilities be utilized in the solution of problems important to the public health.



STEVENAGE

A-20

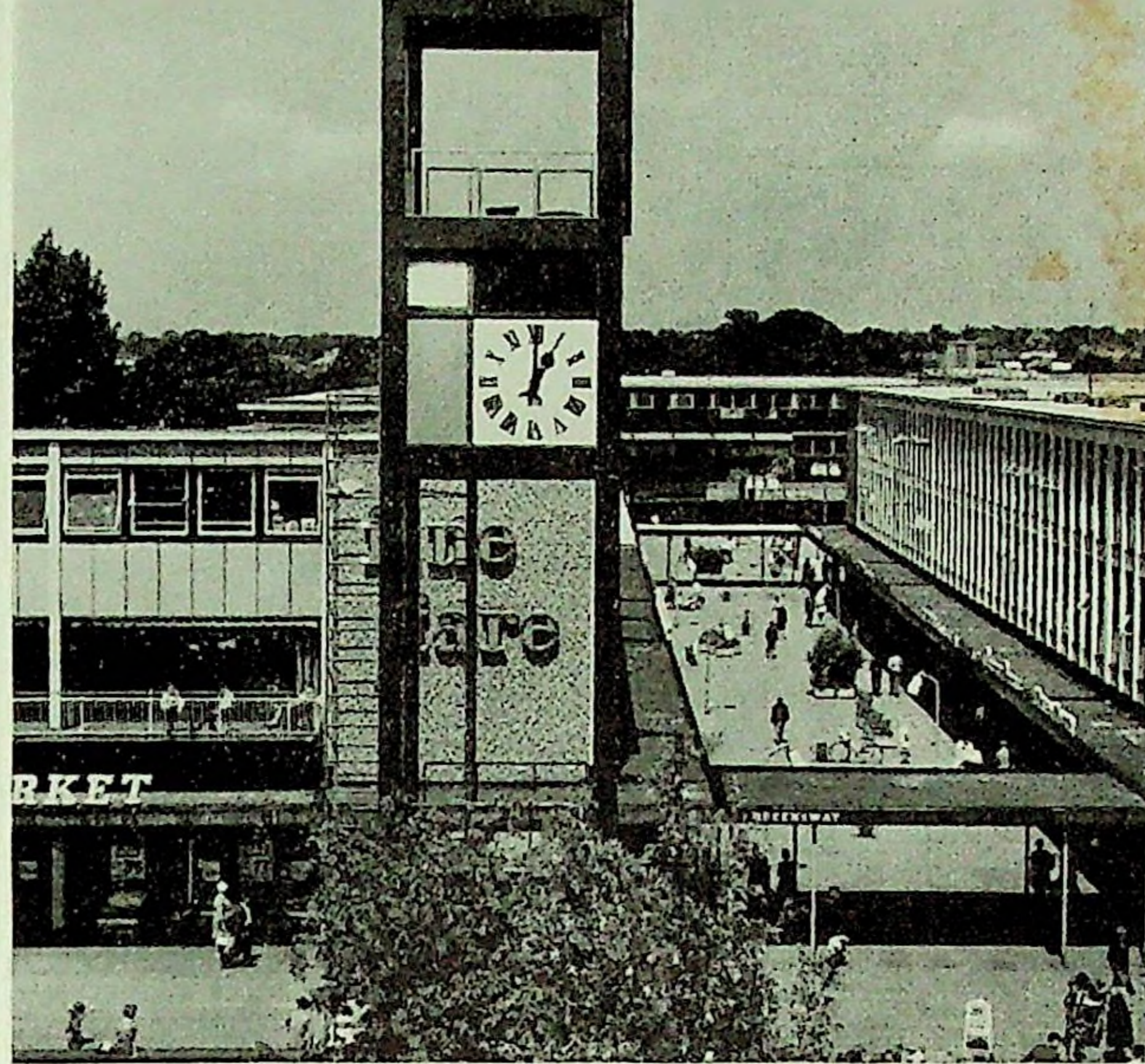
Stevenage

THE FIRST OF BRITAIN'S NEW TOWNS

In November 1946, Stevenage was designated as the first New Town to be built in Britain under the New Towns Act 1946. Today, after 26 years, it is a pleasant and prosperous town of 73,000 people, built around the original old town of about 7,000 people.

Stevenage is situated 30 miles North of London, on the main road and railway route from London to Edinburgh. It is one of eight New Towns located around London with the object of providing new homes for people from London who are living in unsuitable accommodation. The concept of the New Towns was that they should provide not only homes but also work and recreation for their people and the great majority of the residents of Stevenage make their

Fairlands shopping centre, on the main footpath system, in the ultra-safe Pin Green residential area.



Part of Queensway, and illuminated clock tower and pool in Town Square, in the traffic-free Town Centre.

living in the town, working either in the industrial areas, in the shops and offices or in one of the services or professional organisations.

The development of Stevenage is in the hands of a public corporation known as the Stevenage Development Corporation, appointed by the Secretary of State for the Environment and responsible, through him, to Parliament. The Corporation consists of a Chairman and eight Members who appoint their own chief executive and staff. Money required for the development of Stevenage is borrowed from the Government and is repayable with interest over 60 years.

During the 26 years that the Corporation has been responsible for the planning and development of Stevenage as a New Town, more than 18,000 new houses and flats; 10,000 car garages; 60 factories, warehouses and research laboratories (giving employment to more than 20,000 people); five large office blocks; 360 shops and stores; a general hospital; 14 public houses; six restaurants; 14 churches; 50 primary, secondary and special schools; six community centres and tenants meeting halls; 400 acres of playing fields; 100 miles of roads and 25 miles of cycleways have been completed.

A college of further education, public library, health centre, swimming pool, youth centre, dance hall, tenpin bowling centre, 100 bedroom hotel and police, fire and ambulance stations have been provided in the Town Centre, and a twin-auditoria cinema, arts centre (incorporating a theatre), indoor sports centre, new railway station, law courts and multi-storey car parks are either under construction or planned for the near future. A 150 acre main town park, with man-made boating lakes, has been developed by Stevenage Urban District Council, and future recreational plans include two golf courses on the periphery of the town.

The original Master Plan for Stevenage envisaged the development of an area of 6,156 acres (2491.2 hectare) as a town with a total population of 60,000 with all the residential, industrial, commercial and other development necessary to achieve a balanced and largely self-contained community. Under the Stevenage Master Plan 1966, however, Stevenage will continue to grow to a population of more than 100,000 during the next 25 years—to 80,000 in 1975/1976 by planned immigration from London and thereafter to 105,000 in 1995 by its own natural increase. In June 1972, the Corporation

Principal pedestrian-way through traffic-separated Pin Green housing area.





Segregated cycle- and pedestrian-ways linking Town Centre and residential and industrial areas and underpassing main-road junctions.

was asked by the Government to suggest where an additional 3,000 to 4,000 acres of land might be incorporated into the designated area; such enlargement would call for a revised Master Plan.

The town was planned on the basis of an industrial area of some 400 acres (161.9 hectare), with a reserve area for possible expansion, on the west side of the railway. A second employment area is now being developed in the north-east of the town on a 100 acre (40.5 hectare) site which was added to the designated area in 1965.

Each residential neighbourhood of approximately 10,000 people contains a variety of dwellings, from small bed-sitting room flats to five-bedroom family houses, with its own shopping centres, playing fields and children's playgrounds, community facilities, schools, churches and doctors' and dentists' surgeries. Groups of houses and flats of higher standard and design have been built in different neighbourhoods for executives and professional people working in the town so that a distribution of all levels is achieved throughout the town. Houses

for sale and building sites for owner-occupied houses are also available. Since the Corporation was authorised by the Government to offer rented houses for sale to sitting tenants at up to 20% below current market prices, the proportion of owner-occupiers has been increasing rapidly.

The shops are planned so that the housewife can obtain, within easy walking distance of her home, most daily requirements in the neighbourhood where she lives. Primary schools, public houses, churches, self-contained accommodation for elderly people and community facilities are located as closely as possible to the shopping centres.

The larger stores and the main indoor recreational and entertainment facilities are located in the all-pedestrian Town Centre which is situated between the residential neighbourhoods and the industrial area. With its attractive squares and canopied shopping "streets", reserved for pedestrians only, the Town Centre affords shoppers complete protection from accidents and from the weather.

Traffic separation has been an important aspect in the planning of Stevenage. In addition to the miniature highway system which has been provided just for cyclists, the Town Centre (which is as yet uncompleted) was the first shopping centre of its kind in the country where the principle of the pedestrian precinct dominated the whole concept. The principle was later carried into the housing neighbourhoods and the newest—and largest—of the town's residential areas where development is almost complete, has been planned with full segregation of motorists from cyclists and pedestrians, each having their own "highway" system, with pedestrian and cycleway underpasses at all major road junctions.

For further information about Stevenage
write to:

**The Press and Public Relations Officer
Stevenage Development Corporation
Swingate House, Danestrete
Stevenage, Herts.**

Telephone Stevenage 3344

COMMUNITY HEALTH CELL

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BANGALORE - 560 001

Ancient Times

City life often more insanitary than rural, but not always. In ancient Rome, Athens and Babylon fine buildings were accompanied by a high standard of public health:

City baths
Aqueducts
Straight streets
Under-floor heating

Mediaeval Times

Cities grew more haphazardly, were insanitary and affected greatly by plague, cholera and typhus, particularly plague.
1666 Great Fire of London stops plague

19th Century

- 1832 Edwin Chadwick (1800-1885) a lawyer led a great sanitary movement and instituted Royal Commissions. Published most successfully his "Report on
1842 the Sanitary Conditions of the Labouring Population".
He supported doctors in public health, and though he was forced out of public life by his extreme views, continued to feed them with statistics.
- 1847 Health of Towns Committee in U.K.
Chadwick, Shaftesbury, Dr T. Southwood (1788-1861) and Sir John Simon encouraged the widening of streets, paving of sidewalks, drains and sewers.
- 1847 Dr William Duncan appointed the first Medical Officer of Health MOH, in Liverpool.
William Rathbone, a philanthropist there encouraged beginnings of health visiting, employing one of Nightingale's nurses Miss Agnes Jones, as health visitor. She died of typhus after three years home nursing.
- 1848 Sir John Simon made M.O.H. of London. Headed first Ministry (General Board of Health)
- 1854 Dr John Snow removed the handle of the Broad Street pump after an epidemic of cholera involving 500 deaths was traced to infected water.
- 1865 Christian Mission in London founded by William Booth, later became the Salvation Army. Worked especially to rescue beggars, unemployed, orphans, prostitutes and criminals. Organised soup kitchens, free lodging houses, etc.
- 1886 Dr Tom Barnado started orphanages in London; Dr Muller in Bristol
- 1889-1897 Charles Booth (1840-1916) wrote "Life and Labour of the People of London, 1889-1897" and in 1901 "Poverty, a study of Town Life".
- 1899 Sir Ronald Ross advised W. MacGregor in Lagos on swamp reclamation and malaria control
- 1901 Seebohm Rowntree surveyed city of York, and again in 1935
- 1901 General Gorgas controls yellow fever in Cuba and Panama

20th Century

- 1914 Lagos Board of Health set up. Dr I.L. Oluwole (1923-1953) first African MOH
- 1958 Ione Acquah writes her survey of Accra city
- 1961 Peter Marris publishes a study of Lagos re-housing
- 1960s Noise abatement. New town satellites. Revolutionary town planning changes around railways, roads on different levels, car free shopping centres.

44.22

DORKING AND HORLEY
RURAL DISTRICT COUNCIL



<u>POPULATION</u>	34,300
<u>AREA</u>	53,943 Acres
<u>DENSITY OF POPULATION</u>	0.62 persons per acre
<u>TOTAL RATEABLE VALUE</u>	£1,943,827.

THE RURAL DISTRICT of DORKING and HORLEY was formed in 1933 under the Surrey County Council review of the area and comprised parts of the former Reigate and Dorking Rural District Councils.

Its Charter and Arms were granted in 1959. The Rural District comprises 12 Parishes including:-

Abinger Betchworth Capel Headley Leigh Newdigate Ockley Wotton
Buckland Charlwood Holmwood
Horley

GATWICK AIRPORT comes within the Rural District and is situated in the Parish of Charlwood.

WATER SUPPLY

Water is supplied to areas in the Western Parishes by the West Surrey Water Board and in the Eastern Parishes by the East Surrey Water Company. The water is drawn from boreholes in the North Downs.

There are still a few properties within the Rural District that are supplied from private water stores and wells, these are principally situated within the outlying parts of the District.

REFUSE

The Council collects 7,000 tons of refuse a year from the District. Refuse is disposed of to two principal tips in the locality, one in the Dorking Urban District and at a private tip operated by the Buckland Sand and Silica Company.

SEWERAGE

The principal sewage works is at Horley which deals with 1,500,000 gallons of sewage per day. The works has recently been modernised to allow for the development in the area.

The Villages of Charlwood, Capel, Holmwood, Ockley, Abinger, Puckland and Betchworth are sewered.

The Council owns 4 additional small sewage works, 2 at Ockley, 1 at Capel and 1 at Holmwood. Sewage from the Villages of Abinger, Betchworth and Buckland discharge into

the sewers of neighbouring Authorities. The remaining parts of the District which are unsewered are served by Cesspools, Septic Tanks and in a small number of cases there are premises still with bucket closets.

Approximately 12 - 14 Million gallons of sewage is removed from cesspools throughout the District by the Council's tankers, and private Contractors are employed to make a weekly visit to empty the bucket closets in the area.

HORLEY

Horley which has a population of over 18,000 is the major centre of population within the District, and the industries in this Parish include:- Steel Works, Manufacture of Dumpers and Earth Moving Vehicles, Electronic Research Laboratories, Manufacture of Wood working Machines, Motor Transport Engineering Depot, Food Supply Warehouses and Aircraft Services.

AMENITIES

Horley is provided with a fine Public Library, a new Clinic, a new Fire Station, a new Ambulance Station, Cottage Hospital, an S.T.D. automatic telephone exchange, Cinema, Five Primary Schools, Two Secondary Schools and there are Churches of all denominations.

GATWICK AIRPORT

A unique feature of Dorking & Horley Rural District is Gatwick Airport, which is one of the five International Sanitary Airports in Great Britain, which occupies an extensive site in the south-east corner of the District, 25 miles from London and very near the Surrey-Sussex border.

The new Airport was the first to combine air, main line rail (London-South Coast Line) and trunk road (A.23) facilities into one terminus, and such has been its success that developments completed in 1966 have more than doubled the former size of the building, and considerably extended the apron.

Today, the east-west runway is 150 feet wide and 8,200' long, with another 1,000' of clearway extending from the runway thresholds. The main London-Brighton road had to be diverted $2\frac{1}{4}$ miles to clear one end of the runway.

Since 1958, the number of passengers using the airport has increased more than five times to the 1964-65 figure of 1,140,414. The volume of traffic has increased in similar proportions too. When the airport opened in 1958, the number of passengers in that year was 220,000. Traffic has increased to such an extent that in 1966-67, 1,650,000 passengers passed through the terminal.

The existence of the airport places certain demands on the Council's services and in fact daily refuse collection is provided to all parts of the airport, and there is a special trunk sewer connection connecting to the Council's Horley Sewage Works. The Public Health Department of the Council undertakes the inspection of imported food coming into the airport and undertakes non-medical services i.e. Disinfection, Disinsection and rodent control as required under the International Sanitary Regulations.

44-23

HORLEY SEWAGE WORKS

During the past 100 years with the progress of industry and the higher standards of health and hygiene the science of River Pollution Control has progressed in such a manner that although the scientific knowledge and "know how" has been available the capital required to operate schemes of purification of waste water and industrial effluents has never been wholly available. In recent years a more critical view has been taken of river pollution, and it is a fact that many rivers on this country of ours which some 100 years ago supported fish life such as salmon, trout, etc., but up to recent years had been allowed to degenerate in what might be described as open sewers. With the passing of legislation to prevent pollution of rivers the financial aspect has somewhat eased and more and better purification works have been and are being built.

The township of Horley inaugurated its first sewage works in 1938 which was of the bacteriological filter type, as the years passed the works became inadequate to cope with an increasing population and industrial load. Extensions were added to the Depot and were completed in late 1963 with the exception of minor works. The extensions are of the Activated Sludge Principle.

On entering the works one sees the managerial offices, laboratories, workmens messrooms, showers, locker rooms, etc. The building on the right is the Major Pumping Station. This station pumps the sewage and industrial wastes draining from Horley, Salfords, Povey Cross, Charlwood etc., to the primary processes. Before being pumped the solids in the sewage, e.i. rags, paper etc., are cut up into small dices $\frac{3}{8}$ cube in a machine called a Comminator.

The pumps pump the sewage into Grit Separation Chambers where grit is separated from the sewage, these are located North of the Pumping Station.

After leaving the Grit Separation Chambers the sewage enters two Circular Tanks known as primary settlement units, here the grosser solid are settled out and these solids are known as sludge. The sludge is withdrawn and pumped or gravitated into "sludge digestion units" of which more will be said later.

From the two primary settlement tanks the sewage liquor is then passed to a dividing bay where automatic division of the flow takes place, this is North of the Circular Tanks.

A third of the flow is taken to be treated on biological filters of which there are four situated to the West of the primary tanks. In these filters bacteria live and breed, these bacteria require two things to support their life cycle :-

1. Oxygen
2. Food

In the case of 1, the oxygen is carried through the filter or habitat of the bacteria intermixed with the sewage liquor. In the case of 2, the food is supplied with the finely suspended particles in the sewage.

Note the opaque liquor which is passed onto the surface of the filter and compare with the effluent in the filter channel. This effluent is collected into a further settlement unit called Humus Tanks where the excrete from the bacteria mixed with the filter effluent is separated and a clean pure liquid is left which is discharged over grass areas before entering the River Mole.

COMMUNITY HEALTH CELL
47/1, (First Floor) Marks Road continued ...
BAN. 100 001

COMMUNITY HEALTH CELL
47/1, (First Floor) Marks Road
BAN. 100 001

We left a point in this description where $\frac{1}{3}$ of the flow was diverted to Biological Filters, we now consider the processing of the remaining $\frac{2}{3}$ of the flow. Adjoining the point of flow division we find that there are five units for treating the remaining $\frac{2}{3}$ of the flow. These are described as Activation or Aeration units, the sewage liquor enters one end of the unit, and is discharged at the opposite end. The treatment consists of vigorously agitating the liquor by revolving stainless steel brushes, whilst in a state of agitation the liquor is absorbing oxygen. Carefully note that at the inlet end a slurry like liquid is being fed into the units, this is in fact millions of bacteria which are the tiny creatures that feed on the fine solids suspended in the sewage liquor (as in the case of the biological filters except that these are a completely different species). Again the life cycle is completed - bacteria - oxygen - food. After a certain period the liquid leaves the aeration units intermixed with millions of tiny bacteria to enter the final tanks which are circular and 2 in number.

At this point the liquid is separated from the bacteria. The liquid, which should now be clear and pure, is passed over grass areas and out to the River Mole. The bacteria are collected and returned to the inlet of the aeration units to carry on the good work of purification.

It was said earlier that more would be said of sludge digestion. When the sludge is put into the digestion units it undergoes a period of fermentation and digestion for about 160 days, which reduces its bulk and frees it from obnoxious smells. After this process the sludge is pumped to the Sludge Drying Plant, and on entering the sludge is treated with three chemicals (1) Ferrous Sulphate (2) Flocculant AS5 (3) Lime. The treated sludge is then fed to the pick-up bath; sludge is then picked up by the rotating Coil Filter Drum, water being removed by vacuum. The solid remaining on the surface is then discharged onto a conveyor belt and hence to containers for disposal.

A few facts about Horley Sewage Works.

The cost per head of population is about the cost of one cigarette per day to run the works.

About 1.5 million gallons per day are treated.

Constant research in the Laboratories are taking place.

The work is not unhealthy, but rather the reverse.

The management and staff appreciate your visit and interest shown.

C. EDWARDS.

Services Manager.

77TH INDIAN SCIENCE CONGRESS, COCHIN
4TH-9TH FEBRUARY 1990

"RURAL HEALTH AND SANITATION - A NEED OF THE HOUR"
(INVITED PAPER)

BY

DR. V. PARAMESHVARA*

Health is an important and integral part of social and economic development of the country. In a country like India where 85 per cent of the population lives in rural areas and 85 per cent of health manpower and health care is concentrated in urban places, the maldistribution of health resources is sure to reflect on the total development of the society, because a rapid and equitable economic development depends on the health of the rural people. Investment in rural health is an investment in human capital. Delivery of rural health care is very essential. In spite of considerable progress and achievements in eradication of several communicable diseases, the health of rural people still centres round rural sanitation. This is the need of the hour, only next to promotion of food supply and nutrition. Many diseases both communicable and vector and pest borne and worm infestations are directly linked to sanitation; apart from aesthetic. The first step to improve sanitation is by including and adopting such measures as observing personal cleanliness and hygiene, to keep the house and its surroundings clean and pest free, to eat food that is fresh and protected against flies, purify water for

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drinking and store in a clean container, dispose human excreta and other household wastes under sanitary conditions and use of mosquito nets and other devices to prevent insect bites. The proper site for homes should be selected. The place should allow rain, waste water to drain away from the house and be away from a refuse dump and stagnant water where disease vectors and stray animals may live. Odours, dust, smoke or litter would be a great nuisance. Good ventilation of the house is essential. Animals should not share the living quarters of people. Every home should have latrine which should be safe and inexpensive. Water should be drawn from safe sources, if possible from a spring or protected well. Most enteric infections, enter the body through food and water. Therefore cleanliness with regard to both is essential.

Promotion of environmental health depends upon public information and education on health, community water supply and sanitation. Rural sanitation should be planned health service, as part of general socio-economic development. Rural health and sanitation must be made a people's programme and is best administered through intersectorial approach. While the Government agencies could provide basic infrastructure and administration, voluntary and non-Governmental agencies being a part of the community and without bureaucratic hurdles are most suited to provide rural health and sanitation. Rural people can make great contribution by donating their time, labour and material. Community participation also means resource mobilisation as no Government however affluent and committed, can cater to every expectation of rural health care and sanitation.

Use of mass media in health education is an important cost effective method to enhance community participation. Mass media experts learned in behavioural sciences and health communication skills must be included in this programme.

The Government responsible for the health of the public should straight away garner adequate information on current rural health and sanitation in each district and prepare time bound action goals. It is also imperative to establish a national plan for adequate and optimal rural sanitation and prevent diseases borne out of insanitary conditions. This could be achieved by establishing appropriate communication and co-ordination with other departments particularly those dealing with food policy, education and public information.

The whole problem of rural health sanitation has to be tackled on a war footing and an approach that emphasises the intervention to change the whole rural community by health education.

Rural Health and Sanitation - the need of the hour could only be achieved by better health educators than more doctors, better health care than more health care delivery, a political will, involvement of non-Governmental organisations, a dedicated profession and a motivated community.

CHAPTER 6

ENVIRONMENTAL SANITATION

6.1. WATER

WATER IS ESSENTIAL TO LIFE AND, THEREFORE, A COMMODITY WHICH EVERYONE MUST USE.

IN RURAL AREAS, WATER IS USUALLY CONSUMED RAW WHILE PERHAPS 90 PER CENT OF ALL THE OTHER FOOD IS RENDERED SAFE BY COOKING BEFORE USE.

THEREFORE, IT IS VERY IMPORTANT THAT SPECIAL ATTENTION BE PAID TO THE PROVISION OF SAFE DRINKING WATER.

6.1.1. USES OF WATER

Water is mainly used for:

- i. drinking and cooking;
- ii. cleanliness -- washing the person, clothing and household;
- iii. safety - in case of fire;
- iv. cultivation of fruit, flowers and vegetables;
- v. watering livestock.

6.1.2. DRINKING WATER

Water used for drinking must be free from chemical substances and micro-organisms in amounts which would present a hazard to health. Also, drinking water must be colourless and clear, and should be free from any odour or taste.

WATER WHICH IS SAFE TO DRINK SHOULD CONFORM TO CERTAIN INTERNATIONAL STANDARDS WHICH GIVE AN INDICATION OF THE QUALITY OF THE WATER.

6.1.3. INTERNATIONAL STANDARDS

These standards specify in figures what the acceptable safety limits are. It is not necessary for you to know these figures, but it is sufficient to have an idea of what these standards relate to. These standards are:

- i. Bacteriological : The major danger associated with drinking water is the possibility of its recent contamination by human excreta or animal pollution. The standard is, therefore, related to the detection of coliform bacteria (faecal bacteria) in water.
- ii. Chemical : There are certain chemical substances, e.g., fluorides, nitrates, lead, or arsenic, which if present in drinking water at concentrations greater than certain limits may be injurious to health.
- iii. Other : Standards have also been laid down regarding the limits of acceptability in relation to total solids, colour, turbidity and content of chemical substances (bicarbonates, chlorides and sulphates) in water.

- iv. pH Range : The pH range for water is 7.0 to 8.5, i.e. the water should be neutral or slightly alkaline but not acid.

A SAFE WATER SUPPLY IN RURAL AREAS IS A PROTECTED SUPPLY WHICH COMES FROM A SAFE SOURCE OR HAS BEEN PROPERLY TREATED. HOWEVER, IT SHOULD BE REMEMBERED THAT EVEN THIS WATER CAN BE POLLUTED OR CONTAMINATED AFTER IT HAS BEEN COLLECTED FROM A SAFE SOURCE IF PROPER PRECAUTIONS ARE NOT TAKEN.

6.1.4. DISEASES TRANSMITTED THROUGH WATER

Water polluted with human excreta is the cause of gastro-intestinal diseases, i.e. cholera, typhoid, bacillary dysentery and diarrhoeas. All these are caused by bacteria.

Roundworm, guineaworm and amebic dysentery are examples of parasitic diseases spread through contaminated water.

Poliomyelitis (infantile paralysis) and infectious hepatitis (jaundice) are serious infections transmitted by contaminated water; they are both caused by viruses.

6.1.5. COMMON SOURCES OF WATER SUPPLY IN RURAL AREAS

The major sources of water supply are:

1. Surface Waters:
 - i. collections of rain water;
 - ii. tanks and reservoirs;
 - iii. rivers, streams and canals;
 - iv. lakes.
2. Underground Water:
 - i. ordinary wells - shallow or deep;
 - ii. tube wells - shallow or deep;
 - iii. artesian wells;
 - iv. step wells;
 - v. springs.

6.1.6. POLLUTION OF DRINKING WATER

The risks of pollution increase when the water source is a surface source. Drinking water can become polluted in various ways:

1. Before the Water is Collected : Surface water is polluted by people defaecating near the source of bathing and washing their clothes and household utensils in or near the water. These sources are also liable to pollution by animals.

; Collections of water in tanks and reservoirs should always be kept covered to prevent pollution by birds.

Underground water may be contaminated from latrines, cesspools, soakage pits, and septic tanks. The location of wells and the nature of the soil are important factors to be considered if water contamination is to be avoided.

2. During Storage : If water from a protected source is collected in dirty containers, it becomes polluted and dangerous for drinking. Even if the container in which the clean water has been collected was clean, pollution of water can still occur from dust, flies, rats and birds, if the water is left uncovered. Dipping dirty tins into covered clean

Water should be poured out of storage containers, or run out through a tap, or a dipper with a long handle should be kept in the water container.

Water containers should, preferably, be kept out of reach of small children to prevent contamination and accidents.

6.1.7. RESPONSIBILITIES OF THE HEALTH WORKER (MALE) IN ENSURING A SAFE WATER SUPPLY

THE PROVISION OF WATER SUPPLY IS THE RESPONSIBILITY OF ENGINEERS BUT IT IS THE DUTY OF HEALTH WORKERS TO ENSURE THAT THE WATER IS SAFE TO DRINK.

AS A HEALTH WORKER IN THE RURAL COMMUNITY, YOU MUST ENSURE THAT THE WATER CONSUMED BY THE COMMUNITY IS SAFE FOR DRINKING

Your duties in respect of water supplies in the rural areas include:

1. surveying the water sources in the community;
2. chlorinating public water supply sources;
3. ensuring that pumps fitted to community wells are in working order by promptly reporting to the authorities concerned those pumps which are out of order;
4. educating the public on the importance of consuming only safe drinking water;
5. advising on proper methods for water storage;
6. advising on methods for water disinfection;
7. taking the necessary action to safeguard the health of the community in the event of an epidemic caused by contaminated water supply.

1. Surveying the Water Sources in the Community : When you assume your duties in the community, your first activity is to conduct a survey to get to know the area and its people.

MAKE SURE THAT ALL SOURCES OF DRINKING WATER, THEIR CONDITION, WHETHER PERMANENT OR TEMPORARY, AND THE METHOD OF WATER COLLECTION ARE RECORDED. THIS BASE-LINE SURVEY WILL HELP YOU TO ASSESS THE MAGNITUDE OF YOUR RESPONSIBILITIES IN THIS FIELD. PLOT THIS INFORMATION ON THE MAP OF YOUR AREA.

Refer to the household and village records in Chapter 4, 'Record Keeping'.

When surveying the water sources, the following points should be checked to help you decide whether or not a well is sanitary:

- i. There should be no cracks in the lining of the well.
- ii. A parapet wall about one metre high with a slanting surface to the outside should surround the mouth of the well.
- iii. There should be a cemented platform two metres around the well sloping downwards to the outside.
- iv. There should be a gutter or drain at the outer end of the platform to lead the waste water to soakage pit.

- v. Water should be drawn through a well bucket on a pulley or, preferably, through a hand pump.
- vi. No washing of clothes or bathing should be carried out near a well.

Fig. 6.1 and 6.2. are diagrams of an open well and a tube well.'

2. Chlorinating Public Water Supply Sources: The disinfection of water is vital in situations where epidemics of water borne diseases have to be averted or controlled without adequately protected water supplies. Chlorine is the most reliable disinfectant for large scale use.

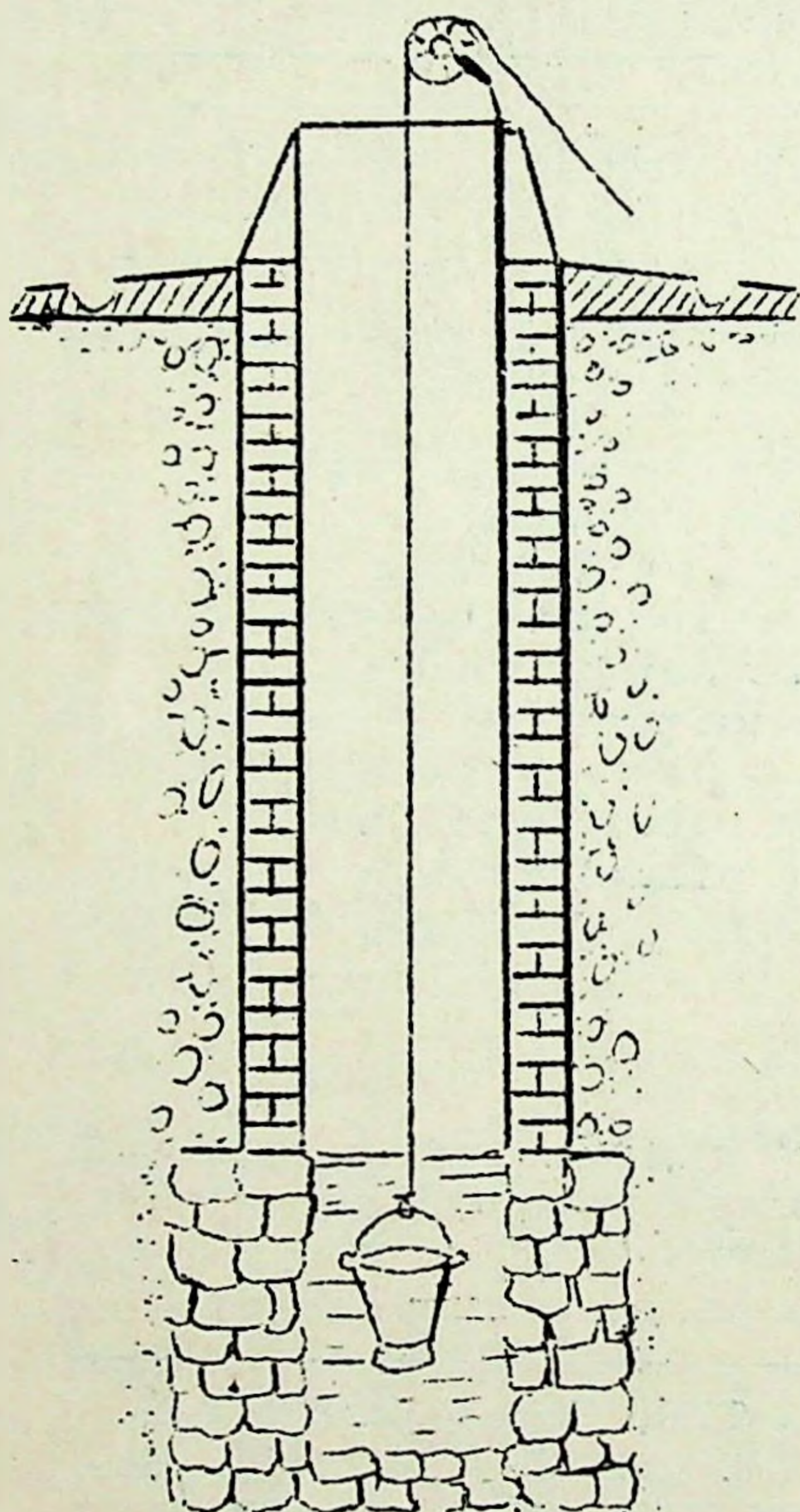


Fig. 6.1: Open Well

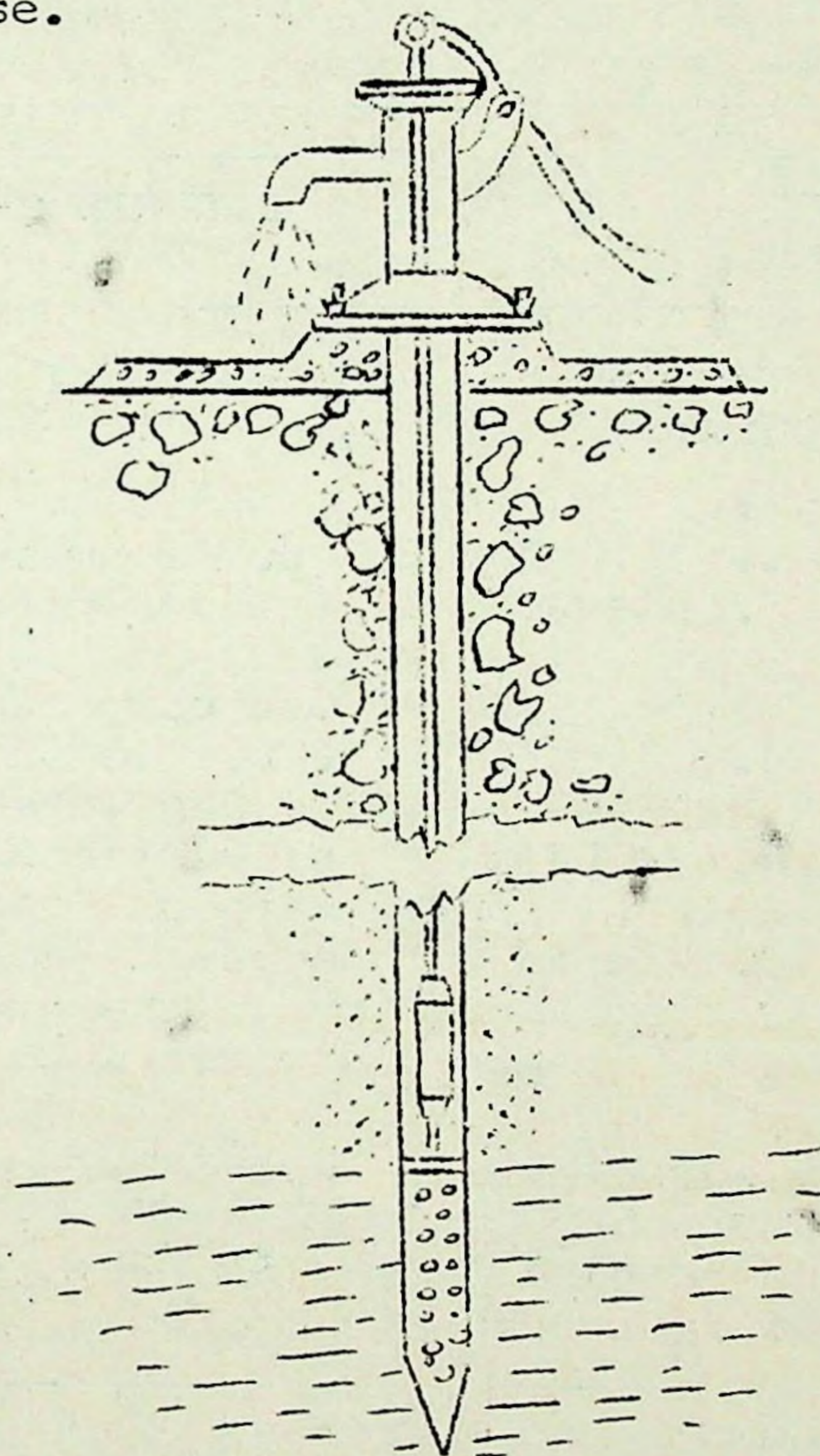


Fig. 6.2: Tube Well

Rural communities living in vulnerable areas must have their wells, ponds, tanks, canals and other raw water sources periodically disinfected with chlorine. Chlorination must be carried out with the available material and man-power resources by a simple, inexpensive and practical method. The base-line survey will help to facilitate the preparation of a plan for the disinfection of water sources.

The objectives of chlorination is to achieve a residual chlorine content in the water of 0.5 parts per million (p.p.m.) after 30 minutes of contact. To achieve this it is generally necessary to calculate the chlorine dose so as to reach 2 p.p.m. immediately after chlorination.

Proceed as follows:

- i. Material Required
 - a. Bleaching powder
 - b. Bucket of an adequate size.

ii. Technique

- a. Estimate the amount of water in the well by using the following formula:

$$5 D^2 H = \text{Number of gallons of water in the well.}$$

(D = diameter of well in feet
H = depth of water in feet)

e.g., In a well having a diameter of 4 feet and containing water to a depth of 10 feet, the number of gallons in the well would be

$$5 \times 4 \times 4 \times 10 = 800 \text{ gallons}$$

- b. Calculate the amount of bleaching powder required by means of the following formula:

$$\frac{14}{X} = \text{Number of grains of bleaching powder required per gallon to achieve 2 p.p.m. dose immediately after chlorination.}$$

(Note: 15 gr = 1gm)

(X = percentage of chlorine in the bleaching powder)

Note: If properly stored in a covered container in a cool, dark, dry place, the chlorine content of unstabilised bleaching powder should not drop below 20 per cent.

For example, to chlorinate a well containing 800 gallons of water with bleaching powder having a chlorine content of 20 per cent the amount of bleaching powder required would be $\frac{14}{20} \times 800 = 560 \text{ gr}$ = approximately 37 gm.

KEEP A RECORD OF THE AMOUNT OF BLEACHING POWDER USED FOR EACH WELL TO SAVE YOU CALCULATING THIS AMOUNT EACH TIME.

- c. Mix the calculated amount of bleaching powder in a bucket three fourths full of water.
- d. Lower the bucket containing the solution into the well and agitate to ensure good mixing, taking care that the bottom of the well is not disturbed.

IT IS DESIRABLE TO CHLORINATE OPEN WELLS ONCE A WEEK. FOR THIS IT IS NECESSARY TO ENLIST THE HELP OF THE PEOPLE USING THE WELL.

Chlorination of ponds, tanks and other surface waters is not carried out as a routine. It is undertaken during epidemics when the water source is responsible. Consult your supervisor for advice in such cases.

3. Maintenance of Hand Pumps : Tube wells are usually disinfected before they are fitted with hand pumps and sealed. Therefore, if the hand pump is out of order the usual source of safe water supply is not available to the community. An alternative source of supply, which may be polluted, will be used and hazards to health created.

IT IS ESSENTIAL THAT TUBE WELLS SHOULD BE ADEQUATELY MAINTAINED TO REDUCE THE HAZARDS FROM THE USE OF POLLUTED WATER SOURCES.

Usually the panchayat is responsible for maintaining the pumps in working order.

YOU MUST BECOME WELL ACQUAINTED WITH THE ARRANGEMENTS IN FORCE IN YOUR AREA RELATING TO THE MAINTENANCE OF WATER PUMPS. IT IS YOUR RESPONSIBILITY TO KEEP A CLOSE WATCH ON THESE PUMPS AND REPORT IMMEDIATELY TO THE AUTHORITY CONCERNED ANY PUMP WHICH IS OUT OF ORDER AND REQUIRED ATTENTION.

IT IS ALSO YOUR DUTY TO MAKE SURE THAT ANY OTHER SOURCE OF DRINKING WATER SUPPLY WHICH IS USED WHEN A TUBE WELL IS OUT OF ORDER IS RENDERED SAFE. CHLORINATION MAY BE NECESSARY AS A FIRST STEP. ADVICE ON BOILING AND OTHER HEALTH EDUCATION ACTIVITIES WILL HELP MAINTAIN THE HEALTH OF THE COMMUNITY.

4. Health Education of the Public : Your community must know what is safe to drink and what is not. It is your duty to teach them what they should know about drinking water. Your topics for educational activities should include the following:

- i. The health hazards attached to drawing drinking water from surface sources.
- ii. The importance of drinking chlorinated water even through it may taste different.
- iii. The importance of boiling water, particularly after the rains when the surface waters are more exposed to the risk of pollution than usual.
- iv. The safe way of storing water and of drawing water from storage tanks and containers.
- v. The diseases carried by water, particularly cholera.
- vi. The importance of keeping the areas around open water supplies free from faecal contamination and other sources of pollution.
- vii. Community responsibility for cleanliness of water sources.
- viii. The need for the community to seek advice whenever problems relating to the supply and utilization of water arise.

5. Advising on the Proper Methods for Water Storage : There are very few houses in rural areas equipped with their own well or hand pump. The majority of the population draw their drinking water supply from a public source. Also, the person collecting the water has to walk some distance to the well or hand pump so that water is collected in quantities which will be utilized throughout the day. In the meantime, the water is stored in the house.

WHILE WATER IS IN STORAGE AFTER COLLECTION THERE IS ALWAYS THE DANGER OF ITS BECOMING POLLUTED, IF THE NECESSARY PRECAUTIONS ARE NOT TAKEN.

As a health worker in the community, it is your duty to advise on the safe way of carrying and storing water as well as the methods of water disinfection available for domestic or individual use.

Storage : Water can be contaminated during transit and storage even if it was quite safe at the source. The following procedures are, therefore, recommended:

- i. The containers used for collecting the water should be clean. They should, preferably, be made of material which can be scrubbed and should be of a shape which allows cleaning from the inside.
- ii. Where water is stored in bulk, i.e. when it is stored in a container other than the bucket or tin in which it has been collected, the bulk container should also be made of material which can be cleaned periodically. It should be remembered that bulk storage results in sedimentation of the solid particles, thus clarifying the drinking water.
- iii. The storage container must be supplied with a suitable cover to prevent dust, flies and other insects, rats or birds from polluting the water. If the water is in an outside storage tank, bird droppings are a source of pollution.
- iv. The storage tank should be raised above the ground and protected to prevent cattle and other livestock from drinking from it, and thus polluting it.
- v. As far as possible, the water should not be drawn out by dipping a tin or other vessel into the storage tank. Preferably, the water should be poured out if the container is small enough. If the container is large and heavy, it should be provided with a tap for running out the water or a dipper with a long handle should be kept in the container.

WHEN RAIN WATER IS STORED IN UNDERGROUND TANKS, THE HAZARD OF MOSQUITO BREEDING IS ADDED TO THAT OF CONTAMINATION AND THE PERIODIC USE OF MALARIOL TO CONTROL MOSQUITO LARVAE MAY BE NECESSARY.

Maintenance of Storage Tanks : Large storage tanks should be cleaned periodically to remove collected sediment and collections of algae. The tank should be scrubbed with bleaching powder taking care not to pollute the tank by using dirty brushes or by entering the tank without taking the necessary precautions.

6. Water Disinfection (Domestic) : To ensure that clean water is consumed, it is necessary to store it in a clean covered container after disinfection. Some of the methods recommended for disinfection on an individual or domestic scale include:

- a. Boiling: ensures total sterilization against all bacteria, cysts, spores and ova. To be effective however, the water must be brought to the boil and kept boiling for a minimum of 5 minutes.

ALL WATER CONSUMED BY BABIES AND CHILDREN SHOULD BE BOILED TO PREVENT THE RISK OF GASTRO-ENTERITIS AND OTHER DISEASES, POLIOMYELITIS AND INFECTIOUS HEPATITIS.

b. Chemical Disinfection:

- i. Potassium permanganate is an oxidising agent

- ii. Iodine is an excellent disinfectant, particularly for small-scale domestic application. Water disinfectants based on iodine are available commercially in tablet form and also as tincture of iodine in liquid form.

How to Disinfect Water Using Iodine : Use two drops of 2 per cent Tn. iodine per litre of clear water. Allow a contact time of 20 to 30 minutes for effective disinfection.

Note : Highly turbid water should be allowed to settle before being treated with iodine.

When iodine tablets are used follow the manufacturer's instructions.

- iii. Chlorine solution can also be used as a disinfectant on a domestic scale.

- c. Filtration : Bacterial filters do not remove viruses, e.g. those which are responsible for infectious hepatitis and poliomyelitis. There are various types of filters with different degrees of efficiency. In general, however, filters require regular cleaning and careful attention to ensure that the filters are not cracked, as otherwise they are a hazard rather than a help.

In rural communities, filters will be used only by those who can afford to purchase them, as they are relatively expensive.

7. Emergency Measures to protect the Health of the Community in Water-borne Epidemics : The characteristics of a water borne disease are as follows:

- i. The outbreak is explosive, i.e. a large number of cases occur within the space of a day. A sudden increase in the number of diarrhoeas suggests an infected water supply.
- ii. The outbreak is limited to the community served by the infected sources, i.e. the well, pond or stream.
- iii. All age groups and both sexes are affected.

WHEN THESE THREE SIGNS OF A WATER-BORNE DISEASE SUDDENLY APPEAR, YOU MUST TAKE IMMEDIATE STEPS TO LIMIT THE SPREAD OF INFECTION.

The steps you must take are as follows:

- i. With the help of the community seal off the water source until it is effectively chlorinated.
- ii. Instruct the householders to empty all their water containers and run off the stores water into the ground.
- iii. Instruct all householders to ensure that the water used for drinking or cooking is boiled.
- iv. Demonstrate to the householders how to disinfect their water containers.

- v. Treat all cases of diarrhoea and take the help of your supervisor and of the medical officer.
- vi. Chlorinate all the water sources in the village.
- vii. Before opening the source for use wait for your supervisor to test the water for residual chlorine.
- viii. Educate the community so as to prevent the re-pollution of open sources of drinking water supply.

MAKE ALL THE NECESSARY ARRANGEMENTS TO PROVIDE AN ALTERNATIVE SOURCE FOR DRINKING WATER UNTIL THE POLLUTED SOURCE IS RENDERED SAFE. THE EFFORT OF THE COMMUNITY SHOULD BE SOLICITED TO PREVENT FURTHER SPREAD OF THE DISEASE.

6.2 DISPOSAL OF LIQUID WASTES (SULLAGE WATER)

Liquid wastes in a rural community are produced from various sources, the most important of which are:

- i. waste from houses which consists of kitchen water, bath water and water from washing of utensils and clothes;
- ii. spillage from public wells and waste from washing places adjoining water sources;
- iii. waste from cattle sheds;
- iv. waste from market places, slaughter houses or fairs;
- v. waste from cottage industries such as weaving and dyeing.

If stagnant pools of sullage water with the consequent breeding of mosquitoes are to be avoided, adequate attention to the disposal of this waste water is necessary.

Besides the hazard of mosquito breeding in the stagnant water, other hazards are bad odours, dampness of houses, breeding of insects, rat infestation and the risk of polluting water supplies.

6.2.1 RESPONSIBILITIES OF THE HEALTH WORKER (MALE) IN THE DISPOSAL OF SULLAGE WATER

Your responsibilities in relation to sullage water disposal includes:

1. Educating the community on the dangers of water collections in the vicinity of human habitations;
2. helping the community to construct drains for conducting the sullage water to a place where it can be safely disposed off;
3. helping the community to construct soakage pits so that the water can be driven underground where it is absorbed without causing danger to health;
4. advising households to use sullage water for watering kitchen gardens;
5. assisting the community in protecting wells from contamination with sullage water;
6. advising the community on the proper maintenance of cattle sheds and the hygienic disposal of waste water.

7. advising market-stall owners and slaughter house staff on hygienic ways of disposal of sullage water;
8. making the necessary arrangements for disposal of sullage water from fairs and melas.

REMEMBER THAT YOUR RESPONSIBILITIES DO NOT END WITH MERELY TELLING THE COMMUNITY WHAT TO DO. YOU MUST SHOW THE COMMUNITY HOW TO DISPOSE OFF SULLAGE WATER. GET THE COOPERATION OF THE COMMUNITY LEADERS IN YOUR EFFORTS TO IMPROVE THE HEALTH STANDARDS OF THE COMMUNITY ENVIRONMENT.

1. Educating the Community on Sullage Water Disposal: The hygienic disposal of liquid wastes in rural areas can be achieved without the expenditure of excessive amounts of money. The community has to know what it is expected to do and be shown how to do it. The responsibility for imparting such knowledge rests with the health worker.

EDUCATING THE COMMUNITY TO IMPROVE ITS ENVIRONMENT IS A MAJOR OBJECTIVE IN HEALTH PROMOTION. DEVELOP YOUR EDUCATIONAL ACTIVITIES AS YOU VISIT HOUSES AND OBSERVE THE WAY SULLAGE WATER IS TREATED. DO NOT FORGET, HOWEVER, THAT GROUP EDUCATIONAL ACTIVITIES INVOLVING THE COMMUNITY LEADERS ARE ESSENTIAL TO ACHIEVE COMMUNITY PARTICIPATION IN IMPROVING THE ENVIRONMENT.

Some of the topics which you should talk about and illustrate with demonstrations include:

- i. the hazards to health inherent in collections of polluted water;
- ii. the health hazards caused by mosquitoes breeding in sullage water in the civinity of houses;
- iii. the composition of waste water originating from households and ways of disposal which remove health hazards;
- iv. the hazards related to the collection of spillage water from open wells;
- v. the hazards to health arising from sullage water from slaughter houses, cattle sheds, fairs, cottage industries and markets;
- vi. the diseases related to liquid wastes in a community environment;
- vii. the construction of drains, soakage pits, etc., to deal with sullage water.

2. Helping the Community to Construct Drains : If waste water collects it has to be drained away to safety. In rural areas where water may be a scare commodity, sullage water should be used to an advantage and should not be wasted. It is, however, important to lead it away safely without creating hazards to health.

The construction of open drains to carry household sullage water must be well planned. Silting results in stagnant water collections and regular desilting can be an expensive procedure; covering a drain with slabs can also be very expen-

sive and the community may not be able to afford such expense. It is important, therefore, to educate the community not to block drains and to allow and ensure a free flow of water. The outfall point should be at a nearby field where a food crop may be grown. Soakage pits and irrigation ponds may be constructed, particularly if the amount of water is large. The opening of the outfall into water courses must be avoided as it will pollute the water.

3. Showing the Community how to construct a Soakage Pit : A soakage pit is a dug-out space filled with stones or, preferably, overburnt bricks. The large number of stones or bricks increases the surface area over which biological and chemical action take place. The water seeps into the ground and reduces the danger of polluting underground water sources, e.g., wells used for drinking water supplies.

The soakage pit can be constructed at a suitable place near the house to take the sullage water. Before the water enters the soakage pit, it should pass through a catch pit so that silt and grit can be retained. This catch pit must be periodically cleaned.

Soakage pits provide a hygienic way of disposal of sullage water and they are cheap and easy to construct. They must however, be cleaned periodically.

THE RAW MATERIAL REQUIRED TO CONSTRUCT A SOAKAGE PIT IS READILY AVAILABLE IN THE PROXIMITY OF A RURAL COMMUNITY. IF LABOUR IS ALSO AVAILABLE AND THE SOIL IS ABSORBENT, THE CONSTRUCTION OF SOAKAGE PITS TO DEAL WITH SULLAGE WATER PROVIDES A HYGIENIC METHOD OF LIQUID WASTE DISPOSAL.

Construction of a Soakage Pit (see fig.6.3): Dig a pit 2 metres deep and 1.5 metres square of 1.5 metres in diameter. Divide it vertically into three equal portions. The lowest portion is filled with gravel or preferably overburnt bricks of $\frac{3}{4}$ size. The middle portion is filled with bricks of $\frac{1}{2}$ size and the upper most portion with bricks of $\frac{1}{4}$ size. This is covered by a layer of earth.

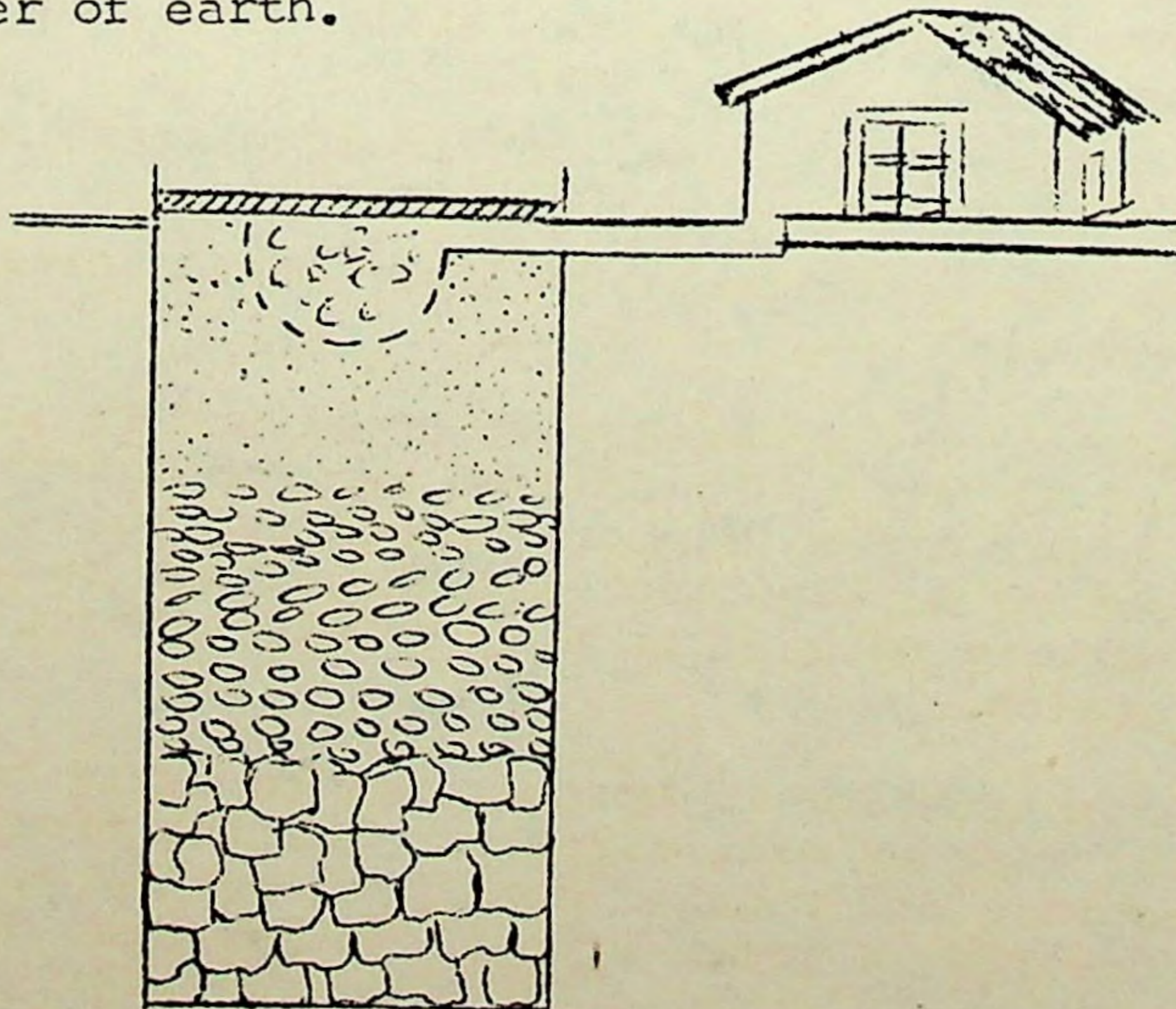


fig. 6.3: Soakage Pit

YOU ARE RESPONSIBLE FOR ENSURING THAT THESE DRAINS ARE KEPT FREE FROM SILT TO ALLOW THE WATER TO FLOW FREELY.

IF A PROPERLY CONSTRUCTED SLAUGHTER SLAB IS NOT AVAILABLE IN YOUR AREA, USE ALL YOUR INFLUENCE TO GET THE COMMUNITY TO CONSTRUCT SUCH A SLAB. SEEK THE TECHNICAL ADVICE OF YOUR SUPERVISOR SITING AND BUILDING IT.

8. Disposal of Sullage Water from Fairs and Melas : Sullage water from fairs and melas is usually made up of waste water from drink and food stalls, and water from ablutions.

This waste water is disposed off as follows:

- i. If the quantity is considerable, it is led into shallow pits where it gets absorbed into the ground. These pits are filled in at the end of the fair or mela.
- ii. If the water is small in quantity, such as water from individual food stalls, it is sprinkled on the ground to dry by evaporation and soaking into the ground.

6.3 EXCRETA DISPOSAL.

The proper disposal of human excreta is an important part of environmental sanitation since the intestinal infections common to man are transmitted through the faeces of sick persons or carriers of disease. Unhygienic disposal of human excreta leads to disease transmission through:

1. flies which carry the germs from the excreta to food;
2. drinking water contaminated by:
 - i. persons washing clothing soiled by faecal matter in the vicinity of unprotected drinking water sources;
 - ii. persons defaecating in or near open streams or pools;
 - iii. the use of unclean vessels and ropes to draw water from an open well;
 - iv. soil falling into an open well; e.g. from the feet of people standing at the edge of the well;
 - v. dust falling into an open well;
 - vi. underground contamination of badly sited wells.
3. vegetables contaminated by persons defaecating in cultivated fields or by human excreta used as fertilizer, and which are eaten raw without washing;
4. hands which are soiled after defaecation and are not washed before handling food;
5. walking barefoot on ground infested with hookworm larvae.

THE PROBLEM OF FAECAL-BORNE DISEASES IN INDIA IS ENORMOUS. THESE DISEASES INCLUDE:

1. BACTERIAL DISEASES - CHOLERA, TYPHOID, BACILLARY DYSENTERY.
 2. PARASITIC DISEASES - AMOEBIASIS, HOOKWORM, OTHER INTESTINAL WORMS.
 3. VIRUS DISEASES - POLIOMYELITIS, INFECTIOUS HEPATITIS.
-

6.3.1 EXCRETA DISPOSAL SYSTEM

Whereas in urban areas sewage is handled on a communal basis, in rural areas the proper disposal of excreta is primarily the responsibility of the house-owner.

Excreta disposal facilities must, therefore, be:

- i. simple, easy to construct with locally available materials, and cheap;
- ii. easy to maintain;
- iii. acceptable to the user;
- iv. able to provide adequate protection from sun, wind and rain;
- v. able to provide the desired privacy.

PRIVATELY OWNED LATRINES GIVE A SENSE OF OWNERSHIP AND ENCOURAGE CLEANLINESS AND PROPER MAINTENANCE.

The methods of excreta disposal can be classified according to whether or not water is used to carry the waste material. In rural areas where there is no water carriage system, the privy method of excreta disposal is used and this will be described in this manual.

PRIVY LATRINES MUST BE PROPERLY CONTROLLED TO AVOID HEALTH HAZARDS.

1. Bucket Latrine (see fig.6.4): A water-tight receptacle (Bucket) in a fly-proof compartment is provided for the accumulation and storage of excreta for short periods. The contents are regularly emptied into trenches or are used for composting.

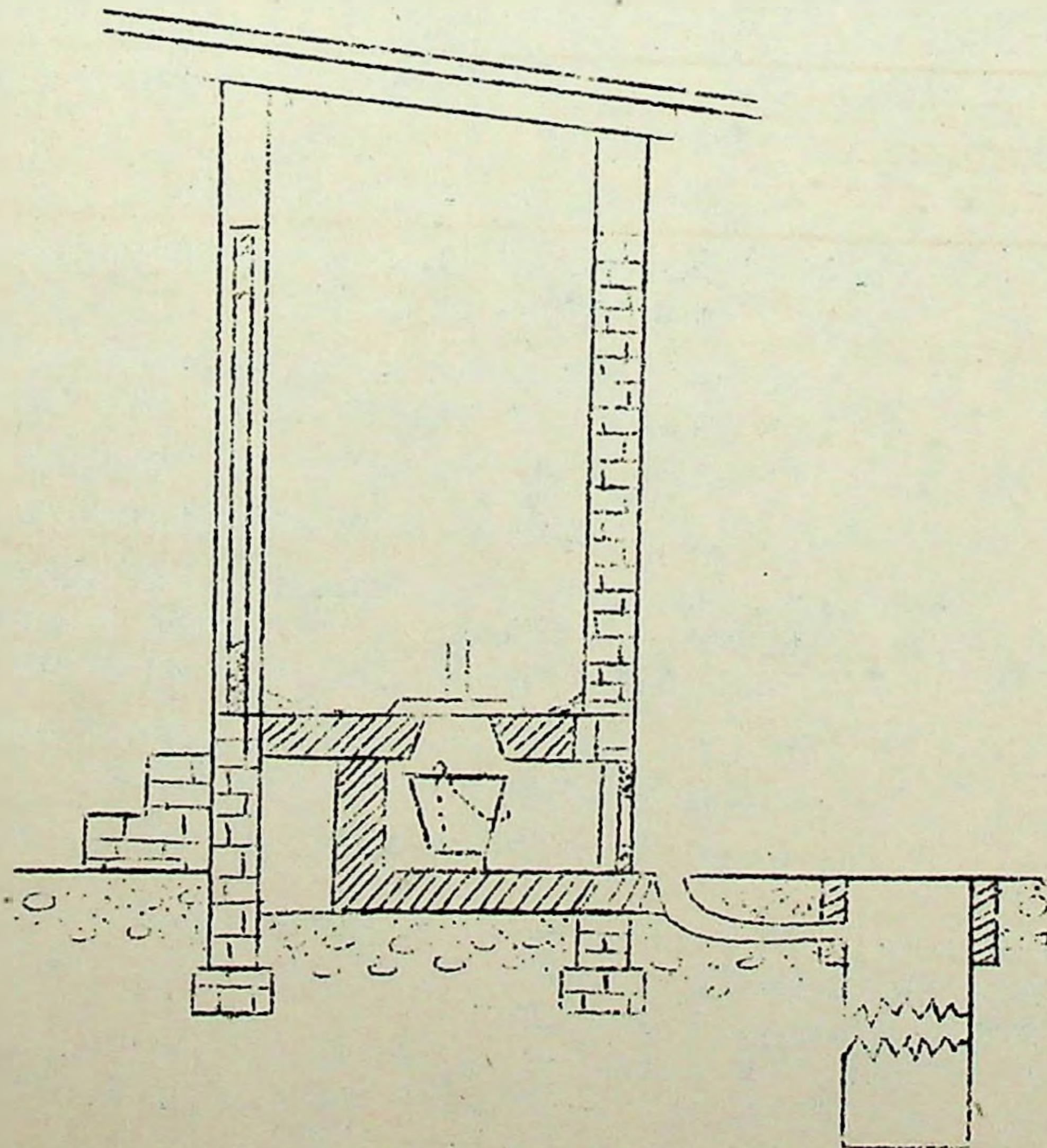


Fig. 6.4: Bucket Latrine

follows:

- i. The bucket-chamber should have a rear door which is kept in good repair and is kept closed, except when the bucket is being removed.
- ii. The bucket-chamber floor should be swept clean every time the bucket is removed.
- iii. The door and walls of the latrine and the bucket-chamber should be made of hard, impervious, smooth material so that they can be kept clean.
- iv. The seat-hole over the bucket should have a flyproof cover with a long handle which should cover the hole when the latrine is not in use.
- v. The latrine should be provided with a well-fitting front door.
- vi. Urine and liquid washings should drain into a soakage pit at the rear of the latrine.
- vii. The bucket should be placed between guide blocks to ensure that it receives all the excreta without soiling the sides.
- viii. The bucket should be in good condition and specifically coloured to distinguish it from buckets used for other purposes.
- ix. Removal, emptying and replacement operations should not result in any spillage of the contents.

BUCKET LATRINE PRESENT HEALTH HAZARDS AND SHOULD BE CLOSELY SUPERVISED TO MAINTAIN GOOD HEALTH. WHEREVER POSSIBLE THEY SHOULD BE REPLACED BY SANITARY LATRINES.

2. Sanitary Latrines : The characteristics of a sanitary latrines are as follows:

- i. The faeces are not exposed to flies or accessible to animals.
- ii. It is free of offensive odours.
- iii. It is not unsightly.
- iv. It does not contaminate surface water or ground water in the vicinity.

There are two types of household latrines which can be constructed cheaply and on a large scale as a permanent sanitary measure.

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These are as follows:

- a. Water-Seal Pit Latrine - RCA or PRAI Pattern (see fig.6.5)

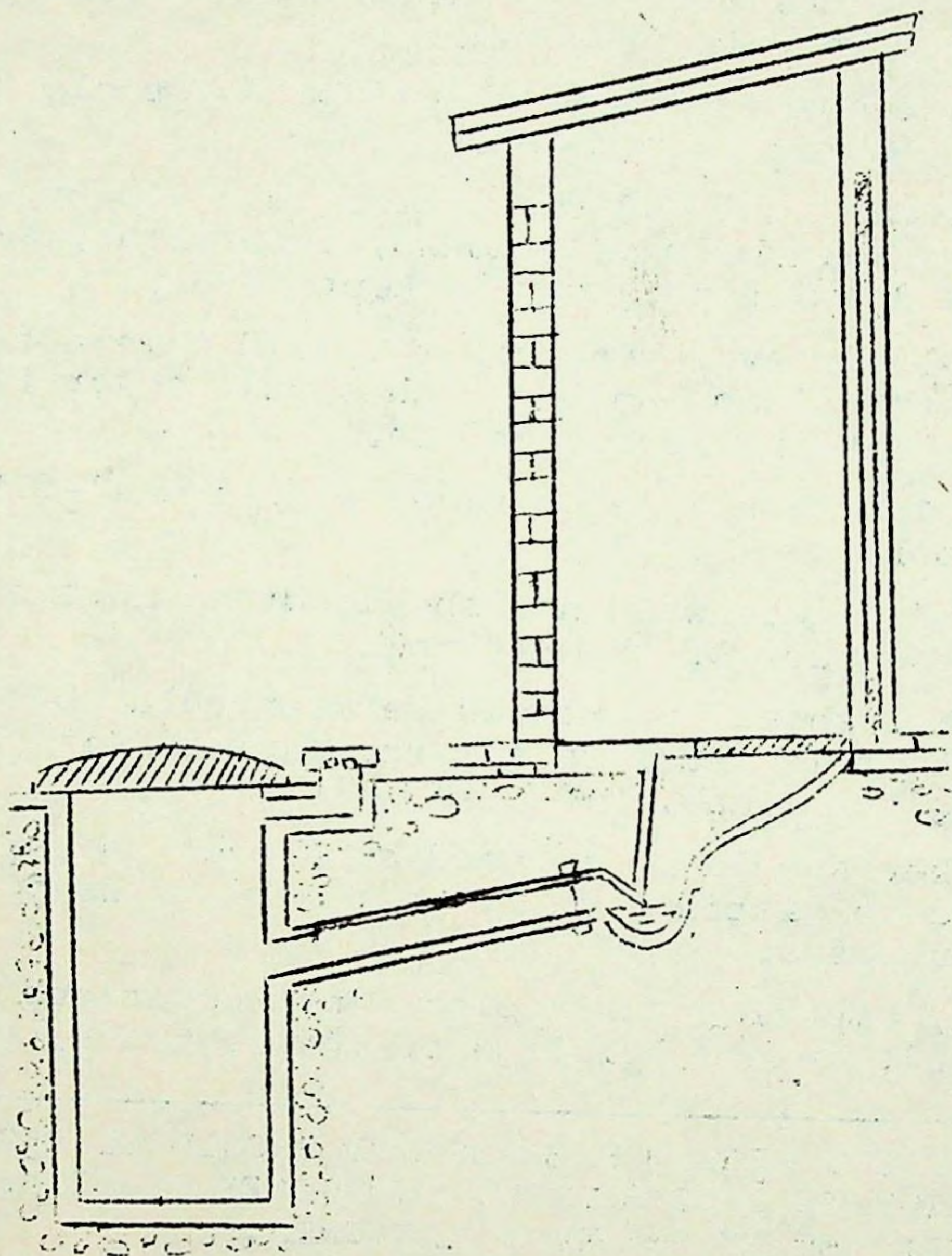


Fig 6.5: Water-Seal Pit Latrine

This consists of:

- i. The pit.
- ii. The seat which has a platform, a pan, a trap, and a water seal.
- iii. The pipe which connects the trap to the pit.
- iv. The superstructure.

The pit is 1 to 1.3 metres in diameter or one metre square and is 2.5 metres deep. Depending on the soil a honeycomb lining may be necessary. The pit is usually located outside the house wall and should be at least 10 metres away from any water source. To prevent the pit from collapsing, it should not be

near a drain or roof drain or in a place where water collects. Space should be provided for a second pit which is dug when the first pit is full. The pit is provided with a strong cover which is below the ground and is covered with earth. This type of pit can be dug without using any special tools and the family members themselves can construct it. This makes it cheap and easy to construct.

The seat consists of a pucca platform made of bricks or cement, a pan, a trap containing a water seal and a connecting pipe which leads to the pit. The water seal should be of 1.25cm. only.

The superstructure can be made of any material according to the means of the family.

It is essential to flush this latrine each time it is used for defaecation with 1 litre of water. If properly used a pit is sufficient for a family of five persons for three to four years, depending on the nature of the soil. When the pit is full the latrine cannot be flushed. A fresh pit should be dug, connected to the seat and covered with the old pit cover. The old pit should be filled up with earth, rammed in properly and allowed to rest for at least six months, after which the contents can be taken out with a special auger and used as manure.

The advantages of a pit latrine are that:

- i. it can be built without special tools;
- ii. the family members themselves can construct the pit with guidance from the health worker;
- iii. its cubic capacity is large enough to satisfy the needs of the family;
- iv. it can be constructed within the household premises;
- v. excreta is disposed off directly into the pit.

b. Bore Hole Latrine (see fig. 6.6) : A hole, 25 cm. to 45 cm. in diameter, is bored into the ground with a mechanical or hand-operated auger to a depth of 5 to 7 metres. The borehole is covered with a squatting slab with a cover. The distance between the seat and the ground water level should not be less than 3 metres.

A water-seal plate can be used instead of the ordinary seat over the borehole, at a slight extra cost. The excreta can be flushed away with as little as 1 litre of water. The latrine is clean and the excreta is completely out of view and inaccessible to flies. When the contents of the borehole have reached 1 metre

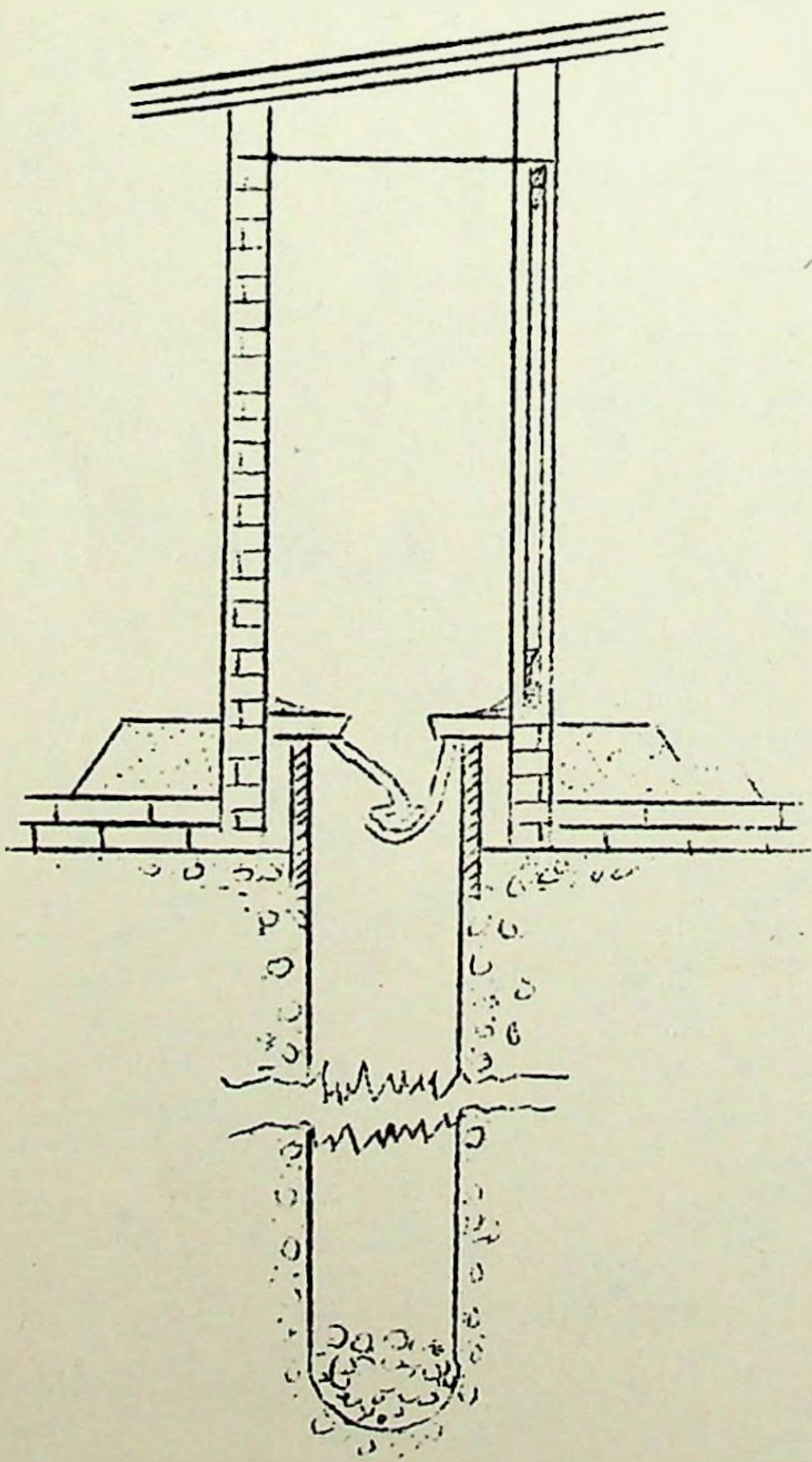


Fig.6.6:Borehole Latrine with water-seal.

below the seat, the latrine should be sealed off and new one built. The pit latrine or borehole latrine should only be used by a family.

The characteristics of a well-constructed pit or borehole latrine are as follows:

- i. The walls of the pit or borehole must not show any signs of caving in.
- ii. The platform or squatting slab should be easy to clean.
- iii. No foul smell should be produced.
- iv. The superstructure, doors and floor should be in good condition and made of material which can be easily cleaned.
- v. The latrine should have adequate ventilation and lighting.

THE ADVANTAGES OF THE WATER-SEAL TRAP ARE THAT SMELLS AND THE DANGERS OF FLY BREEDING ARE COMPLETELY REMOVED.

6.3.2. RESPONSIBILITIES OF THE HEALTH WORKER (MALE) IN RELATION TO ARRANGEMENTS FOR EXCRETA DISPOSAL

THE SANITARY DISPOSAL OF HUMAN EXCRETA IS ESSENTIAL FOR THE MAINTENANCE OF HEALTH. IN RURAL AREAS, WHERE COMMUNAL ARRANGEMENTS FOR DISPOSAL ARE LACKING, THE HEALTH WORKER HAS A VITAL ROLE TO PLAY.

Your duties include the following:

1. Surveying the arrangements for excreta disposal in the community.
2. Assisting and advising on the maintenance of existing arrangements for excreta disposal.
3. Demonstrating and advising on the construction of pit latrines and if available, procuring augers for constructing borehole latrines.
4. Advising on the siting of latrines, and the construction of superstructures.
5. Assisting the community in procuring slabs and water-seal traps.
6. If bucket latrines are in operation, supervising closely the handling of nightsoil disposal and trenching.
7. Educating the community about the health hazards of insanitary arrangements for excreta disposal and the diseases related to bad sanitation.

REMEMBER THAT THE MAIN OBJECTIVE OF SANITARY DISPOSAL OF HUMAN EXCRETA IS TO REDUCE THE INCIDENCE OF FAECAL-BORNE DISEASES.

1. Surveying the Arrangements for Excreta Disposal in the Community : In order to orientate yourself to the existing situation it is necessary that you should carry out a survey of all the methods used for the disposal of excreta in the community under your charge. Proceed as follows:

Prepare checklists to ensure that all the points relating to sanitary methods are not missed. The following checklists are suggested:

a. Bucket Latrine

- i. Is the latrine seat cover provided?
- ii. Is the chamber door self-closing and fly-proof?
- iii. Do the guide blocks position the bucket correctly?
- iv. Are a drain and soakage pit provided for wash water?
- v. Is the bucket regularly emptied?
- vi. Is the latrine kept clean?

b. Water-seal Pit Latrine

- i. Is it located more than 10 metres from a well?
- ii. Is there a water seal?
- iii. Can the latrine be adequately flushed with 1 litre of water?
- iv. Are there any defects in the superstructure, doors and floors?
- v. Are the ventilation and lighting adequate?
- vi. Is the latrine kept clean?

c. Borehole Latrine

- i. Is it located more than 10 metres from a well or hand pump?
- ii. Is there a water seal? If not, is a cover provided for the squatting slab opening?
- iii. Are there any defects in the superstructure, doors and floor?
- iv. Are the ventilation and lighting adequate?
- v. Is the latrine kept clean?

ONCE THE SURVEY IS COMPLETED, ENTER YOUR FINDING IN YOUR HOUSEHOLD RECORD AND VILLAGE RECORD. THIS WILL HELP YOU TO PLAN YOUR ACTIVITIES AND ASSESS YOUR PROGRESS.

2. Assisting and Advising on the Maintenance of Existing Arrangements for Excreta Disposal : Once you have carried out your survey and compiled the results, you are in a position to plan your activities.

Proceed as follows:

- i. Assess the time required to bring existing faulty latrines up to sanitary standards.
- ii. Plan your work piecemeal, tackling a few units at a time.

REMEMBER THAT YOU ARE A MULTIPURPOSE WORKER AND, THEREFORE, YOU HAVE OTHER ACTIVITIES TO PERFORM. DO NOT FORGET YOUR OTHER ACTIVITIES BUT TRY AND DO SOME WORK EVERY DAY TO IMPROVE THE SANITATION OF THE COMMUNITY.

- iii. Explain to the householders what needs to be done to improve their latrines and what help is available to them.
- iv. Try and help them work out the cost of repairs.
- v. Demonstrate to them some of the activities they have to carry out to improve their latrines.
- vi. Tell them of the benefits to health in using sanitary latrines.
- vii. Involve the village leaders in your scheme to improve the sanitation of the community.

HOUSEHOLDS THAT HAVE ALREADY CONSTRUCTED LATRINES MUST BE MADE TO USE THEM AND MAINTAIN THEM IN A SANITARY STATE!

3. Demonstrating and Advising on the Construction of Pit Latrines and, if available, Procuring Augers for Boring Latrines: Water-seal pit latrines are the most hygienic method for excreta disposal in rural areas where water is available in limited quantities. They prevent bad odours and fly breeding.

EVERY EFFORT SHOULD BE MADE TO MOTIVATE RURAL POPULATIONS TO CONSTRUCT AND USE PIT LATRINES.

Ignorance together with the expense involved in constructing a pit latrine are the main deterrents in adopting the method. Ignorance must be overcome by arranging educational activities and demonstrating ways of constructing latrines.

IF IT IS POSSIBLE TO CONSTRUCT A PIT LATRINE WITH A WATER-SEAL TRAP FOR DEMONSTRATION PURPOSES, YOU SHOULD DO SO WITH THE HELP OF COMMUNITY MEMBERS. THIS WILL HELP YOU TO DEMONSTRATE AND HIGHLIGHT THE IMPORTANT FEATURES OF A PROPERLY CONSTRUCTED SANITARY LATRINE.

Advise the community leaders and members where they can get seats and slabs and technical know-how for the construction of latrines. The assistance of your supervisor should be sought for this purpose.

In some blocks hand-operated augers may be available. It is your duty to arrange with the block development officer for borrowing this equipment for the construction of latrines by those households wishing to do so.

4. Advising on the Siting of Latrines, and the Construction of Superstructures : As a health worker in the community you are likely to be asked to give advice on the selection of a location for the construction of a latrine and the type of superstructure to cover it.

The criteria for selecting a site for the construction of a latrine are:

- i. technical - distance from water source;
- ii. cultural - some object to using latrines because they are situated in the house.

When advising on the type of superstructure to be used keep in mind the following:

- i. the cost of construction;

for providing protection from the sun and cold as well as for giving the desired privacy.

5. Assisting the Community in Procuring Pans and Water-seal Traps : It is not practical to make pans and water-seal traps in the villages because moulds are necessary and the proper concrete mixture is required to ensure safety. These facilities are usually available either at the Primary Health Centre workshop or at the block development office.

Both the pans and traps are usually sold to the consumer at a price which covers the costs and which is within the reach of the rural people. The householder will seek your help in procuring what he requires for constructing his latrine. It is desirable that the latrine should be constructed by a trained mason.

YOU SHOULD KNOW WHERE TO GET THE PANS AND WATER-SEAL TRAPS, THEIR PRICE AND THEIR AVAILABILITY. YOU MUST KEEP IN TOUCH WITH THE MANUFACTURERS AND ESTIMATE IN ADVANCE THE REQUIREMENTS OF THE COMMUNITY.

6. Supervising the Disposal of Nightsoil and Handling of Compost Pits and Manure Pits : Bucket latrines are notoriously insanitary and whenever possible they should be replaced by pit latrines. However, where bucket latrines exist you must supervise the collection and disposal of the nightsoil. A safe method recommended for disposing of nightsoil is through shallow trenching. The nightsoil is dumped in the trench and covered with at least 12 cm. of earth, tightly packed to prevent fly breeding.

The use of human excreta mixed with animal excreta and other solid wastes to form manure or compost can provide a way of enriching the soil to improve the crops.

For an outline of the principles of composting see section 6.4.2.

REMEMBER THAT COMPOSTING CAN BE RENDERED SAFE IF THE PROPER METHOD IS USED AND THE TECHNIQUE IS WELL SUPERVISED.

7. Educating the Community on the Health Hazards of Insanitary Arrangements for Excreta Disposal and the Diseases Related to Bad Sanitation : Cultural, social, economic and educational obstacles play a part in deciding what type of sanitation is adopted by a community. The hazards to health may be known already but these may be outbalanced by economic factors.

BEFORE EMBARKING ON AN EDUCATIONAL PROGRAMME TO IMPROVE SANITATION MAKE SURE THAT YOU ARE WELL ACCQUANTED WITH THE COMMUNITY'S NEEDS, ITS CULTURAL AND SOCIAL HABITS AND ITS ECONOMY. UTILISE THE COOPERATION OF WELL-MOTIVATED LEADERS AND COMMUNITY MEMBERS TO BRING ABOUT CHANGE IN THE ATTITUDES OF THE COMMUNITY.

Education of the community towards positive health is a continuous process and is an important part of every health

has to motivate and convince the consumer not only that the construction of a latrine is beneficial but that its use must become a habit and an integral part of one's way of life.

Some of the topics on which you should elaborate are as follows:

- i. The relation between disposal of excreta and pollution of water supplies.
- ii. The relation between disposal of excreta and gastrointestinal diseases.
- iii. The importance of maintaining latrines in good condition.
- iv. The advantages and disadvantages of the various types of latrines.
- v. The precautions which must be taken when trenching, manure pits or compost pits are used for the disposal of human excreta.
- vi. The need for community action to implement a good latrine programme.
- vii. The facilities available for construction and maintenance of latrines and emptying of pits.

YOUR DUTY DOES NOT END WITH THE CONSTRUCTION OF LATRINES AND THEIR MAINTENANCE; YOU MUST SUPERVISE THEIR UTILIZATION.

6.4 DISPOSAL OF REFUSE

The composition of refuse varies in towns and in rural areas. In either case, its accumulation in the house or at the roadside leads to a considerable health hazard. Refuse is made up of:

- i. Garbage : Vegetable parings, animal and fish waste matter from food preparations, left over food and left over fodder of animals. These materials decay and give rise to foul odours, besides serving as food for rats and flies.
- ii. Rubbish : Waste materials such as bottles, broken glasses, paper, tin cans, bits of metal, plastic, etc.
- iii. Ashes : Leftovers from burning wood, charcoal and cow dung fuel.
- iv. Dead Animals : Dogs, cats or chickens killed on the roads, or animals dying of disease, or rats and dogs deliberately destroyed.
- v. Street Sweepings : Leaves, paper, cigarette ends and other materials.
- vi. Animal Dung : Droppings of cows, buffaloes, horses and other animals.

IN RURAL AREAS THE ORGANIC CONTENT OF REFUSE IS RELATIVELY HIGH. THIS ADDS TO ITS VALUE AS A FERTILIZER IF PROPER COMPOSTING CAN BE ARRANGED.

6.4.1. NEED FOR PROPER DISPOSAL OF REFUSE.

The principal public health reasons for proper disposal of refuse are:

- i. piles of waste materials provide food and breeding

- ii. organic waste materials decay and give off foul odours and gases;
- iii. scattered refuse is unsightly, and eye-sore to the community;
- iv. piles of waste material pose fire hazards.

6.4.2. METHODS OF HANDLING AND DISPOSING OFF REFUSE

Refuse collects in a household, and has to be stored for varying lengths of time pending its transportation to the disposal site.

1. Storage : Not many rural households store refuse in preparation for collection as very often organised collection does not exist. However, if such storage is done, you should ensure:

- i. that the dustbin is provided with a lid to prevent flies and insects from getting to the refuse;
- ii. that it is small enough to be easily carried when full, but sufficient to collect the household refuse;
- iii. that it is made of material (plastic or metal) which is easy to wash and not easily broken or destroyed by rats, cats and dogs.

THE CONTENTS OF THE DUSTBIN ARE USUALLY EMPTIED DAILY INTO A NEARBY REFUSE PIT OR WASTELAND OR THEY MAY BE BURNED.

2. Collection : In most rural areas there is not public refuse collection system, so that a member of the family or a family sweeper collects the accumulated refuse regularly for final disposal. However, where a public system operates, the refuse is usually collected in wheelbarrows and transported from the house to the disposal site, which is usually as near the village as possible so as to minimize costs.

REMEMBER THAT FREQUENT COLLECTION OF REFUSE IS NECESSARY FOR GOOD SANITATION. LONG INTERVALS BETWEEN COLLECTIONS CREATE STORAGE PROBLEMS AND FOUL ODOURS.

3. Disposal : The sanitary disposal of refuse may be carried out around the home, where collection systems are not in operation, and where isolated homesteads exist. Where a collection system operates, the refuse is disposed off by the authorities concerned.

a. Community Methods of Disposal:

- i. Dumping on Land : If dumping places are available this is the cheapest method. The refuse is usually burned to reduce its volume and minimize flies. Because no soil is used, flies and rats abound in refuse dumps, while at the same time the place is an eye-sore to the community and emits foul odours.
- ii. Sanitary Landfills : This method of refuse disposal does not create any nuisance, fire or public health hazard. It involves the distribution of refuse in alternate layers of refuse in alternate layers of refuse and earthfill to prevent dogs

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- ii. Sanitary Landfills : This method of refuse disposal does not create any nuisance, fire or public health hazard. It involves the distribution of refuse in alternate layers of refuse in alternate layers of refuse and earthfill to prevent dogs

- iii. Incineration : This involves the construction of properly designed incinerators, and their proper operation and maintenance. This method is very appropriate for small villages where a number of incinerators could be constructed from locally available materials.
 - iv. Composting : This requires frequent mixing and turning and has not been found practical to carry out on this scale.
- b. Methods of Disposal Used in Individual Houses:
- i. Burial : The refuse is deposited in pits and covered with soil.
 - ii. Burning : Simple incinerators are sometimes used, but the refuse is usually burned on open ground.
 - iii. Feeding to Animals : Left over food and other garbage is fed to chickens, pigs, etc. When this method is used, the non-edible components of the refuse are usually buried or burned.
 - iv. Composting : The simplest home-composting method involves the deposition of the refuse and animal manure, together with grass, leaves and other binding material, into a compost pit and covering it with soil to prevent fly breeding and bad odours. At times nightsoil is also emptied into the compost pit. The compost is used as a soil conditioner or fertilizer later on. Turning and mixing of the compost with a rake or long pole will increase oxidation and will improve the quality of the fertilizer.

Composting is easily done in compost pits, which are generally of two sizes:

- a. 4 metres by 3 metres by 1.25 metres.
- b. 3 metres by 2 metres by 1 metre.

The pits are dug into the ground and the walls may be lined with bricks.

Composting is done by spreading the layers of refuse and cow dung in the ratio of 3 to 1 by volume until the whole content of the pit is up to 30 cm. above ground level. The uppermost portion should consist of refuse.

After six months the manure is ready for use.

REMEMBER THAT COMPOST PITS IN THE VICINITY OF HOUSES CREATE A HAZARD TO HEALTH UNLESS THEY ARE CAREFULLY AND CLOSELY CONTROLLED.

6.4.3 RESPONSIBILITIES OF THE HEALTH WORKER (MALE) IN RELATION TO REFUSE DISPOSAL.

It is your duty, as a health worker, to ensure that the environment in which the community lives is safe and conducive to healthy living. This means all sources of pollution must

be eradicated or controlled.

Your duties include:

1. surveying the area to find out how the refuse is disposed off;
2. assessing the methods in use, working out schedules for their improvements, if necessary, and supervising the procedures followed;
3. advising and assisting the householders and the community in constructing disposal units and maintaining those in operation;
4. educating the community about the relation of refuse disposal to health.

REMEMBER THAT RURAL COMMUNITIES ARE USUALLY POOR COMMUNITIES AND CAN MAKE ONLY SMALL CONTRIBUTIONS TO SUPPORT HEALTH ACTIVITIES. FURTHERMORE, THEIR AGRICULTURAL DEMANDS MAY BE PARTLY SATISFIED BY CONTROLLED REFUSE DISPOSAL IN ORDER TO PRODUCE 'WEALTH OUT OF WASTE'.

1. Surveying the area to find out How the Refuse is Disposed Off: In your survey of the rural community you must record the methods in operation for refuse disposal and whether they are sanitary or insanitary. Equipped with this base-line information you will be able to plan your activities and assess the progress achieved.

Start by preparing checklists for methods of storage, collection, transportation and disposal in use. When compiling the results of the survey, deficiencies will be easily identified and the volume of work you will have to organise can be assessed.

In India, refuse is an asset to the farmer and composting is the main method used for its disposal. The checklist to assess the adequacy and utilization of a compost pit should include the following:

- i. Is the pit located in a place which is not likely to be flooded during the rainy season?
- ii. Is the compost pit of the right size?
- iii. Are the walls lined with bricks or are they unprotected?
- iv. Is the refuse in the right proportion to the amount of cow dung being used for composting?
- v. Is it applied in proper layers?
- vi. Are flies and other vermin breeding in the compost pit?
- vii. If the pit is full, is the top layer composed of refuse?
- viii. Is it filled up to 30 cm. or more above the surface of the pit?

ONCE THE ABOVE INFORMATION IS COLLECTED YOU WILL BE ABLE TO ASSESS WHETHER THE COMPOST PIT IS SANITARY OR INSANITARY.

2. Assessing the Methods in Use and Working out schedules for their Improvement, if necessary, and their supervision : Compiling the results of your survey and charting them on a map is as important as carrying out the survey itself. You should take time to interpret your findings and group them to draw realistic conclusions of the situation existing in your area.

Improvements which you feel are necessary will have to be planned and discussed with the house-owners. The expenses and labour involved also need to be worked out.

YOU SHOULD NOT BE DISCOURAGED IF YOU MEET WITH RESISTANCE TO YOUR SUGGESTIONS. PLAN AN EDUCATIONAL PROGRAMME WHICH WILL GRADUALLY WIN YOU THE CONFIDENCE NECESSARY TO ACHIEVE THE IMPROVEMENTS REQUIRED.

REMEMBER THAT WORKING WITH THE COMMUNITY NEEDS TACT AND PATIENCE. AVOID USING ANY METHOD WHICH WILL ANTAGONIZE THE COMMUNITY TO YOUR WORK.

3. Advising and Assisting the Householder and the Community in Constructing Disposal Units and Maintaining those in Operation : You might find that some households have inadequate, or no facilities for proper refuse disposal. It is your duty to advise the householder regarding the type of disposal arrangements which are best suited to his needs. This can be done by:

- i. discussing with the householder any plans he has in mind;
- ii. advising him on the best arrangements he can make for refuse disposal;
- iii. agreeing on the type of disposal arrangements that will be made;
- iv. estimating the costs involved in constructing the unit;
- v. assisting in procuring materials necessary for construction;
- vi. assisting, advising and supervising the construction of the unit;
- vii. advising on its use;
- viii. supervising the way in which the unit is put into operation and educating the householder about its proper utilization.

IT WOULD BE USEFUL IF YOU COULD PREPARE DRAWINGS GIVING THE ACTUAL MEASUREMENTS TO SHOW THE HOUSEHOLDERS AND THE COMMUNITY LEADERS THE TYPE OF CONSTRUCTIONS NECESSARY FOR SANITARY DISPOSAL OF REFUSE.

4. Educating the Community About the Relation of Refuse Disposal to Health : The need of rural people is conserve refuse in order to produce manure and at the same time to do this as near to their house as possible without creating hazards to

HEALTH HAZARDS OF THE RURAL ENVIRONMENT

In the developin world, the environment in urban areas is generally better controlled than the environment in rural areas where pollution goes on unabated.

Legislation aiming at the provision of an environment conducive to promoting healthy physical and mental development is enforced in towns but generally neglected in the rural areas. In the rural areas enforcement officers are not available in sufficient numbers, the population is uncooperative because of illiteracy and the funds necessary for development are insufficient. All these factors, added to which are traditional habits and superstitions, make the life of the peasant hard and hazardous.

THE CHALLENGES FACED BY THE HEALTH TEAM ARE NUMEROUS BUT, WITH TACT, KNOWLEDGE AND PATIENCE, THEY CAN BE TACKLED SUCCESSFULLY.

5.1 HEALTH HAZARDS WITH WHICH THE HEALTH WORKER HAS TO DEAL

Every situation presents its own hazards and in this Manual it would not be possible to deal with individual situations. The general hazards to which a rural community is exposed include the following:

1. Hazards outside the home such as bad roads, collections of refuse, breeding of disease-carrying insects and vermin, stray dogs, unprotected water collections, unhygienic eating places, or unprotected electrical installations.
2. Hazards in the home such as open fires, sharp implements, overcrowding, badly constructed houses, unhygienic food and water storage arrangements, insanitary latrines, or uncontrolled disposal of waste water and solid wastes.
3. Hazards in the fields such as accidents related to the use of agricultural tools, snake bites, scorpion stings, diseases related to the use of pesticides, or diseases related to contact with plants and pollens.
4. Hazards related to cottage industries such as accidents with machinery or health hazards to potters, weavers, and dyers.
5. Hazards related to traditional habits such as those connected with the collection of animal wastes for household use, or hazards related to the breeding of livestock.
6. Hazards related to lack of education about healthy living such as poor personal hygiene or wrong food habits.
7. Hazards related to poor medical facilities such as lack of trained personnel, dispensaries and drugs.
8. Hazards related to poverty such as malnutrition, lack of shelter or inadequate protective clothing.

5.2 HELPING THE COMMUNITY TO OVERCOME THE HEALTH HAZARDS OF THE RURAL ENVIRONMENT

You, as a health worker, have been trained to be able to cope with most of the hazards of living in a rural environment and the community will rely on you to a great extent to promote healthy living and development.

USE YOUR KNOWLEDGE AND SKILLS TO THE BEST ADVANTAGE AND DO NOT HESITATE TO ASK YOUR SUPERVISOR'S ADVICE AND THE FEMALE HEALTH WORKER'S COOPERATION WHEN NECESSARY. REMEMBER THAT YOU ARE WORKING AS A TEAM WITH A COMMON GOAL AND YOUR ACTIVITIES MUST BE DEVELOPED AS A TEAM.

5.2.1 HAZARDS OUTSIDE THE HOME

1. Bad Roads: While the improvement of roads is not the responsibility of the health worker, as a community worker you can help in motivating the community to improve their own roads to reduce the risk of accidents, as well as to improve communications.

(In Chapter 13, 'Accidents', you will find instructions on how to deal with accidents.)

2. Collections of Refuse: In many rural areas refuse is composted for use on agricultural land and the collections of refuse outside houses may be limited. However, it still happens that refuse is moved from the house to an open place near the village, because of lack of facilities for transporting the refuse to a safe distance away from houses.

Your duties as a health worker in this case are enumerated in section 6.4.

VILLAGE LABOUR MAY BE REQUIRED TO HELP YOU RENDER REFUSE COLLECTIONS SANITARY. IN THIS CASE CONSULT THE COMMUNITY LEADERS AND TRY TO GET VOLUNTARY LABOUR FOR THE COMMON NEED OF THE COMMUNITY.

3. Breeding of Disease-carrying Insects and Vermin: The breeding of flies and rats is closely connected with refuse disposal, both outside the house and on the house premises. This breeding must be reduced or preferably completely prevented if diarrhoea, plague and typhus fever are to be kept under control.

REMEMBER ALSO THAT RATS ARE voracious food eaters and consume valuable food which the community needs. What they do not eat they spoil by their urine and faeces rendering large quantities of food unfit for human consumption.

IN THE FACE OF THE HAZARDS OF MALNUTRITION, THE RAT MENACE ASSUMES EVEN GREATER IMPORTANCE.

Proceed as follows:

a. Fly Control

- i. Ensure that household refuse is hygienically disposed of both in the house and on a community basis (communal refuse should be burnt or buried).
- ii. Ensure that sanitary latrines are used for the disposal of human excreta.
- iii. Ensure that animal excreta is disposed of in a sanitary way.

See section 6.3 for details.

b. Rat Control

- i. Ensure the proper disposal of household refuse and communal refuse tips (communal refuse should be burnt or buried).
- ii. Store the food in rat proof containers.
- iii. When the rat population grows to considerable proportions, call upon your supervisor to arrange for trapping or poisoning rats.

REMEMBER THAT FLIES GO IN SEARCH OF FOOD AND IF FOOD IS NOT AVAILABLE THEY BITE THE PREMISES.

c. Mosquito control

The breeding habits of the malaria mosquito (*Anopheles*) and those of the mosquito (*Culex*) that carries filariasis differ. The former breeds in stagnant or slow moving water in natural habitats and the latter in stagnant water in artificial habitats.

The malaria mosquito breeds in stagnant or slow moving water, wells and other collections of water outside the house. These will require:

- i. to be emptied if the collections are small, e.g., holes in the road or by the roadside;
- ii. to be treated with malarial or other larvicides if the pools are large;
- iii. to be removed by filling in or complete removal, e.g., holes in tree trunks must be cut so that water will not collect in them;
- iv. to be irrigated if the collections are at the side of streams.

The filaria-carrying mosquito breeds in tins, old car tyres, water tanks in houses and other man-made water collections. These will require.

- i. to be emptied and turned upside down so that water cannot collect in them;
- ii. to be completely removed;
- iii. to be treated with malarial, if the containers are too large;
- iv. to be covered so that mosquitoes cannot enter them.

4. Stray Dogs: Stray dogs abound in villages and rummage for food around human habitations. The biggest hazards they pose, besides biting people who disturb them, is the hazard of rabies. Rabies is a very serious virus disease which affects the nervous system, and once the signs and symptoms of the disease are established death is certain.

THE ONLY WAY TO TACKLE THE PROBLEM OF RABIES IS TO PREVENT IT. THIS CAN BE ACHIEVED ONLY BY IMMUNIZING ALL DOGS AGAINST RABIES OR DESTROYING ALL STRAY DOGS.

Proceed as follows:

- i. If a person has been bitten by a dog, take the precautions enumerated in section 18.12.
- ii. Report to your supervisor the presence of stray dogs in your area, especially when their numbers become uncontrollable.

IT IS THE DUTY OF THE HEALTH ASSISTANT (MALE) TO ARRANGE FOR STRAY DOGS TO BE DESTROYED.

- iii. Educate the community on the hazards attached to the presence of stray dogs in the area and elicit their cooperation to control this hazard.

5. Unprotected Water Collections: Unprotected water collections can be used for drinking purposes or are simply rain water collections. Both present hazards to health, the former in the spread of intestinal diseases and the latter as breeding places for mosquitoes. The danger of children drowning in water pools is always present.

Your duties in relation to unprotected water collections used for drinking purposes are enumerated in section 6.1.7.

Your duties in relation to water collections which are a hazard through providing mosquito breeding sites are dealt with in section 5.2.1.

See section 20.9 on how to deal with a person who has drowned.

6. Unhygienic Eating Places: In many villages, restaurants and sophisticated eating places are not usually found as the people eat at home. However, tea shops where snacks are prepared usually exist. It is your duty as a health worker to keep a watchful eye on these places.

Proceed as follows:

- a. Take an inventory of all the tea shops in your area and chart them on the map at the subcentre.
- b. Make an initial inspection to assess the following:
 - i. the state of the building and whether it is hygienic or lends itself to the contamination of food;
 - ii. the source of the water supply and water used for the washing up of eating and cooking utensils;
 - iii. the types of food served;
 - iv. the apparent state of health of the food handlers.
- c. Advise the tea shop owners on how to improve conditions which are found to be below the required health standards.
- d. Make periodic visits to these shops to detect early deterioration in their practices and to ensure that the standards are maintained.

REMEMBER THAT THE TEA SHOP IS AN IDEAL VENUE FOR PASSING INFORMATION TO THE COMMUNITY AND THIS OPPORTUNITY SHOULD BE AVAILED OF WHEN HEALTH EDUCATION ACTIVITIES ARE BEING ORGANIZED.

7. Unprotected Electrical Installations: In many rural areas electrical installations are insufficiently protected and carry danger warnings which are of no use to illiterate people. They pose hazards of electrocution, particularly to children.

As a health worker, it is your duty to spot these hazards and bring them to the notice of the responsible authority.

See section 20.8 on how to deal with patients who have been electrocuted.

5.2.2 HAZARDS IN THE HOME

1. Open Fires: The use of open fires for cooking purposes, and in the winter for heating purposes pose hazards to health, particularly to children.

Whenever you come across an open fire in a home, bring to the attention of the mother the danger an open fire creates for children and the importance of keeping children away from unprotected fires.

If a child or any other person is burnt or scalded proceed as detailed in section 18.8.

IF COW DUNG IS USED FOR FUEL SHOW THE HOUSEHOLDER HOW TO BUILD A SMOKELESS CHULA UTILIZING COW DUNG FUEL.

2. Overcrowding: Overcrowding in itself creates hazards to health, especially in the spread of air-borne diseases and contact diseases, e.g., leprosy. In the rural area houses are not supplied with much ventilation, and moreover, what little is available is

blocked up for fear of thieves or wild animals.

As a health worker your responsibilities are to inform the community of the health hazards posed by overcrowding and advise on ways to solve them.

Proceed as follows:

- i. Educate the household on the risks of overcrowding in the homes and the way diseases are spread.
- ii. Take this as an opportunity to spread the family planning programme, if it is not already accepted in that particular household.
- iii. Educate the family on the special precautions which must be taken to prevent the spread of respiratory diseases, e.g., tuberculosis, especially to children, if any member of the family is suffering from such a disease.
- iv. Discuss the advantages of proper ventilation in overcrowded houses.

3. Badly Constructed Houses: Badly constructed houses pose a health hazard because if they collapse they can cause permanent injury or death. Not only the material used but also the way the house is planned may be dangerous.

Whenever you find a badly constructed house, proceed as follows:-----

- i. Advise the householder where he can get help for improving the safety of his house.
- ii. Plastering the walls will prevent the breeding of sandflies and other insects. Advise the householder to smoothen the walls using locally available material.
- iii. Smooth floors prevent the spread of dust and locally available material must be used to pack the floors to remove the dust hazard.
- iv. Pay attention to the roofing of the house to protect against adverse weather conditions.
- v. Help the householder to improve the planning of his house to make it more habitable and conducive to healthy living.
- vi. Educate the household on the advantages to health of well-constructed houses.

4. Unhygienic Food Storage Arrangements: Food in rural areas is in short supply and its proper storage is important to protect it against being eaten by rats, as well as against contamination by flies and other insects.

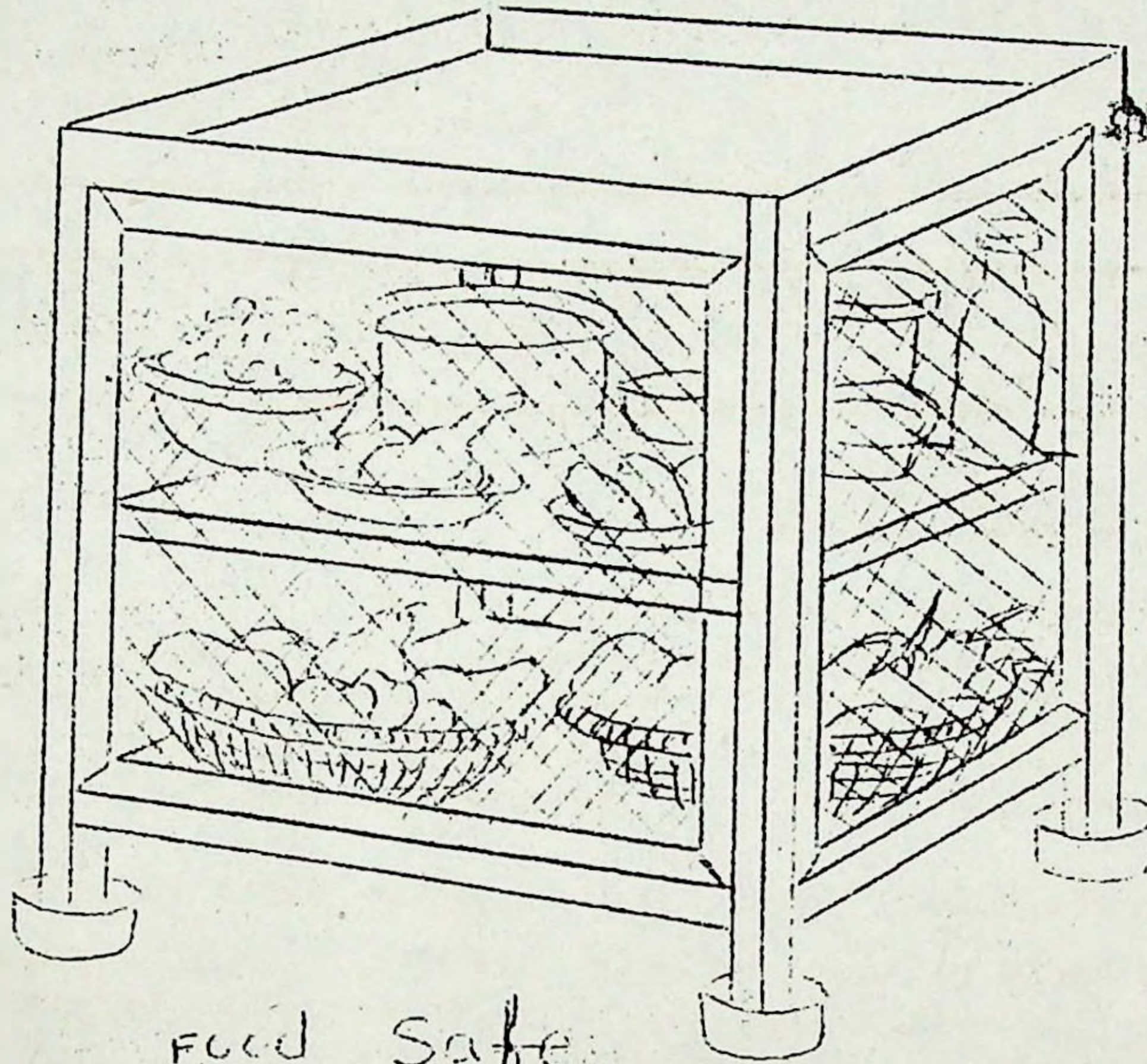
Proceed as follows:

- i. Inspect the food storage arrangements.
- ii. Advise on the improvements necessary to protect the food from being eaten or spoiled by rats, or contaminated by flies and weevils.
- iii. Educate the family on the importance of eating clean food and discuss with them the diseases that are spread by contaminated food.
- iv. Look at the arrangements for storing grain and make sure that the container is protected from infestation by rats and other vermin.

.....Contd/6-

The Food Safe: the Food Safe shown in figure 5.1 is easy and cheap to construct. It has the following advantages:

- i. The food is protected against flies and other insects and vermin. Make sure that the wire mesh is of the right size.
- ii. The food is ventilated and can be kept fairly cool if the safe is placed at the proper place in the house.
- iii. It can be locked against stealing of the food.
- iv. By placing each leg of the safe in a tin containing water, or by hanging the safe to keep it off the floor, you will protect the food against invasion by ants.



YOU MUST ADVISE THE HOUSEWIFE AGAINST STORING COOKED FOODS FOR TOO LONG AS THEY CAN GET SPOILT AND THIS ENCOURAGES THE BREEDING OF GERMS.

5. Insanitary Latrines: The hazards of insanitary latrines in the homes have been described in section 6.3.

You should detect the number of insanitary latrines in your area during the base-line survey. This survey will also give you the opportunity to assess the number of households which have no latrine at all.

THE USE OF A LATRINE OFTEN REQUIRES CHANGES IN ATTITUDE BY THE USER. THESE CAN BE ACHIEVED ONLY THROUGH A CONCENTRATED EFFORT ON YOUR PART BY EDUCATING THE COMMUNITY AND DEMONSTRATING YOUR WILLINGNESS TO HELP.

If possible construct a water-seal latrine (e.g., RCA or PRAI) to demonstrate how a sanitary latrine can be built and how it is to be used.

See section 6.3.1 for further details.

6. Uncontrolled Disposal of Waste Water and Solid Wastes:
The hazards to health following uncontrolled disposal of liquid and solid wastes are described in sections 6.2 and 6.4 where methods for the sanitary disposal of these wastes are also described.

The information collected during your initial survey for base-line data will give you an idea of the magnitude of the problem in your area. Proceed by drawing up a programme, with the help of your supervisor, to deal with the problem piecemeal.

YOU WANT TO ACHIEVE PERMANENT IMPROVEMENTS IN METHODS OF WASTE DISPOSAL. THE BEST WAY TO ACHIEVE THIS IS THROUGH A PLANNED STEP-BY-STEP PROGRAMME BASED ON LOCAL CONDITIONS, HABITS AND TABOOS. TRY TO AVOID ANY CRASH PROGRAMMES WHICH MAY NOT LEAD TO THE DESIRABLE PERMANENT RESULTS.

REMEMBER THAT YOUR SUPERVISOR IS SPECIALLY TRAINED IN ENVIRONMENTAL HEALTH AND ALL YOUR EFFORTS IN THIS FIELD SHOULD BE CLOSELY PLANNED WITH HIM AND THROUGH HIS ADVICE.

5.2.3. HAZARDS IN THE FIELDS

The farmer spends most of his working day in the field where he is using agricultural tools, mechanized or otherwise, and where he is in constant contact with plants and chemicals. All these create occupational health hazards of which he has to be made aware by the health worker so that good health is promoted and maintained.

1. Accidents Related to the use of Agricultural Tools:

Agricultural tools whether mechanized or not, usually consist of heavy equipment supplied with sharp blades which are often unguarded. Accidents from such tools include:

- i. cuts producing wounds of varying degree and severity;
- ii. fractures, which may be simple, compound or complicated;
- iii. crushing injuries which may result in injuries to vital organs; these are more likely to occur when tractors are used in farming.

See the chapters relating to the various types of injuries and follow the steps suggested therein for the treatment of accidents.

REMEMBER THAT FIELDS ARE ALWAYS FULL OF MANURE WHICH IS USED AS A FERTILIZER: SO ENSURE THAT EVERY ACCIDENT INVOLVING A WOUND MUST BE GIVEN TETANUS TOXOID OR ANTI-TETANUS SERUM.

2. Snake Bites: As snakes are usually found in the countryside, it is not surprising that the majority of snake bites occur in farmers, particularly during the harvesting of sugar cane, wheat, etc., when the habitats where snakes live are being destroyed. Special precautions must, therefore, be taken during this period.

See section 18.9 for the procedures to be followed in cases with snake bites.

3. Scorpion Stings: As scorpions also live in the rural areas, farmers are more prone than other people to scorpion stings. However, scorpions often enter houses in villages and live under boxes, etc. so that the community is also at a high risk.

See section 18.10 for the procedures to be followed in scorpion stings.

4. Diseases Related to use of Pesticides: The farmer who wants to get a good income from selling his crops has to ensure that they are not destroyed or infested with pests. As a pest control measure, pesticides (DDT, BHC, Malathion, etc) are used for spraying crops.

The pesticide is sprayed in a fine spray and the aerosols may be inhaled by the sprayer causing bronchial and lung irritation which may result in chronic disease. Contact with the pesticide may produce skin disease which will require attention. Furthermore, certain pesticides, e.g., Malathion, are toxic and may be injurious to health causing poisoning. DDT, the most commonly used pesticide in many parts of the country, is retained in the body and cumulative toxicity may result.

AS A HEALTH WORKER YOU ARE RESPONSIBLE FOR EDUCATING THE COMMUNITY ON THE HAZARDS RELATED TO THE USE OF PESTICIDES AND THE PRECAUTIONS WHICH MUST BE TAKEN IN USING PESTICIDES.

PREVENTIVE PESTICIDE TOXICITY IS VERY IMPORTANT AS CURING PATIENTS WITH PESTICIDE POISONING IS PROLONGED AND CHRONIC & INCAPACITATING CONDITIONS MAY BECOME ESTABLISHED.

Proceed as follows:

- i. Acquaint yourself with the kinds of pesticides in use in your area.
- ii. Discuss with your supervisor and the agricultural officers the hazards related to the pesticides in use.
- iii. Inform the community of the dangers to their health when pesticides are badly handled.
- iv. Inform them of the precautions which they must take to prevent contact, inhalation and poisoning from pesticides.
- v. Ensure that children are not exposed to pesticide poisoning.

IF YOU SEE ANY SIGNS OF PESTICIDE TOXICITY REFER THE PATIENT TO THE DOCTOR WITHOUT DELAY.

5. Diseases Related to Plants and Pollens: Allergies to plants and pollens occur more frequently in rural areas where plants of various kinds are to be found. Very often a person who is allergic to specific plants will know at what time of the year signs and symptoms of allergy occur. If the allergy is specific to one plant (which is seldom the case), desensitization is possible but this is a lengthy procedure and has to be done by a skin specialist. In practice it does not happen with farmers because the allergy is often of a multiple nature and desensitization would then be difficult.

Allergic symptoms occur in the form of:

- i. attacks of asthma (see section 20.4.1);
- ii. skin allergy (see section 18.1).

When these symptoms appear treat as scheduled in the relevant sections referred to above.

SOME ALLERGIES CAN BE PREVENTED, ESPECIALLY WHEN THEY OCCUR AT A DEFINITE SEASON OR TIME OF THE YEAR. IN THESE CASES REFER THE PATIENT TO THE PRIMARY HEALTH CENTRE FOR ADVICE.

Your responsibilities in preventing the occurrence of allergies include:

- i. educating the farmers on the causes of asthma and allergic skin diseases;
- ii. advising them on the use of protective clothing to prevent contact between plants and the skin;
- iii. advising them on the use of inhalers when signs start to appear.

6. Diseases Related to Field Dust: In the dry season, the fields are dry and dusty. Particles of dust are inhaled and may cause bronchial irritation giving rise to attacks of bronchitis. Continuous exposure to the inhalation of dust will result in chronic bronchitis, which may slowly incapacitate the farmer from doing a full day's work.

IT IS YOUR DUTY TO ADVISE FARMERS TO SEEK EARLY MEDICAL TREATMENT FOR ANY CHEST CONDITIONS TO PREVENT THE ESTABLISHMENT OF CHRONIC CHEST DISEASES.

Irritation of the eyes is more frequent in the rural areas during the dry season than at other times of the year.

5.2.4 HAZARDS RELATED TO COTTAGE INDUSTRIES

Small industries are established in many rural areas, where the activities are developed in the home and the products are sold through cooperatives or directly. The most popular of these industries are weaving, dyeing, and the production of textiles, and pottery. Machines may be used to a large or small extent and a number of people may get together at the place of work, constituting a small factory. Unless proper precautions are taken, these industries may pose health hazards and it is your duty to advise on the health of the workers.

Proceed as follows:

- a. Carry out a survey of all the cottage industries in your area.
- b. Note the type of industry and the number of workers that each employs.
- c. Note the type of building where the industry is carried out with special reference to:
 - i. lighting;
 - ii. ventilation;
 - iii. drainage, if water is used in the process.
- d. If machinery is used, e.g., sewing machines, looms, or potter's wheels, note whether the machines are protected against accidents.
- e. Keep a supervisory control on the health aspects of the industries.

1. Accidents with Machinery: Mechanical machines which are used in cottage industries should be properly protected to prevent accidents. Particular attention should be paid to chopping and turning machines in which fingers can be crushed or get amputated. The machines used for chopping up animal food is often the cause of amputated fingers, especially in children who are not aware of the hazard it carries. As this machine is found in many rural homes, you should pay special attention to it.

TECHNIQUES APPROPRIATE FOR THE
VILLAGES ³ SOME EXAMPLES

Wherever machines are used, proceed as follows:

- i. During your visit to the villages, note whether the machines are properly guarded and used.
- ii. Advise on any changes that may be necessary to render machinery safe.
- iii. Note the lighting and ventilation and advise on any improvements you consider necessary to promote a healthy working environment.

In case of accidents with machinery treat as suggested under the chapters dealing with wounds and fractures.

2. Health Hazards of Potters, Weavers and Dyers: Pottery is a common source of employment as containers for carrying water and other pottery utensils are in common use. The material used by the potter contains silica, which when inhaled gives rise to irritation of the bronchi and lungs and may result in chronic lung diseases. Also the risk of burns from kilns which are used for baking the pottery pose a hazard to health unless proper precautions are taken. Textile weaving, carpet weaving and other industries where cotton is used pose a health hazard because of the fine cotton dust which is inhaled, causing bronchial and lung irritation. It is, therefore, very important that adequate ventilation be provided in places where these trades are conducted so that the fine cotton dust is carried away from the working environment. Extractor fans are a big help in reducing this occupational hazard, while at the same time they are cheap to purchase, easy to fit and cheap to run.

CHILDREN SHOULD NOT BE ALLOWED TO WORK IN INDUSTRIES WHERE COTTON IS USED AS PERMANENT INJURY TO THEIR HEALTH MAY RESULT.

Chemical dyes are usually used in the dyeing of cotton fabrics. These dyes if ingested in large doses, may have a harmful effect on the body. Children should be kept away from dye vats in which the dyeing process is carried out as the after finishing work to remove the chemical dyes on their hands.

If any of these trades are in operation in your areas proceed as follows:

- a. Pottery
 - i. Check that the dust from the potter's wheel is carried away from the potter and it is not inhaled.
 - ii. Check that the machinery used is not liable to cause accidents.
 - iii. Check that the waste water is drained away in a sanitary way.
 - iv. Educate the potter how to take precautions to protect his health.
 - v. If a kiln is used, ensure that the hazards of fire are removed.
- b. Weaving
 - i. Check the premises where weaving industries are carried out to ensure that the premises are generally suitable.
 - ii. Check the ventilation to ensure that cotton dust is carried away from the building.
 - iii. Check the methods employed for the disposal of waste products.
 - iv. Educate the workers in ways of protecting their health against the diseases arising out of their employment.
 - v. Advise on improvements which may be necessary to render the working environment healthy.
 - vi. Advise on the importance of seeking early treatment for diseases with chest signs and symptoms.

KEEP VERY CLOSE CONTACT WITH YOUR SUPERVISOR WHEN CARRYING OUT ACTIVITIES RELATED TO COTTAGE INDUSTRIES AS HE IS IN A POSITION TO COOPERATE WITH OTHER OFFICERS CONCERNED WITH COMMUNITY DEVELOPMENT/INDUSTRIAL PROJECTS.

- v. If a kiln is used, ensure that the hazards of fire are removed.

b. Weaving:

- i. Check the premises where weaving industries are carried out to ensure that the premises are generally suitable.
- ii. Check the ventilation to ensure that cotton dust is carried away from the building.
- iii. Check the methods employed for the disposal of waste products.
- iv. Educate the workers in ways of protecting their health against the diseases arising out of their employment.
- v. Advise on improvements which may be necessary to render the working environment healthy.
- vi. Advise on the importance of seeking early treatment for diseases with chest signs and symptoms.

KEEP VERY CLOSE CONTACT WITH YOUR SUPERVISOR WHEN CARRYING OUT ACTIVITIES RELATED TO COTTAGE INDUSTRIES AS HE IS IN A POSITION TO COOPERATE WITH OTHER OFFICERS CONCERNED WITH COMMUNITY DEVELOPMENT INDUSTRIAL PROJECTS.

c. Dyeing:

- i. Check that the sullage water is disposed off in a sanitary way.
- ii. Advise those handling dyes to wash their hands properly before eating.

5.2.5 HAZARDS RELATED TO TRADITIONAL HABITS

Tradition and necessity demand that certain practices which pose health hazards be carried out in rural areas. Livestock and chickens are kept to provide milk and food and to use in land tilling and cultivation where mechanized agriculture is not yet developed or on small holdings. Also, the limited income of the small farmer demands that maximum use be made of wastes to provide compost and fuel, both of which create health hazards.

1. Health Hazards Connected with the Collection of Animal Wastes for Household Use: Cow dung is collected in many villages for making into cakes which are used to provide fuel for cooking and heating. The dung is collected by hand, mixed with husk and flattened out into shape for drying in the open sun. This method of collection and preparation is insanitary and, particularly if the person handling the dung has cuts on the hand, exposes him or her to the risk of tetanus and other infections. This, coupled with fly breeding and the lack of personal hygiene leads to a high incidence of diarrhoeas among children.

If you are working in an area where cow dung is collected for use as fuel, take the following precautions to safeguard the community's health:

- i. educate the community on the risks connected with this habit;
- ii. impress upon the community, particularly the children employed in this 'trade', the need for personal hygiene and the importance of not letting cow dung get anywhere near the mouth through the fingers and hands. The importance of washing the hands and especially the finger nails with soap and water before eating must particularly stressed.
- iii. Discuss the hazards of handling cow dung when cuts are present on the hands.
- iv. Assist the community in finding suitable places away from the house for drying the cow dung cakes to reduce the fly breeding dangers.
- v. Assist the houseowner in construction of smokeless chulas for use with cow dung cakes.
- vi. Impress upon cow dung handlers the importance of seeking medical treatment for cuts and other injuries.

Cow dung is also used in composting and in manure pits. For details on the control of these pits to render the process sanitary see section 6.4.2.

2. Health Hazards Related to the Breeding of Livestock: Livestock is part and parcel of every village house and forms the major form of wealth. It is essential for nutrition and serves as a source of income. It is necessary, however, that cows and buffaloes be kept in hygienic conditions which do not create health hazards.

Your duties to promote the community's health require that you:

- i. advise the house owners to provide adequate space for their livestock to avoid their being too near the house itself;

IT IS IMPORTANT THAT STABLES SHOULD BE PROVIDED FOR LIVESTOCK SEPARATE FROM THE LIVING QUARTERS.

- ii. advise that refuse from stables should be collected regularly and composted in a sanitary way;
- iii. advise that livestock should be kept clean to avoid fly infestations;
- iv. advise that the cow's udders should be cleaned before milking and so should the milker's hands;
- v. advise that the feeding places for livestock should be raised off the ground and kept clean;
- vi. advise that sick cows and buffaloes should be kept in isolation and treated;
- vii. educate the community on the diseases related to livestock which could be passed on to man, e.g., tuberculosis from cows or undulant fever from goats.

THE FAMILY AND ENVIRONMENT IN WHICH IT LIVES ARE INSEPARABLE AND THE IMPROVEMENT OF THE LATTER MUST HAVE A BENEFICIAL EFFECT ON THE FORMER.

5.2.6. HAZARDS RELATED TO LACK OF EDUCATION .

One should distinguish between education and schooling. A person may be an excellent scholar but his or her ideas about healthy living may be grossly lacking. It is your duty to teach the community how to develop good personal habits and how to ensure a healthy environment. Your duties include:

- i. participation in health education programmes for school children;
- ii. teaching school children how to keep healthy through personal hygiene; the care of their teeth, the use of clean clothing and bedding, healthy sleeping habits and good nutrition;
- iii. teaching children the importance of physical exercise for the proper development of the body and the mind;
- iv. educating the children regarding the importance of a healthy home for maintaining good health;
- v. educating the community leaders to appreciate their role in health promotion activities to improve the community environment;
- vi. educating the heads of the households on ways to promote the health of their families through improving the environment of their households;
- vii. educating the mothers on how to look after their children and promote their health through regular immunization, good nutrition and healthy living.

- v. advise that the feeding places for livestock should be raised off the ground and kept clean.
- vi. advise that sick cows and buffaloes should be kept in isolation and treated;
- vii. educate the community on the diseases related to livestock which could be passed on to man, e.g., tuberculosis from cows or undulant fever from goats.

THE FAMILY AND THE ENVIRONMENT IN WHICH IT LIVES ARE INSEPARABLE AND THE IMPROVEMENT OF THE LATTER MUST HAVE A BENEFICIAL EFFECT ON THE FORMER.

5.2.6 HAZARDS RELATED TO LACK OF EDUCATION

One should distinguish between education and schooling. A person may be an excellent scholar but his or her ideas about healthy living may be grossly lacking. It is your duty to teach the community how to develop good personal habits and how to ensure a healthy environment. Your duties include:

- i. participation in health education programmes for school children;
- ii. teaching school children how to keep healthy through personal hygiene, the care of their teeth, the use of clean clothing and bedding, healthy sleeping habits and good nutrition;
- iii. teaching children the importance of physical exercise for the proper development of the body and the mind;
- iv. educating the children regarding the importance of a healthy home for maintaining good health;
- v. educating the community leaders to appreciate their role in health promotion activities to improve the community environment;
- vi. educating the heads of the households on ways to promote the health of their families through improving the environment of their households;
- vii. educating the mothers on how to look after their children and promote their health through regular immunization, good nutrition and healthy living.

REMEMBER THAT AN ILLITERATE PERSON CAN STILL LIVE A HEALTHY LIFE AND BE AN EXAMPLE TO OTHERS. YOUR EFFORTS IN HEALTH PROMOTION SHOULD NOT BE LIMITED TO THE LITERATE SECTION OF THE COMMUNITY BUT SHOULD BE DIRECTED TO ALL WHO ARE WILLING TO LEARN AND TO PROMOTE GOOD HEALTH FOR THEMSELVES AND OTHERS.

5.2.7 HAZARDS RELATED TO LACK OF MEDICAL FACILITIES

The health and medical facilities in rural areas are, on the whole, lacking in quality and quantity. This means that a minor ailment does not receive the necessary attention in time and eventually develops into a major ailment with complications which may be serious. This hazard is not present in urban communities where health facilities are better and more easily available.

Under the Minimum Needs Programme it is planned to upgrade one FHC in four to a 30-bedded rural hospital. This will improve the facilities for referral and make surgical, medical, obstetric and gynaecological specialists available nearer the rural community.

Also, in many rural areas Hakin, Registered Medical Practitioners and practitioners of other indigenous systems of medicine are available. Many people use their services.

YOU MUST ALWAYS KEEP GOOD RELATIONS WITH ANY MEDICAL PRACTITIONERS WORKING IN YOUR AREA. REMEMBER THAT THEIR OBJECTIVES ARE THE SAME AS YOURS, 'TO PROVIDE HEALTH FACILITIES TO THE COMMUNITY AND TREAT THOSE WHO ARE SICK'.

Communications in many rural areas are not very satisfactory and patients may have difficulty in reaching the Primary Health Centre when they are referred to the doctor. As far as possible you should try and arrange transport for such patients. In cases of emergency, elicit the assistance of the village panchayat and other community leaders who may be able to help in providing some form of transport.

UTILIZE TO THE MAXIMUM THE VISITS BY THE DOCTOR AND THE SUPERVISOR IN EXTENDING THE MEDICAL FACILITIES TO THOSE WHO HAVE NOT GOT THE MEANS TO TRAVEL.

YOU HAVE A MAJOR ROLE TO PLAY IN THIS FIELD AND IT IS HOPED THAT YOUR PRESENCE IN THE COMMUNITY WILL PROVIDE BETTER HEALTH CARE AND BE THE MAIN FACTOR IN PREVENTING SIMPLE AILMENTS FROM BECOMING MAJOR COMPLICATED AILMENTS BY RECEIVING PROMPT AND ADEQUATE MEDICAL CARE OR EARLY REFERRAL.

Both you and your team mate, the Health Worker (Female), are expected to spend to considerable part of your time in home visiting. Do not miss this opportunity to look after the health needs of the family in its own home.

KNOW YOUR LIMITATIONS AND REFER PATIENTS TO SEE THE DOCTOR IN GOOD TIME. THIS WILL HELP THE PATIENT TO RECEIVE A BETTER QUALITY OF HEALTH CARE THAN AT PRESENT.

5.2.8 HAZARDS RELATED TO POVERTY

Millions of people in India live below the poverty line, i.e. they cannot afford the basic requirements of food and shelter. The average income in rural areas is below that of urban workers, but the needs of rural populations are also less than those of town dwellers.

Poverty by itself may not affect health adversely, but when it is combined with ignorance and a lack of education then the effects on health become manifest. The lack of adequate schooling facilities in rural areas reduce opportunities for health education of children and the establishment of good living habits among them.

Bad nutrition in rural areas is often attributed to poverty. However, it is clear that poverty alone is not to blame, but cooking habits and eating fads play an important role in the high incidence of malnutrition in India.

YOUR ROLE IS TO GET THE MOST OUT OF WHAT THE PEASANT IN THE RURAL AREA CAN AFFORD WITH HIS LIMITED INCOME. PAY SPECIAL ATTENTION TO NUTRITION AND COOKING HABITS AND TO THE IMPROVEMENT OF THE ENVIRONMENT. TEACH AND SHOW PEOPLE HOW TO SPEND THE LITTLE MONEY THEY CAN AFFORD IN THE BEST POSSIBLE WAY.

You can help the community in your area by:

- i. getting them advice on what crops to grow for food (food crop) and for selling (cash crop); this will help their nutrition as well as give them an income;
- ii. teaching them how to get good nutrition from cheap foods;
- iii. demonstrating to them how to cook foods as to retain their nutritious properties; take the cooperation of the Health Worker (Female) in this activity.
- iv. teaching them to maintain good health; this will save them money which they would normally spend on medicine;

- v. motivating them to practise family planning so that the little wealth they have will not be dissipated among many persons;
- vi. telling them how to keep fit so that they can work more and earn more money for their food and comfort.

REMEMBER THAT POVERTY IS A SYNDROME CAUSED BY A NUMBER OF FACTORS. IDENTIFY THESE FACTORS AND FIND SOLUTIONS TO THEM. YOU WILL FIND THAT TO SOLVE THE MANY PROBLEMS YOU WILL HAVE TO COOPERATE WITH OTHER OFFICERS? e.g., AGRICULTURAL, EDUCATIONAL, AND COMMUNITY DEVELOPMENT, WORKING IN THE SAME BLOCK AS YOURSELF.

AS A HEALTH WORKER YOU ARE A COMMUNITY WORKER AND ALTHOUGH YOUR WORK EMPHASIZES HEALTH YOU MUST REMEMBER THAT HEALTH IS RELATED TO MANY FACTORS. SO BEHAVE AS A COMMUNITY WORKER AND THE COMMUNITY WILL SEEK YOUR ADVICE.

44.14

BASICS OF RD

HEALTH EFFECTS OF AIR POLLUTION

One philosophical and two scientific concepts are needed to relate medical science to the health problems posed by air pollution.

The philosophical concept concerns the role of medical science in responding to those situations in which the health of a community is believed impaired by pollutant exposures.

The first scientific concept deals with the respiratory dose of a material and its absorption, detoxification, storage, and excretion.

The second scientific concept concerns the long-term interacting effects of repeated exposures of the lung to respiratory doses of pollutants. It also concerns the organization and interpretation of evidence necessary to determine the contribution of one type of exposure.

Most of this article will deal with the two scientific concepts through consideration of the dose-response relationships of pollutants taken one at a time—which is *not* the way most pollutant exposures occur. Mortality and morbidity effects which can be related to various pollutant exposures are discussed in relation to the interactive factors. Finally, the relative impact of cigarette smoking, industrial pollution, and community pollution will be considered.

It is helpful to deal first with the philosophical problem of how medical science can contribute constructively to such an emotionally charged, economically sensitive, and politicized issue as community air pollution.

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AIR POLLUTION AS A DISEASE OF THE COMMUNITY

When a patient complains to a doctor of, say, shortness of breath and cough, the doctor must find out if any treatable problem exists, then treat it, and care for the patient.

When a community is so afflicted that people cough, weep, fear for their lives and futures, and ask for medical help, the task of the community health physician is as compelling as that of the clinician, although not so clearly defined. The community health physician should seek out those problems that are remediable and work with the community at rectifying them. In any event, he or she (or they) should accept the reality of the community's complaint and care about it. The problems of community air pollution usually come

to a head with typical complaints about air pollution, often occurring with annoying odor, respiratory tract or eye irritation, impairment of visibility, soiling of paint or clothes, and damage to vegetation.

Compared to the specific illnesses of individuals, the physiological and biochemical disruptions caused by air pollution may be more subtle and complex in their interactions. Nevertheless, they exist and are usually detectable and treatable, or preventable. For these reasons, we speak of air pollution as a disease of the community, affecting the physical and mental health of the residents.¹

The treatment of such a disease involves reducing emissions through use of control devices or alterations either in technology or the materials used or processed. It may also involve abatement or prevention of health problems about which no complaint is made, just as a system review in clinical practice may indicate treatable disease of which a patient did not complain.

Thus, medical science interacting with engineering and technology has led in Great Britain to the requirement for smokeless fuel: that is, use of coke briquets, natural gas, or electrical heating instead of open coal fires which were largely responsible for the pollution disaster of 1952.² This latter event in London caused thousands of excess deaths, mostly from respiratory difficulties. As the amount of black, suspended particulate matter in the air

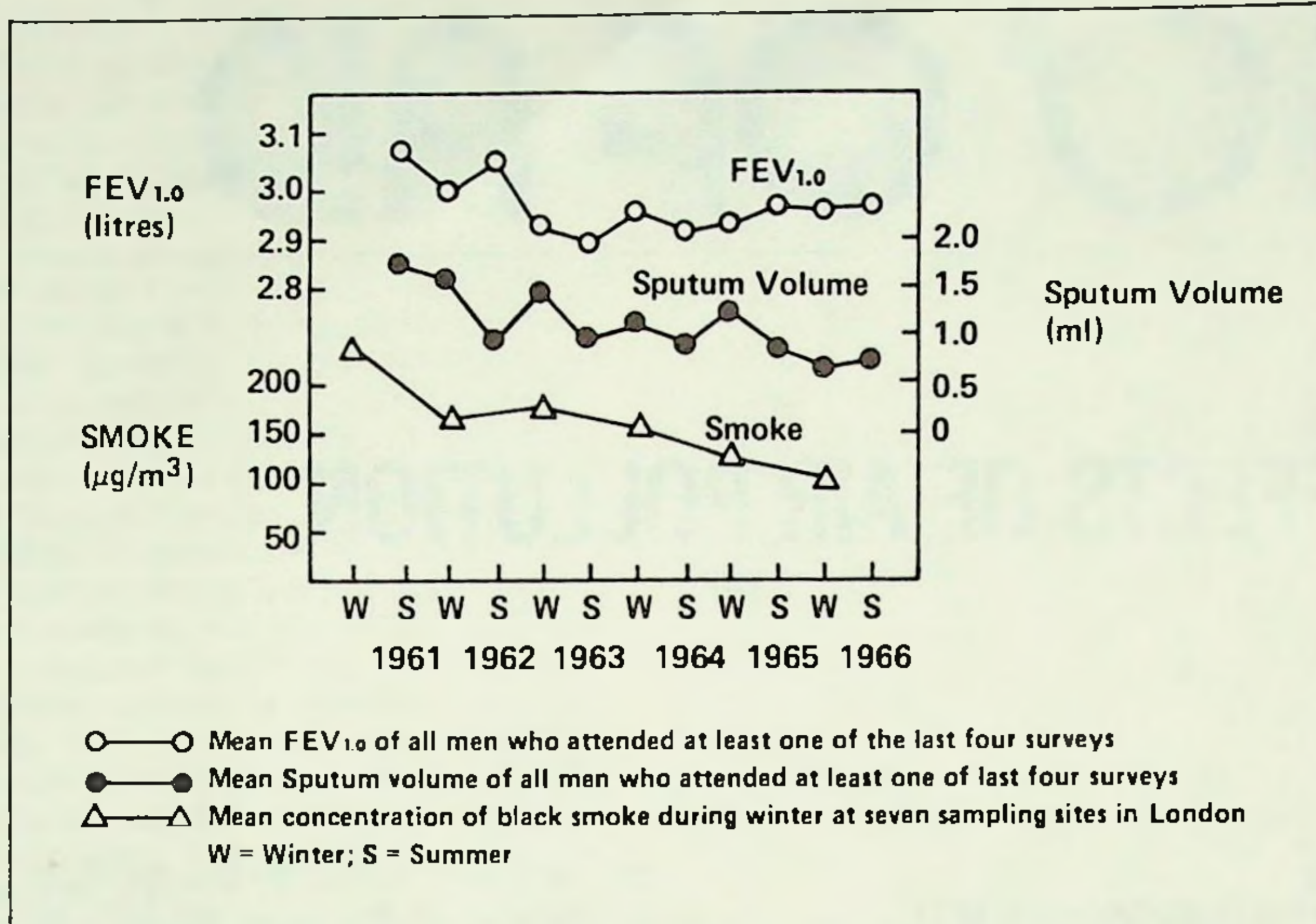


Fig. 1 Mean values of FEV_{1.0} and sputum volume in a panel of working men aged 30-59 in London, along with winter smoke concentrations, 1961-1966.³

dropped due to the "treatment" consisting of smokeless fuel regulations, so did the production of sputum among bronchitis patients (Fig. 1).³

In California, eye irritation from photochemical pollution was the complaint of almost three-fourths of the population in polluted parts of Los Angeles.⁴ This situation was due to sunlight irradiating motor vehicle exhaust ingredients (hydrocarbons and oxides of nitrogen).

California health scientists also found that carbon monoxide from motor vehicles was contributing to aggravation of coronary heart disease, but this had not been previously recognized in the community.⁵ Today, motor vehicle exhaust control systems are the "treatment" requiring decreased emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen, not only in Los Angeles, but all over the country. In other locations, these controls are primarily preventive.

It is generally agreed that sulfur dioxide interacting with particles can aggravate chronic bronchitis. The community "treatment" recommended for the high frequency of bronchitis⁶ seen in polluted areas requires control of smoke from trash burning and of sulfur dioxide from large power plants. These are being done.

The philosophic concept behind prevention was dealt with most comprehensively by the American Association for the Advancement of Science in the report, "Air Conservation."⁷ The American Lung Association's National Air Conservation Commission deals with this concept currently.

HEALTH EFFECTS OF SPECIFIC POLLUTANTS IN RELATION TO RESPIRATORY DOSE

Because breathing is so automatic and air so transparent, we lose sight of the fact that the daily exchange of air for the adult male, for example, is about 30 pounds. This compares with less than three pounds of food and about four and one-half pounds of water. Thus, if a pollutant dose were present in equal proportions by weight (usually expressed as parts per million: ppm) in air and food, the body would have to deal with 10 times as great a dose through the respiratory route as through the gastrointestinal route! For example, 0.5ppm is a concentration of ozone occasionally achieved for an hour in Los Angeles (and almost never elsewhere). This is equivalent to about 1mg/m³ (milligrams per cubic meter). A relatively active adult may breathe 15m³ of air a day, or about one cubic meter an hour. Since virtually all ozone is absorbed, the respiratory dose rate approximates one mg/hour when the concentration of ozone is 0.5ppm. Virtually all of the ozone reacts in the layers of cells and secretions lining the respiratory tract, but the biophysical and biochemical details of this tissue dose are not well established.

(As an exercise, you may want to solve the following problems: Compute the minute volume of ventilation equivalent to 1 cubic meter an hour. What is the weight of 1 cubic meter of air? If the minute volume increases in hard physical activity, what dose rate of ozone would be expected?)

Ozone is a relatively insoluble but highly reactive gas. Sulfur dioxide is relatively soluble, but less reactive. Both are irritating, and both have a characteristic odor. Because sulfur dioxide is soluble, most of its absorption during quiet breathing occurs in the nose and upper airway, whereas most of ozone's absorption occurs at the bronchiolar and alveolar level. Hence, with an increased ventilatory rate and mouth breathing, more sulfur dioxide reaches the trachea, where it may cause reflex coughing.⁸ More ozone reaches the alveolo-capillary membrane, where it may cause edema and impaired gas diffusion.⁹ Exercise increases the respiratory dose and redistributes the total dose to lower portions of the respiratory system. This has been illustrated by experiments on dogs done by Watanabe, Frank, and Yokoyama (Table 1).¹⁰ No doubt, similar gradients occur in man.

The patterns of absorption, metabolism, and excretion are quite different for such pollutants as carbon monoxide gas and lead particulates. Carbon monoxide passes through the respiratory system without modification, and most of it is stored in combination with hemoglobin, from which it displaces oxygen. Carbon monoxide has a hemoglobin affinity about 250 times that of oxygen, i.e., when the ratio of oxygen to carbon monoxide molecules is 1:250, half the binding sites in equilibrated blood will be occupied by oxygen, half by CO.¹¹ Carbon monoxide tends to occupy the most labile binding sites on hemoglobin. This diminishes the oxygen delivering capacity, both by reducing the number of oxygen molecules brought to the tissue and by impairment of release of oxygen bound to hemoglobin.

Because most of the carbon monoxide in the body is bound to hemoglobin, the level of carboxyhemoglobin is a good estimate of the body burden. Furthermore, most of the carbon monoxide is excreted in expired air, when the alveolar carbon monoxide tension is less than that produced by the amount of carbon monoxide in the pulmonary capillaries. It follows that, after an appropriate period of breath holding, usually 20 seconds, the expired air carbon monoxide tension becomes a valid, simple estimator of the carboxyhemoglobin level. Thus, the respiratory system not only is the portal of entry and excretion of carbon monoxide, but it may be used as a tonometer to estimate body burden without sampling blood or tissue. The half-time for uptake or excretion of carbon monoxide for adults is about three to four hours (Fig. 2). Consequently, the level of carboxyhemoglobin estimated from gas expired after 20-second breath holding thus serves as

an estimate of recent pollutant exposure, regardless of whether the exposures were to community air pollution, occupational, or the personal pollution of tobacco smoking.

The previous set of principles has been applied by Deane to a study of Los Angeles commuters.¹² In nonsmokers, the expired air samples averaged 6.3 ppm of CO before the morning commuting trip to downtown Los Angeles and 11.0ppm after the trip. This is equivalent to an increase of about 1½ in the percent of hemoglobin bound by CO. Under conditions of traffic congestion, a faulty muffler, or atmospheric stagnation, the increase may be much greater. Smokers get so much CO from smoking that they start with a variably higher value, about 15ppm, but even they have an increase after commuting.

Lead, too, is a pollutant that tends to accumulate in the body, although its half-time is from months to years. The body burden is a reflection of both respiratory and gastrointestinal ingestion.¹³ Originally, the contribution of air pollution exposure was thought unimportant, because the dose in food and water, which was estimated at about 300 µ gm/day, was so much greater than the 15-75 µ gm/day dose rate in urban areas from inspired air (1-5 µ gm/m³ x 15m³). This view has been modified now that the effect of particle size on respiratory deposition is better understood and the absorption ratios by the two routes are known.

About five percent of orally ingested lead is absorbed (about 15 µ gm/day absorbed dose), whereas about 40 percent of the inhaled dose of submicronic lead particles is retained (6-30 µ gm in urban areas). The larger particles impinge upon the airway high up and, since they are usually insoluble, are carried with the mucous blanket to the pharynx and swallowed.

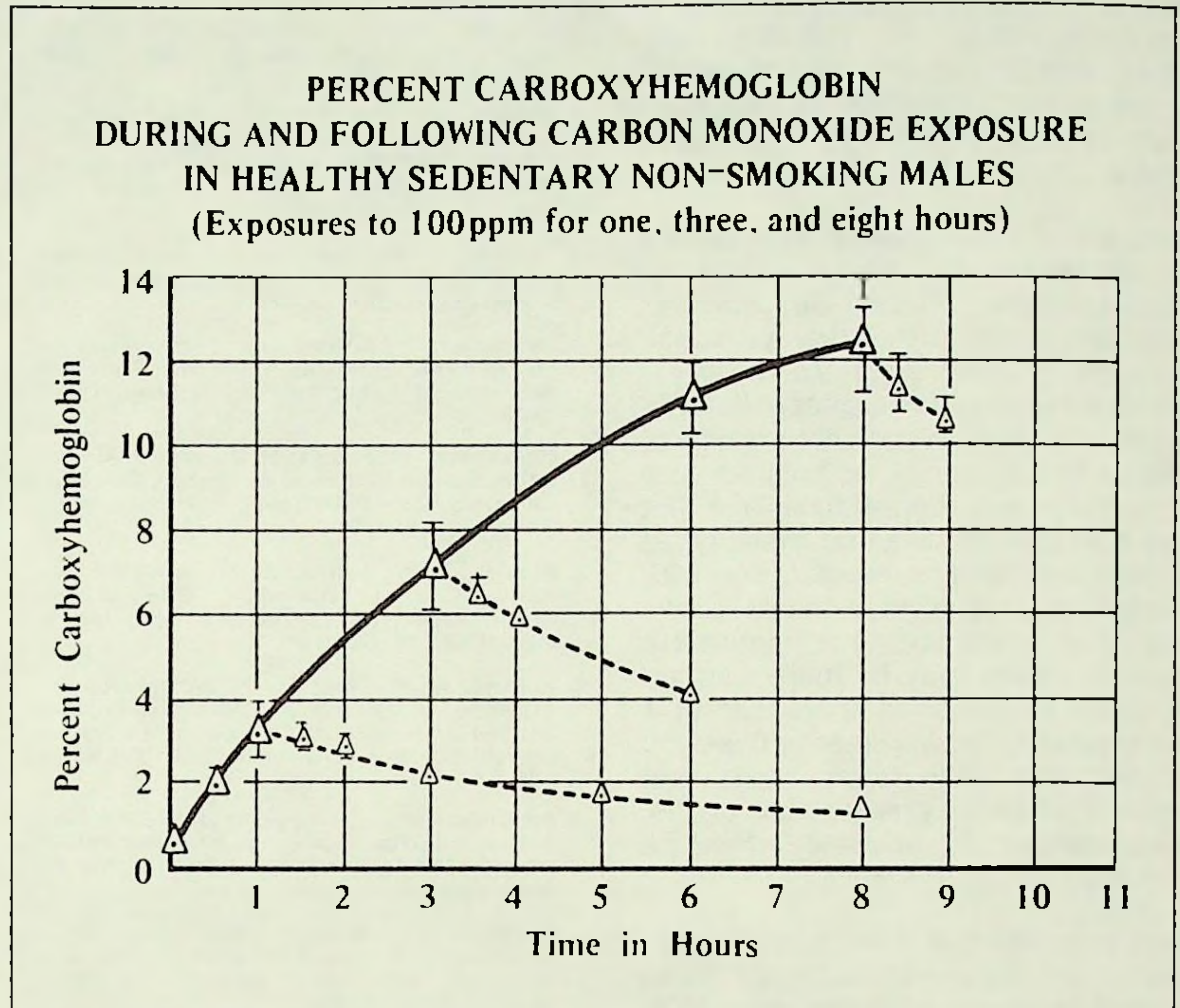


Fig. 2 Carbon monoxide absorption and excretion in healthy, sedentary, non-smoking males.

Source: Based on Stewart et al.²¹

The relation of particle size to site of deposition follows the physical laws of mechanics and aerodynamics (Fig. 3). So important is the particle size to air pollution effects that size segregated air pollutant monitoring is required before effects of particulate pollutants can be adequately evaluated.

Dose-Response Relationships

Between 1968 and 1971, a series of documents and analyses focused on the health effects of such individual pollutants as particulate matter, photochemical oxidants and ozone, sulfur oxides,

carbon monoxide, oxides of nitrogen, and hydrocarbons.¹⁴⁻¹⁹ These appeared as so-called "criteria" documents. Subsequently, reports on other pollutants and their health effects have been compiled and published by the National Academy of Sciences—the National Academy of Engineering. Pollutants discussed included carbon monoxide at low levels, beryllium, asbestos, fluorides, manganese, lead, and polycyclic organic material.

It is now becoming clear that attractive as it may be from an engineering and control point-of-view to consider each pollutant separately, it is not practical from the health sciences point-of-view: the effects of individual pollutants on health are less important than certain commonly occurring pollution interactions. Of these interactions, the two most important are that from sulfur oxides and soot, and that from oxides of nitrogen and hydrocarbons from motor vehicle exhaust. The former tends to produce acid sulfate aerosols, which are not yet being satisfactorily monitored, but which probably include materials such as sulfuric acid mist and zinc ammonium sulfate. Both are potent respiratory irritants. The photochemical interaction of hydrocarbons and oxides of nitrogen produces ozone, which is being monitored, eye and respiratory irritation, two characteristic forms of plant damage, and impairment

TABLE 1
ESTIMATED AMBIENT CONCENTRATIONS OF OZONE THAT WOULD DELIVER 0.26ppm TO THE UPPER TRACHEA IN INTACT DOGS

	Ambient Ozone Concentration (in ppm)	
	Nasal Breathing	Oral Breathing
Low Flow (3.5-6.5 liters per minute)	0.93	0.39
High Flow (35-46 liters per minute)	0.41	0.29

Source: Watanabe et al.¹⁰

TABLE 2

EXPECTED EFFECTS WHEN BOTH SMOKE AND SO₂ EXCEED THE VALUES SHOWN

Effect	Visibility and/or Annoyance	Increased Respiratory Symptoms	Exacerbation of Bronchitis and Emphysema	Excess Mortality and Increases in Hospital Admissions
Concentration and Averaging Time	80 μg/m ³ Annual Geometric Mean	100 μg/m ³ Annual Arithmetic Mean	250 μg/m ³ Daily Average	500 μg/m ³ Daily Average

Source: Based on World Health Organization.²⁰ Measurement methods as prescribed by the British Ministry of Technology.

of visibility. This triad of community symptoms in the presence of elevated ozone constitutes the photochemical smog syndrome. While ozone is a potent respiratory irritant at the concentrations present in polluted air samples, it cannot alone account for eye irritation. Much of the latter appears due to a series of compounds newly named and quite unstable when concentrated. These are called PANs (peroxy acetyl nitrates). Peroxy acetyl nitrate and peroxy benzoyl nitrate are best known. Formaldehyde is also thought to be involved in eye irritation.

Sulfur Oxides and Black Suspended Matter

The World Health Organization Expert Committee on Air Quality Criteria and Guides for Urban Air Pollution,²⁰ basing most of its analysis on British, Dutch, and Japanese data, concluded that when both smoke (black suspended matter) and SO₂ reached the values shown in Table 2 for the indicated period of time, the four types of effects shown would be expected. Note that the measurement methods are those prescribed by the British Ministry of Technology and are not directly equivalent to U.S. methods.

Photochemical Oxidant and Ozone

At about 0.1ppm oxidant (most of which is ozone) for one hour average, eye and respiratory irritation is observed. Increased frequency of asthmatic attacks occurs above 0.2ppm oxidant for an hour. Impairment of lung function in exercising subjects can be shown at ozone levels of about 0.4ppm for two hours, aggravated by simultaneous exposure to SO₂ at the same concentration. Subjects without respiratory symptoms but with a history of asthma and bronchitis are more reactive than those without a positive history. With increasing dose, the severity of symptoms and duration increase.

At elevated oxidant levels observed in Los Angeles, from about 0.1 to 0.4ppm, more motor vehicle accidents occur, performance of student cross-country track teams is impaired, and increased

airway resistance occurs in bronchitic patients.

Nitrogen Oxides

Elevated nitrogen oxide levels tend to occur with photochemical pollution, but few of the health effects can be directly ascribed to oxides of nitrogen. Nitric oxide, colorless, relatively inert biologically, is the gas produced in high pressure combustion (such as occurs in the gasoline engine) from fixation-oxidation of atmospheric nitrogen. It is oxidized to nitrogen dioxide, slowly in pure air, more rapidly in the presence of photochemically activated hydrocarbons.

Nitrogen dioxide, an orange-brown irritating gas, is relatively insoluble, so that when inhaled, much of it reaches the alveolar level. At high doses (5-500ppm), it causes a slowly evolving pulmonary edema. Such exposures, however, are found only in occupational circumstances, not in community air pollution. Because this latency makes human experiments more hazardous, and because at continuous levels greater than about 0.5ppm, mice will develop hyperinflation resembling pulmonary emphysema, few human experimental studies have been reported. Dose-response relationships for hu-

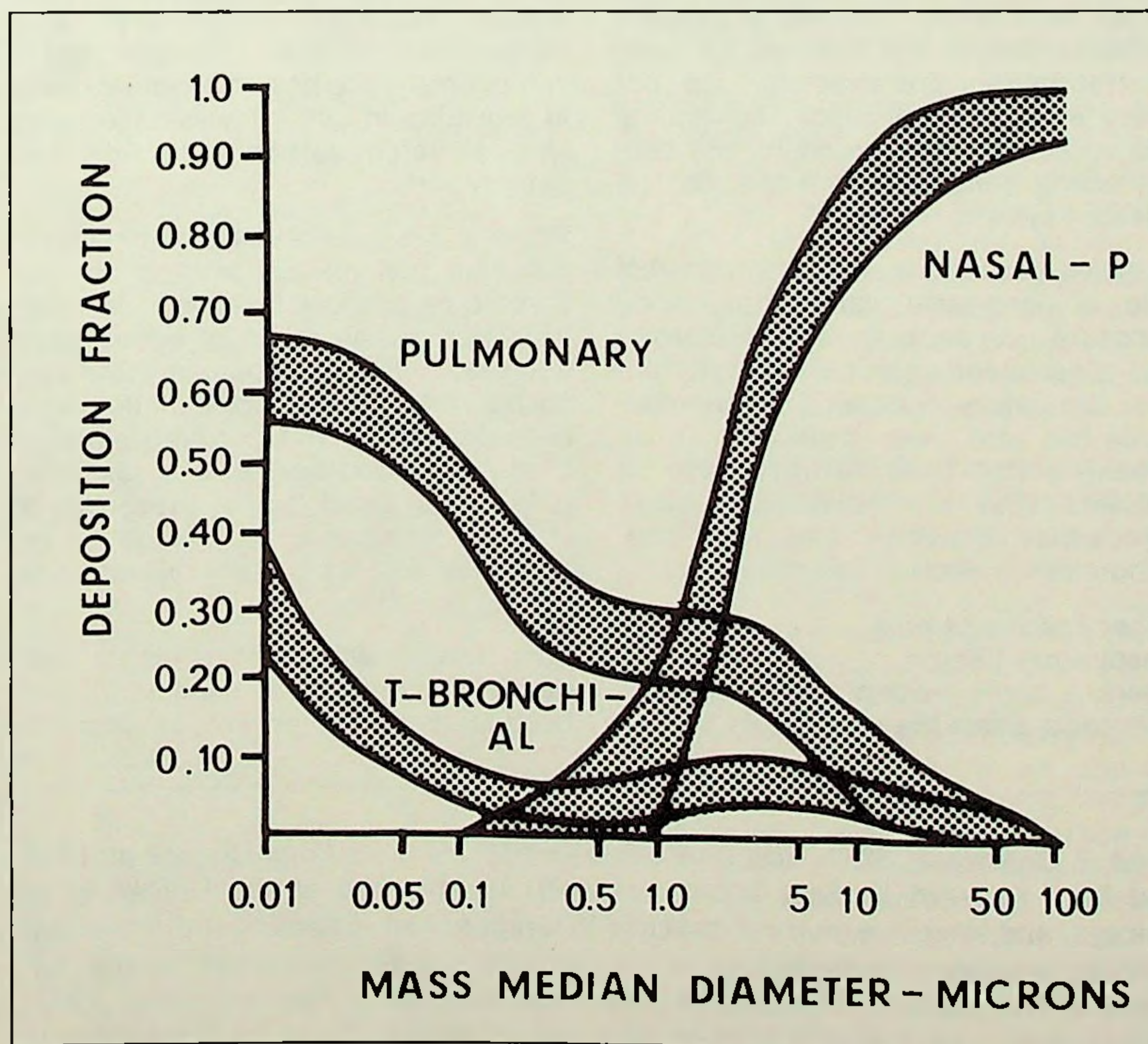


Fig. 3 Deposition in various portions of the lung and respiratory tract for various particle populations.¹⁷ Each of the shaded areas (envelopes) indicates the variability of deposition for a given mass median aerodynamic diameter in each compartment when the standard geometric deviation (σ_g) varies from 1.2 to 4.5 microns, and the tidal volume is 1450 ml. Nasal-P stands for the nasopharyngeal compartment, T-Bronchial for the tracheobronchial compartment, and Pulmonary for the alveolar compartment.

mans are therefore not well defined. At 0.25 to 1ppm NO₂ for one hour, lysis of rat lung mast cells will be produced, and in the rabbit, alteration of structural proteins of the lung occurs. This is the type of exposure that afflicted the Apollo crew on re-entry after the Apollo-Soyuz mission. The rocket fuel nitrogen tetroxide is simply a double nitrogen dioxide molecule.

Carbon Monoxide

The injurious health effects of carbon monoxide are due to impaired transport of oxygen to the tissues. Especially vulnerable is the heart muscle since, compared to other organs, it extracts a high proportion of the oxygen brought to it by the blood. The effects are quantitatively related to carboxyhemoglobin levels in the blood. Increases of carboxyhemoglobin of two percent or more can impair oxygen transport sufficiently to reduce the exercise capacity of persons with insufficient blood supply to the heart, as, for example, in patients with angina pectoris. At this level of carboxyhemoglobin, similar effects occur in persons with impaired circulation to the legs.

Effects also are observed in the central nervous system. At a dose rate of 50ppm for 90 minutes, physiological impairment of time interval estimation has been shown. The methods for demonstrating this are exacting, and not every effort to reproduce the finding has succeeded in overcoming the self-correcting tendencies of the central nervous system.

A major concern is with the possible role of long-term carbon monoxide exposure in causing atherosclerosis and consequently coronary and peripheral circulatory disease. Carbon monoxide has also been implicated in increasing the case fatality rate of patients who are hospitalized with myocardial infarction and may contribute to variation in daily mortality.

Other Pollutants with Respiratory Effects

There is some evidence that odorous pollutants affect the respiratory system

(near pulp mills, for instance, several studies find increased respiratory symptoms), but this is not their most important effect.

Asbestos is primarily of concern because of its occupational hazard, but some cases of nonoccupational asbestosis, of pleural plaque, or of mesothelioma of the pleura have been reported in the vicinity of asbestos plants and mines, both among family members of asbestos workers and others.

THE EFFECTS OF AIR POLLUTION ON RESPIRATORY MORTALITY AND MORBIDITY

As a result of atmospheric stagnation in London, the Meuse Valley in Belgium, the small town of Donora, Pennsylvania, New York City, and Osaka, Japan, it has been clearly documented that air pollution can increase mortality, especially among the elderly and those with chronic cardiopulmonary conditions.

In Great Britain, it has been shown that excess mortality will occur when both sulfur dioxide and particulate matter are elevated. No increased mortality has been conclusively shown in association with elevations of photochemical oxidant, although, as indicated previously, symptoms and disease aggravation occur. The possibility of increase in mortality in Los Angeles associated with elevated carbon monoxide has been reported.

While it has been established that air pollution has an aggravating role in chronic respiratory disease morbidity, its effect on the cause of emphysema and bronchitis is less certain. However, such an effect is suspected on the basis of epidemiologic work in countries other than the United States. The suspicion is especially great for the exposures of children, some of which may occur indoors, as well as to generalized community pollution.

Lung cancer, which has a higher incidence in urban than in rural areas, has been studied to determine whether the

urban factor might be air pollution. The principal arguments that air pollution is a causal factor in lung cancer are as follows: polluted atmospheres contain minute amounts of potent carcinogens; there is a statistically important association between indices of urban pollution and lung cancer rates; and migrant groups from relatively polluted areas to less polluted areas tend to have higher cancer rates than are found in the places to which they migrate. In addition, workmen exposed to some of the agents of polluted air have excess cancer. And some of the pollutants in urban air are also found in cigarette smoke, which is strongly associated with causation of lung cancer.

However, contrary to the view that air pollution is the causal factor in excess urban lung cancer, is the fact that the urban-rural gradient in lung cancer is *not* greatest in those places with the greatest urban pollution. If exposure to urban pollution increases lung cancer, then the rates should be higher in lifetime U.S. urban residents than in migrants to urban areas; in fact, they are not. And the correlations of lung cancer with measured pollutants should be strongest in England, where lung cancer rates are high and pollution has also been very great. A positive correlation has been shown with population density in many countries, but when controlling for population density, no association is found with pollution in Great Britain. If the urban factor were community air pollution, it should affect women as much as men, but it does not appear to do so. Thus, air pollution has not been shown to be the causal agent in the urban excess of lung cancer, although it remains under suspicion.

In a recent report to the Committee on Public Works of the United States Senate, the National Academy of Sciences and National Academy of Engineering estimated that if all types of air pollution were responsible for one percent of urban mortality and morbidity, and this were eliminated, it would imply the reduction of about 15,000 in the annual number of deaths. If this same logic were applied to urban illness, it would mean approximately 15 million less days of restricted activity, or 7 million fewer days spent in bed. The proportion of pollution associated with motor vehicles was estimated as one-tenth to one-fourth, leaving the remaining nine-tenths to three-fourths associated with smoke, sulfur oxides, and industrial fumes.

The bounds of these limits are very broad—0.01 to 10 percent of urban health problems due to air pollution—the estimates, therefore, have a substantial amount of uncertainty. Never-

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theless, there is virtually no uncertainty concerning the fact that it is the respiratory system, respiratory diseases, and respiratory morbidity that bear the brunt of air pollution's adverse health effects.

Compared to the disease and fatality burden caused by cigarette smoking, these are small effects. But they require community, rather than personal, decisions to abate them. To those exposed to irritating or harmful pollutants on the job, the occupational pollutants relative to community air pollution are of overwhelming importance. Yet the data available indicate that these types of exposures tend to interact, one with another, often in a more-than-additive way. For instance, the cigarette smoker's health may be more harmed by urban air pollution than that of a non-smoker. The workman whose job exposes him to irritating dusts and fumes is often at greater risk of disabling respiratory disease when he lives in an air-polluted neighborhood.

Thus, prevention of chronic respiratory disease involves decreasing all three types of exposure to inhaled pollutants: cigarette smoking, occupational gases, dusts, and fumes, and community air pollution. Because of the interaction of these exposures, it is inefficient to seek to control one type and neglect the others.

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Env File

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T N V H A NEWS LETTER

SUPPLEMENT JUNE 1990

23 SIRUVALLUR ROAD, PERAMBUR, MADRAS 600 011

**COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road
BANGALORE - 560 001**

**FOOD FOR THOUGHT
ON
POLLUTION
FOR ENVIRONMENT DAY
JUNE 5, 1990**

PASS ON THE MESSAGE TO SAVE LIFE ON EARTH

Edited by: Mrs. J.P.Saulina Arnold for Tamil Nadu Voluntary Health Association

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The Politics of Environment
The Illustrated Weekly of India
May 6-12,90

Holistic Health Work Book
SAHAJ, Pune

HUMAN ECOLOGY

Humankind projects a bio-social entity on our planet. Hence there exists two systems of environmental relationships pertaining to wo/man. They are:

1. *Human - nature system*
2. *Human - human system*

Human being's absolute well-being/health is determined by two factors:-

1. The availability of the optimum conditions required for a person to exist as a healthy biological being, i.e. pertaining to the natural environmental conditions - climatic, cosmic etc. (that of the human - nature system)

2. The availability of the optimum conditions required for her-him to exist as a healthy social being. i.e. pertaining to the social, economic, political and various other related dimensions etc., (that of human-human system)

These two are inter-related. All global problems of our time originate exactly from the above mentioned two systems of environmental relationships only.

Humankind's environmental relationships (both natural and social) result in the existence of different modes of social production and consequently of different social conditions which arise from the nature of social systems and the modes of social production. Hence the inter-relationships between persons and the environments must be viewed within clearly defined socio-economic and political systems of our time.

Problems emerge out in infinite variety that of both nature and social environments. Studies have proved that human beings are found to be unable to adjust to the changes in the environment and in the modes of life created by the humankind. What really happens is a very slow adaptation of persons to the environmental changes that are taking place drastically and this kind of slow adaptive mechanism gives rise to what is known as bio-social disadaptation - the failure of human beings to adjust both biologically and socially to the modern modes of life, with the rapidly changing environment, the bio-

technosphere of her/his own making, with all its numerous ill effects, the most glaring of which is a high incidence of diseases both physical and psycho-social.

Present day science and technological progress has its harmful effects on the environments and consequently on the overall health of the populations in varying degrees in different countries depending on the socio-economic and political systems of each nation. A society can control environmental factors and also help facilitate maintenance of the ecological balance if it has social, economic and political conditions ensuring the fulfilment of the material and cultural requirements of the people.

Purpose of Human Ecology:

As mentioned earlier, only if human beings are provided with optimum conditions pertaining to the natural and social environments can an individual remain in this planet as an absolutely healthy being.

To determine the above mentioned conditions, the optimal ecological factors and to provide them to every member of the human community is a task of the society and can be termed otherwise as ecological task. Hence the prime purpose of human ecology is to find through research into various interaction between persons and the environment, the optimal conditions necessary for persons to exist and develop their physical and spiritual abilities- in order to exist as healthy bio-social beings -- the bio-social collectives (societies) in relation to space and time.

This can be achieved only in conjunction with all branches of knowledge viewing them as one integrated whole. In other words, Human Ecol-

ogy takes or rather demands absolutely a systematic view of all human knowledge put together, for a relatively better understanding of the reality around and responding accordingly/adequately in relation to space and time, for the maintenance of ecobalance - harmony between persons and nature.

Thus Human Ecology is involved in various branches of natural and social sciences. For instance, physiology, nutrition, hygiene, psychology and climatology are basic to an understanding of the ecology of the individuals. The ecology of human communities involves anthropology, botany, demography, economics, geography, geology, history, political science,

sociology and zoology. Different branches of applied ecology are also involved - like agriculture, animal husbandry, conservation, forestry, game and fish management, medicine, parasitology, public health and range management.

Most of the concepts of Human Ecology are those of the individual disciplines concerned. The concept that each person/individual and each human community operates as an ecological unit that must possess effective, regulatory mechanisms to maintain stability in its fluctuating habitat, however serves to unify all branches of enquiry concerned in any way with the relations between persons and their physical, biotic and social environments.

"Every time something occurs in the natural world, some amount of energy ends up being unavailable for future work. That unavailable energy is what pollution is all about. Many people think that pollution is a by-product of production. Infact, pollution is the sum total of all the available energy in the world that has been transformed into unavailable energy. Waste, then, is dissipated energy."

-- Jeremy Rifkin

NARMADA VALLEY PROJECT - A BIRD'S EYE VIEW

The Narmada Valley Project, having two major dams proposed - the Sardar Sarovar and the Narmada Sagar, along with more than 3,000 major and minor dams is one of the ambitiously conceived projects in human history.

* Narmada Sagar is designed to irrigate 1,23,000 hectares of land and it will submerge 90,000 hectares. Also expected to generate 223 MW of electricity.

* The Narmada Valley Project will eventually displace probably over one million people, and will be 'the largest river basin population resettlement to date', according to the world bank

* Indirect ecological consequences of the dams are more than the direct negative consequences.

* With the forests, hundreds of species of plants and animals will disappear. The animals will be running blindly to escape the rising water as a result of the dam. Some will get trapped and

killed. The overall pressure on the remaining forests will be more and might even lead to further reduction of population of animals. The World Bank report says- 'Successful relocation of wild life is never easy and much death is unavoidable.'

* Fertile lands will be sacrificed for the construction of canals. It is difficult to estimate the true value of agricultural land, which is not just the market value of the crops being produced. The value of top soil on such land is of great importance. It takes thousands of years to form just a few inches of soil.

* There are other problems too associated with dams, like earthquakes, which cannot have viable solutions. Narmada basin is classified as a zone of moderate seismicity, with infrequent occurrence of earthquakes.

* During the last two centuries nearly 30 earth-

quakes have occurred in that area.

* Neglect of soil conservation measures has resulted in rich top soil being washed away into rivers, eventually get deposited into the reservoirs of large dams, thus reducing the capacity.

* Another major problem is the health hazards due to large irrigation projects - high incidence of malaria, filariasis, cholera, gastroenteritis, viral encephalitis, goitre and some other water borne diseases are bound to occur.

* Studies have shown that large reservoirs cause elevation of subsoil water in the nearby areas resulting in the levels of fluorides, calcium, trace metals etc. in soil sediments, thus resulting in the emergence of diseases like fluorosis.

WATER POLLUTION

Polluted water is one that contains all kinds of disease causing impurities like microorganisms, dissolved poisonous solid chemicals as well as poisonous gases.

* Mostly all industries discharge waste, dumping directly into streams, rivers, lakes, sea as well as open land. It also reaches ground water sources like well by seepage.

* The main culprits are textile printing, dyeing units, tanneries, coir processing industries, distilleries and sewage.

* Agricultural activities using fertilizers and pesticides around the water sources percolate down or get carried by run off water and reaches the water sources. These water-borne pollutants seriously affect human life by entering into the systems directly or indirectly through food material - plants and animals.

* Typhoid, cholera, infective hepatitis (jaundice) diarrhoea, dysentery, para typhoid, fever, etc. are caused by micro organisms through water.

* Around 25 million deaths occur in the world every year because of water-borne diseases and half of them are children. About 6 million children under five die from diarrhoea every year globally.

* Around 500 million people suffer from water washed diseases like trachoma. Water washed diseases like skin diseases, scabies, leprosy, eye disease, trachoma, conjunctivitis are widely spread over tens and scores of millions of people every year.

* Approximately 160 million people suffer from malaria-water insect related disease. Almost 200 million people suffer from schistosomiasis guinea worm which grows to 80 cms long, emerging through skin causing severe pain.

* Every hour between 1000 and 2500 third world children under five die simply because of lack of clean water.

* No river in India is safe for fish. In India 14 major rivers carry 85% of the surface run off, their drainage basins cover 73% of the country which has resulted in severe pollution of almost all the major rivers - Ganga, Yamuna, Narmada, Godavari, Krishna and Cauvery.

* Around 60,000 carcasses of cattle, dogs and other animals are dumped into the Ganga every year.

* About 40,000 fully burned dead bodies and ashes and 10,000 half burned dead bodies are pushed into the Ganga every year.

SOLID WASTE POLLUTION

Solid waste pollution is caused by the indiscriminate dumping of different varieties of solid wastes like, garbage, industrial and agricultural waste, human and animal excreta etc., causing direct, but slow and secondary harm to the environment and living beings.

* Mechanical industry wastes are scrap metal, chips, sand and grit, oily sludges, rubber and rejects.

* City refuse is increasing rapidly since the past fifty years as a direct consequence of the population growth and increasing affluence.

* Waste collected from all sources are dumped over a plot of land on the periphery of a town or city, attracting disease bearing flies and rats. The refuse containing all kinds of things when burned

produces poisonous gases like phosgene and when it starts rotting it produces toxic gases like methane, ammonia, sulphur dioxide etc.

* All these waste dumping attracts crows, vultures and pigs to scatter the rubbish around leading to further problems. Moreover, it contaminates soil and even underground water. Bio-degradable refuse emanating from markets, kitchens and gardens give rise to more ill-effects.

* Dogs, cats, cows, goats which roam on city streets thrive on food remains in the garbage. Rodents, bandicoots, cockroaches and an assortment of flies thrive on the putrefying matters and multiply fast.

* Near airport, piles of garbage attract birds, mostly kites and vultures, which causes serious obstruction to aircraft movement. All major airports in India face the problem because of bird hits.

* Potable water is polluted by rain water seeping into the sub-soil water through deposits of putrefying refuse.

* Jaundice has become endemic in certain parts of India owing to lack of sanitation and pollution of drinking water.

Human excreta is a major source of a lot of infections. The specific health hazards of improper excreta disposal are:

1. Soil pollution-which results in contamination of soil giving rise to diseases especially to those consuming vegetables grown on such soils.

2 Water pollution - causes various intestinal and allied diseases. The decomposing organic matter and pathogenic agents in faeces are causes of a large number of water-borne diseases - like hepatitis polio-myelitis, cholera, typhoid, paratyphoid, bacillary dysentery, gastro-enteritis, diarrhoea, amoebiasis, giardiasis, round worm, thread worm, hydatid disease, Weil's disease, guinea worm disease, fish tape worm, schistosomiasis.

3 Contamination of foods occur through micro-organisms present in faeces causing food-borne

illnesses namely typhoid, paratyphoid, food poisoning, diarrhoea, dysentery, viral hepatitis, gastro enteritis, round worm, tape worm, hook worm, whip worm etc.

4 Propagation of flies - transmitting many diseases like typhoid, diarrhoea, dysentery, cholera, gastro-enteritis, amoebiasis, conjunctivitis, trachoma, helminthic (worm) infestations etc.

Approximately every 10-12 years the pressure of chemicals on the natural environment doubles, Solid waste pollution of all kinds cause major environmental problems.

AIR POLLUTION

Air pollution means any solid, liquid or gaseous substance present in the atmosphere in such concentrations as may tend to be injurious to human beings or other living creatures or plants or property or environment.

* Generally the sources of air pollution are industrialised plants and power stations burning coal or crude oil, steam locomotives used in railways, steamer and motor vehicles, motor transport and internal combustion engines burning petrol, diesel, kerosene, naphtha and other fuels, large incinerators, domestic furnace using coal, kerosene, cowdung cakes and fire-wood; lighting in houses by burning vegetable oils, paraffins, kerosene, coal and gases, miscellaneous, commercial and community activities like pesticides usage and agricultural chemicals.

* Major pollutants are sulphur and nitrous oxides, carbon monoxide, hydrogen sulphide, metallic fluorides, particles of dust, smoke, fly ash, soot, organic phosphates, chlorinated hydrocarbons, heavy metals, particles and fumes of lead, zinc, arsenic, uranium, beryllium dust, argon, iodine, etc.

* Air pollutants exhibit themselves as smog, smoke, ash fumes, mists, dusts, odours and gases.

* India consumes nearly 562 tonnes of fossil fuels and combustibles every year, releasing about 94 million tonnes of poisonous materials in the atmosphere.

Burning of commercial fuel sources like coal, diesel, petroleum, gas, petroleum refining operations and non-commercial fuel like firewood, dry cattle dung, vegetable waste products, refuse burning, together emit 33 million tonnes of carbon monoxide, 68 million tonnes of sulphur dioxide, 25 million tonnes of nitrogen oxides, 90 million tonnes of hydrocarbons and 100 million tonnes of particulates in India.

Automobiles are one of the main sources of pollution in major cities of the world. Indian vehicles are seven times more polluting than those in developed countries, 63% of the total pollution is caused by vehicles. Automobiles emit carbon monoxide, hydrocarbons, nitric oxide, formaldehydes and lead compounds.

LAND POLLUTION

Land or Soil pollution originate mainly from:
1. The unintended or incidental Pollution of Soil with human-made chemicals; 2. The Spent material from mining, or Industrial processing, etc.
3. The discharge of sewage or waste water from urban areas on the land used for agricultural purposes particularly that of adjoining urban areas and 4. The indiscriminate disposal of solid waste (refuse).

* Agricultural and forestry activities are also contributing to the pollution of soil from different sources. Various fertilizers, herbicides, pesticides, fungicides, soil conditioners and fumigants which are in use have destroyed the agricultural, horticultural and silvicultural soils. The chemicals used pollute the soil completely and even-pollute water sources.

* Various hazardous toxic chemicals getting accumulated in soil reach water and all sorts of food products, for instance, remnants of stable pesticides like DDT, Lindane, Aldrin, Dieldrin etc. appear to be bound to or absorbed on soil particles which are made up of inorganic minerals coated with organic compounds.

* Percentage of pesticide present in soil after one year - Aldrin 26% Heptachlor 45%, Chlordane 55% Lindane 65% Dieldrin 75% DDT 80%

* WHO estimates that one person every minute is poisoned in the third world by pesticides.

* City refuse is increasing day by day causing multi-dimensional pollution even contaminating the soil and in the course of time the underground water.

* Altogether about 40-50 billion tonnes of waste and rubbish are dumped on our planet every year, destroying the land.

* Today an average Indian produces 0.4 kg of refuse per day while an American produces seven times more.

* Industrial solid wastes which get burned or ignited get leached by rainfall destroying vast areas of soil and pollution of surface or ground water. The open cast mining of coal, the formation of mountains of slag and the tailings from mines are examples of solid industrial waste destroying the land.

* 50-60% of the land has been denuded of forests, globally. About 60 billion tonnes of soil is washed into the ocean every year.

* Globally, deserts created as a result of human activities extend over 9 million sq km. Natural desert and created deserts together constitute 57 million sq km or 44% of the earth's land surface.

* In India, out of the 329 million hectares of land mass, almost 175 million hectares of land is degraded. India is losing forest cover at the rate of 1.5 million hectares per year and 30-50 million tonnes of food grains are lost on account of loss and destruction of top soil.

* Almost three-quarters of the developing world's people still depend on agriculture for their livelihood. The loss of soil in both quality and quantity is perhaps the most ignored of all environmental disasters.

* In the last 100 years, an estimated 5000 million acres of soil have been lost and destroyed, the equivalent of one quarter of the earth's farm land.

NOISE POLLUTION

Noise Pollution can be understood as an

unacceptable level of sound causing irreparable damage to the human system.

* Sound is a form of energy and it is measured in units called decibels (dB). The decibel scale is logarithmic; so a noise level of 90 dB would be ten times louder than 80 dB.

* Example, a whisper equals 20 dB, normal speech ranges between 30-50 dB, street noises 40-70 dB, car engines 90 dB, and a revving jet shoots up to 150 dB.

* In India, misused conical speakers, blaring radio and TV sets, open air cinema shows (especially in the late hours of the night) horns of vehicles, loud noise-making fire crackers are examples of our callousness towards other's feelings.

* Textile mills, major industrial units, jets zooming in and out of the airport cumulatively contribute toward noise pollution.

* Many pop stars are found to suffer from partial deafness after 4-5 years in the business.

* All the noise sources described so far are human-made. But nature itself is a major producer of noise, much of which exceeds the accepted danger level. Thunderstorms, hurricanes, earthquakes volcanic eruptions show nature at her noisiest state and they are reminders that the faculty of hearing is essential to our survival. Our environment is full of sounds many of which are dangerous signals warning us to pay attention.

* The overall loudness of environment noise is doubling every ten years which would be a sinister threat to our health and well-being. The effect of continued exposure is very pronounced at 90 dB the upper limit prescribed by the International Standards Union. Exposure to this level for 8 hours daily can cause permanent deafness. At 93 dB the exposure should not exceed 4 hours: and at 96 dB the human ear can tolerate it only for 2 hours.

* Noise not only is a chronic irritant but a serious health hazard capable of causing irreparable damage to the physique and psyche of human beings. It is more likely to reduce the accuracy, quality of our work than the quantity.

* Loud noises greatly enhance the production of adrenal hormones and it also increases susceptibility to the virus causing cancerous tumours. It also causes cardio vascular problems such as heart diseases and high blood pressure leading to cardiac disturbances, neuro-sensory and social conflicts at home and at work.

* Noise becomes direct threat to patients and pregnant women. Studies show high incidence of excessive menstrual flow among women and also high rate of birth defects, premature and still births especially among pregnant women living near Los Angeles airport in U.S.A., the Heathrow airport in U.K. and the Osaka airport in Japan as compared to pregnant women who live in quieter areas.

* Researchers claim that if the present noise levels continue unchecked future generations will be born deaf. Tens of thousands of urban communities across the world are threatened by noise assaults.

RADIATION POLLUTION

* Radiation is a pollutant far more dangerous than any other existing ones.

* Different sources are-cosmic radiation, coming from outer space, terrestrial radiation originating from the radioactive substances contained in the earth's crust, human-made radiation like X-rays and other types of radiation used for medical purposes, fall out from testing nuclear weapons, radiation from nuclear reactors and other industries using ionising radiation and radioactive materials released in the course of nuclear power production.

* Damage due to radiation can lead to gene mutation, resulting in abnormal and disabled children, Genetic hazards of radiation are invisible, irreversible and unquantifiable.

* There is no safe level of radiation at all. Actually no dose of radiation is so low that the risk of cancer is zero.

* Animals feeding on vegetation are infested with radio-active contaminants. Human beings thriving on animal and plant nutrients get the

radio-active pollutants into bones, glands, tissues, leading to over all damage to the body.

* A nuclear war will turn our planet into an inhospitable place for atleast 25,000 years.

* Experts opine that within 5 km of Chernobyl disaster site, victims stand a 50% chance of survival and the survivors would have suffered bone marrow and gastro-intestinal tract damage.

* People living in places between 5-10 km away from site would have experienced nausea and other symptoms. Within a range of 90 km from the site, a smaller amount of radiation can cause a significant increase in the incidence of blood cancer and other forms of cancer during the next 30 years.

* An estimated 4,000 small and big nuclear accidents have occurred around the world. Most have gone unreported.

* In India an estimated 300 incidents of a 'serious' nature have occurred, causing radiation

leaks and physical damage to workers.

* More than 200,000 people died due to atom bomb explosion in Hiroshima and Nagasaki in August 1945.

* Even at sites 10 km away from the plant, grass and milk samples show the presence of radium which has entered the aquatic system.

* Risk of cancer due to irradiation varies from person to person, and differs with types of cancer, age, sex, genetic inheritance, individual characteristics and eating and smoking habits.

* Studies show that children with allergies have a 300% to 400% increased risk of dying of blood cancer. A study in US reveals that the incidence of multiple myeloma, a bone marrow cancer doubled with a cumulative dose of only 4 rems, a dose lower than the currently specified annual exposure limits.

- From 1990 Calendar on Pollution Produced by:
Centre for Human Ecology, Bombay.

The Shape of a Sustainable Society

Jobs	New and/or Expanded Employment Purpose	Focus on
Energy Auditors:	Identify conservation potential	Save Energy
Wind prospectors	find new uses	Alternate energy
Agronomists	bring back balance of nature by organic gardening	Produce food, feed, and fibre
Foresters	reestablishing the water table and rainfall	Reforesting the land
Solar architects	to use readily available energy	Develop all possible uses of sun energy
Biogas technicians	to lessen the cost of cooking gas, and replace chemical fertilizers	Use as fuel and fertilizer
Family Planning Midwives	to stabilize population as a social goal	New population policy

Holistic Health Work Book, SAHAJ.

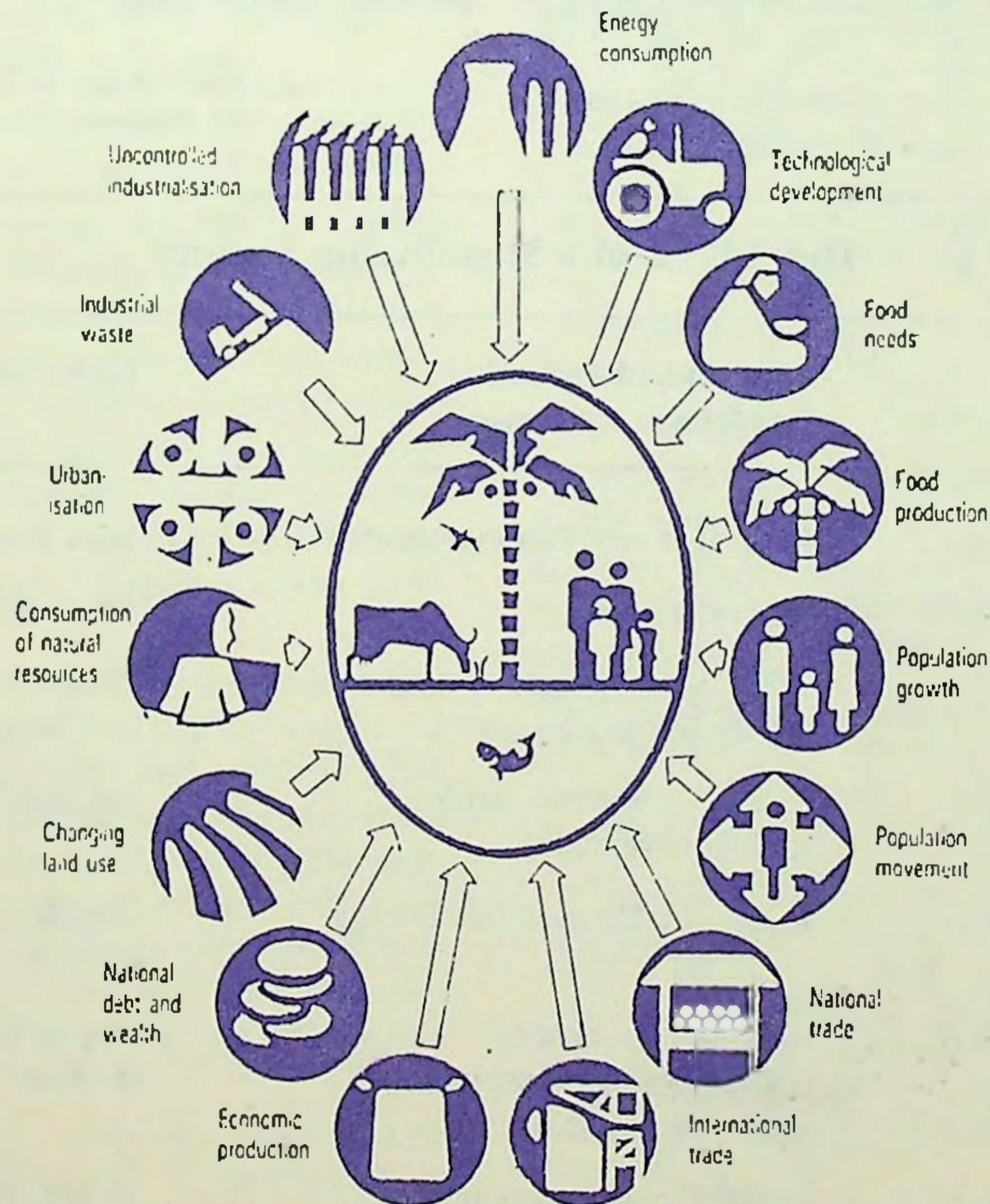
ENVIRONMENT, HEALTH AND DEVELOPMENT

INTRODUCTION

The all pervasive nature of the environment we live in cannot be stressed adequately. The quality of water that we consume for drinking or for personal and household tasks, the soil in which we grow our food and on which we dispose waste material, the animals and plants around us, the air that we breathe and the rural and urban setting in which we dwell or work determines to a large extent the level of our physical, mental and social well being.

Over the ages, man and woman have been altering their environment by accident or by design, as illustrated below:

DEVELOPMENTAL ACTIVITIES AFFECTING ENVIRONMENT*



* Source: The State of Environment 1984. The environment in the dialogue between and among developed and delveloping countries. United Nations Environment Programme.

Environmental degradation undermines development and damages human health. Ill health, on the other hand affects the work force, hinders development and leads to environmental degradation. Environment, development and health are thus closely interlinked with proper development improving the environment, sustaining development and increasing community health, making possible sustainable development. The role of men and women in the maintenance of a clean and healthy environment is therefore indispensable.

URBANIZATION AND INDUSTRIALIZATION

Urbanization and industrialization and the resultant influx of population has resulted in severely stretching the existing facilities such as housing, water supply and waste disposal, roads and transport system and basic services.

The domestic wastes and garbage in the congested settlements cause insanitary conditions, as well as insect and rodent problems giving rise to many illnesses and deaths. Indiscriminate spraying of insecticides, rodenticides and pesticides often result in health risks. Unsatisfactory housing, overcrowding, inadequate excreta disposal, burning of wood, coal and cowdung cakes for cooking pose severe health problems. Industrial emissions and inappropriate disposal of wastes, create additional health hazards.

Every one has a right to enjoy a reasonably clean, safe and healthy environment in which to live and work. Developmental activities must therefore be controlled and well planned and steps ensured to see that waste products are removed safely.

PLANNING OF URBAN DEVELOPMENT

Rapid urbanization is reaching serious proportions in the developing world leading to, among other problems, unhealthy living conditions, overcrowding, psychosocial stresses and violence. Unplanned, hastily planned settlements or squatter settlements are invariably deficient in housing and essential services for healthy living. Towns and cities must be therefore devel-

oped in a planned manner, segregating residential areas from those meant for commerce and industry.

HOUSING AND SHELTER

Shelter is one of the essential requirements for human life. Uncontrolled migration from rural to urban areas make housing a major problem. Poor housing has been shown to be associated with tuberculosis, streptococcal infections, rheumatic fever and rheumatic heart disease. Houses must be so designed and constructed as to allow adequate air and sun light to enter and, at the same time, protect its dwellers from the elements. Where fire-wood, coal, or cowdung cakes are used for cooking, houses must be provided with smokeless "chulahs" and proper ventilation to let out the smoke from the burning fire, thereby keeping the in-door air clean. Residents should have access to safe drinking water, waste disposal sites and sanitary latrines.

WATER SUPPLY AND SANITATION

In most SEAR countries the supply of drinking water has not kept pace with population growth. Waste collection and disposal facilities are often lacking. Contamination of sources of water supply often occur as a result of insanitary disposal of solid and liquid domestic wastes including human excreta.

It is not uncommon for whole settlements drawing water from public taps or open wells or community handpumps forcing people either to draw insufficient quantities of water or to go to polluted water sources. Lack of adequate water for washing and cleaning coupled with poor sanitation lead to infection and reinfection through the oral-faecal route. The provision of safe water supply and satisfactory disposal of wastes is therefore imperative for a clean environment and healthy living.

DISPOSAL OF SOLID WASTES

Large volumes of refuse are produced by the communities. Until the turn of the 20th century, the generally accepted way of disposal of domestic refuse was either to dump it into the

courtyard of the house where it accumulated and decomposed till it was finally carted away to farms or other disposal sites, or throwing it out into the streets where it dispersed. This, however, encouraged the breeding of flies, insects and rodents, which in turn, transmitted many diseases.

KEEP OUR ENVIRONMENT CLEAN

Yet, the more new industries develop and existing industries expand, the more the environment gets affected. Although environmental issues have become matters of great concern, the speed at which new technologies are introduced is rarely matched with measures to protect the environment and the people.

On the other hand, hazardous substances produced by industry are being handled by the public without being fully aware of their dangerous side effects. Pesticides, for instance, are the most important and most widely used hazardous chemicals in the Region. Their improper application leads to thousands of deaths every year.

Albert Einstein once stated that "concern for man himself and his fate must always form the chief interest of all technical endeavour". If he was alive today he would certainly realize that concern for man and his fate would become meaningless without concern for the environment.

In the case of industries it would mean careful consideration of a number of issues of far reaching consequence:

(1) Policies and Planning

Again it will be politicians, policy and decision-makers and planners who will have to take the first step and formulate proper policies and develop realistic plans for establishing and expanding industries.

(2) Legislation

Although some form of legislation mostly exists it is usually inadequate or in need of improvement or for strengthening procedures for enforcement. It should typically include the setting of standards and maximum allowable concentrations as well as drawing up of regula-

tions covering the production, conveyance, disposal and accidental discharge of dangerous substances.

(3) Introduction of new technologies

New technologies and industrial innovations are being introduced all the time often without due regard to safety. Legislation should promote safe production technologies as well as the recycling or proper disposal of waste.

(4) Site Selection

The selection of a proper site for an industry vis-a-vis well-serviced housing is extremely important. If carefully located, an industry will not only present a minimum risk but will also mean reduced distances for employees to travel to work.

(5) Health of the Workers

In the case of an industry the working environment is at least as important as its surroundings. Workers have to be properly protected against harmful factors (toxic fumes, dust, noise, radiation, etc). The provision of first aid equipment and protective devices is not enough. Safety will have to start at the source through hazard control.

(6) Public Information

There is a general lack of awareness on the part of both the public as well as the decision makers. Health education and public information programmes should, therefore, include safety aspects of the handling and disposal of hazardous substances and of industrial accidents.

CONCLUSION

Never before in history have there been cities as large as today's, doubling their size every 10 to 15 years. Never before have goods been produced in such quantity and variety and never before have our energy requirements been of such proportions. In view of the fact that our numbers and our demands are still increasing we have to consider future steps carefully and remember Einstein's words and act accordingly.

- WHO Information Kit -
Health for all - All for Health

ALTERNATIVES FOR POLLUTIONS

Instead of	Safer alternatives
Air freshener	Fresh flowers set out an open box of baking soda set out vinegar in a dish
General cleaner	Mix baking soda with small amount of water
Drain Opener	Use a plunger, mechanical snake or drain strainer Pour 1/2c baking soda into drain, followed by 2c boiling water. Prevent clogs: flush drain with boiling water weekly
Furniture polish	Rub in a small amount of mayonnaise with a soft cloth Mix 1 part lemon juice with 2 parts olive or vegetable oil and rub with a soft cloth Mix 3 parts olive oil and 1 part vinegar and rub with a soft cloth
Laundry detergent	Use washing soda or soap
Toilet bowl cleaner	1/2c bleach and scrub stains with a pumice stone
Wood floor cleaner	Mix half oil and vinegar solution apply thinly and rub well Use 1 t. baking soda and about one and a half liters of hot water for painted wood and rinse with clear water
Fertilizer	Compost coffee grounds and tea bags - Do not use grass treated with chemicals
Houseplant insecticides	Soapy water on leaves and rinse Mix pepper in water and spray on leaves
Household insecticides	Ants won't cross a barrier of cucumbers or red pepper Encourage spiders - they eat flies and mosquitoes For cockroaches, spread 2 T. Flour, 1.T. cocoa powder, 4 T. Borax around infested area For flies, make flypaper by dipping brown paper in honey

CODE:

C - Cup

t - teaspoon

T - Table Spoon

Peace News letter, Central New York

The Politics of Environment

OPERATION CLEAN-UP

Among the hundreds of things the environment ministry has activated, to the annoyance of vested interests, are the following. Offered to give an idea of what is happening. Whether Maneka Gandhi wins her battles or not, these will change the face of India in the nineties.

ENVIRONMENT COURTS

Special courts are being set up to give the poor man hope for speedy justice against multicore factories that pollute the environment with impunity. Drafted by Justice Bhagwati, the proposed act will take away power from bureaucrats and politicians and pass it on to the common man.

ENVIRONMENT-FRIENDLY PRODUCTS

The ministry will set stringent standards for all products in the market. Those which meet these standards of production and performance will be given this label of excellence. Like the ISI mark.

DELEADING OF PETROL

Refineries are being persuaded to invest Rs 1100 crores to making their petrol lead-free. India has the highest lead content in its petrol, which results in immense and intense city pollution. The ministry is lobbying very hard to get foreign grants for this investment.

BAN ON HARMFUL PESTICIDES

The most widespread form of pollution in India is through pesticides. Food, fruit, water, nothing is safe. Eight chemical pesticides, of which DDT, BHC, Aldrin and Malathion are the main criminals, have been isolated. Plans are now afoot to replace them with safe biopesticides.

NATIONAL FORESTRY FUND

This will allow businesses to get a 100 per cent tax exemption while contributing to the greening of India. The money will be given to tribals and NGOs across the land, to start work immediately.

NATIONAL WASTE MANAGEMENT COUNCIL

This was set-up in March. Its main task is to convert the 40 million tonnes of flyash that lie in mountains near thermal power plants into bricks, city garbage into energy, sewage into fertiliser. The ministry has already made the big cities buy plants that will convert garbage into fuel pellets, to replace firewood.

SOLAR ENERGY COMMISSION

Since the energy sector is a major polluter, the idea is to create decentralised energy at the village level instead of multiplying mainstream producers. The ministry has asked for this commission, to save vast sums of money from being spent on dams and nuclear reactors, cut down on pollution, solve the energy problem at the grassroots level.

PUBLIC LIABILITY INSURANCE

When a leak occurs or large-scale poisoning results from an accident in a chemical plant, be it a maker of paints or pesticides as in the case of Bhopal, the guilty company holds up payment for years by litiga-

tion. This legislation will make it mandatory for all such factories to take out a heavy public liability insurance, to be paid within 48 hours of the damage.

BAN ON ANIMAL SYMBOLS

The law ministry has been persuaded to ban the use of animal symbols in elections, to prevent political parties from playing around with the lives of the animals used during campaigning.

WILD LIFE AMENDMENT ACT

A cabinet note has been circulated, suggesting ways and means to more strongly apply this act and punish those who violate it.

NO SMOKING IN PUBLIC PLACES

Against much opposition, the ministry has successfully inspired a ban on smoking in many public places. This will soon come into effect.

Rumours insist the minister is proposing to attack tobacco growing itself- by proposing a freeze on land use for tobacco cultivation and a strong incentive programme to divert farmers to other crops.

BAN ON BVO

BVO (brominated vegetable oil), an emulsifying agent in citrus - based soft drinks was banned internationally a decade back. But many soft drink makers in India were happily using the cancer-causing chemical, ignoring the consequences. This summer, no soft drinks with BVO will be on the shelves. the ban has been enforced for the first time, at the insistence of the environment ministry.

POLLUTION BY MOTOR VEHICLES

Anti-pollution measures against motor vehicles are being strictly enforced for the first time. Cars, two-wheelers not adhering to the standards prescribed are being fined heavily and may even be yanked off the road, to send the message home.

HOTELS IN GOA

Action has been taken against a large number of hotels in Goa, which encroached on the beaches in flagrant violation of the laws. They are now being forced to break down their illegal structures and conform to the environment laws governing seaside resorts.

CREATING WOOD SUBSTITUTES

To conserve forests, the ministry is aggressively pursuing the use of wood substitutes in all areas. Jute for packaging. Concrete for railway sleepers. Agricultural waste and wild plants like water hyacinth for paper. Artificial wood for furniture. Wherever possible, wood is being replaced by substitutes.

ENVIRONMENT CLEARANCE FOR PROJECTS

The ministry has proposed amendments to the Environment Protection Act that will make it statutory for all public and private sector units to get environment clearance before going on stream. If implemented, this will make the environment ministry even more powerful than what it has become today.

NATIONAL ZOO AUTHORITY

Seeing the terrible state of zoos everywhere, the idea has been mooted to form a Zoo Authority of India, under the Wildlife Protection Act, that will manage all zoos in different parts of the country. Meanwhile, all roadside zoos are being closed down.

NO TRADING IN BIRDS AND ANIMALS

Efforts are being made to stop the illicit trade in birds and animals. Raids have been conducted in many cities to stop such businesses and the public is being educated to not encourage them by buying animal skins, bones, ivory from those who catch wild creatures illegally.

NATIONAL RIVER ACTION PLAN

The proposal is to set up a national river authority, which will plan a policy for water use and waste water management at a national level.

-- From The Illustrated Weekly of India

May 6, 1990

Movement Toward a New Society

A network is already there of people around the world who have chosen a voluntary simple life style. To start living a simpler life style, we must shift away from the ecologically faulty system we now have, to what we'll need for an ecologically oriented economic system.

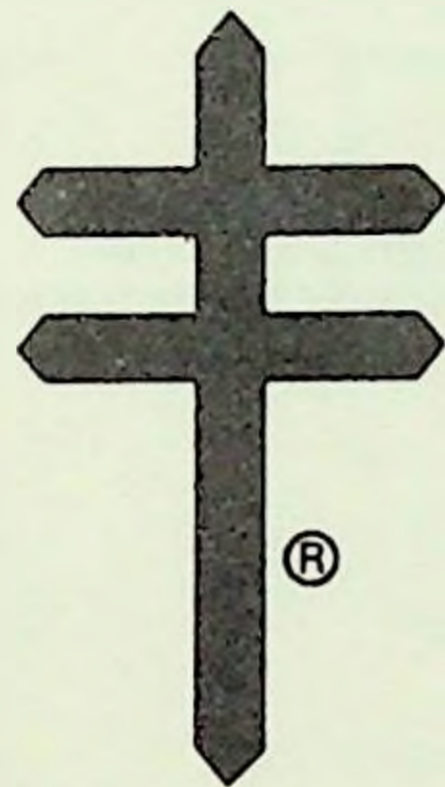
Now We Have an Ecologically Faulty System	What We'll Need for An Ecologically Oriented Economic System
VALUES	
Growth, big is good, Complex Technology, Maximum Production Planned Obsolescence	Steady State Small is beautiful, Intermediate Technology Adequate Production Minimised Consumption Equilibrium, Conservation Frugality, Durability
LIFE STYLES	
Keep up with the rich, Conspicuous Consumption, Nuclear Family Desire For Highest Possible Income Eat for taste and fashion	Simplicity, Communal Living Greatly Reduced Consumption Delight in Living With Minimal Income and Possessions Eat for nutritious value
PLANNING	
Mostly by Business Firms to Maximise their Profit and Economic Growth	Developed through Democratically controlled bodies and aimed at Governing Production by Social and Ecological Criteria.
CAPITAL	
Maximum Accumulation of Capital Through search for Maximum Profit, Maximum GNP and Quantity of Capital Stock	Capital Investment Rate Set Equal to Depreciation Rate. Production For Social Use Rather Than Private Profit. Minimize GNP and Maximise Quality of Capital Stock.
RESOURCES	
Used In A Wasteful Way-- Use Rate Increasing Exponentially. Planned Obsolescence leads to Very High Resource Consumption. Unnecessary Duplication Leads to Wasted Material and Time	Drastic Reduction in Resource Use Per Unit of Industrial Production. Products Built for Durability, Repairability, Recycling. Minimal "Throughput." Goal of Waste Elimination, e.g. Instead of Several Competing private drug companies making almost identical products with enormous advertising outlay, have a few regional drug companies making standardized drugs.

From: Holistic Health Work Book, SAHAJ, Pune.

44.13

COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road
BANGALORE 560 007

Health Effects of Air Pollution



A STATEMENT
BY THE
AMERICAN THORACIC SOCIETY

Published by
American Lung Association
1740 Broadway • New York, N.Y. 10019

FORMERLY NATIONAL TUBERCULOSIS AND RESPIRATORY DISEASE ASSOCIATION

Reprinted from
THE AMERICAN REVIEW OF RESPIRATORY DISEASE
Vol. 108, No. 3, September 1973

SUMMARY

When considering the effects of a pollutant or combination of pollutants on man, we must realize that such an exposure can result in precursors of illness, physiologic change of unknown significance, and a pollutant burden in a larger proportion of the population than that which is made overtly ill. We must also keep in mind the fact that chronic, long-term exposures may act insidiously and that it may be extremely difficult to relate the exposure to the resultant disease. In addition, there may be other competing factors, such as cigarette smoking or other tobacco usage that may overwhelm the effect of a pollutant or that may act synergistically with the exposure. The relative importance of many of these interactions still needs to be worked out.

Sulfur Oxides and Suspended Particulates

It is probably advisable to consider these two pollutants together, as their major source is the burning of fossil fuels (coal and oil), even though the precise extent of their interaction is not entirely known. There is evidence that sulfur oxide can be converted to sulphuric acid (H_2SO_4) or to other sulfates. It may be that the particles play a role in this conversion to what is a more toxic substance (H_2SO_4) than sulfur dioxide. The importance of other sulfates and their effect on human health still needs more research. The present primary standards for sulfur dioxide and particulates appear to be close to the no-effect level. As more long-term studies are completed, it may well be that in the future these levels should be reduced in order to have some safety factor.

Carbon Monoxide

Carbon monoxide is a normal metabolite. It will normally be excreted via the lungs if the pressure in the ambient air (or alveoli) is lower

than that in the blood. Conversely, it will be absorbed via the same route if the pressure is reversed. The major sources of carbon monoxide are internal combustion engines and cigarettes and other tobacco products. Evidence is accumulating that indicates that when carboxyhemoglobin is 5% or more, alterations in physiologic function can occur. These include alteration in light sensitivity of the eye. More importantly there can be interferences in oxygen uptake by heart muscle at 3-5% carboxyhemoglobin. This latter may account for the increased incidence of myocardial infarcts in heavy cigarette smokers. The primary standard of 10 mg/m³ or about 8 ppm as a maximal 8-hour value is probably more stringent than is necessary since such exposures would probably produce 1.4-1.0% carboxyhemoglobin, which is about twice what is normally present. The one hour standard of 40 mg/m³ (34 ppm) is probably reasonable with some safety factor even for those with myocardial disease.

Oxidizing Type of Air Pollution

This represents a complex mixture of compounds that require ultraviolet rays (sunlight) as the energy source to activate the chemical interactions. The resultant compounds are the substances that cause irritation of the eye, nose, and throat. Some of the compounds involved are oxides of nitrogen and hydrocarbons from the internal combustion engine and ozone that is produced as a result of the activity of ultraviolet radiation. To date, no increase in mortality has been associated even with episodes of relatively high levels of pollution due to these compounds. Studies on long-term effects are needed, as the levels of ozone and oxides of nitrogen have reached levels in Los Angeles that have been associated with increased susceptibility of mice to bacterial infection, and men have shown reductions in the diffusing capacity of their lungs. The primary standard for photochemical oxidant is 125 $\mu\text{g}/\text{m}^3$ as the maximal one-hour value. This seems to be a reasonable value. The

The American Thoracic Society is the medical section of the American Lung Association.

primary standard for nitrogen dioxide is 100 $\mu\text{g}/\text{m}^3$ as the annual arithmetic mean. More research is needed to substantiate this value as it is based essentially on one study which should be confirmed. Hydrocarbons per se do not seem to be a problem but rather their degradation products resulting from photochemical reactions and the irritant substances produced. The primary standard for hydrocarbons has, therefore, been predicated on their potential to produce these by-products, and it has been set at 125 $\mu\text{g}/\text{m}^3$ as the maximal concentration from 0600 to 0900. This also seems to be a reasonable value although more research will be needed to rule out possible long-term effects.

Other Substances

Certain other materials, such as asbestos, arsenic, beryllium, cadmium, and lead do not have levels as primary standards. Instead, these substances, all of which can have devastating effects, are controlled by emission standards in order to minimize the exposure of general populations. Asbestos and beryllium have been definitely im-

plicated as producing disease in non-occupationally exposed individuals. Cadmium accumulates in the kidney, and it is believed to be a factor in producing hypertension because of its effect on the kidney. Further research is needed to confirm this. Lead may come from a variety of sources; there have been instances in which soil has been contaminated with lead and small children have been poisoned. Arsenic is probably the least toxic of this group but it, too, has been involved in an episode of community air pollution that resulted in considerable dermatitis in the children. It does therefore seem prudent to control the emission of these substances to the levels proposed.

Special Note

The Council of the American Thoracic Society acknowledges this contribution of Benjamin G. Ferris, Jr., M.D. The summary is abstracted from an extensive review of the literature prepared by Dr. Ferris at the request of the National Air Conservation Commission. Single copies of the review document are available upon request.



CHRISTMAS SEALS, BEQUESTS, AND MEMORIAL GIFTS

FIGHT LUNG DISEASE
IT'S A MATTER OF LIFE AND BREATH

Distributed by your local Christmas Seal association
Published by the American Lung Association



T N V H A NEWS LETTER

SUPPLEMENT MAY 1990

23 SIRUVALLUR ROAD, PERAMBUR, MADRAS 600 011

COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road
BANGALORE - 560 001

A COLLECTION OF READINGS ON

ENVIRONMENT
&
HEALTH

NEWS AND INFORMATION FROM VARIOUS SOURCES

PUBLISHED TO CREATE AWARENESS & IMPART
INFORMATION AMONG READERS.

Edited by: Mrs. Saullina Arnold, For Tamil Nadu Voluntary Health Association, Madras.

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TO THE FOLLOWING PUBLISHERS

World Health Organization
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"Environment"
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LWF Mission Notes
December 1989, Geneva.
For Articles and Book Review

SCALA
A Periodical from the Federal Republic of Germany,
September/October, 1987.

CONSUMER
Publication of Department of Health and Human Service
Public Health Service, Food and Administration
Rockville, Md 20857
Office of Public Affairs, USA.

1990 WORLD HEALTH DAY MESSAGE

Message from Dr. U Ko Ko, Regional Director
W.H.O. South-East Asia Region

Never before in the history of the human race has humankind faced the kind of ecological dangers that it is now confronted with. Population explosion, uncontrolled urbanization and industrialization have brought in their wake widespread pollution of air, water and land as well as deforestation, desertification, accidents involving chemicals, and the danger of extinction of some plant and animal species. In the name of progress, man seems to have thrown caution to the winds. All that matters is the perceived benefit in the short-term.

Fortunately, since these problems are largely man-made, there are workable solutions at hand as well. But these can be arrived at only through coordinated global actions. However, the message for an urgent solution is loud and clear: Unless something is done now there may as well be no tomorrow.

Numerous reports by Commissions and environmentalists have clearly highlighted the

need of international concerted action to stem the tide that seems all set to engulf the world. It is to underscore, once again, the very direct links between man and his environment that WHO has chosen environment and health as its theme for World Health Day this year.

The increase in air and water pollution, giving rise to the greenhouse effect, depletion of the ozone layer, rising sea level, respiratory and water-borne diseases, and the host of other problems related to rapid urbanization and industrialization need urgent action, not so much to undo the harm and has already been done, but to prevent further damage to the world's ecosystem.

As the Director-General of the World Health Organization, Dr. Hiroshi Nakajima has said, "We must alert everyone to the dangers of an unhealthy environment and to improve health and preserve humankind".

OVERVIEW

Throughout the history of our civilization doomsayers have never been in short supply. Our age has even found it trendy to be pessimistic. But it is no exaggeration to say that one of the few unifying factors in today's world, cutting across social and political systems, religions, continents and nations, is a growing concern for environmental health and protection of the Earth.

It was only in the second half of this century that it dawned on us that Development

with a capital D has two faces: nations and individuals may become richer, but factories and cars pell environmental danger. The worldwide "green" movement is evolving very rapidly from a fringe faction into a major force on the international scene. There is a very good reason for this. Not only the quality of life but, in the long-run, the very survival of the species depends on safeguarding our planet. Global environmental problems seem to be taking over from nuclear war fears as the world's

biggest headache.

We can only guess how many millions today all over the globe endure a precarious existence in shanty towns, inner city slums, refugee camps and squatter settlements. Their "planet" is a long, long way from being a healthy one. The lack of safe water and sanitation encourage a host of diseases-typhoid, cholera, hepatitis, poliomyelitis, dysentery, amoebiasis.

The fuel burned in the earth by about half of the world's population as the major source of domestic energy results in between 400 to 500 million people suffering from severe indoor air pollution. Scarce food, overcrowding, perpetual stress, alienation-all this creates fertile conditions for severe mental health problems; suicide is no stranger in the slums.

Crippling burden of infectious disease and malnutrition is a new set of non-communicable diseases commonly associated with hasty industrialization and the indiscriminate use of chemicals.

Malnutrition, that eternal sign of poverty, is one of the most persistent of the health problems of the urban poor.

Water is essential to life. It is also a major medium for disease transmission including typhoid and cholera. People from the industrialized North for whom diarrhoea is just an unpleasant holiday experience find it hard to grasp that in the Third World five million children die every year from diarrhoeal diseases. The major villain of this global tragedy is unsafe water.

The sheer scale of water-borne diseases is truly staggering. Poliomyelitis, guinea worm infection, malaria, yellow fever, dengue, river blindness, schistosomiasis -- these are just a handful of the more commonly known ones. The bad news is that, through out the tropics, matters are getting worse, not better. Malaria and other vector-borne diseases previously confined to the countryside have followed the rural to urban migrants and found ideal breeding grounds in the city slums. Emergence of

urban malaria is yet another vivid example of the fact that developing countries, populations are much more exposed, not only to the elements, but even more so to whole host of maladies which can be called diseases of poverty.

In the countryside itself all is not well. Over intensive agricultural production has dumped potentially dangerous levels of nitrates and other chemicals into the soil and thence into the water. High-yield harvests can only be sustained by covering plants and soil with ever greater amounts of fertilizers and pesticides. Meanwhile, weeds and insects are developing resistance to these chemicals, thus defeating the multimillion dollar efforts that go into research and production of commercial pesticides.

The agricultural sector in developing countries is geared predominantly to local needs. There are some notable exceptions, however, in the form of traditional export crops such as coffee or cotton. These gobble up the lion's share of the pesticides which reach the developing countries-merely one-fifth of the global production.

The bad news is that, in one form or another, global climate change is coming. The good news is that we know about it and can and must benefit from that knowledge. Every little effort helps! This is what WHO means with its slogan for World Health Day 1990:

OUR PLANET -- OUR HEALTH

Think globally -- Act locally

As we move into the last decade of the century, environmental issues are taking on a new importance on the world's agenda. Back in the 17th century the English poet, John Donne, wrote: "No man is an island entire of itself." Today, we can add "No country is an island entire of itself." We are all under a cloud, and it is a cloud of our own making.

- From World Health Organization News

UNDERSTANDING THE GREENHOUSE EFFECT

By Suzanne D. Latonde

Since 1950 the over-all temperature of the planet has gone up by almost 1°F. Scientists attribute the temperature rise to the "greenhouse effect".

A greenhouse occurs when a layer of the atmosphere, 6 to 12 miles from the ground, warms while the stratosphere above it cools. The presence of carbon dioxide (CO₂) in the atmosphere is blamed for 50% of the warming. Three other gases also contribute to the problem: methane produced in wood burning and the raising of rice and cattle; nitrous oxide which comes from caremissions, and CFCs which also cause ozone depletion.

Since the beginning of the Industrial Revolution 70 parts/million of CO₂ have been added to the atmosphere mostly through the burning of coal and oil. More recently, one of nature's largest consumers of CO₂, the tropical rain forest, is under attack with 27.2 million acres destroyed.

How does carbon dioxide effect the atmosphere?

"CO₂, like water and certain other substances, is a greenhouse gas: it allows sunlight to pass through it, but it absorbs infrared radiation (heat) that rises from the plant and re-radiates part of this heat back to the surface." (p.90 Scientific American, Feb., 1988)

Scientists theorize that the earth's "COs levels have probably fluctuated in response to surface temperature" (p 92, *ibid.*). The planet has several separate means of adjusting its thermostat. For instance, when the earth and its atmosphere are warmer, increased evapora-

tion of the water in the oceans occurs, thus forming clouds. Clouds produce rain which cools the earth and lowers its temperature.

The so-called carbonate-silicate geochemical cycle also recycles CO₂, removing it from the atmosphere, storing it in rocks, and finally allowing its release through volcanic eruptions.

NASA scientists point out that the "earth has always had a moderate climate primarily because its cycling mechanism increases the amount of CO₂ in the atmosphere when the surface cools and reduces the amount when the greenhouse temperature rises" (p.90 *ibid.*). These same researchers point out that the present warming is linked to the burning of fossil fuel which cannot continue for more than a few hundred years before the planet's reserves of oil and coal are eliminated." They predict that after this warming period (brief in view of the earth's life) the CO₂ levels will again fall.

Other scientists do not share this optimistic outcome of the greenhouse effect. Instead, they foresee the possibility of a rise in the oceans because of the melting of the polar ice cap and, as a consequence, coastal cities throughout the world will be covered by the oceans.

Only time will tell, if there is no change in the current CO₂ emission levels, which theory is correct.

-- Central New York
Environment - August/September, 89.

Several Gases are responsible for the Greenhouse Effect, the most important being carbon dioxide (CO₂) which is released by the burning of coal, oil, and natural gas. Also, the

loss of much of our planet's forests results in less O₂ in the atmosphere. Other important Greenhouse gases are Methane, Nitrous Oxide, various Chlorofluorocarbons (CFC_s) and

ground-level ozone, all of those concentrations have been observed to be increasing in our atmosphere.

The Union of Concerned Scientists strongly suggests a World Wide prohibition of CFC's, long-lasting, man-made chemicals that are used in refrigerators, air conditioners, insulating foams, aerosol sprays and solvents. Another necessary step is to stop the World Wide destruction of forests. When trees are cut and burned, they release carbon dioxide as well as methane and nitrous oxide.

The primary solution of this dilemma of global warming is to cut the use of fossil fuels. We must increase our efforts to use energy more efficiently. A promising approach to energy conservation is cogeneration, which is the use of waste heat or fuel from industrial processes to generate electricity. Cogeneration currently produces about 2% of electricity. Solar Energy is becoming a more practical source of energy. Since 1976, the price of Photovoltaic Cells,

which convert sunlight directly to electricity, has dropped by a factor of 10, and the world market of Photovoltaic Cells has grown 50-fold. Solar Collectors in California now supply electricity to utilities at competitive prices. Wind power is another renewable energy source as is Geothermal power (power generated from Earth's interior). Biomass (wood and vegetation) could supply part of U.S. energy needs. It could be burned to produce heat and electricity or be converted to alcohol to fuel cars. Nuclear power does not produce greenhouse gases however chronic problems of safety, cost, management, and disposal of radioactive wastes have not been resolved. If we are to save our planet, we must move away from the use of fossil fuels and toward greater energy efficiency and widespread use of renewables.

*City Edition, July 31, 89
(Syracuse, N.Y.)*

ENVIRONMENTAL INFORMATION - IN A NUTSHELL

Q. What will happen if the ozone layer becomes thinner?

Global warming will develop and cause massive flooding as sea levels rise. Climates will change and animal and plant habitat will be destroyed. Increased ultra-violet light in the atmosphere will cause skin cancer and start to kill microscopic life in the food chain, which would ultimately affect humankind.

Q. What is Greenhouse Effect?

The greenhouse affect occurs when certain gases mainly, carbon dioxide, ground-level ozone, chlorofluoro-carbons(CFCs) and halons, methane and nitrous oxide build up in the atmosphere. These gases trap some of the heat emitted by the earth increasing the earth's surface temperature and altering the global climate and all the natural and human activities that depend on it. Without a certain amount of this natural and human activities that depend on it. Without a certain amount of this natural warming, the earth would be above 60 colder

than it is, and life on earth, as we know it, would not be possible. Great uncertainties surround the exact consequences of the extra global warming from the build-up of greenhouse gases, but it could well pose the greatest environmental threat in history.

Q. Does coal fires contribute to the Greenhouse Effect?

Yes, coal plus carbon dioxide into the atmosphere and this contributes to global warming.

Q. Why are eco-friendly products so expensive?

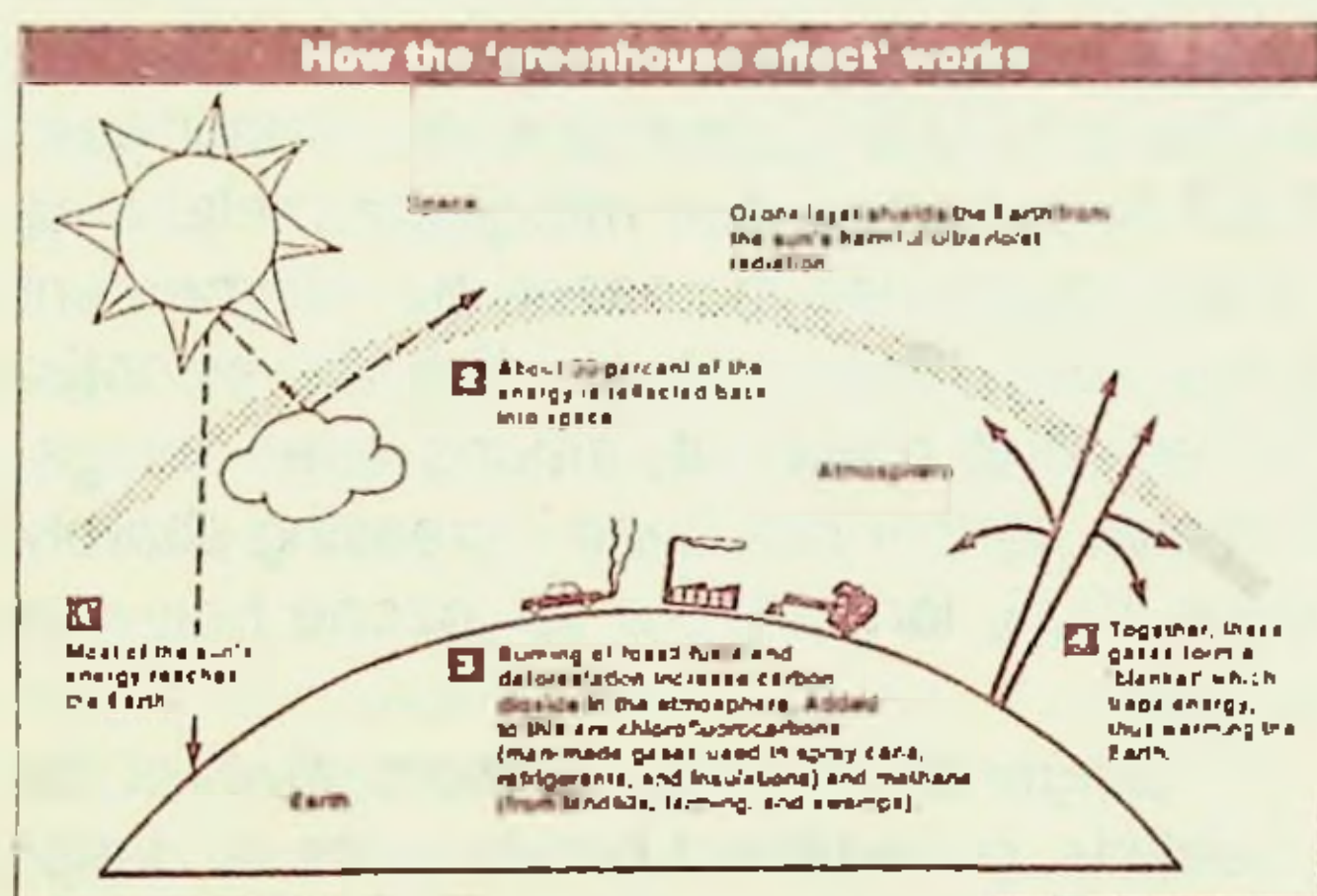
They are more expensive to produce. Washing powder serves as a good example. One of its main ingredients is phosphate. It both softens washing water and removes dirt and fabric. Phosphates are detrimental when discharged into rivers. To replace phosphate in detergent and maintain standards, manufacturers must use two costly products. Hence higher costs, passed on to the consumer.

Q. Why aren't solar, wind or tidal energy more popular?

It should be possible to offer a 1970 European standard of living to the entire world by using the renewable energy sources listed above. However every nation would be obliged to spend billions of dollars before this could be achieved.

Q. Are diesel-run cars the cleanest?

No. In the past diesel was cleaner than petrol, and it's true that it is lead-free, but petrol has improved and now diesel is considered environmentally second rate. Cars also burn energy and encourage fuel consumption.



Q. Are cars converted to unleaded petrol environmentally-friendly?

Unleaded petrol is only a first step. Without a catalytic converter cars still emit chemicals harmful to the environment.

Q. Why do countries continue to cut down rain forests when they know the damage it's doing?

Developing nations have many problems and environment isn't always top of agenda. They have weak economies and huge debts to repay. Rain forests are a source of income. Wood for timber is sold to the industrialized nations. For example Japan buys 40 per cent of all tropical wood for chopsticks. Cattle grazed on cleared land can be sold as beef.

Q. If trees help to combat the build-up of greenhouse gases, why aren't more planted?

Planting trees help, but the amount needed to combat the current planetary threat is colossal. A forest the size of Australia would be needed. The answer to the greenhouse effect is to stop the causes. Re-forestation has to be part of a major, multifaceted package.

Q. What are nitrates? What are the health problems caused by nitrates in water?

Nitrates are chemicals used mostly in agriculture. Plants absorb only some of the nitrogenous fertilizers, and the residue ends up in rivers, streams and often tap water. Nitrates are not the only problem. Water can also contain lead, chlorinated solvents and pesticides. Experiments suggest that nitrates in water may cause cancer.

Q. What is acid rain? What damage does it do?

It's caused by the burning of fossil fuels; wood, coal and oil in homes and industry, and nitrogen oxide from car exhausts. The sulfur and nitrogen oxides enter the air, float upwards into the atmosphere and eventually fall again as rain, mist or snow. They very often fall hundreds of miles from their place of origin, which is why one country's pollution can become another's environmental nightmare. Massive damage has been done to forests and woodlands. But acid rain also acidifies lakes, killing fish and fauna; attacks the surface of the oceans; and acidified agricultural land, causing farmers to use even more chemical fertilizers to maintain crop yield. It attacks stonework, particularly on vulnerable old buildings.

Q. It is true that some flower bulbs are stolen from the wild?

Yes. The biggest exporter is Turkey. In the last 10 years they've exported 71 million anemones, 20 million cyclamen, 111 million winter aconites. In only one year 30 million snowdrops were exported. Countries including Portugal, Spain, Yugoslavia, India and Japan are involved in this trade and large areas of land are being stripped of their native plants.

From: LWF Mission Notes, December 1989

BOOK REVIEWS

OZONEMANIA

"My Adventures in the Ozone Layer" by S. Fred Singer, in National Review (June 30, 1989), P.O. Box 96639, Washington, D.C. 20077-7471.

Last year's global environmental menace was the "greenhouse effect." This year's is the "hole" in Planet Earth's ozone layer, which screens out the sun's ultraviolet rays. But is a little premature to stock up on sun block yet, suggests Singer, an environmental scientist at the University of Virginia.

The "hole" is the planet's stratospheric ozone layer was discovered over Antarctica by British scientists in 1985. Alarms were sounded, international conferences held, and in 1987 the world's industrial nations agreed under the Montreal Protocol to begin reducing production of chlorofluorocarbons (CFCs). These are the industrial chemicals, used in refrigerators and air conditioners, in plastic foam-blowing, and in electronic cleaning equipment, which are said to be responsible for the missing ozone.

"The case against CFCs is based on a theory of ozone depletion, plausible, but quite incomplete," says Singer. In March 1988, the National Aeronautics and Space Administration (NASA) released, amid much fanfare, a study of ozone trends over 17 years. It reported that ozone was disappearing even faster than theory predicted. "This could mean that the theory is wrong, or the trend is spurious, or both," observes Singer. But NASA cited it only as a cause for greater alarm about CFCs.

In fact, says Singer, the ozone hole may have other causes. It may, for example, be a temporary phenomenon related to cycles of solar activity.

Moreover, he argues, the evidence linking increased exposure to the sun's ultraviolet rays to human illness is suspect. One scientist frightened a U.S. Congressional committee in 1987 by reporting that malignant melanoma (skin cancer) had increased by 100 percent since 1975. True enough. But the scientist neglected to point out, among other things, that skin cancer has been increasing sharply since 1935, long before the ozone hole appeared.

Singer is suspicious of the motives of the scientists, government bureaucrats, and diplomats who are fanning the ozone panic. The scientists get more research grants and public attention; the bureaucrats get more power; the diplomats get more diplomacy." For all involved there is of course travel to pleasant places, good hotels, international fellowship, and more." Until we better understand that science behind ozone depletion, Singer concluded, some controls on CFC production are prudent. But a complete ban would be costly and premature.

From: LWF Mission Notes, Dec. 1989

DO COMPUTERS KILL?

"The Hazards of Electromagnetic Fields: Video-Display Terminals" by Paul Brodeur, in The New Yorker (June 26, 1989), 25 W. 43rd Street, New York. 10036.

Almost one out of every 15 white-collar workers in the USA uses a computer or word processor with a video-display terminal (VDT).

Few of these users know that "they are being exposed to potentially harmful magnetic fields emitted by their machines".

So writes Brodeur, in the last of a three-article series on the hazards of various kinds of electromagnetic radiation.

Complaints about eye problems caused by VDTs began cropping up during the 1970s among the first heavy users of computers - telephone-company operators and newspaper employees. In 1980, matters took an even more serious turn when it was learned that four of seven pregnant women in the classified advertising department of the Toronto Star gave birth to children with birth defects. In May 1981, more reports of birth defects and miscarriages prompted a U.S. Congressional panel to hold hearings. Government and industry specialists reassured the Congressmen that VDTs emit several kinds of radiation, including x-rays, all harmless. In the radio spectrum, they said VDTs radiate in the very low frequency (VLF) range, not known to have any biological effects. The controversy died down.

But clusters of birth defects kept occurring. In October 1982, a Czech emigre biophysicist in Canada, Karel Marha, revealed that VDT's also emit extra low frequency (ELF) radiation, and noted that the East Bloc countries had strict standards for VDT emissions. In Madrid, Dr. Jose M. R. Delgado found that chicken embryos exposed to pulses of ELF radiation, similar to those emitted by VDTs, suffered abnormalities. The experts who testified before Congress in 1981 had lacked

equipment capable of detecting ELF emissions. The U.S. and Canadian press reported none of this.

And so it went on. Every new study pointing to hazards was dismissed by other experts, or in the case of important research sponsored by IBM in 1984, Brodeur contends, was misrepresented by corporate spokesmen. The Reagan administration delayed a government research effort. Newspaper publishers and editors, who employees were among the most often affected, imposed a virtual "black-out" on VDT stories.

That began to change last year, when Kaiser Permanent released a study showing that pregnant women who worked with VDTs for more 20 hours per week were 80 percent more likely to suffer miscarriages than other women. But many in business and government continue to deny that a problem exists, Brodeur says, fearful of the costs and disruptions of remedial efforts.

He believes that a crash program of research is needed to determine if VDTs damage fetuses, eyes, or possibly cause cancer. Preventive measures need to be taken before the findings are in. Not to act now, he says, would make users of the nation's 30 million VDTs "test animals in a long-term biological experiment."

From: LWF Mission Notes

WANTED: A NEW NORTH-SOUTH ETHIC THAT DEMANDS ECOLOGICAL JUSTICE

By Jose Ramos Regidor

Third World liberation movements, the workers' movement, the ecology and peace movements all sprang up as a criticism of the current model of development. The following article calls for a new ethic that would embody both social and ecological justice. Regidor is a Spanish theologian and author. His article first appeared in the international documentation service (IDOC.)

Today it is no longer possible to speak of separate crises because it is slowly dawning on us that they are all profoundly related. Indeed, the most significant contemporary movements that have arisen to challenge specific manifestations of injustice all share the same origin: opposition to the current development model.

From their specific perspectives, the

workers' movement, Third World liberation movements, the peace movement and the environmental movement all critique that model but for different reasons.

The workers' and Third World liberation movement criticize the current model because it is not capable of producing wealth without at the same time exploiting people and marginalizing the great majorities of the world from participation in the very "development" it creates. These movements chronicle the injustice, alienation, dependency, hunger, misery and death the development model brings in its wake.

The peace movement criticizes the model because the production of wealth creates a structure of military-industrial dominance that promotes an arms race now capable of destroying all life on the planet (i.e. the nuclear bomb and chemical and biological weapons). This movement argues that the military-industrial state produces a society dominated by violence and ever-increasing militarization. Under this system, democratic institutions are progressively weakened.

The ecology movement criticizes the development model because it cannot produce wealth without also producing pollution and environmental destruction. Environmentalists charge that, sooner or later, production of pollution will outstrip production of actual wealth, and they warn that if continued it may destroy life on this planet.

It is important to see the common roots of these movements in their criticism of today's development model. Though, historically, they have had a profound mistrust for each other and in some cases have maintained that their movements were antagonistic to each other.

This results from their different histories. Each emerged from very different experiences; from different social and geographical settings, with their own unique struggles based on their own analysis and their own plans for solving the problems.

Yet, the very fact that they all criticize the

present development model holds out hope that they will overcome their historical antagonism. This will demand that each movement overcomes its tendency to become absorbed in its own project. Instead, each must evaluate the significance of the problems being addressed by the other movements in order to discover the connections between the struggle for socioeconomic and political justice on the one hand, and peace and care of the environment on the other. From their own specific cultural perspective and from their own unique experiences, each must help to forge a culture where liberation of the poor majorities is possible. Where peace can flourish and where the earth's resources are cared for and preserved.

Today, the environment is recognized to be as important as peace and justice; the struggle for life and the battle against the principalities and powers of death. In fact, the violence that attacks human life in the form of injustice and oppression is rooted in the same violence that is unleashed against nature attacking the entire biosphere. This creates in its wake an environmental devastation that affects not only the human beings alive today, but endangers the survival of future generations.

The link between these forms of violence is sparking the growing awareness that, besides the right to socioeconomic justice, all humans have the right to ecological justice. This expanded sense of justice allows new insight into wrongdoing, allowing us to speak of the sins of ecocide (destruction of the ecosystem), geocide (devastation of the earth) and biocide (annihilation of the planet's life-systems). This new ethical awareness places these atrocities alongside the sins of homicide, genocide and ethnocide.

This broader definition of justice calls for a heightened awareness of the species-an awareness of the responsibility of the present generation to assure the survival of humanity on earth. This heightened awareness demands that we struggle to end all injustice to individuals and groups, and exacts a commitment to

care for the earth in so that the survival of future generations is guaranteed. Such an awareness will see the close connection between social justice on the one hand and ecological justice on the other.

The German philosopher H. Jones proposed this maximum as a key principle or imperative for a new ecological ethic: Act in a way that the consequences of your actions are compatible with the permanence of human life on earth.

In the new ethic, permanence of life on earth in all its social, cultural and environmental diversity necessarily becomes the principle that guides and structures both private and public behavior. This new imperative calls for the development of a new hierarchy of values, a new praxis and new parameters for acceptable behavior.

Just as insights for the social sciences deepen our commitment to social justice in that they help us to understand the mechanisms of oppression and exploitation and point the way to solutions, so too will the insights of the natural sciences help us to unmask the root causes of environmental destruction. They will also point to new ways of living, producing, consuming, even thinking, not based on the domination of nature by humans and certain individuals, peoples or social sectors by others.

Just as a more profound sense of social justice has led ethicists to speak of social sin, so too will this new sense of ecological justice lead to a sense of and condemnation of ecological sin. This term pinpoints the responsibility of everyone for the environmental degradation that chips away at the permanence of human life on earth, now and in the future.

Ecological sin takes the option for the poor, the central ethical principle of liberation theology, and carries it further by including the earth's future generations, our descendants, who may be forced into a less than dignified life because of our damage to the earth.

The biblical command *Thou shalt not kill*

can thus be extended to include not only individuals and peoples presently living on earth, but also to entire future generations who are now in danger of inheriting a depleted, polluted earth which may not support their existence because of what is being done today by us--their forebears.

Today's ecological crisis is a worldwide phenomenon, although there appears to be more awareness of the problem in the North where the ecological movement originated. Yet, although the South is just as affected by the depletion of the earth's resources, if not more so, it would be wrong to impose Northern ecological categories and analysis on the South. First, because the ecological culture in the North expresses the environmental crisis of a society characterized by a certain well-being, even affluence. As such, it often ignores or dismisses as irrelevant the dimension of social justice that is central focal point of struggle for the South's poor majorities.

Second, because the ecological problem does not reflect the cultural experiences or the history of exploitation of Southern peoples. This has caused many political leaders among the South's indigenous, black and campesino peoples to reject the environmental issue as a "luxury" only for the industrialized countries with the time and money to invest in protecting endangered species of animals, birds, insects and plants. There is, however, a growing awareness and acceptance of the existence of another ecological stance that expresses the connections between environmental degradation and the whole question of social and economic inequality. And that focus is being taken seriously by these leaders in the South.

More and more voices are being raised pointing to the organic link between the destruction of the environment and socioeconomic and political injustice. These voices call for a new language capable of reflecting that link.

This much needed synthesis was nowhere more evident than in the life and death of Francisco "Chico" Mendes, the rubber-

tapper from the Brazilian Amazon, killed in December 1988 by landowners, angry that he organized tribal peoples and fellow rubber-tappers to dispute their claims to the rain forest.

Mendes stood for that synthesis in two ways. First, through the proposal for a land reform in the Amazon that would use the rain forest without destroying it. (just before he was killed, Mendes was instrumental in bringing rubber-tappers and the local indigenous tribes together in an umbrella organization to fight for the survival of the Amazon against further incursion by plantation owners and cattle ranchers.) He insisted that the survival of both groups depended on the survival of the rain-forest and vice versa.

Second, his proposal to establish "strategic reserves" within the Amazon, which would be off-limits to everyone except the native inhabitants and the rubber-tappers who farmed the rain forests ecologically, was one that came from the local people themselves based on their own experience, their own analysis and their own traditional culture.

Mendes and his movement are notable because theirs is one of the few success stories of organized tribal peoples who asserted their right to control over their own destiny--a role denied them throughout the past 500 years, since the conquest of the Americas. It is a contribution by Southern peoples to a new ecological culture that embodies the point of view of the South yet is able to establish a dialogue with the North.

Another central theme emerging from Mendes and the rubber-tappers' struggle is their concept of the land. For indigenous peoples, the land can never be reduced to a commodity to be brought and sold; rather it is a living re-

ality with which one must commune. In this sense, the relationship with the land forms part of the very essence of a people's cultural identity. When the invaders arrived 500 years ago, a process that continues today, they plundered the active inhabitants' lands, taking from them not only their economic basis of survival, but the deepest roots of their cultural identity.

This destruction of the land is thus closely connected to the economic and cultural destruction of America's indigenous peoples. Through the past five centuries of conquest, ethnocide and ecocide went hand in hand.

The rubber-tappers' experience, and especially Mendes' murder, has brought this dimension of exploitation to light on a global level. Chico Mendes lived the synthesis between a Third World culture and language that calls for indigenous and workers' rights, respect for human rights and an end to exploitation by large landowners and the ecological language of the North, and the unifying element in that synthesis is concern for the land.

Today's ecological crisis forces us to recognize that land is a limited resource. But it cannot be the object of unlimited exploitation. Any synthesis in the struggle to protect the environment will have to deal with the centrality of the land question. Only by understanding the relationship between the land and indigenous peoples, the land and settlements of black people, the land and the campesinos will we be able to comprehend the vast transformation that has made land into a commodity. This is at the root of the present-day depletion of resources, environmental devastation and pollution.

From: LWF Mission Notes, Dec. 1989

Health For All by 2000 AD
THROUGH PEOPLE'S ACTION FOR HEALTHY
ENVIRONMENT AND EARTH

A NEW WAY OF THINKING

Using Nature as a Model, Lessons for Politicians

By Evelyn Rossberg

The unusual environmental philosophy of the biochemist and environmental researcher Frederic Vester has stunned the experts and interested the layman. Like no other, the professor from Munich knows how to show complicated global interrelationships in an understandable and convincing way.

Why shouldn't we learn from an enterprise which hasn't gone bankrupt in four million years? This is the question asked by the Munich biochemist, environmental expert and ecologist, Frederic Vester. He finds the answer in the land, in the sea and in the air. For him the Earth itself serves as an ideal technological and management model, it is one huge, highly efficient enterprise.

It cannot be said that we have not proved to be willing pupils of mother nature in the past. With some success we have industriously imitated what we have seen: for example, the form and structure of plants has served as a model for roof design, and certain aspects of communication, for instance, flight orientation and reducing interference, were used by dolphins, bats, mosquitos and other creatures long before man thought of them. However, there is one great difference: nature's biotechnology is considerably better developed and much more energy efficient than anything which man has tried to produce. "How does nature use these technologies?" asks Professor Vester, "how does it manage to make do with so little energy and to continually recycle all its material? For hundreds of thousands of years the material available has consisted of about two billion tons of organic matter and every year about ten per cent of its is converted. How can nature manage to do this without having energy problems and problems of waste? In nature there is no form of absolute

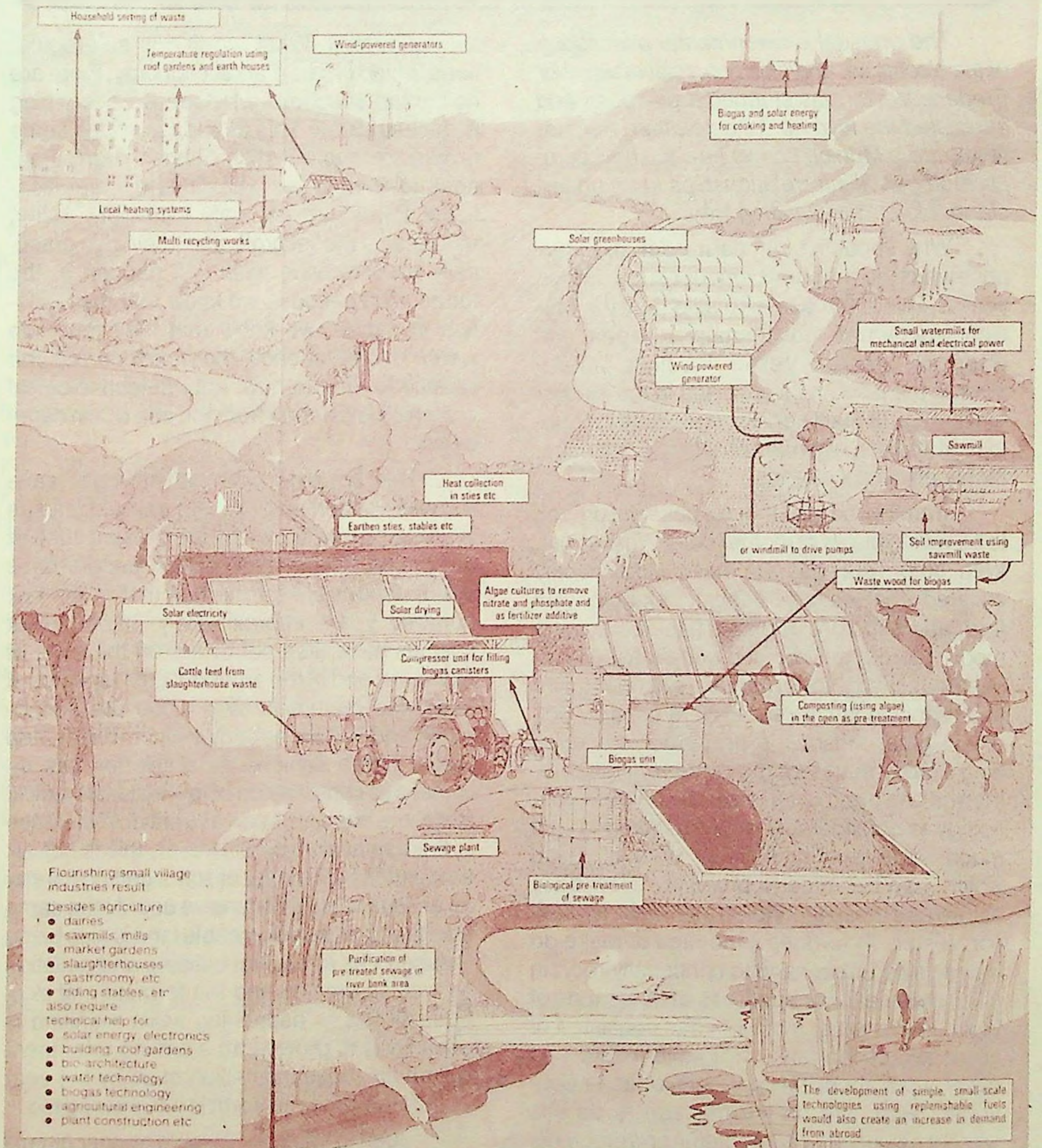
central control. What we find is self-regulations, a kind of free market economy; there are no central structures whatsoever. everything is decentralised. This already provides some answers to the question of how nature manages to function so well. Nature's organisational forms are not only incredibly. Using nature as a model profitable, they also practically predetermine what will happen in the future. And because we know that they function in nature, we know that they really do work! This must show that mankind has the chance to enter a new, natural-technological era which is different from the one which came before."

This, however, will mean having to leave the well-trodden path. Where it would lead us is all too clearly shown by the present state of our planet. Over 4,000 million people have been responsible for the fact that in the last hundred years approximately 30,000 plant species have died out or are on the point of extinction and of the around 12,000 species of birds and mammals over 1,000 are endangered and 200 are already extinct. In the same period homo sapiens as a species has increased its consumption of raw materials tenfold and there has also been a twentyfold increase in the use of energy. However, this is not all: the Earth's fertile layer of soil is getting thinner as a result of highly intensive use. At the same time the total area of useable land is also being reduced - as a result of building and pollution as well as erosion and the formation of deserts. All this is happening while mankind is continuing to grow at an alarming rate: there will be six thousand million of us by the year 2000. However, the Earth is not growing too ...

Seen in this way, it would appear almost suicidal that nature's self-regulatory powers,

The use of new technologies

The use of environmentally less harmful technologies would result in further advantages for man and the environment and would encourage the development of new ideas by farmers



Flourishing small village industries result besides agriculture

- dairies
- sawmills, mills
- market gardens
- slaughterhouses
- gastronomy, etc
- riding stables, etc

also require technical help for

- solar energy, electronics
- building, roof gardens
- bio-architecture
- water technology
- biogas technology
- agricultural engineering
- plant construction etc

The development of simple small scale technologies using replenishable fuels would also create an increase in demand from abroad

The path towards a form of technology which serves nature rather than working against it

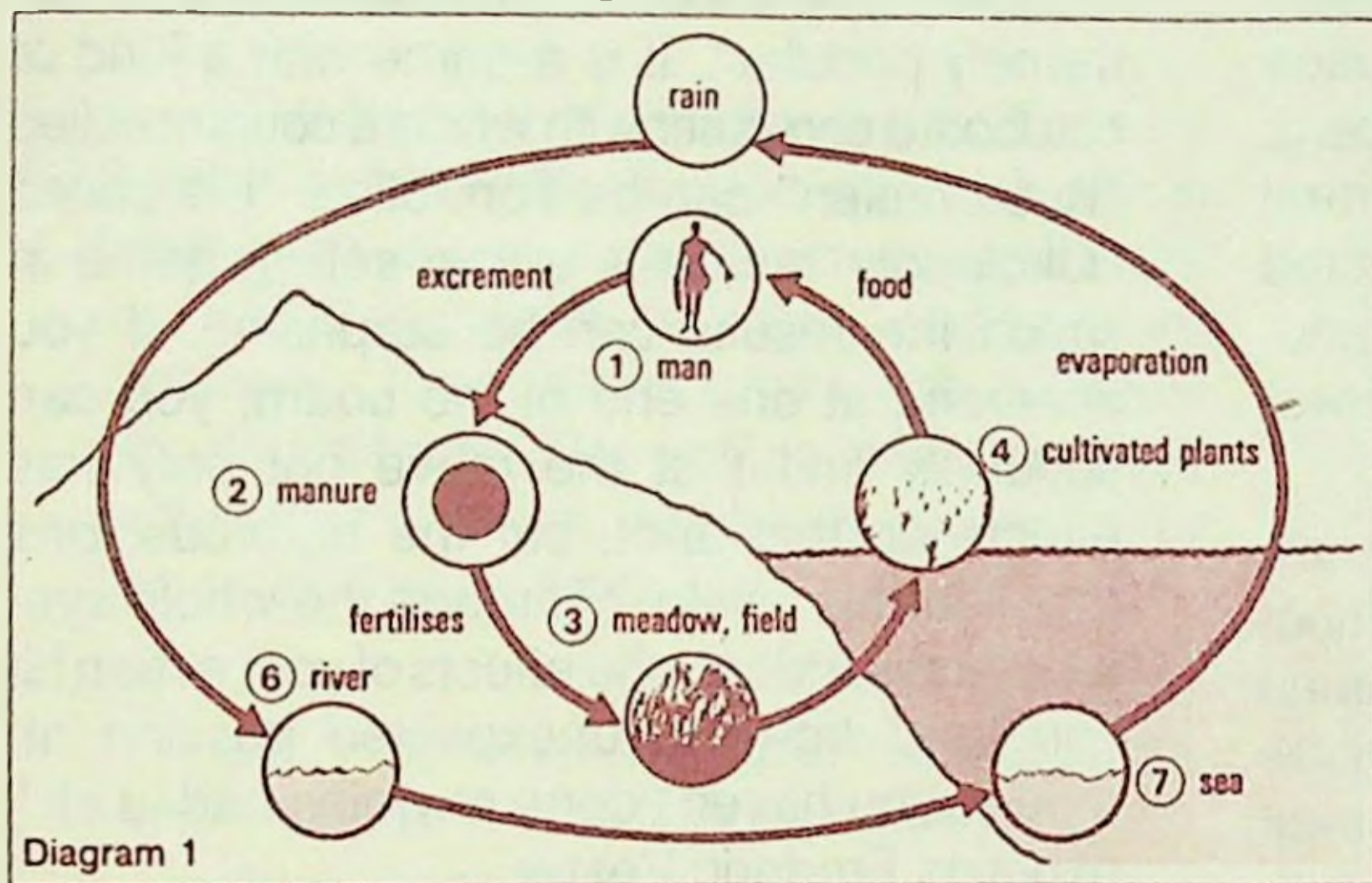


Diagram 1

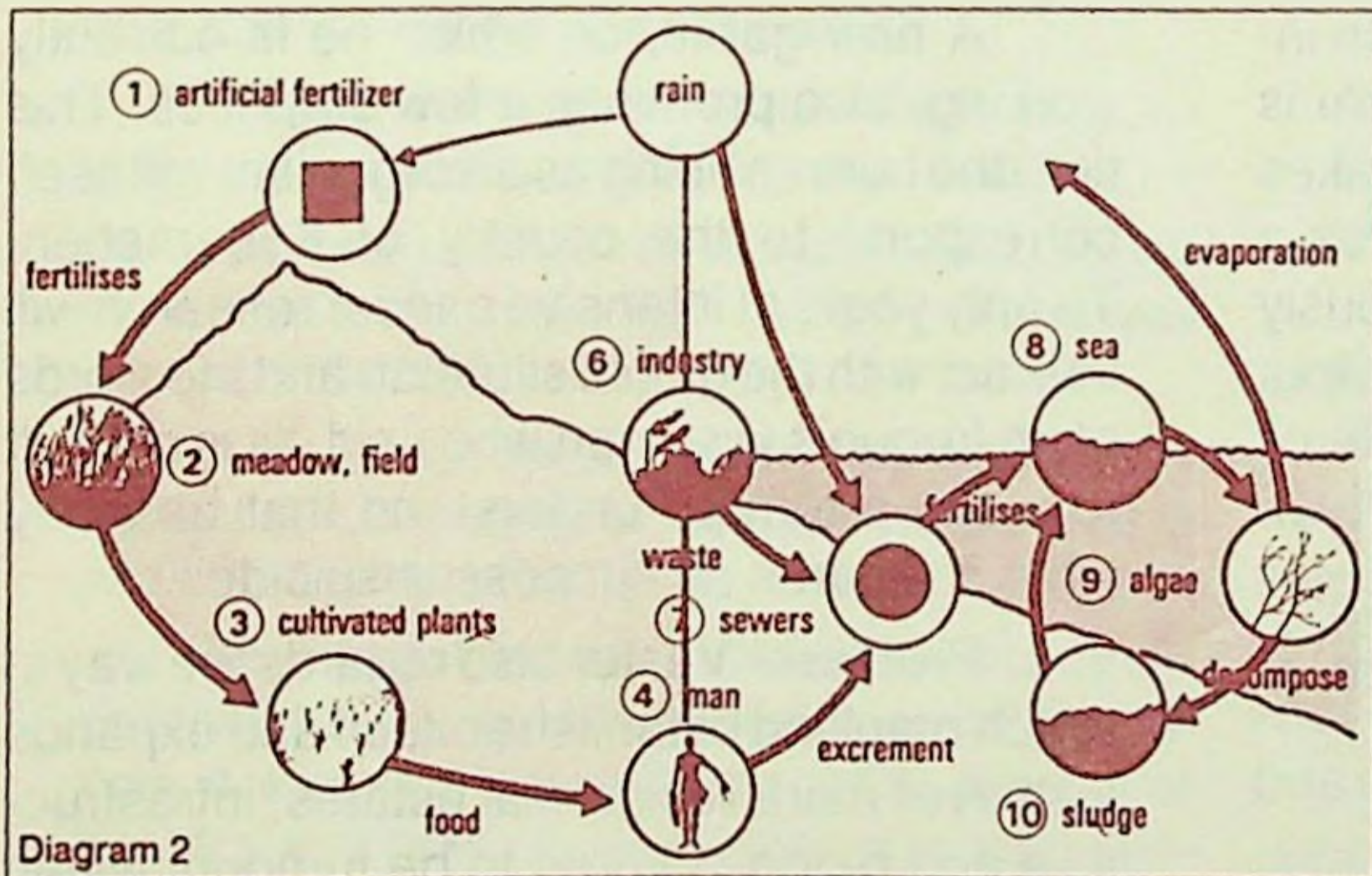


Diagram 2

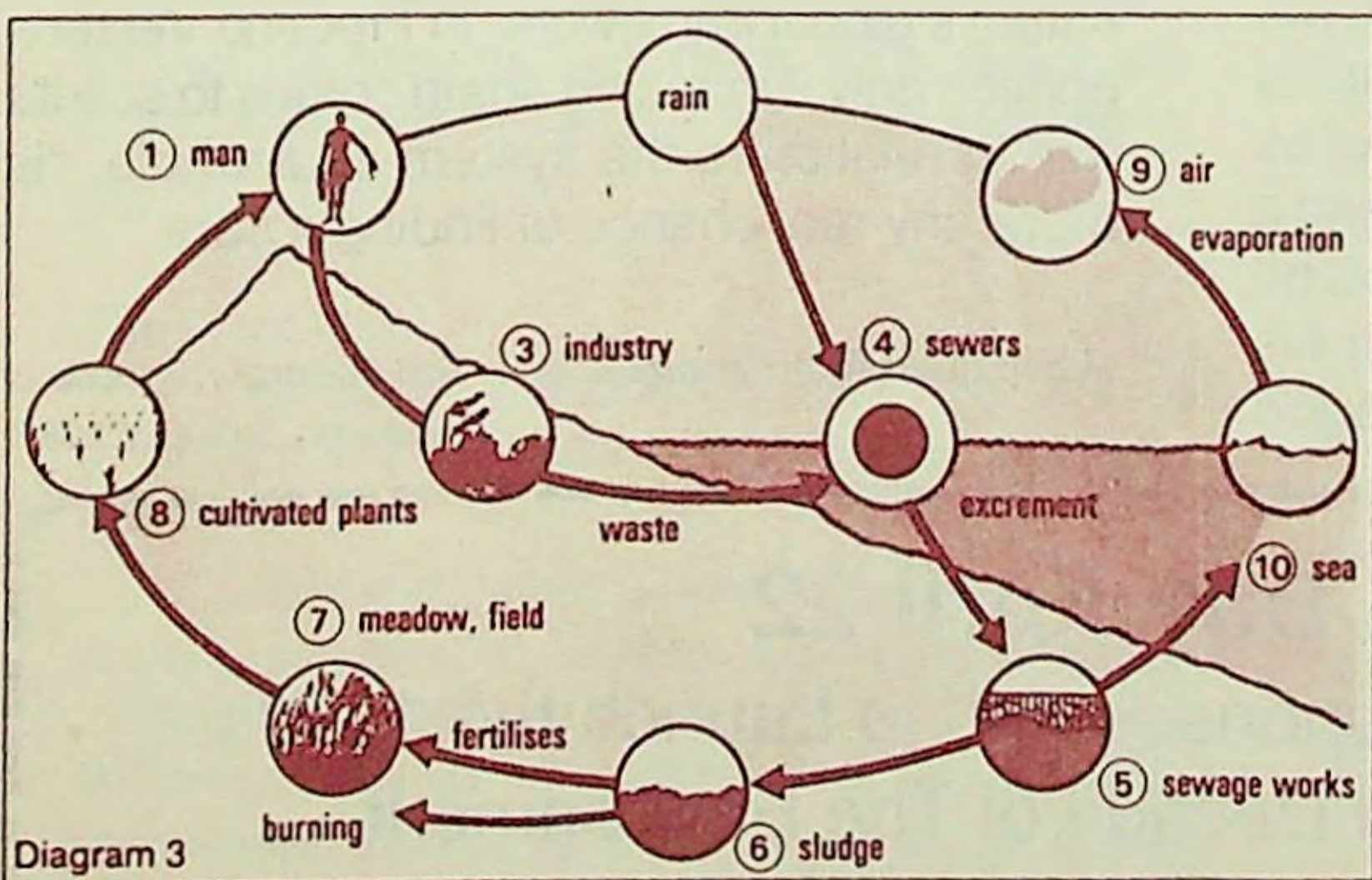


Diagram 3

The natural cycle, above, and nature's equilibrium have been upset by human interference. The excessive use of agricultural fertilizers and industrial waste have changed the situation, centre. A new interactive cycle, below, could be achieved by implementing appropriate measures.

which have functioned for millions of years, were not recognised earlier, researched and sensibly used. However, if this is to become possible in the near future, the main thing required at the present time is a much more widespread awareness of global interrelationships. And this is exactly what Frederic Vester is trying to do. As professor dealing with "the interdependence of technological and social change" at the Federal Armed Forces' University in Munich he instructs tomorrow's decision-makers in "interactive thinking", a method of thinking involving global interrelationships, interactive rules and feedback processes similar to the pattern of nature's biological networks. For years he has also been trying to explain his inter-disciplinary approach to politicians and managers. He also does similar work with his organisation, "Studiengruppe für Biologies and Umwelt GmbH". What is characteristic about Frederic Vester's work is the fact that in preparing a project he goes far beyond the narrow area to be investigated, records the connections with other fields, examines the different repercussions, looks very carefully for complex indirect relationships and then makes them an important part of his project. He juxtaposes the convergent cause-and-effect pattern used in the sciences with his own form of "interactive thinking". Nevertheless, he does not regard himself as a revolutionary. He is an "evolutionary", someone whose thought patterns are simply bound up with elementary life processes - and thus also with his original subject area, biochemistry. For Frederic Vester the key to the future is "a cybernetic form of economy, life and technology". This involves cooperative technology, symbioses and recycling as well as

energy chains and repeated reuse to make later repair and treatment superfluous. Frederic Vester's trial projects in the Federal Republic of Germany and Switzerland now already demonstrate what cybernetic technology could look like. One of these projects is a sewage works in Wiesloch not far from Heidelberg. The sewage works cooperates with eight rural districts. Dung and liquid manure is collected from local farmers by the lorry load. The effluent is transported to the decomposition tower where it is processed into biogas.

Professor Vester is convinced that without intact ecosystems even industry cannot function. His criticism is predominantly aimed at "enormous mono-structures and centralised administrative bodies; it is aimed at their 'throw-away' technology and their dependence on ever increasing production, which inevitably leads to unemployment. Criticism is also valid in relation to their size which makes them too big for individuals to deal with as a unit, and also because of their enormously high input of energy and much too high output of environmental pollution, social problems and stress. These are developments which we do not find resulting from the technologies used by nature." Professor Vester does not regard technology itself to be the problem. Problems are created by its inappropriate scale and its ill-considered use within existing organisational structures. In contrast to many others, for example, he is very far from condemning micro-electronics. It is rather the opposite: as "a basically ecological technology" involving a minimal use of space, energy and materials he is quite prepared to make room for it in his overall plan. For those who find all this too

theoretical. Frederic Vester's form of interactive thinking involving cybernetic systems can also be learnt in the form of a game. In the words of the author the prize-winning and completely new kind of game for adults is "extremely popular". It is a game with a kind of cardboard computer with which a country called "Kybernetien" can be controlled. It is called "Okolopoly" and it is a vest-selling game in which the results can be surprising. If you intervene at one end of the board, you can suddenly find that the move not only has effects on that spot, but the repercussions travel further afield. "Through the whole system! And suddenly the effects of your action hit you hard from an unexpected position although you haven't done anything bad at all," explains Frederic Vester.

A new game, on which he is currently working, also promises a few surprises. This time the human being as an organism will itself correspond to the country of Kybernetien. Twenty years of intensive cancer research will interact with the global situation and the words of an Iroquois wiseman who said, "it is difficult to make a tumour understand that basically what it regards as success is suicide."

Professor Vester also regards the way in which mankind establishes itself and expands with ever more residential estates, infrastructure and mono-cultures to be tumours within nature's global framework. In Frederic Vester's opinion only if mankind again comes to see its role in relation to the system as a whole, "is there any real chance of finding a cure."

From: SCALA, A Periodical from The Federal Republic of Germany, Sep-Oct 1987.

Earth Day April 22

To Promote Heroic Responses and to Launch the 1990s
As an International Decade of The Environment

Environment Day June 5

Radiation: Benefit vs. Risk

by Valorie A. Britain

The benefits of radiation are for the most part taken for granted by society. Radiation is being used at increasing rates to provide more and better products, services, and conveniences. But there is much that we do not know about radiation. This article explains what radiation is and how it holds the potential for risk as well as benefit.

Every day, each of us make numerous decisions involving the benefit-risk principle.

Does a benefit derived from driving a car outweigh the danger of an accident?

Does the risk of a financial loss from an investment exceed the possibility of a profit?

Do the economic benefits of a new factory in a community outweigh the possible health hazards from air pollution?

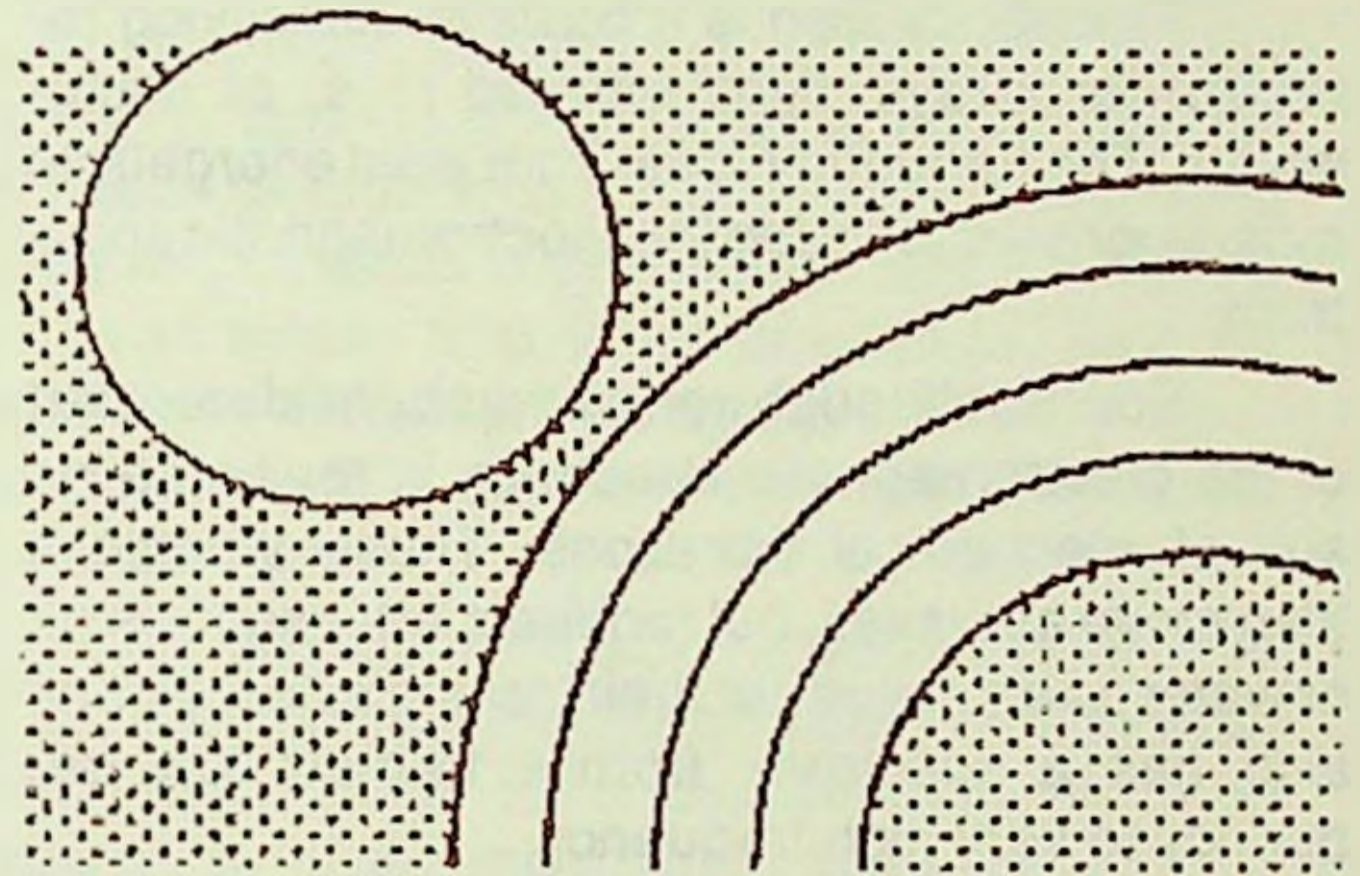
Throughout life we constantly weigh benefit against risk and strive to increase the balance in favour of the benefits.

To understand how FDA carried out its responsibilities in regulating radiation-emitting products, it is important to understand this concept of benefits and risks. As with other products regulated by FDA, radiation-emitting devices must perform so that the benefits from them will outweigh the risks. FDA's job is to do everything possible to minimize these risks.

The Benefits

The benefits associated with the use of machines and materials which produce radiation are many:

Medical diagnosis and therapy: The lives of many thousands of persons are saved or made longer, and better health is assured for additional millions each year, through medical and scientific techniques which use a variety of radiation-producing machines and radioactive materials to detect and treat diseases. These radiation-producing machines include x-ray, diathermy, ultrasonic, laser, and ultraviolet equipment.



Research: Radioactive isotopes and lasers, for example, are valuable research tools. These and many other radiation sources have led to important scientific advances in medicine, agriculture, and industry. Even greater advances are sure to come.

Communications: Microwave radiation in a particular has enabled advances in communications that allow for the rapid transmission of information throughout the United States and the world. Television and radio transmitters and radar equipment are examples of communications systems that are dependent on microwave energy. Lasers also are making contributions in the field of communications.

Atomic power: Nuclear reactors have become sources of power for industry, homes, farms, and transportation systems. Many other useful applications of nuclear energy are being developed.

Household conveniences: The light bulb, fast-cooking microwave oven, and ultrasonic cleaner are examples of radiation at work to provide home conveniences. Although the light bulb has been around for many years and is hardly thought of as a radiation source, the microwave oven and ultrasonic cleaner are relatively new items which utilize the potential that radiation offers.

What is Radiation?

Explaining the hazards of radiation is a far more difficult task than describing its benefits. As a starting point, the term radiation should be defined.

Radiation is energy moving through space as invisible waves. The frequency of these waves--that is, the number of waves per second--helps to determine radiation characteristics and how radiation can affect people.

Frequency also is a basis of classifying radiation as x rays, light, infrared rays, or microwaves. The frequency scale from least energetic to most energetic is called the electromagnetic spectrum.

Sound, although sometimes considered part of the electromagnetic spectrum, is really the result of mechanical vibrations. These vibrations also move as waves, but require matter such as air or water as a medium for their transmission. Sound also has a spectrum, from extremely low frequency to very high frequency.

There are two principle categories of radiation--*ionizing* and *nonionizing*. Ionizing radiation such as x ray has the ability to strip electrons from atoms, creating electrically charged ions capable of disrupting life processes. Nonionizing radiation lacks the ability to create ions, but may disrupt body processes through other mechanisms. Microwaves, light, and sound are classified as nonionizing radiation.

Most of what is known today about the effects of radiation on humans is the result of exposures to large amounts of radiation--some harmful such as a burn from a sunlamp, and some helpful such as the destruction of cancerous cells during radiation therapy. Not as much is known about the effects of small amounts of radiation, such as those to which everyone is subjected--natural background radiation and emissions from radio transmitters, for example. In particular, we do not know definitely whether there is an amount of radiation below which injurious effects will not occur.

Adverse health effects on people from exposure to *ionizing* radiation are believed to have a direct relationship to the amount of radiation received. Experts believe that any level of ionizing radiation has a potential for causing some biological damage. That is to say, there is no known amount of ionizing radiation below which it can be said that an adverse health effect may not occur. Therefore, it is prudent for those responsible for protecting public health to assume that even small amounts of radiation present some risk of injury.

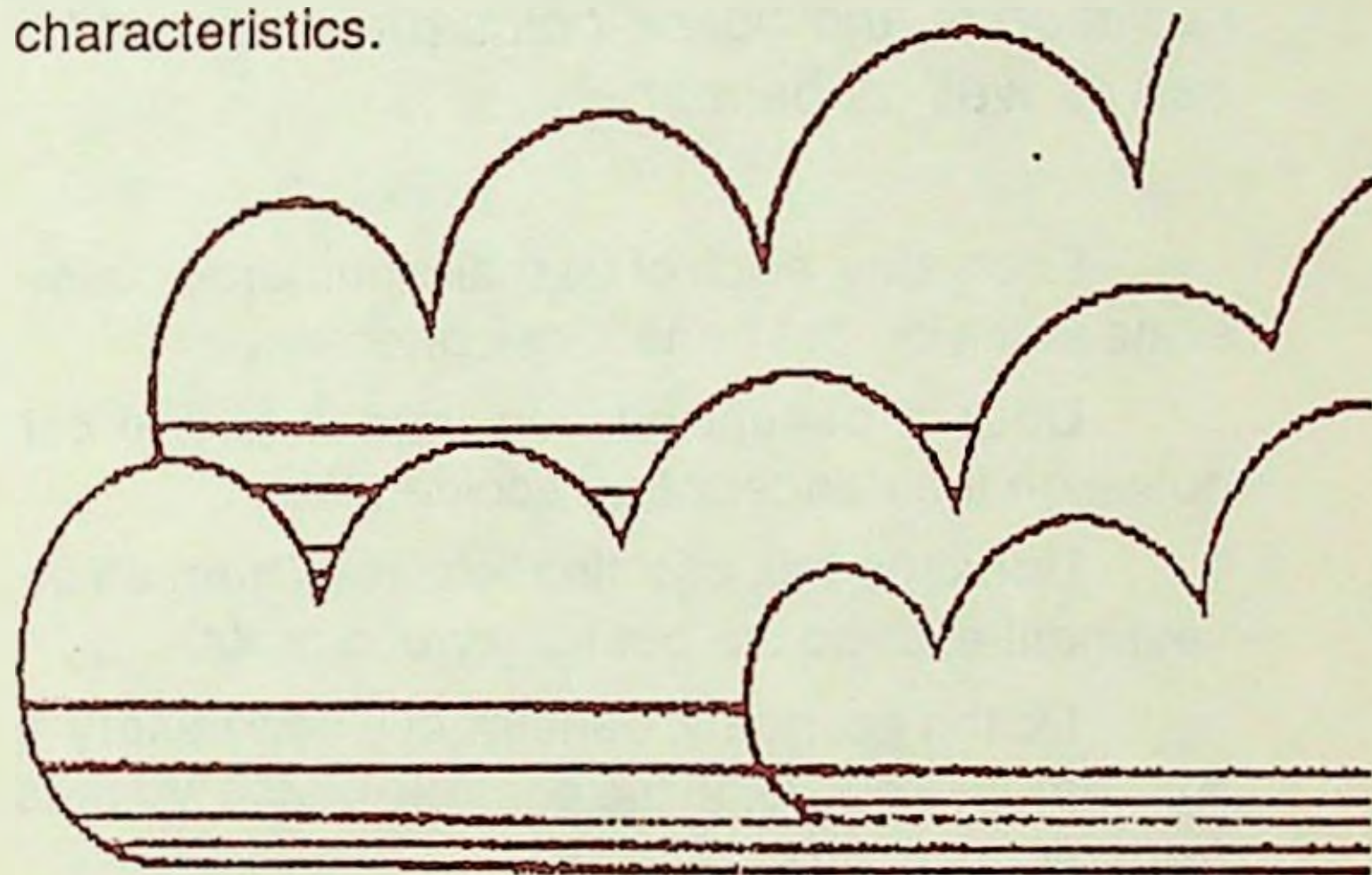
In the case of *nonionizing* radiation, the

relationship between amount and effect is not known. There is not yet clear agreement as to whether a threshold exists below which no harmful effects can be either produced or expected.

The effects of radiation are categorized as either somatic or hereditary.

Somatic effects directly affect the health of the person exposed to radiation.

Hereditary effects occur in the genes of reproductive cells of the exposed individual, and may harm the health of future offspring. Genes are the "biological blueprints" that determine inherited characteristics.



Somatic effects may appear soon after radiation exposure or many years later. They may appear after acute exposure--radiation delivered in a short period of time--or after chronic exposure--radiation received frequently or continuously over long periods of time.

The short-term effects of acute, high-level ionizing radiation exposure are well known, having been studied in humans and experimental animals. These may include nausea, fatigue, blood disorders, intestinal problems, a temporary loss of hair, and skin burns. At high enough doses, even death can occur.

From the standpoint of public health significance, possible long-term effects of low-level radiation on large populations is cause for concern. However, relationships between exposure and long-term effects are difficult to establish, partly because the effects are similar to those of diseases which may not be radiation related, and partly because the effects may not appear until years after exposure.

As regards nonionizing radiation, we have some information on short-term acute effects and long-term chronic effects. For example, acute ef-

fects on the skin and eye, primarily burns, have been observed from exposures to all types of nonionizing radiation. Under certain circumstances, microwaves have been associated with the production of cataracts and temporary sterility. Some central nervous system effects have been reported to result from exposure to microwaves. In other areas, chronic exposure to ultraviolet light has long been associated with the production of skin cancer. Tissue destruction and interference with nerve impulse transmission are among reported effects of ultrasound. Loss of hearing is a well-documented effect of intense sound.

How Radiation Affects People?

Although scientists do not completely understand how radiation interacts with living things, most agree that radiation acts primarily on the cells in the body and on the complex chemical processes occurring in them.

The cells of the human body are highly specialized, each with a predetermined task to perform. Like other harmful agents, radiation can disturb the balance in a cell so it can no longer perform its function. If enough cells are affected, processes of the entire body may be disrupted. If radiation harms the reproductive cells, this damage may be passed on to future generations.

The human body is able to repair some radiation damage to cells and cell processes. However, many scientists believe that radiation-injury repair is never complete, and that some cell damage always remains. If cells are subjected to constant or repeated radiation, damage may accumulate and cause disease.

Radiation acts differently on different people. A wide variation in sensitivity to radiation exists among individuals, organs, and even cells.

The way in which radiation is applied is another factor in determining biological damage. The most important aspects are (1) the kind of radiation, (2) the amount of radiation, and (3) the specific parts of the body exposed.

Each of these factors must be considered

before possible biological effects can be estimated. Even then, the effects of exposure to radiation on the eventual well-being of an individual may be impossible to predict.

The *kind of radiation* to which a person is exposed--whether ionizing or nonionizing or, within these categories, whether x or gamma rays, microwaves, or light--is a key factor in assessing the chance of biological harm. This may be illustrated by the various kinds of eye damage which radiation has been shown to produce in animals. Animals exposed to microwaves may develop early cataracts. Exposure to certain energy light may cause retinal damage.

The *amount of radiation* absorbed or taken in by the body is most important in determining what effects it will have on the body. Generally, the more radiation received, the greater the effect.

In addition, a given quantity of radiation may produce less of an effect if divided into a number of smaller amounts administered over a long period of time, than if it were given in a single exposure. This is usually because of the cell's ability to repair itself.

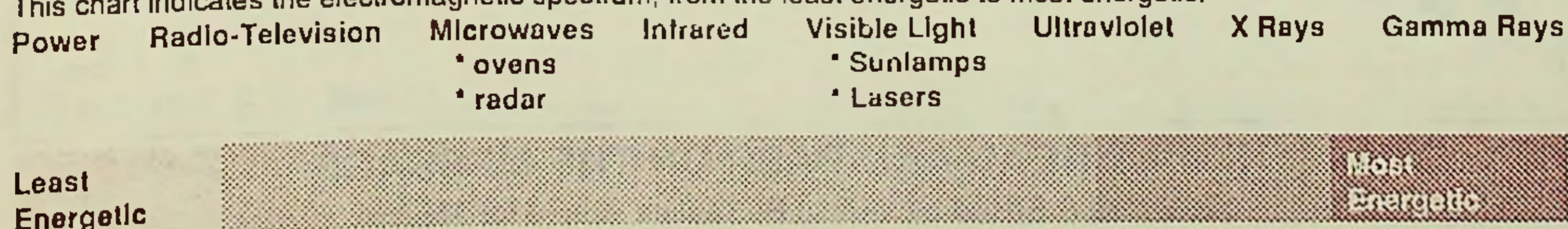
The *portion of the body* irradiated, in terms of both area and location, is an important factor in evaluating the possibility of a biological effect. In general, the larger the body exposed, the greater the probability of overall damage to the organism. The location of the irradiated part is also important.

In the same individual, a wide variation in susceptibility to radiation damage exists among different types of cells and tissues. In general, rapidly dividing cells appear to be more sensitive than nondividing cells, and nondifferentiated cells appear to be more sensitive than highly specialized cells.

Consumer Protection

In 1968, Congress enacted the Radiation Control for Health and Safety Act to protect consumers from the hazards of radiation-producing electronic products. Under the Act, the Food and Drug Administration's Bureau of Radiological Health

This chart indicates the electromagnetic spectrum, from the least energetic to most energetic.



conducts an electronic product radiation control program to assess the biological effects resulting from all types of radiation exposure, evaluate radiation emissions from electronic products and conduct research to minimize exposure, and set and enforce radiation safety performance standards.

In conjunction with its regulatory efforts, the Bureau carried out specialized programs to reduce unnecessary patient exposure during diagnostic x-ray examinations and nuclear medicine procedures by encouraging improved practices among health practitioners and ancillary personnel and by developing new techniques. It also conducts a limited radioactive materials control program for materials not under the jurisdiction of the Atomic Energy Commission.

The Bureau makes continual checks to assure that its efforts are such that the potential of radiation for service to humankind can be realized with a minimum risk of harm. As new radiation-producing electronic products are developed, FDA will see to it that they too are safe for consumer use.

The Atomic Energy Commission controls the use of certain radioactive materials and nuclear power production. The Environmental Protection Agency is, in general, responsible for environmental radiological health protection.

Great strides are being made to reduce the exposure of the public to unnecessary radiation.

Valorie A. Britain is a technical writer in FDA's Bureau of Radiological Health.

Safe Use of Medical X Rays

Many people associate any mention of radiation with x rays taken by their physician or dentist. This is not surprising when one realizes that an estimated 130 million people undergo some kind of x-ray examination each year in this country. This represents over 90 percent of the U.S. population's exposure to man-made radiation.

However, some x-ray examinations are unnecessary and can be avoided. To make sure you receive an x-ray only when necessary:

- * Don't decide on your own to have an x-ray examination such as at a mobile unit for detecting tuberculosis. FDA opposes the continued use of TB x-ray screening programs because there are safer and more effective means to diagnose TB, and because the mobile x-ray units used often expose patients to more radiation than is necessary.

- * Don't insist on an x-ray when you visit your doctor or dentist. Let him be the judge of whether you need one. A doctor or dentist, to satisfy your insistence, may comply with your request for an x-ray examination, even when he doesn't think you need one.

- * Tell your doctor and dentist about previous x-rays. They may be able to obtain and use them. There are times, however, such as before surgery or during treatment, when a practitioner may need new x-rays even though others have been taken recently.

- * Women who are pregnant or who think they could be pregnant should tell their physicians. Radiation may affect the fetus, and knowledge of possible pregnancy may affect the doctor's decision as to whether to use x-rays or not. However, if your doctor says you need an x-ray, even though you're pregnant, have it taken.

- * In the case of males of reproductive age or younger, including children, the physician or x-ray technician should be asked about the possibility of protecting the reproductive organs with a special lead shield for x-ray examinations that might expose the reproductive organs to the direct beam. Such examinations usually involve the lower abdomen, lower back, or hip areas. (Protecting the reproductive organs of the female patient is technically far more difficult and is often impossible because covering part of the abdomen with lead shielding can obscure needed diagnostic information on the x-ray film.)

From:
CONSUMER, Sept. 1981

KINDLY READ AND PASS ON THE MESSAGE

Collected & Edited by: Mrs. J.P. Saullna Arnold for TNVHA

THE EARTH IS PRECIOUS

In 1884, the "Great White Chief" in Washington made an offer for a large area of Indian land and promised a "reservation" for the Indian people. Chief Seattle's reply, published here in full, has been described as the most beautiful and profound statement on the environment ever made.

How can you buy or sell the sky, the warmth of the Land?
The idea is strange to us.

If we do not own the freshness of the air and the sparkle of the water, how can you buy them?

Every part of this Earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing and humming insect, is holy in the memory and experience of my people.

The sap which courses throughout the trees carries the memories of the red man.

The white man's dead forget the country of their birth when they go to walk among the stars. Our dead never forget this beautiful Earth, for it is the mother of the red man.

We are part of the Earth and it is part of us.

The perfumed flowers are our sisters; the deer, the horse, the great eagle, these are our brothers.

The rocky crests, the juices in the meadows, the body heat on the pony, and man - all belong to the same Family.

So when the Great Chief in Washington sends word that he wishes to buy our land, he asks much of us.

The Great Chief sends word he will reserve us a place so that we can live comfortably to ourselves.

He will be our father and we will be his children. So we will consider your offer to buy our land.

But it will not be easy. For this land is sacred to us.

This shining water that moves in the streams and rivers is not just water but the blood of our ancestors.

If we sell you land, you must remember that it is sacred, and you must teach your children that it is sacred and that each ghostly reflection in the clear water of the lakes tells of events and memories in the life of my people.

The water's murmur is the voice of my father's father.

The rivers are our brothers, they quench our thirst. The rivers carry our canoes, and feed our children. If we sell you our land, you must remember, and teach your children, that the rivers are our brothers, and yours, and you must henceforth give the rivers the kindness you would give any brother.

We know that the white man does not understand our ways. One portion of land is the same to him as the next, for he is a stranger who comes in the night and takes from the land whatever he needs.

The Earth is not his brother, but his enemy, and when he has conquered it, he moves on. He leaves his father's graves behind, and he does not care.

He kidnaps the Earth from his children and he does not care.

His fathers' grave, and his children's birthright, are forgotten. He treats his mother, the Earth, and his brother, the sky, as things to be bought, plundered, sold like sheep or bright beads. His appetite will devour the Earth and leave behind only a desert.

I do not know. Our ways are different from your ways.

The sight of your cities pains the eyes of the red man.

But perhaps it is because the red man is a savage and does not understand.

There is no quiet place in the white man's cities. No place to hear the unfurling of leaves in spring, the rustle of an insect's wings.

But perhaps it is because I am a savage and do not understand.

The clatter only seems to insult the ears. And what is there to life if a man cannot hear the lonely cry of the whippoorwill or the arguments of the frogs around a pond at night? I am a red man and do not understand. The Indian prefers the soft sound of the wind darting over the face of a pond, and the smell of the wind itself, cleaned by a midday rain, or scented with the pinon pine.

The air is precious to the red man, for all things share the same breath - the beast, the tree, the man, they all share the same breath.

The white man does not seem to notice the air he breathes. Like a man dying for many days, he is numb to the stench.

But if we sell you our land, you must remember that the air is precious to us, that the air shares its spirit with all the Life it supports.

The wind that gave our grandfather his first breath also receives his last sigh.

And if we sell you our land, you must keep it apart and sacred, as a place where even the white man can go to taste the wind that is sweetened by the meadow's flowers.

So we will consider your offer to buy our land. If we decide to accept, I will make one condition: the white man must treat the beast of this land as his brothers.

I am a savage and do not understand any other way.

I have seen a thousand rotting buffaloes on the prairie, left by the white man who shot them from a passing train.

I am a savage and I do not understand how the smoking iron horse can be more important than the buffalo that we kill only to stay alive.

What is man without the beasts? If all the beasts were gone, man would die from a great loneliness of spirit.

For whatever happens to the beasts, soon happens to man. All things are connected.

You must teach your children that the ground beneath their feet is the ashes of you grandfathers. So that they will respect the land, tell your children that the earth is rich with the lives of our kin.

Teach your children what we have taught our children, that the earth is our mother.

Whatever befalls the Earth befalls the sons of the Earth. If men spit upon the ground, they spit upon themselves.

This we know: The earth does not belong to man; man belongs to the earth. This we know.

All things are connected.

Whatever befalls the earth befalls the sons of the earth. Man did not weave the web of life; he is merely a strand in it. Whatever he does to the web, he does to himself.

Even the white man, whose God walks and talks with him as friend to friend, cannot be except from the common destiny.

We may be brothers after all. We shall see.

One thing we know, which the white man may one day discover - our God is the same God. You may think now that you own Him as you wish to own our land; but you cannot. He is the God of man, and his compassion is equal for the red man and white.

This Earth is precious to Him, and to harm the Earth is to heap contempt on its Creator.

The whites too, shall pass; perhaps sooner than all the other tribes.

Contaminate your bed, and you will one night suffocate in your own waste.

But in you perishing, you will shine brightly, fired by the strength of the God who brought you to this land and for some special purpose gave you dominion over this land and over the red man.

That destiny is a mystery to us, for we do not understand when the buffalo are all slaughtered, the wild horses are tamed, the secret corners of the forest heavy with scent of many men, and the view of the ripe hills blotted by talking wires.

Where is the thicket? Gone.

Where is the eagle? Gone.

The end of living and beginning of survival.

STRATEGIES FOR ENVIRONMENTAL HEALTH ACTION.

A note for discussion at the MFC mid-annual Meet, Patiala
25-29 July, 1985.

DHRUV MANKAD

A) INTRODUCTION

Environmental Health is a term having a wide scope, encompassing the relationship between health and habitat, air, water, work place and so on.

Although the theme has been discussed since long, the Bhopal tragedy has brought it into sharp focus. Milder versions of Bhopal have been occurring frequently but the actions taken have been in the form of spontaneous protests by local people in the affected area. Many times, investigative journalists have brought such issues to light e.g. plight of villagers around ACC cement factory at Sevaliya in Gujarat or the Grasim episode. Later, after some local action, interest has died down. It is only after Bhopal that a planned action at all India level is taking place.

There was a time when the capitalistic industrial development encroached upon the lives of the workers only - both at the workplace and in the homes which were not very far away from the factories. But the ever expanding, blind industrial development during the present phase of capitalism, has spread its tentacles over the lives of all but the highly privileged few, both in Urban as well as rural areas. Thus Occupational health has been subsumed by Environmental Health and the effects of the nature of industrial development on health is no longer a concern of the workers only. Though, the analysis of the problem and the solutions offered, would differ from class to class. But, any such movement would certainly pose certain basic questions regarding the rate and the nature of present industrial growth.

B) STRATEGIES ADOPTED BY THE PEOPLE

People have always reacted spontaneously against encroachments by alien elements on their ways of life. A brief overview of strategies used may help in formulating future strategies.

1) The working class, looked upon as merely a tool in the production process, has always been the first one to bear the brunt of the effects of a new technology.

i) One of the most successful health movement of workers was the Black lung movement of coal miners of the USA. Loy Rego, writing in SHR 1:3 puts down the reasons for its success as -

- a) the workers' strength vis-a-vis the mine owners for coal is a key item.
- b) public sympathy.
- c) capacity of the workers to shut down mines.

All this was possible because of the mass nature of the movement as reflected by the fact that many folk songs were written on the work lines.

ii) Even when the position of the working class was weak, partially successful actions have been initiated. For instance, a newspaper report in a local daily in Gujarat regarding the plight of workers in slate-pencil industry spurred a social worker to file a writ petition in the Gujarat High Court. The report filed by the Committee appointed by the HC forced the State Labour Department to make surprise checks which controlled some of the problems of lime dust.

2) Growth of industries in the rural areas under the guise of decentralization has meant a direct threat to the rural people as well as to the agriculture. Farmers too, have successfully fought this encroachment.

i) In Sevaliya in Gujarat, around 14,000 farmers were affected by cement dust from the ACC cement Factory. After several years of memoranda-giving and lobbying, adopted a strategy of no-tax campaign and they gheraoed the management of the factory. As a result, a precipitator was immediately installed. The workers of the factory were sympathetic to the farmer's demands but were afraid that they would lose their jobs if they joined the struggle and therefore kept out of it.

ii) The famous case of Chipko Movement of Garhwal is well known. The women of Chamoli and other villages in Garhwal, in a unique fashion, protested against senseless destruction of forests by Contractors by embracing the trees. But in lesser known incidents, the women have adopted novel ways to protest against cutting of trees. In 1978, women of Bhuyander village in the Chamoli region, stole the axes of men from nearby villages who had come to cut the trees and refused to return till they agreed to go back.

3) As pointed out earlier, the anarchic capitalist development of industries now, threaten to destroy the lives of ordinary citizens, mainly of those living in and around cities.

Citizens too, have adopted various strategies to combat this menace.

i) A Citizens Anti Pollution Committee was formed in 1975 in Goa against the air and water pollution by Zuari Agro Chemical Industries. It took out a morcha in protest but to no avail. Later, three political parties supported the Committee and a threat was given by the All India Port and Dock Workers' Federation to boycott unloading

of raw materials for the Birla factories at various ports. The company had to bow down and it paid compensation to farmers and provided clean drinking water facilities to the affected villages. A water treatment plant was also installed.

ii) At Mavoor in Kerala, Gwalior Rayon discharged effluents into the once clear Chaliyar River, beginning from 1948. Fish died, skin infections spread. In 1963 people protested but promises given then were forgotten. The protests persisted during 1965, 1967, 1968, and 1973. Finally in 1978-79, Kerala Shastriya Sahitya Parishad brought out a report which concluded that the problem persisted because of the callousness of the factory management to employ the available know how of effluent treatment. In 1979, in a massive agitation, people broke down a Company erected bund to protect its own water intake. Thus, it was forced to lay a pipe line to dump the effluent in a far away brackish water-stretch.

iii) Citizens of Ward 12 in Ratlam had moved a local trial court to direct the Municipal Council to construct proper drainage for the locality. ^{When} The State High Court affirmed the trial court's order, the Municipal Council approached the Supreme Court. It turned down the plea and directed the Council to carry out the work. In his judgement, Justice V.R. Krishna Iyer observed that the citizens could "use the law and call the bluff of the municipal body's bovine indifference to its basic obligations."

C) ALL THESE INSTANCES SHOW A CERTAIN COMMON PATTERNS :

1) Mass actions are almost always successful, even when only partially. They also have the advantage of the heightened environmental health concern being passed down the generations and across geographical areas as evinced by the Black Lung Movement and The Chipko Movement.

2) Actions against industries by the citizens are more likely to succeed if the workers of the industry concerned as well as other allied industries are directly involved. This is shown in the case of Zuari Agro Chemicals. On the other hand, workers are more likely to succeed in their struggle for better work environment if they acquire the sympathetic participation of all the affected people as is seen in the Black Lung Movement.

3) While dealing with Government bureaucracy and industry executives, mere rhetoric and agitation is not adequate. Sometimes information made public wields power. For this it becomes important that scientists are involved.

4) An educated population having the support of scientific information might be able to carry out a sustained struggle for better environment as is seen in the case of Gwalior Rayon, Mavoor. In

In contrast to this in another Birla owned factory at Amlai the movement of local villagers only petered out after the management gave some flimsy promises. In the former case, the people admit that support of KSSP was vital for the movement.

5) Women have a direct stake in protection of forests. They are ^{more} easily mobilised for such actions, than ^{are} men, who sometime are in favour of contractors in order to protect their jobs. Chipko and other movements in Chamoli region points to such a situation.

D) From the ongoing account, it is clear that it is possible to select one or more from several strategies used, to make an Environmental Health Action sustainable and successful.

1) Information Gathering and Disseminating : Does in a planned, conscious manner or in an unplanned, unconscious and experiential manner, this is the first and a vital step in the right direction. It helps to make people concerned conscious of the problem and breaks the ice for the people to speak out.

2) Lobbying etc :- First, lobbying could also serve the above purpose. Moreover the existing democratic institutions should be utilised. ^{to make an impact on the problem.} Lobbying of legislators, and political parties is a useful strategy for gaining support from 'within'. Although there is always the possibility of opportunist politics entering the movement in this way, but if one guards against it consciously and if the decision making is democratic enough, it could be combated.

3) Publicity and Public opinion building.

Due to widespread experience of environmental piracy by various industries, people are becoming sensitive to environmental issue. So are the Government bodies, bureaucracy and the executive. Wide publicity in the existing media-news-papers and magazines has its impact. With the tradition of public interest litigations picking up in our judicial process, even newspaper reports are now being converted into writ (Petitions by various High Courts and the Supreme Court.

4) Legal Actions :- Actions can be initiated against environmental offenders under the Prevention of Pollution Acts, Factories Acts and other acts governing the worker management relationships, 'Municipalities Acts (as in Ratlam case) and finally as writ petitions in the State High Courts and the Supreme Court invoking the Fundamental Rights and the Directive Principles enshrined in our Constitution. Though the efficacy of such actions is limited, but if nothing else, they serve the purpose of ..

highlighting the issue. This strategy is particularly useful for citizen's actions and workers of unorganised section of workers having little strength vis-a-vis the industry and the State.

5) Direct Actions : Whether the aggrieved are workers, farmers, or ordinary citizens, men or women, this form of protest works best if properly organised and properly carried out. The success depends upon the strength and ability of the aggrieved to be able to hit the concerned at the place where it hurts most. It could take the form of a strike action in a key industry (as in Black Lung Movement) prevention of movement of key raw materials and finished products. (as it happened in Gwalior Rayon case.) No tax campaigns (as in ACC Sevaliya case) or simply creating a bad image of the offending industry's high selling product.

6) Certain Problem Areas : While surveying the environmental 'ill health' and actions against it, one comes against certain tangles defying pat solutions :

1) It is commonly observed that if aggrieved citizens plan actions against an offending industry, the workers and their T.U.s are either disinterested or actively against such movements for the fear of losing jobs, in case the industry is forced to close down.

In such a case, it is imperative on the part of the aggrieved party to explain to the workers their problems and also to include in their demands, the demands of compensation and alternative employment for the workers in case the industry is closed down partially or wholly. This may ensure at the involvement of the workers.

2) It is a common belief that lack of safety measures, non-implementation of safety rules and compensation laws in case of accidents or occupational health hazard are highly prevalent in the unorganised industries. Under the guise of decentralization this sector has mushroomed during the past few years. But, given its nature, the workers have little strength to fight it. They can do so only at the risk of unemployment or even losing their lives.

→ While the stonger, more organised workers enjoy a better work environment.

i) First, one needs to examine this belief.

a) Mine workers would be considered as organised workers. A survey of 11 coal mines totalling 9643 workers showed the prevalence rate of all categories of pneumoconiosis as 10.8%. A survey of 7,653 underground miners with 5 or more years of service in the Kolar C Gold fields revealed the incidence of silicosis to be as high as 43.8%.

b) Accident rate in Coal mines during 1977 was 0.47 fatal accident and 4.33 seriously injured persons per 1000 persons employed. Textile workers are also an organised section of working class. Injuries reported for 1978 in textile factories were 54.32% of total reported injuries in the industries during the year. While it employs on an average 26.62% of total no. of workers employed.

This shows that the quality of work environment for the organised working class is also no good. That for the unorganised working class would certainly be deplorable.

ii) Even then, it is true that unorganised workers have very low strength vis-a-vis their managements and the State. Therefore, they are unable to initiate actions on their own. They need greater outside support and help than does the organised working class.

iii) Now, the question arises, as to whether in the existing situation in India where the environmental health movement is in its infancy, it is better to support a stronger section where chances of success are high or to take up the cause of those workers whose needs are greater but chances of total success are low.

The answer could be in affirmative to both in part. It would be prudent to aim for total success taking directly with the organised and enlightened sections of workers possessing some leverage. On the other hand low key actions like publicity, lobbying and legal actions would ensure partial successes for the unorganised section of the working class.

ROLE OF GROUPS LIKE MFC. - Being what it is, MFC can be looked upon chiefly as a resource group. It could provide on its own or by directing to people who could take up the technical aspect of an environmental health problem.

1) Carrying out Studies : Any movement, strong or weak, spontaneous or planned would need solid information base if it is to have a lasting impact. MFC could undertake studies in the field of the impact of the environmental degradation on health.

2) Publicizing the issue:- MFC members could write in popular press, in medical journals etc. about the environmental health issues, thus publicising it and lending it credibility.

3) Direct medical intervention : As in Bhopal, under extraordinary circumstances in case of an environmental disaster, MFC could intervene medically by providing medical relief and long term rehabilitation as a part of an ongoing people's movement.

Note: 1. The case studies are based taken from State of India's Environment - A Citizens' Report - 1982. CSE, New Delhi
2. The statistics are from work place Environment by Ravi Duggal. FRCH Bombay. mimeo

HEALTH BASICS: WATER AND SANITATION



Health workers are aware of the link between safe water supplies and excreta disposal and the prevention of diarrhoeal diseases, but the installation of these facilities only provides half the answer. Of equal importance is teaching people how to use them. When is handwashing most important? How do you maintain safe water supplies? This insert provides practical information on hygiene behaviour at family and community level before, during and after the installation of water and sanitation facilities.

SAFE WATER

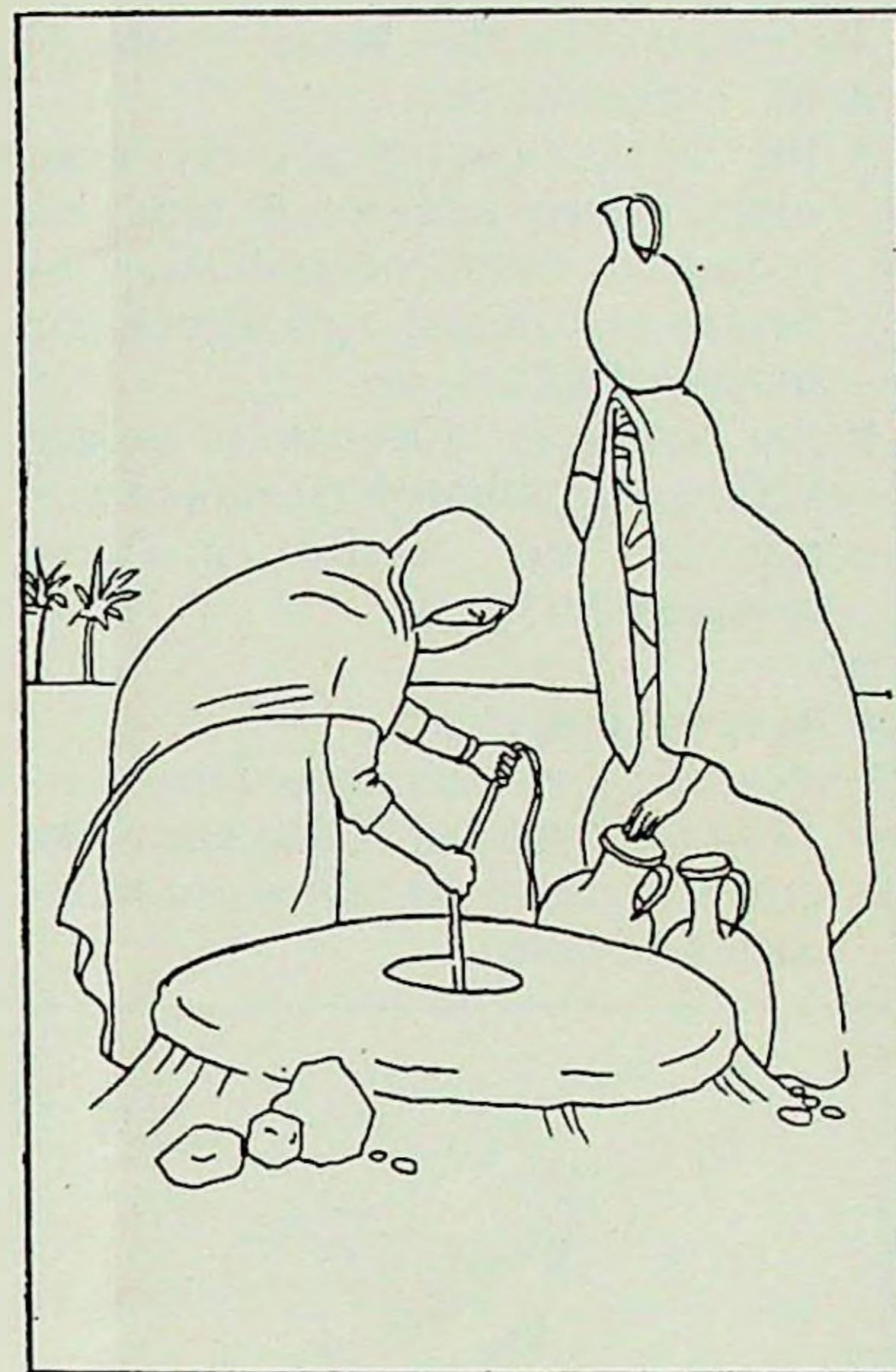
To be sure that the water we use for drinking is safe, contamination must be prevented:

1. At the water source and in the water delivery system (wells, pipes, taps etc).
2. Between collection and use.

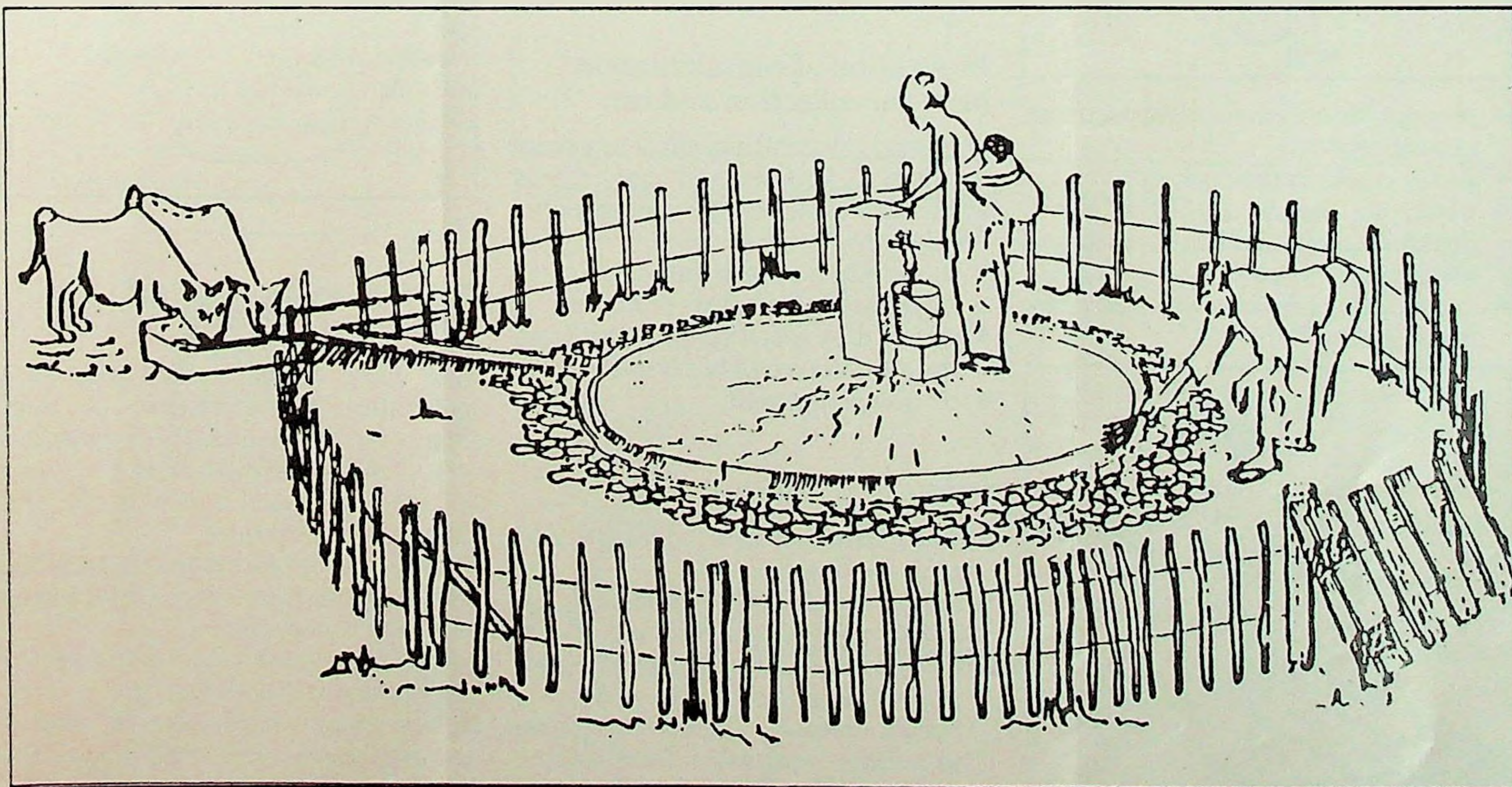
Safe water from wells

To protect well water from contamination you can:

- construct a wall around the well with a platform and drainage facilities. This will help to prevent soil from falling into the well and waste water from draining back into it;
 - only use one bucket to draw water from the well and keep this bucket clean;
 - if possible, keep the well covered when it is not being used;
 - take care that the rope of the bucket cannot get dirty with soil and contaminate the water;
 - make sure that your hands are clean when using the bucket;
 - bathe, and wash clothes, away from the well so that waste water cannot drain back into the well;
 - keep surroundings clean and animals away from the well.
- These points are also equally important for wells where handpumps are used to lift the water instead of



buckets. Handpumps need to be properly operated and maintained to guarantee a permanent supply of safe water.



Build a fence around the well or tap to keep out animals.

WATER AND SANITATION

Safe water from public taps

Tap water can be from a spring water, groundwater or surface water source. To ensure that this water is safe to drink, make sure that:

- the intake (water source) area, piping system and storage tanks are protected from contamination by human and animal, agricultural and industrial wastes; *or*
- the water is adequately treated before use (although treatment may not be very feasible in some communities).

Also:

- keep the taps clean;
- clean the area around the tap daily;
- clean (and unblock if necessary) the drains regularly so that waste water can drain away;



- prevent the area around the tap from getting muddy;
- repair cracks in the concrete;
- bathe and wash clothes at some distance away from the drinking water tap;
- keep cattle and other animals away from taps.



Other ways to stop water from being contaminated include:

- asking a person living near the tap to look after it;
- building special facilities at some distance away from the water source for bathing and washing clothes;
- making a fence around the tap to keep out animals;
- building special ditches or troughs away from the tap for cattle and domestic animals to drink from.

Prevention of contamination between collection and use

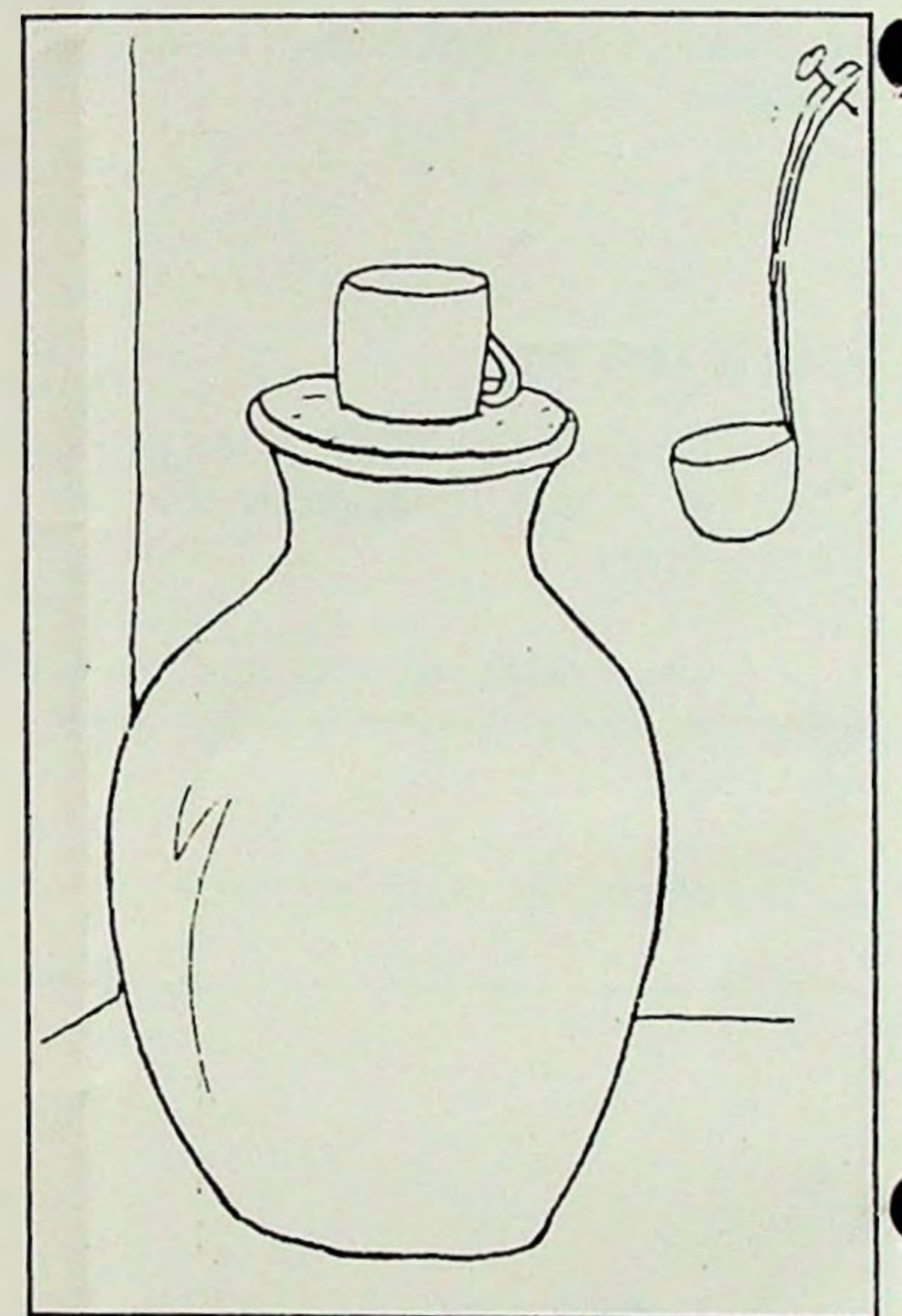
Water may become unsafe at any point between collection and use. Clean water can easily become contaminated when:

- it is touched by dirty fingers;
- it is poured into a dirty container;
- dirt or dust gets into the water from the air if the container is uncovered;
- dirty cups are used.

Points to remember:

- wash hands before collecting and carrying water;
- make sure the container for collecting the water is clean;
- carry water in a covered container if it has a large opening (e.g. if it is a bucket or basin). This will also help to prevent the water from spilling during the trip home (although a loose lid will not prevent spilling) and make sure the cover is clean;

- if possible, empty and clean the household water storage container daily;
- keep household water storage containers covered, and do not allow children or animals to drink from them;
- allow no one, especially a child, to put their hands into the storage container;
- pour water out of the water storage container without touching it, or use a clean long-handled dipper to take the water out;
- use clean cups or mugs for drawing and drinking the water.



SAFE WASTE WATER DISPOSAL

Safe waste water disposal from taps and after domestic use is very important. Stagnant pools of water and muddy places around houses and water collection sites are a health risk and can attract mosquitoes.

- clean and unblock drains near public taps regularly so that waste water can always run away;
 - throw away domestic water waste or dispose of it in a soakage pit.
- In dry areas where water is scarce, domestic waste water could be used to:
- water vegetables and fruit trees;
 - water domestic animals;
 - clean latrines.

WATER AND SANITATION

PERSONAL HYGIENE

Good personal hygiene can prevent or reduce the incidence of diarrhoea, skin and eye diseases and body lice. One way to improve personal hygiene is to have plenty of water near people's homes.

This can be used for:

- washing hands after defaecation;
- washing hands before preparing and eating food;
- washing the faces and hands of children;
- bathing or body-washing;
- regular washing of the hair;
- washing of clothes and bedclothes;
- cleaning teeth.

Washing, especially hand washing, should be done whenever possible with soap. Where soap is not available for bathing, substitutes such as ash, clean sand, a flat stone, or a clean cloth to rub the body, could be used.

The importance of handwashing

Handwashing after defaecation will greatly help to reduce the risk of disease transmission.

In areas where anal cleansing with water is practised, the promotion of handwashing may create fewer problems than in areas where other cleansing materials are used. When anal cleansing is done with water it means that at least some water is available and that handwashing may be integrated more easily as a part of defaecation practice.



Handwashing can help to reduce the risk of disease transmission.

DOMESTIC HYGIENE

To prevent disease transmission:

- make sure that water containers, dippers and cups are clean to prevent the contamination of drinking water;
- wash cooking pots, dishes, eating utensils, carefully after each use. A rack drainer (to keep items above the ground) in the sun above a soakaway may be the best place to drain and dry washed articles. The water from washing can be emptied into the soakaway (waste water soakage pit);
- control flies not only by burying faeces and use of pit latrines but also by covering food and safely disposing of domestic waste;
- cover, bury or burn domestic waste to deter flies and rats.



WATER AND SANITATION

EXCRETA DISPOSAL

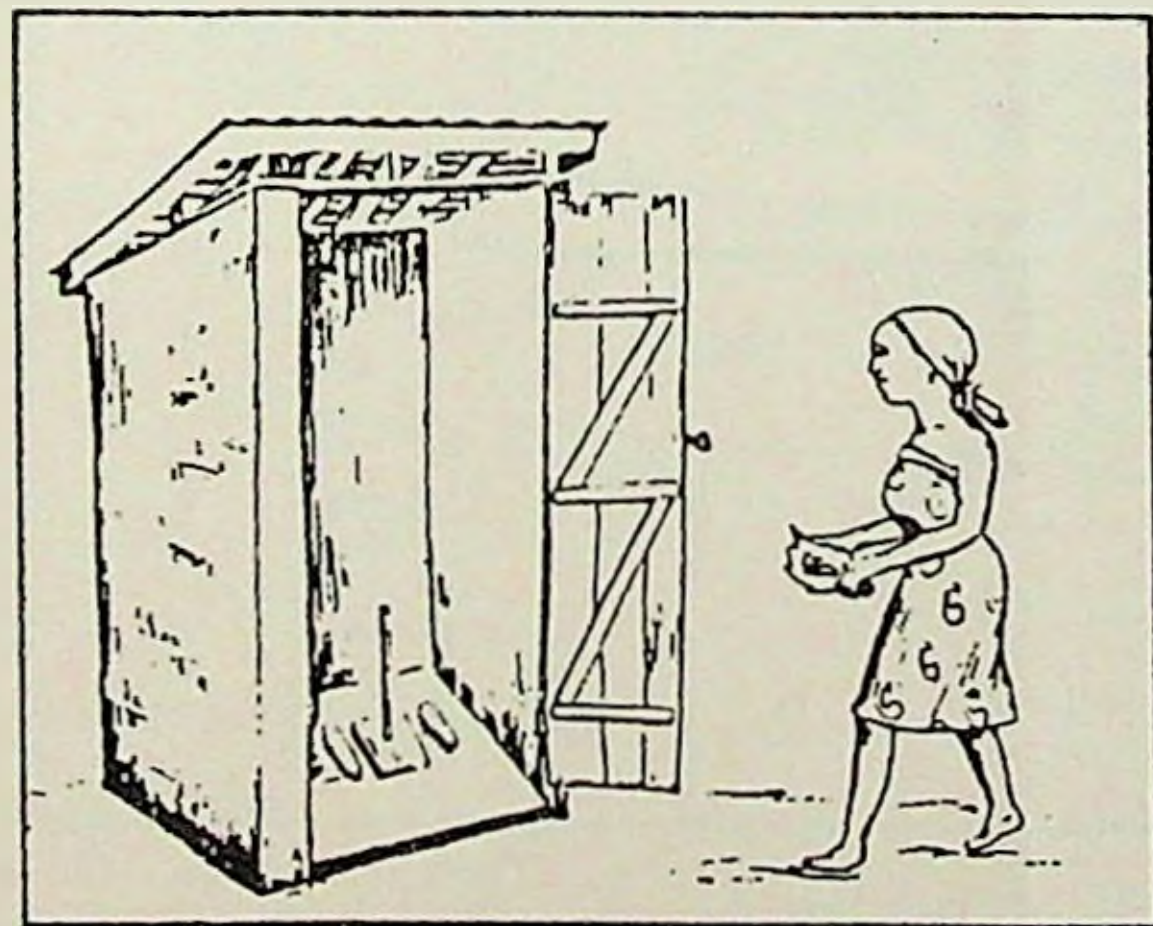
Safe excreta disposal is as essential as a safe water supply in preventing the spread of disease.

Where there is no latrine

If there is no latrine available, it is important to dispose carefully of faeces by burying – dig a small hole before passing stools (as far away as possible from houses, paths, animals and small children, and at least 10 metres away from the water supply), and cover with earth to prevent contact from flies and animals. Avoid going barefoot to defaecate, and do not allow children to visit the defaecation area alone.

Children and excreta disposal

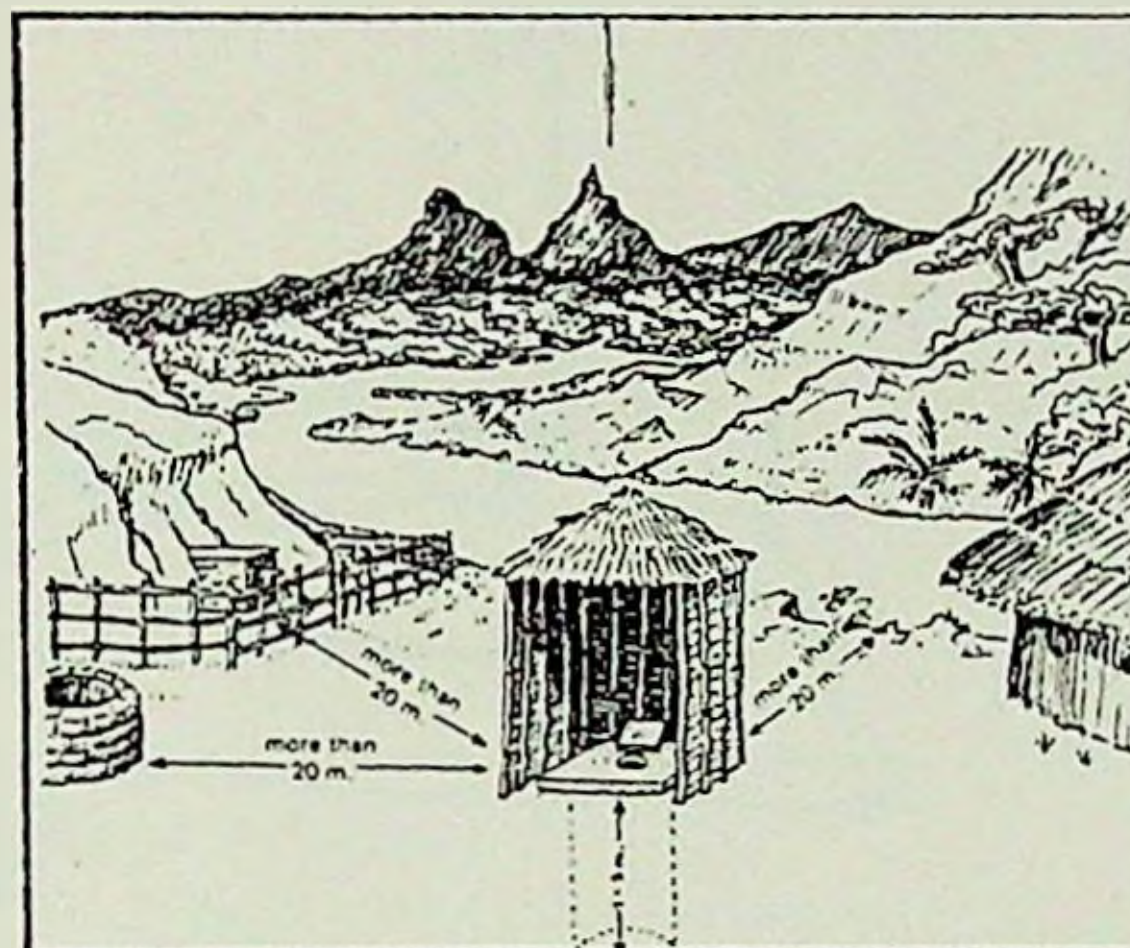
A common belief in many societies is that the faeces of babies and children are less harmful than those of adults. In fact the faeces of babies and young children are just as dangerous as those of adults. It is therefore important to dispose of these faeces in a safe way.



If children are too small, or are too scared of the squat-hole, to use a latrine, a separate children's latrine could be built or a hole in the ground at

a convenient distance from the house made for them to use for defaecation. After each time it is used the faeces should be covered with soil. Another hole can be made when the first one is full. Another possibility is to get the child to use a potty, or to defaecate onto paper or a large leaf, which can then be put in the latrine.

Locating a latrine

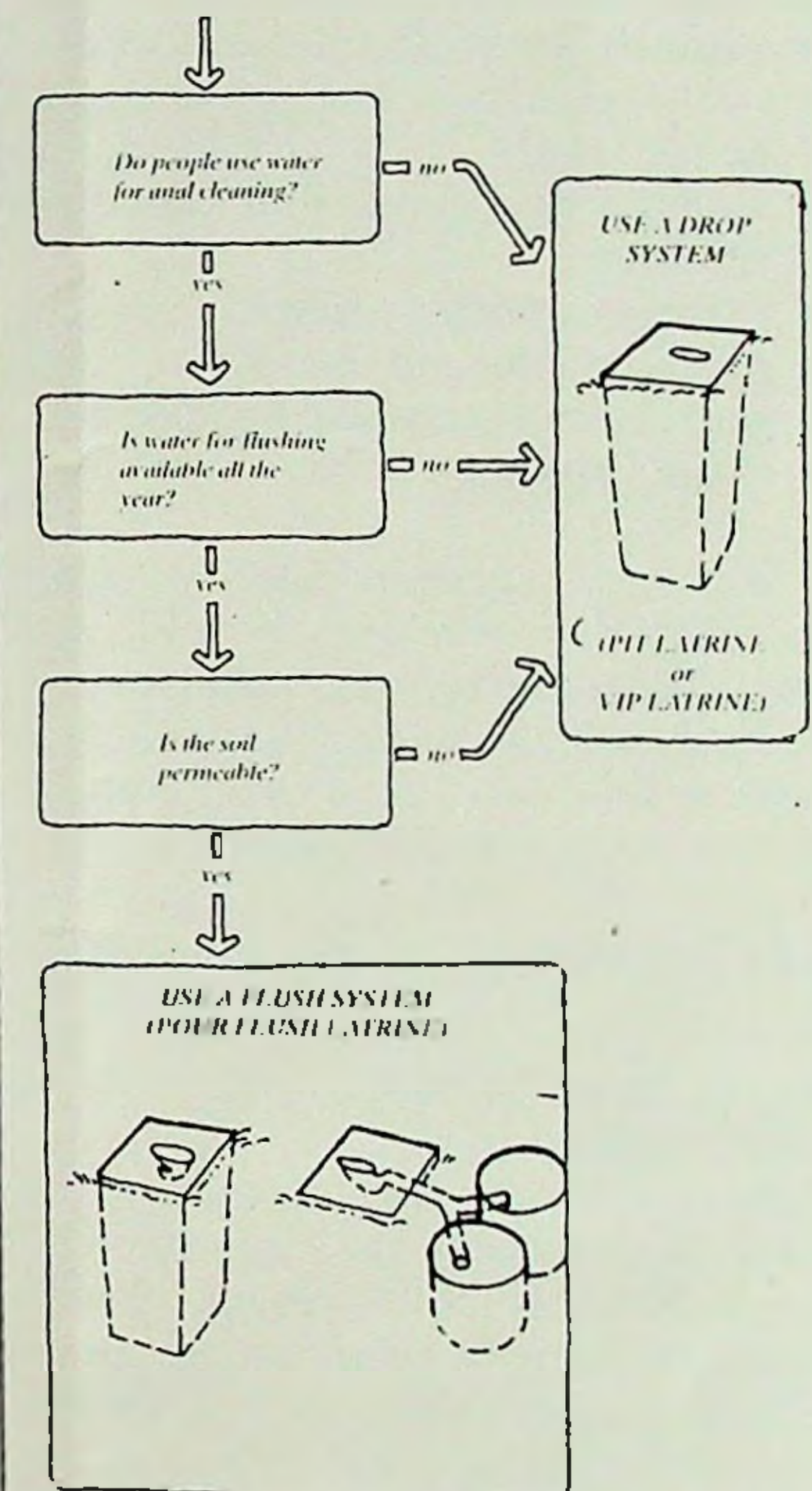


A latrine should be at least 15 metres from all wells, springs, rivers, or streams.

- If possible, the bottom of the latrine should be more than 1.5 metres above the highest groundwater table. If the bottom of the latrine is likely to be close to, or reach down into, the groundwater, then build it downhill from the water source. If you cannot place the latrine downhill, then it should be built at least 15 metres away from all houses, wells, springs, rivers or streams.
- A latrine site should be dry, well drained and above flood level.
- The latrine should be close to the home, if it is too far away, it is less likely to be used.

Choosing a latrine

Flush system or drop system?



If the answer to these questions is YES, select a flush system. If the answer to one of the questions is NO, choose a drop system.

LATRINE COMPARISONS

LATRINE	Rural application	Urban application	Cost to build	Ease of construction	Water requirement	Best anal cleaning material	Hygiene	Fertilizer production
Pit latrine	suitable in all areas	not in high density suburbs	low	simple — except in wet and rocky ground	none	any	moderate	can do
VIP Latrine	Suitable in all areas	not in high density suburbs	low	simple — except in wet and rocky ground	none	any	good	not easily
Pour flush latrine	suitable	not suitable	high	requires skilled builder	water source near privy	water	good	no

WATER AND SANITATION

Latrines

A latrine is a safe place to pass stools and urine, but only when:

- it is properly built;
- well maintained;
- cleaned every day; and
- there are no flies.

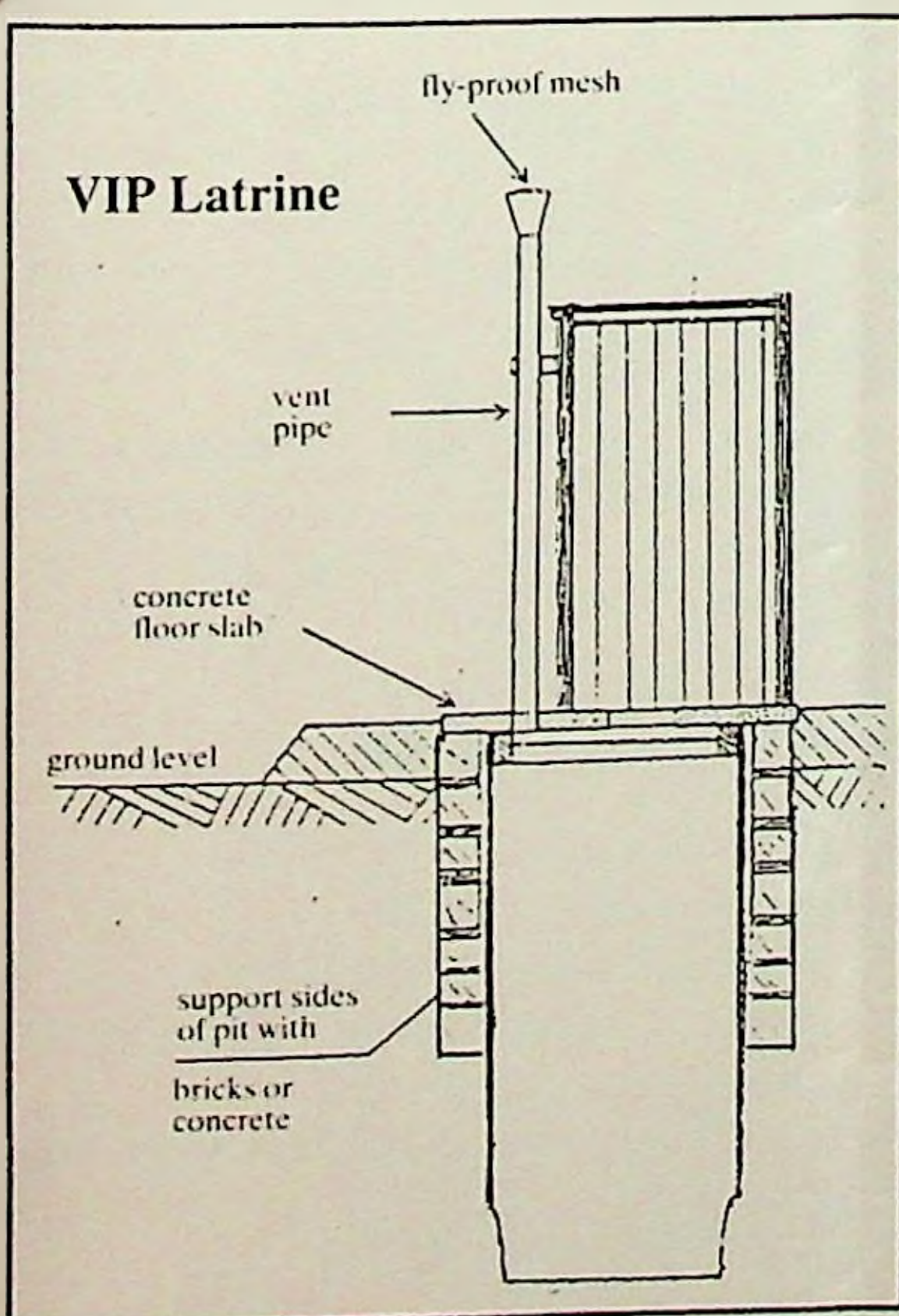
A good latrine should fulfil the following conditions:

- it should not contaminate the surrounding area;
- there should be no contamination of surface or ground water which can enter springs or wells;
- there should be no need to handle fresh faeces;
- faeces should not be accessible to flies, animals or other people;
- there should be minimal bad smells;
- the methods used to build latrines and maintain them should be simple and inexpensive;
- it should be safe and attractive for children to use;
- it should be designed in such a way that it is culturally acceptable.

Types of latrines

Pit latrine

The pit latrine consists of a hole in the ground bridged by a floor slab or squatting plate, around which a hut is built to provide privacy. A cover, with a long handle, can be used to prevent flies from entering the hole.



The pit latrine should be about 3 metres deep by 1 metre wide and the sides should be strengthened with sticks, stones, or bricks to prevent collapse.

When the pit is two-thirds full, it should be filled in with earth, and a new pit dug nearby. The liquids from the old pit will soak into the soil, and the solids remaining will become harmless after two years and can be dug from the pit and used as fertilizer.

VIP latrines

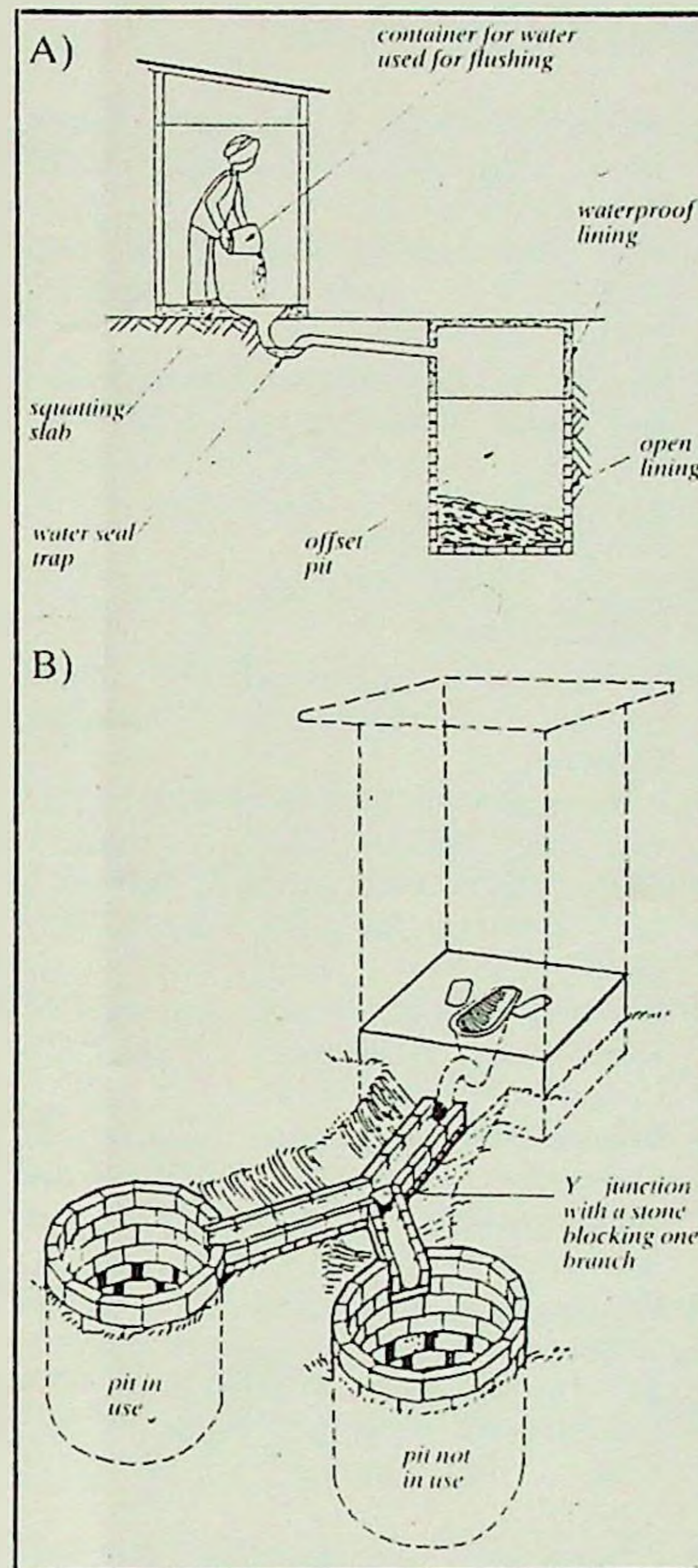
Good ventilation is important. Problems of bad smells and flies can be reduced if a vent pipe is installed. This should be at least 300 mm (0.3 metres) above the highest point of the hut, (except for conical roofs, where the vent pipe should go to at least the height of the apex). The movement of air across the top of the pipe will create an up-draught, drawing up smells from the pit, and trapping any flies under the mesh at the top of the pipe.

The mesh should be inspected every month to make sure it is properly secured, and that spiders' webs, flies and other debris are not blocking the vent pipe. These can be cleared by pouring water down the pipe.

Pour flush latrine

A) The pour-flush latrine has a squatting slab which is specially made to include a water seal trap, set into the floor. Excreta is flushed down a short length of pipe from the water seal trap with a small amount of water. The pit itself should be open lined at the bottom to allow the escape of liquids, while the top section should be waterproof.

B) Two pits can be dug side by side and connected to the latrine by a 'Y' junction. One arm of this junction is sealed at first, so that only one pit fills. When this pit is full, it is sealed and the second pit is used. By the time this pit is full, the contents of the first pit can be dug out and used as fertilizer. The advantage of this type of latrine is that it includes a water seal trap, so that fly-breeding in the pit, and odours are avoided.



Acknowledgements

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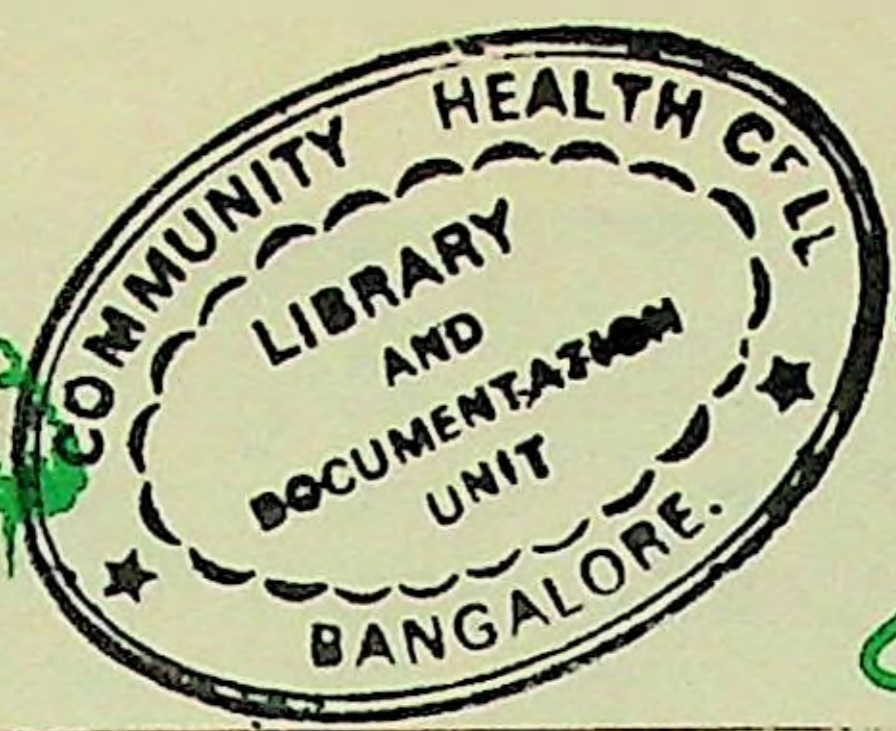
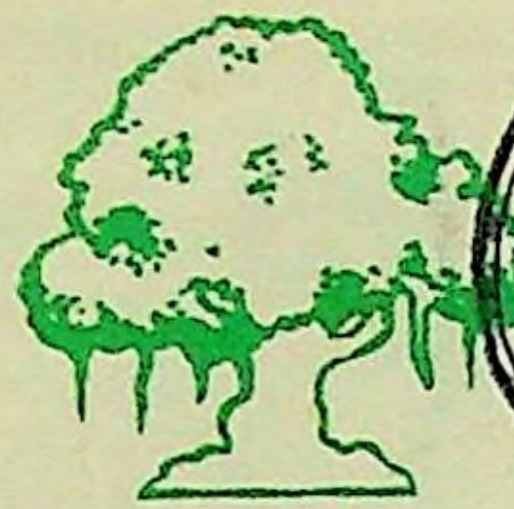
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For Private Circulation Only

LEAFLET

Newsletter of the LIFE ENVIRONMENT AWARENESS FOUNDATION SPECIAL ISSUE 1991

BLAZING A GREEN TRAIL

The Ecological consciousness that the Life Environment Awareness Foundation (LEAF) is spreading amongst the youth of India, is the commendable effort of one man and his vision, says Sadanand Kanavalli.

This is an extract of a feature by Sadanand Kanavalli in The ILLUSTRATED WEEKLY OF INDIA (Magazine Sec) March 9-10 '91.

Our Environment is sinking fast because of man's mindless exploitation of natural resources. There is no dearth of people who keep on preaching, that the need of the hour is to make the entire population ecologically conscious. But, there is one man, H. P. Yatish, who has put his nose to the grindstone and has been greening children by catching them young.

This he does through Life Environment Awareness Foundation (LEAF) he founded in 1982, the only one of its kind in the country, or may be in all the world.

At an International Environmental Conference held in Bangalore in April last year, a lady from Italy had exhibited information regarding what was her organisation's effort to educate children ecologically. And to our surprise, we found that LEAF has long been doing much better on a much wider scale and very systematically, too.



Jungle Craft : Interpretation of tracks & signs in the jungle

LEAF is a non-profit organization dedicated to the promotion of

Environmental education. It has a network of LEAF Nature Clubs (LNCs) at the grassroot level, which are a happy blend of an Educational and a Recreational Club.

Through LNCs, LEAF puts through various programmes for Ecological understanding. They provide opportunities for direct interaction with Nature, helping individuals experience its richness and wonders and thereby developing a harmonious relationship with Earth and its denizens.

The programmes and techniques are based on Learning Through Discovery.

The DISCOVER NATURE Programs are carefully planned and are a system by themselves.



Training in Camp Craft: Tent pitching by participants at a Wilderness Camp

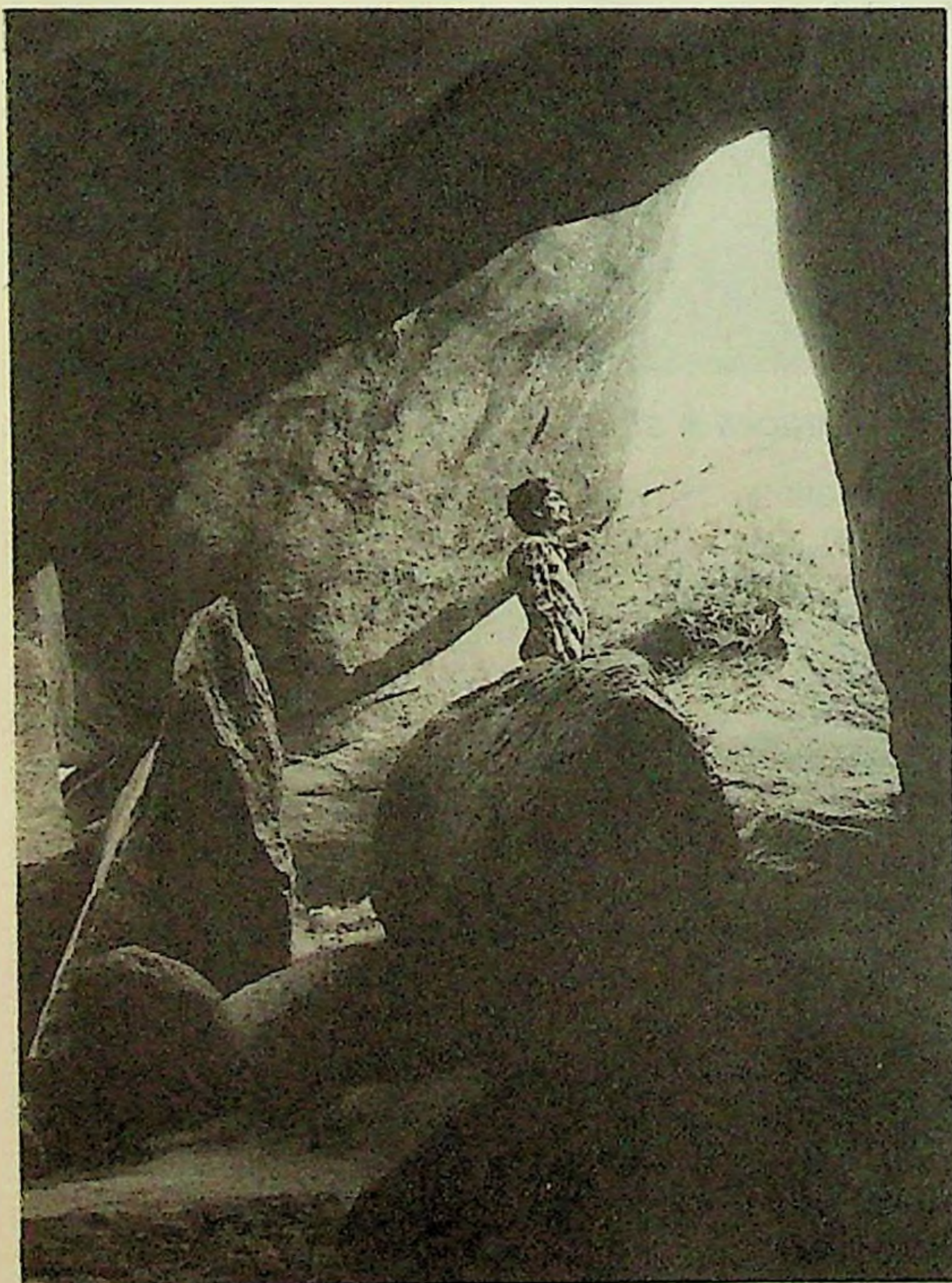
There is no dearth of people who preach that the need of the hour is to make the entire population ecologically conscious. But there is one man who has put his nose to the grind stone.

It is not mere knowledge that is aimed at, but action flowing from that knowledge towards a **Sustainable Earth**.

From modest beginnings, LEAF has come of age. It launched its first LEAF Nature Club in 1985-86 with just a single unit of 60 members of *St. Francis Xavier Girls' High School*, Bangalore. The following year, LNCs were started in *Basaveshwara Girls' High School*, Rajajinagar and *Udaya Education Society's Co-ed School* in Vijayanagar.

LNCs were started in 9 schools in 1988-89 plus the first outside-Bangalore LNC at far-off *Shirahatti* in Dharwad district. Now LEAF has spread its wings wide and in 1989-90, the year just gone by, there were 17 schools with membership totalling 900. More and more schools are approaching LEAF on their own to open LNCs.

But Yatish is an efficiency bug. Whatever he does must be *pucca*. He doesn't want LEAF to be an empire which has expanded beyond its capacity to administer. Nevertheless, there are plans to reach out to Dharwad and, with that as a nucleus, to North Karnataka. Before going outstation, he insists on a small band of *Volunteers*.



Study and exploration of a Cave in wilderness



Founder President H P YATISH with wife, Jayanthi & son, Akash

The man, the mission

HP Yatish, 33, a Chemical Engineer, is a dynamic workoholic. He just lives LEAF. On an average, he rides 70 kms everyday on various LEAF errands. Son of late H K Panditaradhya, who retired as Chief Engineer, Yatish began as a wildlife photographer and wildlife camp organizer. From April to November in 1985, he organized 34 wildlife camps for the general public, students and rural youth.

He soon realized that these camps in the nature of holiday tours lead nowhere. Yatish started thinking seriously of *Continued Environment Education* and the idea of LEAF Nature Clubs dawned on him. Ever since, he has been at it, blending all his energy, time and resources to this cause.

For a living he has his own *Safaritan*, a unit arranging about 20 wildlife camps a year for foreigners and Indians at wildlife centres in Karnataka and in Mudumalai in Tamil Nadu. Through his contacts with foreigners he is associated with International organisations like *Care For The Wild* and *Zoocheck*.

Yatish has gathered round him a committed band of like-minded workers. Among them are Dr Mewa Singh, a wildlife academic; Rita Thomas, an Economics Lecturer in a Junior College; Dasharath Singh, a school teacher; K R Anand, a Officer in Life Insurance Corporation; Shantha Manohar, a Sales Officer at Keonics; Uday Shankar, a Drip Irrigation Consultant.

And of course, there is Jayanthi, wife of Yatish, who is the Coordinator at LEAF Headquarters. She joined as a staffer and has ended up as a life partner. They make a *made-for-each-other* couple with a one-year old son Akash, whom they have already taken to many a Camps. That way, he could go into the record books as the youngest camper ever.

He trains the Volunteers first in all the skills needed and then commences setting up a LNC.

Each LNC is a self-governed and self-supporting unit with a Committee comprising of President, Vice President, Secretary & Joint Secretary, elected from amongst themselves and a Teacher Coordinator from the staff of the institution and a Coordinator from LEAF.

The Program

LEAF offers a variety of outdoor activity to suit different needs from school children, teachers and others. There are a series of well-graded camps arranged regularly for LNC members.

- **Basic Nature Camp** of 2 days and a night for beginners, the minimum age being 10, is held on weekends throughout the year at *HKP Outdoor Nature School - Hulkunte*. Beginning on Saturday afternoons, it ends on Sunday evenings.

- Those who qualify at the *Basic Nature Camp* - their performance is closely observed to ascertain their abilities and involvement - are eligible for the (2nd level) **Nature Education Camp** or the **Wilderness Camp** of three days and two nights.

The *Nature Education Camp* is held for children below 13 years. And the *Wilderness Camp* is held for children over 13 years at Hulkunte, the ancestral homestead of Yatish, where he has developed the **HKP OUTDOOR**



K N Rajaram of LEAF & Lt. Cdr. Bhat (Retd.) with two participants (in the front) during GETHNAA's River Rafting from Srirangapatna to Shivana Samudra

NATURE SCHOOL. Here camps after camps are held during Summer, Dassera and Christmas vacations.

- Those who have successfully attended the *Wilderness Camp* qualify for the (3rd level) **Adventure Camp** and **Wildlife Study Camp** of four days and three nights held at the *Blu Lagoon* Island on Cauvery river, at *Bandipur / Nagarhole National Parks* or in the Western Ghats.

- **Holiday Courses: The Discover Nature Course** (for juniors) & **Adventure Course** (for seniors) of 10 to 15 days are held during the Summer holidays.

- **Educators' Course** offers School Teachers an atmosphere of outdoor school and gives them a fresh approach, new skills and a new perspective.

One may wonder how all this is possible. But LEAF has an excellent track record. It has conducted 24 workshops, 28 short courses on Wildlife Ecology, more than 150 camps and 250 Field Outings for Bird Watching.



HKP Outdoor Nature School's Senior Instructors Jayanthi & Dasharath Singh with LEAF Volunteer C K Bhargavi (extreme left) preparing lunch in Jungle

THE STRUCTURE

BASIC LEVEL:

Basic Nature Camp
Leadership Camp for Nature Club Leaders

WILDERNESS LEVEL:

Wilderness Camp
Nature Education Camp
Volunteer Training Camp on Interpretation

ADVENTURE LEVEL:

Adventure Camp
Wildlife Study Camp
Adventure Physical Efficiency Trg. Camp

TRAINING LEVEL:

Wildlife Study Exchange Program
Discover Nature Course
Adventure Course

ADVANCE LEVEL:

Himalayan Trekking & Adventure program



LEAF Volunteers are trained in Outdoor/Camping Skills & Interpretation techniques

THE CONTENT

These camps are not holiday packages. They offer rigour, challenge, self-discipline and self-help. Groups of 20 to 30 girls and boys trek, climb, camp and study Nature. They are accompanied by 3 to 5 instructors.

They travel by soft routes so that no trace remains of their trekking & camping, which enables the succeeding campers to enjoy the route afresh.

A wide array of things are taught through joyous discovery: **Selection of No-trace-campsites, Back Packing,**

Map Reading, Survival techniques, Time Control plans, Energy conservation, Selection and Care of equipment, Tent Pitching, Shelter-building, Fire-making, Cooking, rationing of Camp Food, Sanitation in the field, Team spirit, Community Living, Bird Watching, Animal Behaviour, Jungle Craft &, above all, ENVIRONMENTAL ETHICS.

Last year the **Ham** (Amateur Radio) hobby was introduced at a few LNCs. It has a desk top publishing unit to undertake its publications: **LEAFLET; Discover Nature** newsletter; other books viz., **CAMP CRAFT, HAM GUIDE, Guidelines & Techniques for Environmental Interpretation** and study material for the campers. It also makes and markets Wildlife Stickers &



Learning through Games: Elephant Country Walk enhances sensory perception (other than sight) in examining the environment

Youngsters return home from camps ecologically wiser and confident about meeting the challenges of life. They develop leadership qualities and a well-rounded personality. **In fact, LEAF has lived up to its name in creating Life Environment Awareness.**

Greeting Cards, the proceeds of which are used to fund its activities.

LIFE ENVIRONMENT AWARENESS FOUNDATION

LEAF HQ, 26 & 27, 9th Main,
Raja Mahal Vilas, Bangalore 560080
Ph 343 323 Cable: WILDERNESS

Besides camps, LEAF organizes seminars and workshops, quiz and elocution competitions for children.



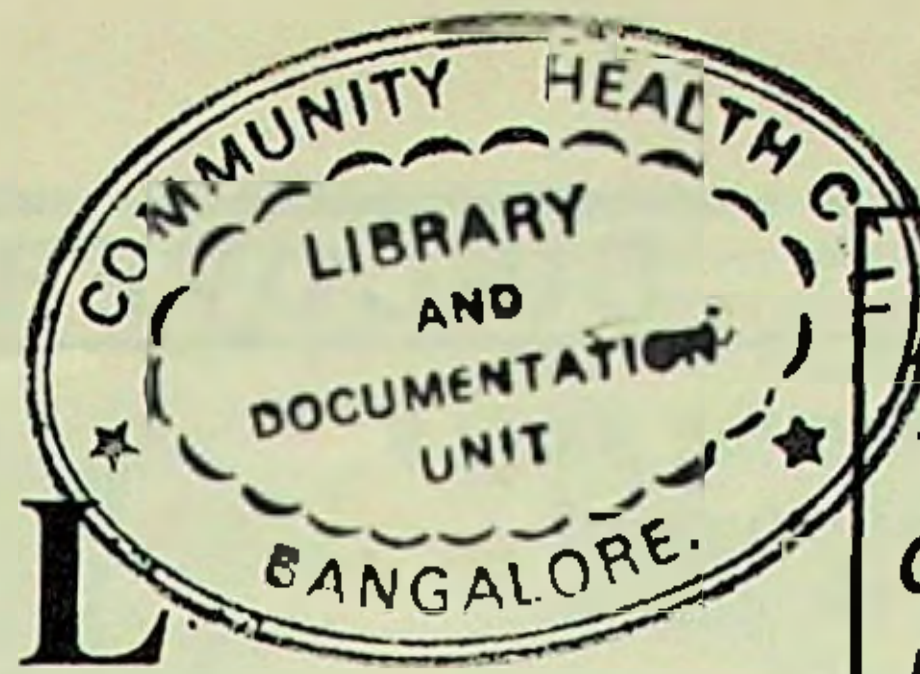
Field Exercise to understand the effects of a water body on the surrounding temp. & first hand interaction with pond & its environs



Training on Obstacle Course improves physical efficiency & coordination

HKP OUTDOOR NATURE SCHOOL

Affiliated to LIFE ENVIRONMENT AWARENESS FOUNDATION



HKP ONS
1985 1990
COMPLETES
FIVE YEARS

INTRODUCTION

The HKP Outdoor Nature School is the only one of its kind in the country, providing opportunities for special adventure in experiencing the richness and wonders of outdoor life and learning through it. It is a light, refreshing way of getting in touch and sharpening the perception.

The program and technique are based on Discovery approach. These are designed to increase individual's awareness and understanding of Nature.

The DISCOVER NATURE program run by HKP ONS is a *Sustaining Environmental Learning Program* for school children. It provides an in-depth understanding of basic ecological principles by using innovative techniques and unique approaches.

WHO CAN USE THE DISCOVER NATURE PROGRAM ?

Primarily designed for children, to whom discovery activities are particularly valuable, the DISCOVER NATURE PROGRAM may also be used as a unique method for adults.

DISCOVER NATURE programs are very relevant to children in field study, and also to teachers in primary and secondary schools where an understanding of ecological concepts is important.

WHO ARE WE ?

Since 1985, we have taught wilderness skills, bird watching, conservation and leadership to school children. Our programs range from weekend outings to two weeks in length. Groups of 10 to 20 children both girls & boys in the age group of 10 to 18 years travel with 3 to 5 instructors. They trek, climb & camp, studying Nature.

We go by soft paths, travelling in a manner which will have the least impact



on the environment. We believe this *minimum-impact camping* is essential to the preservation of Nature. Thus we teach children to leave no trace of their presence so that those who follow can enjoy the same environment with the same *Sense of Discovery*.

On a DISCOVER NATURE Program, haversacks, ropes, binoculars, tents and camping kits are important. Every course/camp includes the Discover Nature syllabi - the skills and information essential to low-impact wilderness camping. We teach our participants to be safe and knowledgeable users of the wilderness.

Environment Education is our priority, and we believe that the best ecological understanding comes through experience. We explain, demonstrate and immediately practise new skills. We give our participants responsibility in the wilderness, the relationship between action and result is vivid and satisfying.

WHAT WE DO ?

During the program, participants gradually take charge of the day's activities and, as a team, they become increasingly alert at route finding, camping without damaging the land,

coping with the weather, taking care of each other. Our outdoor "class rooms" change as our skills grow. Experience teaches us judgement about the safest route, brings out the capabilities of our partners, provides confidence to encounter hazards etc.

By the last day of a camp, we will have explored important new ideas, had some unexpected adventures, and observed Nature intimately. Our participants will have become safer, more skilled, more observant wilderness campers.

We hope that our children will carry their knowledge home, spread word about conserving our Nature and lead exciting, safe outing independently. Our goal is to provide them the skills to make that possible.

Come Discover Nature with us.

DISCOVER NATURE IS

"What I hear, I forget;

"What I see, I remember

"What I do, I know"

ಕೆರೆ

ಉಳಿಸಿ



ಮಣ್ಣು, ನೀರು, ಮರಗಳಿಗಲ್ಲ ರಕ್ಷಣೆಗಾಗಿ ಮಾನ ಪ್ರತಿಜ್ಞೆ.

ಸಂಚಿಕೆ ೨

ಖಾಸಗಿ ಪ್ರಸಾರಕ್ಕಾಗಿ

ಜೂನ್-ಜುಲೈ 1990

ಸಂಪಾದಕೀಯ

ಹಸಿರು ಕರ್ನಾಟಕ ಸೃಷ್ಟಿಸೋಣ ಲ ಟ

ಬೇಸಿಗೆ ತೆರಳಿ ಮೊದಲ ಮಳೆ ಅಲ್ಲಲ್ಲಿ ಬಿದ್ದಿದೆ ನೀಲಾಕಾಶದಲ್ಲಿ ಕವು ಮೋಡಗಳು ದಂಡು ಕಟ್ಟಿ ತೇಲುತ್ತಿದ್ದಂತೆ ರೈತನ ನಿರೀಕ್ಷೆಯ ನವಿಲು ಗು ಬಿಚ್ಚಿ ತೊಡಗಿದೆ.

ಈಗ ಸಸಿ ನೆಡಲು ಸಕಾಲ ಹಸಿರು ಹೊನ್ನನ್ನು ಸೃಷ್ಟಿಸಲು ಸರಿಯಾದ ಕಾಲ.

ಮರಗಿಡಗಳು ಜೀವ ಜಗತ್ತಿಗೆ ನೀಡುವ ಕೊಡುಗೆಯ ಬಗ್ಗೆ ಹೊಸ ದಾಗಿ ಹೇಳಬೇಕಾದುದಿಲ್ಲ. ನಮ್ಮ ನಿತ್ಯ ಜೀವನದಲ್ಲಿ ಅಣ್ಣ ತಮ್ಮಂದಿರಂ ಬಪ್ಪ ಹೊಂದಿಕೊಂಡಿವೆ. ಬೇಸಾಯಕ್ಕೆ ಬೇಕಾದ ಮರಮುಟ್ಟು ಒದಗಿಸುವುದರಿಂದ, ಅಡುಗೆಗೆ ಬೇಕಾದ ಉರುವಲು ಕೊಡುವುದರಿಂದ, ಉಸಿರಾಡಲು ಬೇಕಾದ ಆಮ್ಲಜನಕ ಸೃಷ್ಟಿಸುವುದರಿಂದ, ಮರಗಿಡಗಳ ಬೀರುಗಳು ಭೂಮಿಯನ್ನು ಮಳೆ ಬಂದಾಗ ಮೇಲ್ಪದರದ ಮಣ್ಣು ಕೊಚ್ಚಿ ಹೋಗದಂತೆ ತಡೆಯುವುದರಿಂದ ಅವು ನಮ್ಮ ಬದುಕಿಗೆ ಅಮೂಲ್ಯ ಸ್ಥಿರಾಸ್ತಿಗಳು.

ದಣಿವು ಪ್ರಯಾಣಿಕನಿಗೆ ಸೆರಳಾಗಿ, ಆಡುವ ಹುಡುಗರಿಗೆ ಆಟದ ಮನೆಯಾಗಿ, ಹಬ್ಬಗಳಲ್ಲಿ ಜೋಕಾಲಿಯಾದಲು ಹುಡುಗಿಯರಿಗೆ ಆಗತ್ಯವಾಗಿ, ಪೂಜಿಸಲು ಎಷ್ಟೋ ಕಡಿ ದೈವವಾಗಿ ಮರಗಳು ನಮ್ಮ ಸಾಂಸ್ಕೃತಿಕ ಬದುಕಿನಲ್ಲಿ ಬೆರೆತು ಹೋಗಿವೆ.

ಮರಗಳನ್ನು ಕಡಿಯುವಾಗ ಮನುಷ್ಯನ ಕೈಯೇ ಕಾಲೋ ಕಡಿದಷ್ಟು ಯೋಚನೆ ಮಾಡಬೇಕಾಗಿದೆ. ಒಂದು ಮರವನ್ನು ಎಲ್ಲ ಮರೆತು ಒಣ ಸೌದೆಯ ಗೂಡಾಗಿ ನೋಡಿದರೆ ನಾವು ಮೂರ್ಖರು. ಈ ಪ್ರಕೃತಿಗೆ ಒಟ್ಟು ಮನುಷ್ಯನ ಬದುಕಿಗೆ ಅದು ಕೊಡುವ ಕೊಡುಗೆಯನ್ನು ಸರಿಯಾಗಿ ಲೆಕ್ಕ ಹಾಕಿದರೆ ಒಂದೊಂದು ಮರಕ್ಕೆ ಸುಮಾರು 16ಲಕ್ಷ ರೂಪಾಯಿ ಬೆಲೆಯನ್ನು ಕಟ್ಟಬೇಕಾಗುತ್ತದೆ. ಇಂತಹ ಅಮೂಲ್ಯ ಸಂಪತ್ತನ್ನು ನಾವು ಬೇಜವಾಬ್ದಾರಿಯಿಂದ ಹಾಳುಗಡವೆವೇವೆ. ಸರ್ಕಾರ ಈ ಸಸ್ಯ ಸಂಪತ್ತಿನ ಬಹುಭಾಗವನ್ನು

ಕೈಗಾರಿಕೆಗಳಿಗೆ ಅಗ್ಗದ ಬೆಲೆಗೆ ಮಾರಿ ಬಿಟ್ಟಿದೆ. ಮಿಕ್ಕಿದ್ದನ್ನು ಕಾಡುಗಳೆಂದು ಮತ್ತು ಕಾಡ್ಗಿಚ್ಚು ನಾಶಮಾಡಿದೆ.

ಈ ಎಲ್ಲ ದುಸ್ಕೃತ್ಯಗಳ ಫಲಿತಾಂಶವನ್ನು ಇಡೀ ಕರ್ನಾಟಕದ ಜನತೆ ಅನುಭವಿಸುತ್ತಿದ್ದಾರೆ. ಭೂ ಸವಕಳಿ ಹೆಚ್ಚಿದೆ ಕೆರೆ, ಹಳ್ಳ ಅಣೆಕಟ್ಟುಗಳಲ್ಲಿ ಹೂಳು ತುಂಬ ತೊಡಗಿ, ಕೃಷಿಗೆ ಪೆಟ್ಟು ಬಿದ್ದಿದೆ. ಭೂಮಿಗೆ ಬಿದ್ದ ಬಹು ವಾಲು ನೀರು ಹರಿದು ಸಮುದ್ರ ಸೇರಿ ವೃಥಾವಾಗಿದೆ. ಪದೇ ಪದೇ ರಾಜ್ಯದ ಎಲ್ಲ ಜಿಲ್ಲೆಗಳು ಬರಗಾಲಕ್ಕೆ ತುತ್ತಾಗಿವೆ. ಈ ಎಲ್ಲಾ ಅವಘಡಗಳು ಆಗದಂತೆ ತಡೆಯಲು ನಾವು ನಮ್ಮ ಮರ-ಗಿಡಗಳನ್ನು ಮತ್ತು ಸೃಷ್ಟಿಸಬೇಕಾಗಿದೆ. ನಮ್ಮ ಹೆಮ್ಮೆಯ ಕಾಡುಗಳನ್ನು ಮತ್ತು ಸೃಷ್ಟಿಸಬೇಕಾಗಿದೆ.

ಸ್ವಯಂ ಸೇವಾ ಕಾರ್ಯಕರ್ತರು ಈ ಮಳೆಗಾಲದ ಸಮಯವನ್ನು ಸರಿಯಾಗಿ ಬಳಸಿಕೊಂಡು ಹಸಿರು ಕರ್ನಾಟಕ ಸೃಷ್ಟಿಸಲು ಟೊಂಕ ಕಟ್ಟಿ ಎಲ್ಲಾ ಕಡೆ ಸಸಿಗಳನ್ನು ನೆಟ್ಟು, ಅವುಗಳನ್ನು ರಕ್ಷಿಸುವಂತೆ ಜನರನ್ನು ಪ್ರೇರೇ ಪಿಸಬೇಕು. ಸಸಿ ನೆಟ್ಟರೆ ಸಾಲಮ, ಸಸಿಗಳ ರಕ್ಷಣೆಗೆ ಜನರು ಮುಂದಾಗುವಂತೆ ಸಂಘಟನೆ ಮಾಡಬೇಕು. ಈ ದಿಸೆಯಲ್ಲಿ ಸ್ವಯಂ ಸೇವಾ ಕಾರ್ಯಕರ್ತರ ಪಾತ್ರ ಬಹಳ ಮುಖ್ಯವಾದದ್ದು.

ಒಂದು ಮರ ನೆಟ್ಟರೆ ಅದು ನೂರು ಮರಗಳನ್ನು ಸೃಷ್ಟಿಸುತ್ತದೆ. ಹಾಗೆಯೇ ಒಬ್ಬ ಕಾರ್ಯಕರ್ತ ತನ್ನಷ್ಟೇ ಉತ್ಸಾಹದಿಂದ ಮರ ರಕ್ಷಿಸುವ ಮತ್ತು ಹಲವರನ್ನು ಸೃಷ್ಟಿಸಬೇಕು ತನ್ನ ಆಚರಣೆಯ ಆದರ್ಶದಿಂದ, ತನ್ನ ತಿಳುವಳಿಕೆಯ ಮಾತುಗಳಿಂದ.

ಮಳೆಗಾಲದಲ್ಲಿ ಸಸಿ ನೆಡಿ, ಬೇರೆಯವರಿಂದ ನೆಡಿಸಿ ಸಸ್ಯ ಸಂಪತ್ತಿನ ಉಪಯುಕ್ತತೆ ಬಗ್ಗೆ ಈಗ ಜನರ ಜಾಗೃತಿ ಸಭೆ ಮಾಡಿ ಎರಡೂ ಫಲ ಕೊಡುತ್ತವೆ.

ಹಸಿರು ಕರ್ನಾಟಕದಲ್ಲಿ ಹಸಿವೆಗೆ ಅವಕಾಶವಿರುವುದಿಲ್ಲ. ನಾವೆಲ್ಲ ಈ ದಿಸೆಯಲ್ಲಿ ಮುನ್ನಡೆಯೋಣ.

ಶುಭಾಷಯಗಳೊಂದಿಗೆ ಸಂಪಾದಕ ಮಂಡಲಿ.

ಸಾಗರ-ಹೊಸನಗರ ಬಳಿ ಶ್ರಮದಾನ

1989 ರ ಮೇ ನಲ್ಲಿ ಸಾಗರ ಮತ್ತು ಹೊಸ ನಗರ ತಾಲ್ಲೂಕಿನ ಮತೂರು ಮತ್ತು ಕಾರ್ಗಡಿ ಎಂಬ ಗ್ರಾಮಗಳಲ್ಲಿ ಕೆರೆ ಹೊಳು ತೆಗೆಯುವ ಶ್ರಮಾನುಭವಕಾರ್ಯಕ್ಕೆ ವ್ಯಾಪಕ ಯುವ ಬೆಂಬಲ ವ್ಯಕ್ತವಾಯಿತು ಅಂತೆಯೇ ಈ ವರ್ಷದಲ್ಲೂ ಏಪ್ರಿಲ್ 27, 28, 29ರಂದು ಸಾಗರ ತಾಲ್ಲೂಕು 'ಜಿಗಳೇ ಮಸಿ' ಕೆರೆ ಹೊಳು ತೆಗೆಯುವ ತಿಬಿರವನ್ನು ವ್ಯಕ್ತಲಕ್ಷ ಅಂದೋಲನೆ ಮತ್ತು ಆರೋಗ್ಯ ವಿಕಾಸ ಪ್ರಕಲ್ಪ ಸಂಸ್ಥೆಗಳು ಸಂಘಟಿಸಿದ್ದವು.

ನಿಜಕ್ಕೂ ಗ್ರಾಮ ಸಾಮೂಹಿಕ ಕಾರ್ಯಕ್ಕೆ ಶಕ್ತಿ ನೀಡುವ, ಗ್ರಾಮದ ಏಕತೆಗೆ ಸಹಾಯ ನೀಡುವ ಕಾರ್ಯವಿದು.

ದೊಡ್ಡನಾಯ್ಕನಹಳ್ಳಿಯಲ್ಲಿ ಭೂ ದಿನಾಚರಣೆ

ಕೋಲಾರ ಜಿಲ್ಲೆ ಮಾಲೂರು ತಾಲ್ಲೂಕಿನ ದೊಡ್ಡನಾಯ್ಕನಹಳ್ಳಿಯಲ್ಲಿ ಮಂಡಲ್ ಸಂಚಾಯಿ ಪ್ರಧಾನರಾದ ಶ್ರೀ ನಂಜುಂಡಪ್ಪನವರ ಉಸ್ತುವಾರಿಯಲ್ಲಿ ಪ್ರಯೋಗ ಸಂಸ್ಥೆಯ ಶ್ರೀ ಎಂ. ರಾಜಣ್ಣನವರು ಸಂಯೋಜಿಸಿದ್ದ ಈ ಕಾರ್ಯಕ್ರಮದಲ್ಲಿ 25 ಜನ ರೈತರು ಕೆರೆ ಅಂಗಳದಲ್ಲಿ ಸೇರಿ ಒಂದು ಹಿಡಿ ಮಣ್ಣನ್ನು ಕೈಲಿ ಹಿಡಿದು ಭೂಮಿ ಸವಕಳಿ ತಪ್ಪಿಸಲು, ಭೂ ಸಾರ ಸಂರಕ್ಷಣೆ ಮಾಡಲು ವ್ಯಕ್ತಿಗೆ ವರ್ಷಕ್ಕೆ ಒಂದು ಗಿಡ ನೆಟ್ಟು ಕಾಪಾಡಲು, ಭೂಮಿಗೆ ಹೆಚ್ಚು ನೀರು ಇಂಗಿಸಲು ಕ್ರಮ ಕೈಗೊಳ್ಳುವುದಾಗಿ ಪ್ರಮಾಣ ವಚನ ಸ್ವೀಕರಿಸಿದರು.

ಭೂ ದಿನಾಚರಣೆ ಮಹತ್ವದ ಬಗ್ಗೆ ಪ್ರಯೋಗ ಸಂಸ್ಥೆಯ ನಿರ್ದೇಶಕರಾದ ಶ್ರೀ ರಾಮಕೃಷ್ಣ ಗೌಡ ಮಾತನಾಡಿದರು.

ಕಲಘಟಗಿಯಲ್ಲಿ ಪಾದಯಾತ್ರೆ

ಕೆರೆ ನೀರಾವರಿ, ಪರಿಸರ ಸಂರಕ್ಷಣೆಗಾಗಿ ಬೊಗೆನಗರ ಕೊಪ್ಪ ಹಾಗೂ ಇತರ ಒಂಬತ್ತು ಗ್ರಾಮಗಳ ಯುವಕ ಸಂಘಗಳು ಐಕ್ಯವಾಗಿ ರಚಿಸಿಕೊಂಡಿರುವ ಮಹಾಮಂಡಲದ ವತಿಯಿಂದ ಒಂದು ಪಾದಯಾತ್ರೆ ಏರ್ಪಡಿಸಲಾಗಿತ್ತು.

ಜನ್ನೂರಿನಿಂದ ಆರಂಭವಾದ ಪಾಡ ಯಾತ್ರೆಗಂಜಗಟ್ಟಿ, ಸುರಶೆಟ್ಟಿಕೊಪ್ಪ, ಹೊಸೂರು ಬೊಗೆನಗರಕೊಪ್ಪ, ಮುಂತಾದ ಒಂಬತ್ತು ಹಳ್ಳಿಗಳನ್ನು ಕ್ರಮಿಸಿ ಈ ಪಾದಯಾತ್ರೆಯಲ್ಲಿ ಬೇರೆ, ಬೇರೆಗ್ರಾಮಗಳ 15 ಜನ ಯುವಕರು ಭಾಗವಹಿಸಿದ್ದರು.

ಪ್ರತಿ ಗ್ರಾಮದಲ್ಲಿ ರೈತರ ಸಭೆ ನಡೆಸಿ ಕೆರೆಗಳ ಪುನರುಜ್ಜೀವನದ ಬಗ್ಗೆ ಅರಿವುಮಾಡಿ ಸಲಾಯಿತು. ಗ್ರಾಮಸ್ಥರು ಪಾದ ಯಾತ್ರಿಗಳಿಗೆ ಊಟದ ವ್ಯವಸ್ಥೆ ಮಾಡಿದ್ದರು. ಎಲ್ಲಾಗ್ರಾಮಗಳಿಗೂ ಕರ-ಪತ್ರಗಳನ್ನು ಹಂಚಲಾಗಿತ್ತು.

ಮಗಡಿ, ನೀರು, ನೆಲದ ರಕ್ಷಣೆಗೆ ಗಮನಕೊಡುವಂತೆ ಒತ್ತಾಯಿಸಿ ಮಂಡಲ್ ಸಂಚಾಯಿ ಕಛೇರಿಗೆ ಮನವಿ ಪತ್ರ ನೀಡಲಾಯಿತು.

ಶ್ರೀ ಎಂ.ಎಸ್. ಹುಲಗೂರ್ ಈ ಪಾದ ಯಾತ್ರೆಯನ್ನು ಸಂಯೋಜಿಸಿದ್ದರು.

ಕೂಡ್ಲಿಗಿಯಲ್ಲಿ ಕೆರೆ ಅಭಿವೃದ್ಧಿ ಸಮಿತಿ

ಕೂಡ್ಲಿಗಿ ತಾಲ್ಲೂಕು ತಿಪ್ಪೇಹಳ್ಳಿ ಗ್ರಾಮವನ್ನು ಕೇಂದ್ರವಾಗಿಟ್ಟುಕೊಂಡು ಸುತ್ತಲ ಮೂರು ಹಳ್ಳಿಗಳ ಜನ "ಕೆರೆ ಅಭಿವೃದ್ಧಿ ಸಮಿತಿ" ನೀರಾವರಿ ರಚಿಸಿದ್ದಾರೆ.

ಇತ್ತೀಚೆಗೆ ಗ್ರಾಮದ ಶಾಲಾ ಕಟ್ಟಡದಲ್ಲಿ ಪರಿಸರ ಹಾಗೂ ಕೆರೆಗಳ ಬಗ್ಗೆ ಸಭೆಯನ್ನು ಏರ್ಪಡಿಸಲಾಗಿತ್ತು. ನಾಲ್ಕು ಹಳ್ಳಿಗಳ 50 ರೈತರು ಸಭೆಯಲ್ಲಿ ಭಾಗವಹಿಸಿದ್ದರು. ಕಾ.ತಿ. ಮಾಸ್ತರ್ (ವ್ಯಕ್ತ ಪ್ರೇಮಿ ಸಂಘ, ಕೊಂಡ್ಲಹಳ್ಳಿ) ಚಳ್ಳಕೆರೆ ಬಸವರಾಜು (ಸಂಪಾದಕ, ವಿಮೋಚನಾ ಸಂಗತಿ) ಜಿ.ಎನ್. ಸಿಂಹ(ಹರಪನಹಳ್ಳಿ) ತಿಪ್ಪೇರುದ್ರಪ್ಪ (ಸ್ಥಳೀಯ ಸಂಪನ್ಮೂಲ ಅಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆ, ಮಾಡಲಕೆರೆ) ಹ ಗೂ ಬಂಜೆಗೆರೆ ಜಯಪ್ರಕಾಶ್ ಭಾಗವಹಿಸಿ ಪರಿಸರ ಹಾಗೂ ಕೆರೆ ನೀರಾವರಿಗೆ ಸಂಬಂಧಿಸಿದ ವಿಷಯಗಳ ಬಗ್ಗೆ ಮಾತನಾಡಿದರು.

ಗ್ರಾಮದ ಕೆರೆಯ ದುಸ್ಥಿತಿಯ ಬಗ್ಗೆ ಜನರು ನಿಧಿ ಕೂಡಿಸಲು ಮತ್ತು ಶ್ರಮದಾನ ಮಾಡಲು ನಿರ್ಧರಿಸಿದರು. (ಈಗಾಗಲೇ ರೂ. 1,000 ನಿಧಿ ಕೂಡಿಸಲಾಗಿದೆ)

ಕಾರ್ಯಕ್ರಮವನ್ನು ಬಿ.ಬಿ. ಕೆರೆಯ ಎಂ.ವೈ.ಸ್ವಾಮಿ ಸಂಯೋಜಿಸಿದ್ದರು.

ಬೇರು ಬಿಡುತ್ತಿರುವ ಕಬಿನಿ ನಿರೋಧ

ಕಬಿನಿ ಎರಡನೇ ಹಂತ ನಿರ್ಮಾಣ ನಿರೋಧಿ ಸಮಿತಿ ಯು ಹೆಚ್.ಡಿ. ಕೋಟೆಯಲ್ಲಿ ಸಮಾವೇಶ ನಡೆಸಿದ ನಂತರ ಆ ಸಮಿತಿಯ ಘಟಕಗಳನ್ನು ರಚಿಸಲು ಹ ಗೂ ಈ ಬಗ್ಗೆ ವ್ಯಾಪಕ ತಿಳುವಳಿಕೆ ನೀಡಲು ಸಮಿತಿಯು ಹಳ್ಳಿಗಳಲ್ಲಿ ಪಾದಯಾತ್ರೆ ಮಾಡಿದೆ.

ಮಾರ್ಚ್ ತಿಂಗಳಿನಲ್ಲಿ ನಡೆದ ಈ ಪಾದ ಯಾತ್ರೆ ಹತ್ತು ಹಳ್ಳಿಗಳನ್ನು ಕ್ರಮಿಸಿದೆ. ಈಗ ಹತ್ತು ಹಳ್ಳಿಗಳಲ್ಲಿ ಕಬಿನಿ ನಿರೋಧಿ ಸಮಿತಿಗಳು ರಚನೆಯಾಗಿವೆ ಈ ನಿರ್ಮಾಣದಿಂದ ತೊಂದರೆ ಗೊಳಗಾಗುವ ಎಲ್ಲಾ ಹಳ್ಳಿಗಳಲ್ಲಿ ಸಮಿತಿಗಳನ್ನು ರಚಿಸಲು ಉದ್ದೇಶಿಸಲಾಗಿದೆ. ಈ ಜನ ನಿರೋಧಿ ನಿರ್ಮಾಣವನ್ನು ತಡೆಗಟ್ಟಲು ತಾಲ್ಲೂಕಿನ ಜನ ಸಿದ್ದವಾಗುತ್ತಿದ್ದಾರೆ.

ನಕ್ಷೆ ಸುಟ್ಟು ಪ್ರತಿಭಟನೆ

ಕಬಿನಿ ಎರಡನೇ ಹಂತದ ನಿರ್ಮಾಣವನ್ನು ನಿರೋಧಿಸಲು ಬಿ.ಮಟಕೆರೆ ಗ್ರಾಮದಲ್ಲಿ ಆ ಯೋಜನೆಯ ನಕ್ಷೆ ಸುಡುವ ಮೂಲಕ ಜನ ತಮ್ಮ ಪ್ರತಿಭಟನೆ ವ್ಯಕ್ತಪಡಿಸುವ ಕಾರ್ಯವನ್ನು ಸ್ವಾಮಿ ಆನಂದ್‌ರವರು ಯೋಜಿಸಿದ್ದರು.

'ಪ್ರಯೋಗ'ಗೆ ಪತ್ರಕರ್ತರ ಭೇಟಿ

ಪ್ರಯೋಗ ಸಂಸ್ಥೆಯ ಕೆಲವು ಗ್ರಾಮಗಳಾದ ತಿಪ್ಪಸಂದ್ರ, ನಲ್ಲಾಂಡಹಳ್ಳಿ, ದೊಡ್ಡನಾಯ್ಕನಹಳ್ಳಿ, ಚಿಕ್ಕನಾಯ್ಕನಹಳ್ಳಿ, ಕಣಗಲ ಗುಂಡ್ಲಹಳ್ಳಿ ಗ್ರಾಮಗಳಲ್ಲಿನ ಕೆರೆಗಳ ಹೊಳು ತೆಗೆಯುತ್ತಿರುವುದನ್ನು ವಿರೋಧಿಸಲು ಕೋಲಾರ ಜಿಲ್ಲೆಯ ಪತ್ರಕರ್ತರು, ವಾರ್ತಾ ಇಲಾಖೆಯವರು ಹೊಳು ತೆಗೆಯುತ್ತಿದ್ದ ಸ್ಥಳದಲ್ಲೇ ರೈತರನ್ನು ಭೇಟಿ ಮಾಡಿದ್ದರು.

ಪ್ರಯೋಗ ಸಂಸ್ಥೆಯ ಯೋಜನಾ ಧಿಕಾರಿ ಶ್ರೀ ಆರ್.ಕೆ.ಗೌಡರವರು ಹೊಳೆತ್ತುವ ಕಾರ್ಯದ ಬಗ್ಗೆ ಸಂಕ್ಷಿಪ್ತವಾಗಿ ವಿವರಣೆ ನೀಡಿದರು. ಅತಿಥಿಗಳು ಕಣಗಲ ಗ್ರಾಮದ ಕೆರೆಯಲ್ಲಿ ರೈತರನ್ನು ಭೇಟಿ ಮಾಡಿ ಚರ್ಚಿಸಿದರು.

ಕುರುಬರ ಹಳ್ಳಿಕೆರೆ ಕಾಪು ಚಿಳದಿಂಗಳು !

ನೀರು ಹಾಯಿಸಲು ಜನೀನೇ ಇಲ್ಲ. ಸರ್ಕಾರ ಮೂರುಹತ್ತ ರೂಪಾಯಿ ಖರ್ಚು ಮಾಡಿ ಕೆರೆ ಕಟ್ಟಿದ ಈ ಘಟನೆ ನೆರದಿಯಾಗಿರು ವುದು ಶಿರಾ ತಾಲ್ಲೂಕು ಹುಯಿಲ್‌ದೊರೆ ಮಂಡಲ ಪಂಚಾಯಿತಿ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಕುರುಬರ ಹಳ್ಳಿಯಲ್ಲಿ.

ಇಲ್ಲಿ ನಿರ್ಮಿಸಲಾಗಿರುವ ಕೆರಿಗೆ ಯಾವುದೇ ಅಚ್ಚು ಕಟ್ಟು ಇಲ್ಲ. ಸುತ್ತಲು ಅಪವಿ ಇದೆ. ಕುರುಬರ ಹಳ್ಳಿಯ ಗ್ರಾಮಸ್ಥರು ಜಮೀನು ಮಾಡಿ ನೀರಿನ ಉಪಯೋಗ ಪಡೆ ವೋಣವೆಂದು ಯೋಚಿಸಿದರೆ ಅರಣ್ಯ ಇಲಾಖೆ ತಡೆಯಲು ಮಾಡುತ್ತಿದೆ.

ಹಾಗಿದ್ದರೆ ಇಲ್ಲಿ ಕೆರಿ ನಿರ್ವಾಣ ಮಾಡುವಾಗ ಸರ್ಕಾರ ಏನು ಉದ್ದೇಶವಿಟ್ಟು ಕೊಂಡಿತ್ತು. ಎಂದು ಜನ ಪ್ರಶ್ನಿಸುತ್ತಿದ್ದಾರೆ. ಈಗಾಗಲೇ ಜಮೀನುಗಳಿಗೆ ನೀರು ಉಣಿಸು ತ್ತಿದ್ದ ಕೆರಿಗಳು ದುರಸ್ತಿಯಿಲ್ಲದೆ ಸೊರಗುತ್ತಿರು ವಾಗ, ಹೀಗೆ ಸೂಕ್ತ ಉಪಯುಕ್ತತೆಯಕಾರಣ ವಿಲ್ಲದೆ ಕಾಡು ಬೆಳೆದಿಂಗಳೆಂತೆ ಕಾಡಿನಲ್ಲೊಂದು ಕೆರಿ ಕಟ್ಟಿದ ಬಗ್ಗೆ ಸರ್ಕಾರ ಏನಾದರೂ ವಿನ ರಣೆ ಕೊಟ್ಟಿತೇ? ಈ ಸಂಸ್ಥೆಗೆ ಉಪಯೋಗ ಪಡೆಯಲು ಜನರಿಗೆ ಮಾರ್ಗವೊಂದನ್ನು ಸೂಚಿ ಸೀತೆ ಎಂದು ಜನರು ಕಾಯುತ್ತಿದ್ದಾರೆ.

ಬಡವರ ಪಾಲಿಗೆ ಇಲ್ಲದ ಭೂಮಿ ಒಂದು ಕಡೆಯಾದರೆ ಕಟ್ಟಲ್ಪಟ್ಟಿರುವ ಕೆರೆಯ ನೀರಿನ್ನು ಎಲ್ಲಿಗೆ ಬಿಡಬೇಕು, ಇದು ಯಾರ ಉಪಯೋಗಕ್ಕಾಗಿ ಕಟ್ಟಲ್ಪಟ್ಟಿದೆ ಎಂಬುದು ಸ್ಥಳೀಯ ಜನರ ಪ್ರಶ್ನೆಗಳಾಗಿವೆ.

ಸರ್ಕಾರ ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಕ್ರಮ ಯಾಡುವ ಆಸೆ ಅನಿವ ತೋರಿಸಿ ಬಡವರಲ್ಲಿ ಎಷ್ಟೋ ಕನಸುಗಳನ್ನೆ ಕಲ್ಪಿಸಿ ಸಿಲುಕುವಂತೆ ಮಾಡಿ “ ಸತ್ತ ಕರು ಹಾಕುವ ದನದಂತೆ ” ಪ್ರಯೋಜನವಿಲ್ಲದ ಕೆಲಸ ಮಾಡಿ ತಾನು ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಕ್ರಮ ಮಾಡಿದ್ದೇನೆ ಎಂದು ಸಾರಿಕೊಳ್ಳುವುದರಲ್ಲಿ ಏನು ಅರ್ಥವಿದೆ. ಇನ್ನು ಮುಂದಾದರೂ ಸರ್ಕಾರ ಇತ್ತ ಗಮನ ಹರಿಸು ವುದು ಒಳ್ಳೆಯದು.

ತಿಪ್ಪೆಹಳ್ಳಿ, ಕೆರೆಯ ಕಣ್ಣೀರು

ಕೂಡ್ಲಿಗಿ ತಾಲ್ಲೂಕಿನ ತಿಪ್ಪೆಹಳ್ಳಿಯಲ್ಲಿ ಒಂದು ಹಳೆಯ ಕೆರಿ ಇದೆ ಅದರ ಏರಿ ಒಡೆದು ಈಗ ಇನ್ನೆತ್ತು ನರ್ಷಗಳಾಗಿವೆ. ಸುಮಾರು ಹತ್ತು ಮೀಟರ್ ನಷ್ಟು ಉದ್ದದ ಏರಿ ಒಡೆದು ಹೋಗಿದೆ. ಅದನ್ನು ಒಮ್ಮೆ ರೈತರು ಸ್ವತಃ ದುರಸ್ತಿ ಮಾಡಿದರು. ಏರಿ ಮತ್ತು ಒಡೆಯಿತು.

ಸರ್ಕಾರಿ ಇಂಜಿನಿಯರ್‌ಗಳು ಬಂದು ಆ ಏರಿಯು ದುರಸ್ತಿಗೆ ಒಂದು ಲಕ್ಷ ರೂಪಾಯಿ ಖರ್ಚಾಗುತ್ತದೆಂದು ಅಂದಾಜು ಮಾಡಿದರು. ಕೆರೆಯು ದುರಸ್ತಿಗಾಗಿ ವೀಶೇಂಪ್ರವಾಟಲೆಯ ನೊಂದಲು ಸುಖ್ಯ ಸುಖ್ಯಯಾಗಿದ್ದಾಗ ಮನವಿ ಪತ್ರವನ್ನು ಅರ್ಪಿಸಲಾಗಿತ್ತು. ಆ ನಂತರ ನುಖ್ಯಸುಖ್ಯಯಾದವರಿಗೇ ಈ ಕೆರೆಯನ್ನು ದುರಸ್ತಿ ಮಾಡಿಸುವಂತೆ ಮನವಿ ಪತ್ರ ಸಲ್ಲಿಸಲಾ ಗಿದೆ.

1989 ರಲ್ಲಿ ಶ್ರೀಯುತ ರಾಜೀವ್‌ಗಾಂಧಿ ಯವರು ಬಳ್ಳಾರಿಗೆ ಬಂದಿದ್ದಾಗ ಗ್ರಾಮಸ್ಥರೊ ಟ್ತರು ಪ್ರೋಲಸರು ಏಟು ಕೊಟ್ಟರೂ ಬಿಡದೆ ಮುನ್ನುಗ್ಗಿ ಹೋಗಿ ರಾಜೀವಿಗೆ ಮನವಿ ಅರ್ಪಿಸಿ ದ್ದಾರೆ. ಆದರೂ ಸರ್ಕಾರ ಕಿವಿಗೊಟ್ಟಿಲ್ಲ. ಈ ಸಲ ವಾದರೂ ಈ ಕೆರೆಯು ದುರಸ್ತಿಯಾಗ ಬಹು ದೊಂದು ಸಂಬಂಧಪಟ್ಟ ಇಲಾಖೆಗೆ ಹಲವಾರು ಪತ್ರ ಬರೆದಿದ್ದಾರೆ. ಆದರೆ ಉತ್ತರವಿಲ್ಲ.

ಒಮ್ಮೆ ಇಂಜಿನಿಯರುಗಳು ಬಂದು ಈ ಕೆರಿ ಪ್ರಯೋಜನವಿಲ್ಲ, ಹೊಸಕೆರೆಯನ್ನು ಮೂರುಲಕ್ಷ ಖರ್ಚು ಮಾಡಿ ಕಟ್ಟುತ್ತೇವೆ ಎಂದರು ಮತ್ತು ಕೆಲವರು ಇದು ಸರ್ಕಾರ ಕೆರಿ ಯಲ್ಲ ಅದಕ್ಕೆ ಸರ್ಕಾರ ಹಣ ಕೊಡುವುದಿಲ್ಲ ಎನ್ನುತ್ತಿದ್ದಾರೆ. ಒಟ್ಟಿನಲ್ಲಿ ನೂರಾರು ಎಕರೆ ಜಮೀನು ಬೇಳು ಬಿದ್ದು ಎಷ್ಟೋ ಕುಟುಂಬ ಗಳು ಭೂಮಿ ಇದ್ದೂ ಉಪವಾಸವಿರುವ ಸ್ಥಿತಿ ಯಾಗಿದೆ.

ಈ ಬಗ್ಗೆ ಹಣ ಕೂಡಿಸಲು ಹಳ್ಳಿಯ ವರು ಅಸ್ತು ಸ್ಥಿತಿನಂತರಲ್ಲ. ಏಕೆಂದರೆ ಸಾಕಷ್ಟು ದೊಡ್ಡ ಸೊತ್ತ ಬೇಕಾಗುತ್ತದೆ. ಈ ದಿನೆಯಲ್ಲಿ ಯಾವ ಕಡೆಯಿಂದ ಸಹಾಯ ಹೆಸ್ರದೊರೆತೇತು ಎಂದು ಜನ ಕಾದಿದ್ದಾರೆ. ಸಹಾಯ ಮಾಡುವ ವಂದ್ವರ ದುಡಿಯಲು ಸಿದ್ಧರಿದ್ದಾರೆ.

ಭಲೆ

ದಿನಾಂಕ 1 ನೇ ಮೇ 90 ರಂದು ಬಿಡುಗಡೆಯಾದ ಕೆರಿ ಉಳಿಸಿ, ಎಂಬ ಮಾಸಿಕ ಪತ್ರಿಕೆಯನ್ನು ನೋಡಿ ಖುಷಿಯಾಯ್ತು. ನಿಮ್ಮ ಸಾಹಸಕ್ಕೆ ಭಲೆ ಎನ್ನುವೆ. ಕೆರಿ ಕುರಿತು ನೀಡುವ ಅಭಿಯಾನ ಒಂದು ನರ್ಷದ ಹಿಂದೆ ಪ್ರಾರಂಭ ವಾದದ್ದು ಈಗ ನಿಧಾನವಾಗಿ ಹಬ್ಬ ತೊಡಗಿದೆ ಎಂದು ತಿಳಿಯಲು ಈ ಪತ್ರಿಕೆ ಸಹಾಯ ಮಾಡಿದೆ. ಕೆರಿಗಳನ್ನು ಕುರಿತ ಮಾಹಿತಿ ಸುದ್ದಿ ಗಳ ವಿನಿಮಯಕ್ಕೆ ಇಂಥ ಪುಟ್ಟ ಪತ್ರಿಕೆ ಸಹಾಯ ಮಾಡಲಿ.

ಅನಂತಹೆಗ್ಗಣಿ

ಸಹಾಯಕ್ಕೆ ಸಿದ್ಧ

ನಿಮ್ಮ ಪತ್ರಿಕೆ ನೋಡಿ ಸಂತೋಷವಾ ಯಿತು ಕರ್ನಾಟಕ ಮೂಲೆ ಮೂಲೆಯಲ್ಲಿ ಎಲೆ ಮುಯಲ್ಲಿ ನಡೆಯುತ್ತಿರುವ ಮುಖ್ಯ ಕಲ್ಯಾಣ ಕಾರ್ಯಗಳನ್ನು ಬಹಳ ಜಿನ್ನಾಗಿ ಗ್ರಾಮೀಣ ಜನರಿಗೆ ಮನದಟ್ಟಾಗುವಂತೆ ತಿಳಿಸಿದ್ದೀರಿ. ನಿಮ್ಮ ಅಂದೋಳನ ಸ್ವಗತ ಪಥದಲ್ಲಿ ನಡೆದು ರೈತರ ಕಲ್ಯಾಣವಾಗುವುದರಲ್ಲಿ ಸಂದೇಹವಿಲ್ಲ.

ನಾನು ಇನ್ನಿಬ್ಬರ ವ್ಯಕ್ತಿಗಳ ಸಂಗಡ ಫೋರ್ಡ್ ಫೌಂಡೇಷನ್‌ಗಾಗಿ ಕೆಲಸ ಮಾಡುತ್ತಿ ದ್ದೇನೆ. ನಮ್ಮ ನಿಮ್ಮಿಬ್ಬರ ಫೋಯ ಒಂದೇ ತೆರಿ ನಾಗಿದೆ. ನಾನು ಕೆರೆಯನ್ನು ಅದರ ಮೊದಲಿನ ಸ್ಥಿತಿಗೆ ತರಲು ತಾಂತ್ರಿಕ ಸಲಹೆ, ಯೋಜನೆ ತಯಾರಿಕೆಯಲ್ಲಿ ಉಚಿತವಾಗಿ ನೆರವು ನೀಡಲು ನಾನು ಸದಾ ಸಿದ್ಧ. ಈ ರೀತಿಯ ಕ್ರಿಯೆ ಈಗಾಗಲೇ ನೆಲಮುಗಲ ತಾಲ್ಲೂಕಿನ ಮಾರಗೊಂಡನ ಹಳ್ಳಿಯಲ್ಲಿ ಯುವಜನ ಮತ್ತು ಅಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆಯ ಸಹ ಭಾಗಿತ್ವದಲ್ಲಿ ನಡೆಯುತ್ತಿದೆ.

ಒಂದು ನರ್ಷದ 100 ದಿನಗಳ ಅವಧಿ ಯಲ್ಲಿ ಮುಗಿಯುವಂತಹ ಹೂಳಿತ್ತುವ ಕಾರ್ಯ ವಾಗಿದ್ದು ಹರಿಜನರಿಗೆಅನುಕೂಲವಾಗುವಂತಿದ್ದರೆ ಅಂತಹಕೆರೆಯ ಅಭಿವೃದ್ಧಿಗೆ ನಾನು ಸಹಕರಿಸಲು ಸದಾ ಸಿದ್ಧ.

●ಲೇಖಿ. ರಾಮುಕ್ಕಪ್ಪ ಕಟ್ಟಿ

ಬಿ.ಇ. (ಸಿವಿಲ್) ಎಂ.ಐ.ಇ ನಿನ್ನತ್ತ ಸೊಪರಿಂಟೆಂಡಿಂಗ್ ಇಂಜಿನಿಯರ್

ಮಾಹಿತಿ

✳ ಛಾರತದ ಸೆನ್ಸಸ್ ಕಮೀಷನರ್ ಆಗಿದ್ದ ಸರ್ ಜಾರ್ಜ್ ಎಲಿಯಟ್ 1870 ರಲ್ಲಿ ಹೀಗೆ ವರದಿ ಮಾಡಿದ್ದ ಒಂದೊಂದು ಕಣವೆಯಲ್ಲಿಯೂ ನೀರಾವರಿ ಕೆರೆಗಳ ಒಂದು ದೊಡ್ಡ ಜಾಲವೇ ಇರುತ್ತದೆ. ಒಂದೊಂದು ನದಿಯೂ ನದಿಯೂ ಹತ್ತಾರು ನೀರಾವರಿ ಕಾಲುವೆಗಳಿಗೆ ನೀರನ್ನು ಪೂರೈಸುತ್ತದೆ. ಈ ಇಡೀ ವ್ಯವಸ್ಥೆ ನಿಜಕ್ಕೂ ಚಮತ್ಕಾರ ಪೂರ್ಣ ಸಂಸ್ಥಾನದ ಆಡಳಿತವನ್ನು ನಡೆಸುತ್ತಿದ್ದ ಆಂಗ್ಲ ಅಧಿಕಾರಿಗಳು ಹಿಂದಿನಿಂದ ಬಂದಿರುವ ಏರ್ಪಾಡನ್ನು ಸುಸ್ತಿಯಲ್ಲಿ ಮುಂದುವರಿಸಿದರೆ ಸಾಕಾಗಿತ್ತು.

✳ ಹಳೆ ಮೈಸೂರಿನ ಮೊಟ್ಟಮೊದಲ ಆಂಗ್ಲ ಚೀಫ್ ಇಂಜಿನಿಯರುಗಳಲ್ಲಿ ಒಬ್ಬನಾದ ಮೇಜರ್ ಸ್ಯಾಂಕೀ ಹೀಗೆಂದಿದ್ದ ಇಲ್ಲಿಯ ಜಲಶೇಖರಣೆಯ ವ್ಯವಸ್ಥೆ ಎಷ್ಟು ವೈಜ್ಞಾನಿಕವಾಗಿದೆ ಎಂದರೇ ಹೊಸದಾಗಿ ಕೆರೆಗಳಿಂದ ಕೈ ಜಾಗವನ್ನು ಹುಡುಕುವುದಕ್ಕೆ ಶ್ರಮ ಪಡಬೇಕಾಗುತ್ತದೆ ಈಗ ಇರುವ ಕೆರೆಗಳನ್ನು ದುರಸ್ತಿಗೊಳಿಸುವುದು ಸಾಧ್ಯವಾದೀತು. ಆದರೆ ಎಲ್ಲೆಯಾದರೂ, ಹೊಸ ಕೆರೆಯೊಂದನ್ನು ಕಟ್ಟಿದಲ್ಲಿ ಅದರಿಂದ ಇನ್ನಾವುದೋ ಹಳೆಯ ಕೆರೆಯ ನೀರು ಪೂರೈಕೆಗೆ ತಡೆಯಾಗುವುದು ಖಂಡಿತ.

✳ ಕರ್ನಾಟಕದಲ್ಲಿ ಈಗಿರುವ ಕೆರೆಗಳ ಸಂಖ್ಯೆ 43,474, ಸುಮಾರು 18.28 ಲಕ್ಷ ಎಕರೆಯಷ್ಟು ಜಮೀನು ಈ ಕೆರೆ ಅಚ್ಚು ಕಟ್ಟಿಗೆ ಒಳಪಟ್ಟಿದೆ 19 ಜಿಲ್ಲೆಗಳ 27,028 ಹಳ್ಳಿಗಳಲ್ಲಿ ಹರಡಿರುವ ಈ ಕೆರೆಗಳಲ್ಲಿ 2,500 ಕ್ಕೂ ಹೆಚ್ಚಿನವನ್ನು ಅನುಪಯುಕ್ತವೆಂದೂ ಕೈಬಿಡಲಾಗಿದೆ. ಮಿಕ್ಕವುಗಳಲ್ಲಿ ಹೆಚ್ಚಿನವನ್ನು ಸುಸ್ತಿಯಲ್ಲಿವೆಯೆಂದು ಹೇಳುವಂತಿಲ್ಲ.

✳ ಹೊಳು ತುಂಬಿರುವುದರಿಂದಾಗಿ ಅನುಪಯುಕ್ತವಾಗಿರುವ ನೀರಾವರಿ ಜಮೀನು 3.81442 ಎಕರೆಯಷ್ಟಿದ್ದರೆ, ಕೆರೆಗಳಲ್ಲಿ ಹೊಳು ತುಂಬಿ ನೀರಿನಾಸರೆ ಕಳೆದು ಕೊಂಡಿರುವುದು. 2.19.305 ಎಕರೆ, ಹೀಗೆ ಒಟ್ಟು ಹತ್ತಿರದಿಂದ 600,000 ಎಕರೆಗಳಷ್ಟು ಜಮೀನಿನಲ್ಲಿ ಉತ್ಪಾದನೆ ತಪ್ಪಿದಂತಾಗಿದೆ. ಎಂಬುದರಿಂದ ಕೆರೆಗಳ ಮಹತ್ವವನ್ನು ಅಂದಾಜು ಮಾಡಬಹುದಾಗಿದೆ.

✳ ಕರ್ನಾಟಕದಲ್ಲಿ ಇರುವ ಮೇಲಣ ವಿವಿಧ ಗಾತ್ರದ ಕೆರೆಗಳ ಸಂಖ್ಯೆ ಹೀಗಿದೆ. (1975)

ಗಾತ್ರ	ಸಂಖ್ಯೆ	ಅಚ್ಚು ಕಟ್ಟು (ಎಕರೆ)
1) 10 ಎಕರೆಗಿಂತ ಕಡಿಮೆ ಜಮೀನಿಗೆ ನೀರೊದಗಿಸುವ ಸಣ್ಣ ಕೆರೆಗಳು	15,713	7,744
2) 10 ರಿಂದ 50 ಎಕರೆವರೆವಿಗೆ ನೀರೊದಗಿಸುವ ಸಣ್ಣ ಕೆರೆಗಳು	16,257	3,72,698
3) 50 ರಿಂದ 100 ಎಕರೆವರೆವಿಗೆ ನೀರೊದಗಿಸುವ ಮಧ್ಯಮ ಗಾತ್ರದ ಕೆರೆಗಳು	3,328	2,19,305
4) 100 ರಿಂದ 500 ಎಕರೆವರೆವಿಗೆ ನೀರೊದಗಿಸುವ ದೊಡ್ಡ ಕೆರೆಗಳು	2,701	5,15,378

5) 500 ಎಕರೆಗೂ ಮೇಲ್ಪಟ್ಟು ನೀರೊದಗಿಸುವ ಅತಿ ದೊಡ್ಡ ಕೆರೆಗಳು 336 3,04,178

✳ ವಿಶ್ವಬ್ಯಾಂಕಿನ ಸಾಲ ದೊರೆತೊಡನೆ ಕೆರೆಗಳ ನಿರ್ಮಾಣವ ವೆಚ್ಚವನ್ನು ಬಹುಪಟ್ಟು ಏರಿಸಲಾಯಿತು. ಹೀಗೆ ಹೆಚ್ಚಿದ ವೆಚ್ಚದಿಂದಾಗಿ ಕೆರೆಗಳ ಸಂಖ್ಯೆ 169 ರಿಂದ 79 ಕ್ಕೆ ಇಳಿಯಿತು ಮುಂಚೆ ರೂ 3,021000 ಅಂದಾಜು ಮಾಡಿದ್ದ ಒಂದು ಕೆರೆಗೆ ಇಂದು ರೂ. 34,00,000 ವೆಚ್ಚವಾಗುತ್ತಿದೆ. ಪರಿಣಾಮವಾಗಿ ಒಂದು ಹೆಕ್ಟೇರಿಗೆ, ನೀರಾವರಿ ಹೊಂದಗಿಸಲು, ಇಂದು ರೂ. 1 ಲಕ್ಷಕ್ಕೂ ಹೆಚ್ಚು ಖರ್ಚು ತಗಲುತ್ತದೆ. ಈ ಹೊರೆಯನ್ನು ಸಾರ್ವಜನಿಕರೇ ಹೊರಬೇಕಾಗುತ್ತದೆ

✳ ಕರ್ನಾಟಕದಲ್ಲಿ ವರ್ಷಕ್ಕೆ ಚದರ ಕಿಲೋ ಮೀಟರಿಗೆ ಕೊಚ್ಚಿ ಹೋಗುವ ಮಣ್ಣಿನ ಪ್ರಮಾಣ, ಕರಿ ಮಣ್ಣಿನ ಪ್ರದೇಶಗಳಲ್ಲಿ 11,250 ಟನ್ ಕೆಂಪು ಮಣ್ಣಿನ ಪ್ರದೇಶಗಳಲ್ಲಿ ಸವಕಳಿ 359 ಟನ್. ಎಲ್ಲೆಡೆ ಆರಣ್ಯ ನಾಶದಿಂದಾಗಿ, ಸವಕಳಿಯ ಪ್ರಮಾಣ ವರ್ಷದಿಂದ ವರ್ಷಕ್ಕೆ ಹೆಚ್ಚಾಗುತ್ತಿದೆ. ಆದರೂ ಹೊಸ ಕೆರೆಯ ಯೋಜನೆಯಲ್ಲಿ ವ್ಯಕ್ತವಾದ ಮೀಸಲಿರುವ ಹಣ ಒಟ್ಟು ಯೋಜನೆಯೇ ಶೇ. 10 ರಷ್ಟು ಮಾತ್ರ ಈ ಅಲ್ಪ ಮೊತ್ತವನ್ನು ನೀಲಗಿರಿ ಮೊದಲಾದ ಕಳಪೆ ಮುನಗಳನ್ನು ಬೆಳೆಯುವ ರೂಢಿ ಬೆಳೆಸಿಕೊಂಡಿರುವ ಆರಣ್ಯ ಇಲಾಖೆಗೆ ನೀಡಲಾಗಿದೆ. ಹೀಗೆ ಈಗ ಹೊಸದಾಗಿ ನಿರ್ಮಿತವಾಗುತ್ತಿರುವ ಕೆರೆಗಳ ಆಯುಷ್ಯ ಅಲ್ಪಾವಧಿಯದಾಗುತ್ತದೆ.

✳ ಹೆಚ್ಚು ಹೊಳು ತುಂಬಿರುವ 35,298 ಕೆರೆಗಳನ್ನು ದುರಸ್ತಿಗೊಳಿಸಲು ಯೋಜಿಸಿದಲ್ಲಿ ಕೃಷಿ ಅಭಿವೃದ್ಧಿ ಪರಿಸರ ರಕ್ಷಣೆಗಾಗಿ ಸಹಾಯವಾಗುವುದಲ್ಲದೇ ಸಾವಿರಾರು ಮಂದಿಗೆ ಉದ್ಯೋಗವು ದೊರೆಯುತ್ತದೆ.

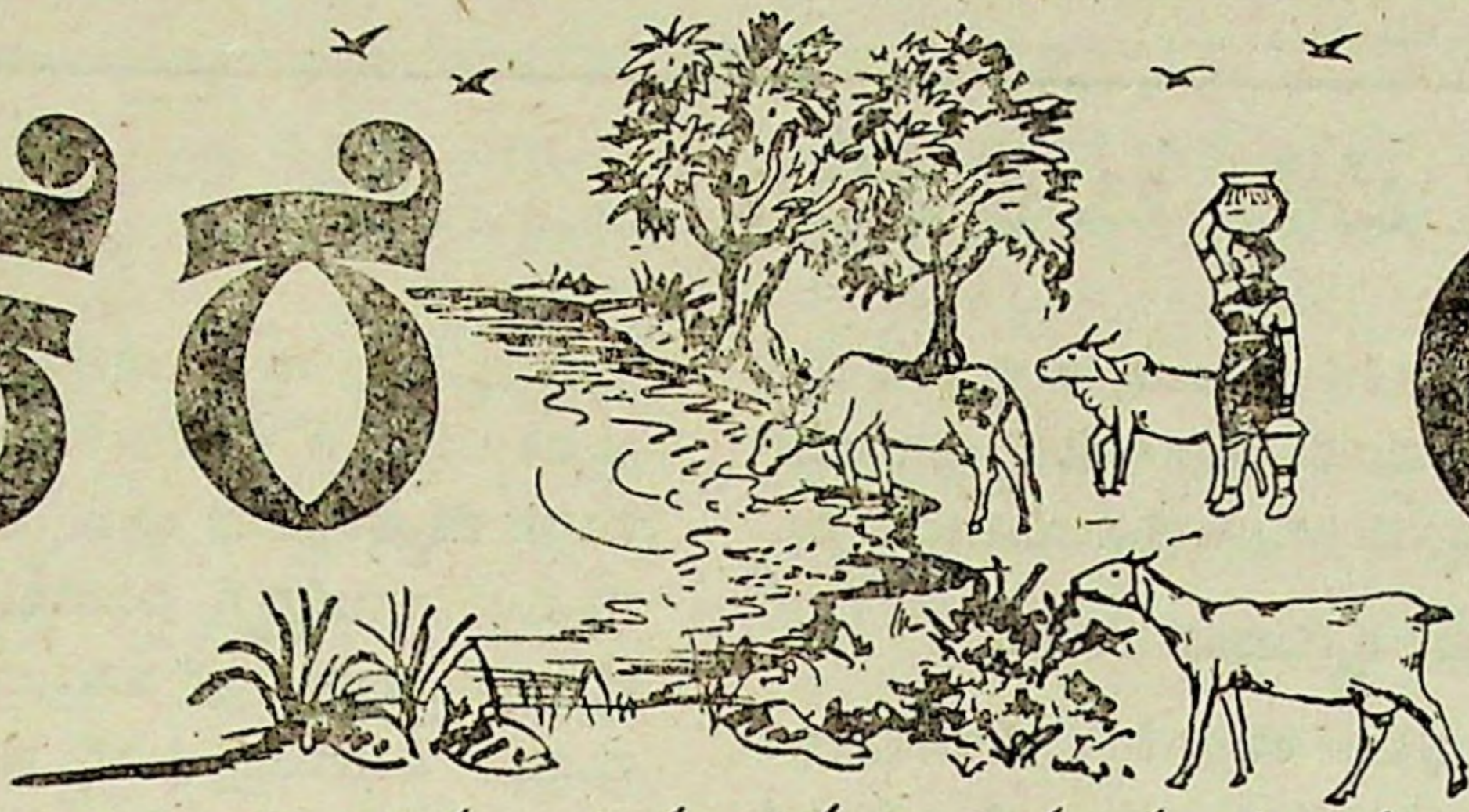
ಮನೆವಿ

ನಾವು ನಂಬಿಕೊಂಡಿದ್ದ ಮುದ್ರಣಾಲಯವನ್ನು ಮಕ್ಕಳಿಗಾಗಿ ಒಂದು ಪುಸ್ತಕ ಮುದ್ರಿಸುವ ಜವಾಬ್ದಾರಿ ನಿರ್ವಹಿಸುತ್ತಿದ್ದುದರಿಂದಾಗಿ ಜೂನ್ ಪತ್ರಿಕೆ ತರಲಾಗಲಿಲ್ಲ, ಕಾರಣ ಜೂನ್-ಜುಲೈ ಮಾಹೆಗಳ ಜಂಟಿ ಪ್ರಕಾಶನವಾಗಿ ಈ ಪತ್ರಿಕೆ ನಿಮ್ಮ ಕೈ ಸೇರಿದೆ. ಇನ್ನು ಮುಂದೆ ಈ ರೀತಿ ಆಗದಂತೆ ಜಾಗ್ರತೆ ವಹಿಸುತ್ತೇವೆಂದು ಈ ಮೂಲಕ ವಜನ ನೀಡುತ್ತೇನೆ. ವರದಿಗಳನ್ನು ಕಳಿಸಿ ಸಹಕರಿಸಲು ಕೋರುವ,

ತಮ್ಮ ವಿಶ್ವಾಸಿ
ಸಂಪಾದಕರು ಮಂಡಲಿ C/O
ಗ್ರಾಮ ಕಲ್ಯಾಣ
ಕೋಟೆ-ತೆಂಕಿ-572137
ಕರ್ನಾಟಕ

ಕೆರೆ

ಉಳಿಸಿ



ಮಣ್ಣು, ನೀರು, ಮರ ಗಡಗಲು ರಕ್ಷಣೆಗಾಗಿ ಮಾನ ಪತ್ರಿಕೆ.

ಸಂಚಿಕೆ ೧

ಸಂಪುಟ ೧

ಖಾಸಗಿ ಪ್ರಸಾರಕ್ಕಾಗಿ

ದಿನಾಂಕ 1-5-1990

ಸಂಪಾದಕೀಯ

ಕಟ್ಟೋಣ ಬನ್ನಿ ಹೊಸ ನಾಡೊಂದನು

ಬೆಳೆ ಆಧಾರವಾಗಿರುವ ನೀರು, ಮಣ್ಣು ಮತ್ತು ಸಸ್ಯರಾಶಿ ಸ್ವಾಭಾವಿಕವಾಗಿ ಈ ನಾಡಿನ ಅದೂಲ್ಯ ಸಂಪತ್ತಾಗಿವೆ. ದಿನೇ ದಿನೇ ಕಷ್ಟಗಳ ಸುಳಿಯಲ್ಲಿ ಸಿಕ್ಕು ದಿಕ್ಕಿಡುತ್ತಿರುವ ಕೃಷಿಯನ್ನು ಅಭಿವೃದ್ಧಿಪಡಿಸಲು ಸರ್ಕಾರ ಸ್ವಯಂ-ಸೇವಾ ಸಂಸ್ಥೆಗಳು ತಮ್ಮ ದೇ ಆದ ವಿಧಾನದಲ್ಲಿ ಪ್ರಯತ್ನಿಸುತ್ತಿವೆ. ಸ್ವತಃ ರೈತ ಕೂಡ ಪ್ರಯತ್ನಿಸುತ್ತಿದ್ದಾನೆ.

ನಮಗೆ ಪಾರಂಪರಿಕವಾಗಿ ಬಂದಿರುವ ಕೆರೆ ರೈತರ ಪಾಲಿಗೆ ಒಂದು ಆಸ್ತಿ. ಸಮುದಾಯ ಆಸ್ತಿ. ಮಳೆಯಿಂದ ಬಿದ್ದ ನೀರನ್ನು ಸಂಗ್ರಹಿಸಿಟ್ಟು ಕೊಂಡು ಬೆಳೆಗಳಿಗೆ ನೀರು ಒದಗಿಸುತ್ತದೆ. ದನ ಕರಗಳಿಗೆ, ಜನರ ದಿನ ನಿತ್ಯದ ಬಳಕೆಗೆ ಅವಕಾಶ ಕೊಡುತ್ತದೆ. ಭೂಮಿಯೊಳಗೆ ನೀರು ಜಿನುಗಲು ಬಿಟ್ಟು ಅಂತರ್ಜಲ ಹೆಚ್ಚಿಸಿ, ವ್ಯವಸಾಯದ ಹಾಗೂ ಕುಡಿಯುವ ನೀರಿನ ಬಳಕೆಗೆ ಮತ್ತೊಂದು ಮೂಲವನ್ನು ಜೀವಂತವಾಗಿಸುತ್ತದೆ. ಬಿದ್ದ ಮಳೆ ನೀರು ಸುಮ್ಮನೆ ಹರಿದು ಭೂಮಿಯ ಫಲವತ್ತಾದ ಮೇಲ್ಪದರಿಂದ ಮಣ್ಣು ಕೊಚ್ಚಿ ಹೋಗದಂತೆ ತಡೆಯುತ್ತದೆ.

ಕೆರೆ ಗ್ರಾಮೀಣ ಬದುಕಿಗೆ ಹಲವಾರು ರೀತಿಯಲ್ಲಿ ನೆಚ್ಚಿ ಗೆಯ ಗೆಳೆಯ ನಾಗಿದೆ. ಅದನ್ನು ನಿರ್ವಹಿಸಲು, ರಿಪೇರಿ ಮಾಡಿಸಲು ಹೆಚ್ಚಿನ ಜನರು ಪಟ್ಟಣದ ಮೇಧಾವಿ ಇಂಜಿನಿಯರ್‌ಗಳನ್ನು, ತಜ್ಞ ನೀರಾವರಿ ಇಲಾಖೆಯನ್ನು ಕಾಯಬೇಕಾದುದಿಲ್ಲ. ಕೆರೆಯ ಮೂಲಕ ಒಣ ಭೂಮಿಗೆ ನೀರುಣಿಸುವ ಯೋಜನೆಗಾಗಿ ಸರ್ಕಾರಗಳು ವಿಶ್ವಬ್ಯಾಂಕ್‌ನಿಂದ ಸಾಲ ತರಬೇಕಾದುದಿಲ್ಲ. ಸಾಲ ತಂದು ರೈತರಿಗೆ ಮತ್ತಷ್ಟು ತೆರಿಗೆ ಹೊರಿಸಬೇಕಾದುದಿಲ್ಲ.

ಕೆರೆ ಪಾರಂಪರಿಕವಾಗಿ ಒದಗಿ ಬಂದಿರುವ ನಮ್ಮ ಪಾರಂಪರಿಕ ತಂತ್ರ ಜ್ಞಾನ, ಅದನ್ನು ಅಭಿವೃದ್ಧಿ ಪಡಿಸಬೇಕೆಂದರೆ ಅದರಲ್ಲಿರುವ ಹೂಳನ್ನು ತೆಗೆಯಬೇಕು. ಮತ್ತೆ ಹೂಳು ತುಂಬದಂತೆ ತಡೆಯಬೇಕು. ಹೂಳು

ತುಂಬದಿರಬೇಕೆಂದರೆ ಕೆರೆಗೆ ನೀರು ಹರಿದು ಬರುವ ಜಲಾನಯನ ಪ್ರದೇಶ ದಲ್ಲಿ ಗಡ ಮರಗಳು ಹೇರಳವಾಗಿ ಬೆಳೆಯಬೇಕು.

ಕೆರೆಯನ್ನು ಕಾಪಾಡಿಕೊಳ್ಳುವುದೆಂದರೆ ಹೀಗೆ ಮಣ್ಣು ನೀರು, ಸಸ್ಯ ಮೂರನೂ, ಬೇಸಾಯಕ್ಕೆ ಪ್ರಾಣಗಳಾದ ಈ ಮೂರನ್ನು ರಕ್ಷಿಸಲು ಜನ ತಮ್ಮ ಶ್ರಮ ಹೂಡಬೇಕಾಗುತ್ತದೆ. ಆ ಸಂಪತ್ತು ಅಕ್ಷಯ ನಿಧಿಯಾಗಿ ಬೇಸಾಯದ ಜೀವವನ್ನು ಬದುಕಿಸುತ್ತದೆ.

ಈ ಕರ್ತವ್ಯವನ್ನು ಜನರಿಗೆ ಮನವರಿಕೆ ಮಾಡಿಸಿ, ಜೈತನ್ಯವನ್ನು ಪುನರುಜ್ಜೀವನಗೊಳಿಸಿ ದೃಢವಾದ, ನಂಬಲರ್ಹವಾದ ಅಭಿವೃದ್ಧಿಯ ಹಾದಿಯಲ್ಲಿ ನಡೆಯುವುದನ್ನು ಖಾತ್ರಿಗೊಳಿಸಲು ಕರ್ನಾಟಕದ ಕೆಲವು ಸಂಘಟನೆಗಳು ಒಂದು ವೇದಿಕೆಯನ್ನು ರಚಿಸಿಕೊಂಡಿವೆ. ತಮ್ಮಲ್ಲಿರುವ ಜ್ಞಾನ, ಶ್ರಮ ಹಣಗಳನ್ನು ಈ ದಿಸೆಯಲ್ಲಿ ಜಂಟಿಯಾಗಿ ವ್ಯಯಿಸಿ ತಮ್ಮ ಕರ್ತವ್ಯ ಸುಗಮವಾಗಿ ಈಡೇರಿದ ಸಾರ್ಥಕತೆ ಪಡೆಯಲು ನಿರ್ಧರಿಸಿವೆ.

ಈ ಸ್ವಯಂ ಸೇವಾ ಸಂಸ್ಥೆಗಳು, ನೀರು, ಮಣ್ಣು, ಸಸ್ಯಗಳ ಅಭಿವೃದ್ಧಿಗಾಗಿ ಕೆರೆಯನ್ನು ಕೇಂದ್ರವಾಗಿಟ್ಟುಕೊಂಡು ಜನರ ಮೂಲಕ ನಡೆಸುವ ಚಟುವಟಿಕೆಗಳನ್ನು ಬೇರೆ ಬೇರೆ ಜನರಿಗೆ ತಿಳಿಸಲು, ಆ ಮೂಲಕ ಬೇರೆ ಜಾಗಗಳಲ್ಲೂ ಇಂತಹ ಸ್ವಯಂ ಪ್ರೇರಿತ ಚಟುವಟಿಕೆಯನ್ನು ಪ್ರೇರಿಸಿಸಲು, ಜನರ ನಡುವೆ ಸಂಪರ್ಕ ಸಾಧ್ಯವಾಗಲು ಒಂದು ಪುಟ್ಟ ಮಾಸ ಪತ್ರಿಕೆಯನ್ನು "ಕೆರೆ ಉಳಿಸಿ" ಎಂಬ ಹೆಸರಿನಲ್ಲಿ ಹೊರತರಲು ನಿರ್ಧರಿಸಿದ ಸಲವಾಗಿ ಈ ಪ್ರಥಮ ಸಂಚಿಕೆಯು ನಿಮ್ಮ ಕೈ ಸೇರಿದೆ.

“ಕೆರೆ ರೈತರ ಜೀವನಾಡಿ”
“ಕೆರೆ ಉಳಿಸಿ, ನೀರು ಗಳಿಸಿ”

ಮೂಡಿತೊಂದು ಬೆಳ್ಳಿ ಚುಕ್ಕೆಯೂ.....

ಕಬಿನಿ ನಿರ್ಮಾಣ ವಿರೋಧ

ಹೆಗ್ಗಡೆ ದೇವನಕೋಟೆ ತಾಲ್ಲೂಕಿನಲ್ಲಿ ಈಗಾಗಲೇ ಮೂರು ದೊಡ್ಡ ಅಣೆಕಟ್ಟುಗಳಿದ್ದು, ತಾಲ್ಲೂಕಿನ ದಟ್ಟ ಕಾಡನ್ನು ಅರ್ಧ ಮುಳುಗಿಸಿವೆ. ನೂರಾರು ಹಾಡಿಗಳ ಗಿರಿಜನರನ್ನು, ಹಲವಾರು ಹಳ್ಳಿಗಳ ಬಡರೈತರನ್ನು ಎತ್ತಂಗಡಿ ಮಾಡಿ ಈ ‘ಅಭಿವೃದ್ಧಿ’ ನಡೆಸಲಾಗಿದೆ. ಈಗ ನಿರ್ಮಾಣ ವಾಗಲು ಉದ್ದೇಶಿಸಿರುವ ಕಬಿನಿ ಎರಡನೇ ಹಂತದ ಅಣೆಕಟ್ಟು ನಿರ್ಮಾಣ ವಿರೋಧಿಸಿ ಅಲ್ಲಿನ ರೈತರು ಇತ್ತೀಚೆಗೆ ಸಮಾವೇಶ ನಡೆಸಿದರು.

ನಾಲ್ಕು ಸಾವಿರಕ್ಕೂ ಹೆಚ್ಚಿಗೆ ಸಂಖ್ಯೆಯಲ್ಲಿ ಹೆಚ್.ಡಿ. ಕೋಟೆಯಲ್ಲಿ ನೆರೆದಿದ್ದ ರೈತರು ‘ಕಬಿನಿ ಎರಡನೇ ಹಂತ ನಿರ್ಮಾಣ ವಿರೋಧಿಸಮಿತಿ’ ರಚಿಸಿಕೊಂಡು ಹೋರಾಟದ ನಿರ್ಣಯಕ್ಕೆ ಬಂದರು. ಸಭೆಯಲ್ಲಿ ರೈತಸಂಘ, ದಲಿತ ಸಂಘರ್ಷ ಸಮಿತಿ, ಪ್ರಗತಿರಂಗ, ಸಿ. ವಿ. ಕೆ, ಕರ್ನಾಟಕ ವಿಮೋಚನಾರಂಗ, ಮುಂತಾದ ಜನಪದ ಸಂಘಟನೆಗಳ ಹಾಗೂ ಕಾಂಗ್ರೆಸ್, ಜನತಾ, ಜನತಾದಳ ಮುಂತಾದ ರಾಜಕೀಯ ಪಕ್ಷಗಳ ಪ್ರತಿನಿಧಿಗಳು ಭಾಗವಹಿಸಿ ಹೋರಾಟಕ್ಕೆ ಬೆಂಬಲ ಸೂಚಿಸಿದರು.

‘ತಾರಕ’ ಜಲಾಶಯ ಏತ ನೀರಾವರಿಯೇ ಜನ ಜಾರಿಗೊಳಿಸಬೇಕೆಂದು, ಕಬಿನಿ ಎರಡನೇ ಹಂತದ ನಿರ್ಮಾಣವನ್ನು ಕೈಬಿಡಬೇಕೆಂದು ಒತ್ತಾಯಿಸಿ ಸರ್ಕಾರಕ್ಕೆ ಮನವಿ ಸಲ್ಲಿಸಲಾಯಿತು. ಆರ್. ಸ್ವಾಮಿ ಆನಂದ್ ಈ ಕಾರ್ಯಕ್ರಮವನ್ನು ಇತರರ ನೆರವಿನೊಂದಿಗೆ ಸಂಘಟಿಸಿದ್ದರು.

ತಾಲ್ಲೂಕು ಜನಕಲಾಮೇಳ

ಹರಪನಹಳ್ಳಿ ತಾಲ್ಲೂಕು ಜನಕಲಾಮೇಳ ಕೊಮಾರನಹಳ್ಳಿಯಲ್ಲಿ ತಾಲ್ಲೂಕು ಜನಕಲಾಮೇಳವನ್ನು ಕೃಷಿಕ ಯುವಜನ ಸಂಘ ಏರ್ಪಡಿಸಿತ್ತು. ಊರ ಬಳಿಯ ದೊಡ್ಡ ಮಾವಿನ ಮರದಡಿ ಬೆಳಗ್ಗೆಯಿಂದ ಸಂಜೆವರೆಗೆ ನಡೆದ ಕಾರ್ಯಕ್ರಮದಲ್ಲಿ ಲಂಬಾಣಿ ಹೆಣ್ಣು ಮಕ್ಕಳ ಕುಣಿಕೆ ಮಹಾಭಾರತ ವಾಚನ, ಕೋಲಾಟ, ಡೊಳ್ಳು ಬೀದಿ ನಾಟಕ, ಏಕಪಾತ್ರಾಭಿನಯ, ಜನಪದ ಗೀತೆ ಗಾಯನ ಮುಂತಾದ ಕಾರ್ಯಕ್ರಮಗಳು ನಡೆದವು.

ತಾಲ್ಲೂಕಿನ ಹಲವಾರು ಹಳ್ಳಿಗಳಿಂದ ಬಂದಿದ್ದ ಸುಮಾರು 300 ಜನರಿದ್ದ ಈ ಕಾರ್ಯಕ್ರಮವನ್ನು ಜಿ.ಎಫ್. ಸಿಂಹ ಸಂಯೋಜಿಸಿದ್ದರು. ಮರ ನೆಡು, ಶ್ರಮದಾನ ಮಾಡು

ಕಲಘಟಗಿ ತಾಲ್ಲೂಕಿನ ಬೋಗೇನಾಗರ ಕೊಪ್ಪ ಗ್ರಾಮದ ಯುವಕ ಸಂಘವು ಊರಿನ ಬಸವದೇವರ ಗುಡಿಯ ಮುಂದೆ ಶ್ರಮದಾನ ಹಾಗೂ ಸಾಂಸ್ಕೃತಿಕ ಕಾರ್ಯಕ್ರಮ ಏರ್ಪಡಿಸಿತ್ತು. ಗುಡಿಯ ತೋಪಿನಲ್ಲಿ ತೆಂಗಿನ ಮರ, ಮಾವಿನ ಮರಗಳನ್ನು ನೆಡಿಸಲಾಯಿತು. ನಂತರ ನಡೆದ ಆಟೋಟ ಸ್ಪರ್ಧೆಯಲ್ಲಿ ಸುತ್ತ-ಮುತ್ತಲ 9 ಗ್ರಾಮಗಳ ಯುವಕ ತಂಡಗಳು ಭಾಗವಹಿಸಿದ್ದವು ಎಲ್ಲಾ ಯುವಕ ಸಂಘಗಳು ಸೇರಿ ‘ಮಹಾ ಮಂಡಲ’ ಎಂಬ ಒಕ್ಕೂಟ ರಚಿಸಿಕೊಂಡು ಕೆರೆ, ಒಣ ಬೇಸಾಯ, ಪರಿಸರ, ಅಭಿವೃದ್ಧಿಗಾಗಿ ಸ್ವಯಂ ಸೇವಾ ಕಾರ್ಯ ನಿರ್ವಹಿಸಲು ನಿರ್ಣಯಿಸಿವೆ.

ಆಟೋಟಗಳಲ್ಲಿ ಗೆದ್ದವರಿಗೆ ಸ್ಥಳೀಯ ಶಾಸಕರು ಬಹುಮಾನ ವಿತರಣೆ ಮಾಡಿದರು. ಎಂ. ಎಸ್. ಹುಲಗೂರ ಈ ಕಾರ್ಯಕ್ರಮವನ್ನು ರೂಪಿಸಿದ್ದರು.

ಹುಬ್ಬಳ್ಳಿಯಲ್ಲಿ ತರಬೇತಿ

ಅನ್ನ, ನೀರು, ಪರಿಸರ ಹಾಗೂ ಪ್ರಾಣಿ ಸಂಪತ್ತುಗಳ ರಕ್ಷಣೆಯ ಬಗ್ಗೆ ಹುಬ್ಬಳ್ಳಿ ಸಿದ್ದ ರೂಢಿಸ್ವಾಮಿ ಮಠದಲ್ಲಿ ಮೂರು ದಿನಗಳ ತರಬೇತಿ ಏರ್ಪಡಿಸಲಾಗಿತ್ತು. ಕೆರೆಗಳ ರಕ್ಷಣೆ, ಜೀವನ ಶಿಕ್ಷಣದ ಪ್ರಾಮುಖ್ಯತೆ, ಮುಂತಾದವುಗಳ ಬಗ್ಗೆ ಹಲವಾರು ತಜ್ಞರು ತರಬೇತಿ ನೀಡಿದರು. ಈ ತರಬೇತಿಯಲ್ಲಿ ಹಲವಾರು ಸರ್ವೋದಯ ಕಾರ್ಯದ ಮುಖಂಡರು ಭಾಗವಹಿಸಿದ್ದರು. ಹಿರಿಯ ಸರ್ವೋದಯ ಕಾರ್ಯಕರ್ತ ಎಸ್. ಎಸ್. ಗುರಿಕಾರ್ ಈ ತರಬೇತಿಯನ್ನು ಸಂಘಟಿಸಿದ್ದರು.

ಗ್ರಾಮದ ಅಸ್ತಿ ಗ್ರಾಮಸ್ಥರಿಗೆ

ಕೆ.ಆರ್.ನಗರ ತಾಲ್ಲೂಕು ಕುಪ್ಪೆ ಗ್ರಾಮ ಹಾಗೂ ಪಕ್ಕದ ಗ್ರಾಮಗಳ ಯುವಕರು ಸಂಘ ಸೇರಿ ಗ್ರಾಮೀಣ ಸಂಪನ್ಮೂಲ ರಕ್ಷಣೆಗೆ ನಿರ್ಣಯಿಸಿದ್ದಾರೆ. ಇದುವರೆಗೆ ಅಲ್ಲಿದ್ದ ಕೆರೆಯಲ್ಲಿ ಮೀನು ಹಿಡಿಯುವ ಕಂಟ್ರಾಕ್ಟನ್ನು ವ್ಯಕ್ತಿಗಳಿಗೆ ಕೊಡು

ತ್ತಿದ್ದನ್ನು ನಿಲ್ಲಿಸಿ ಗ್ರಾಮ ಸಮಿತಿಯ ಸಮೂಹಿಕ ಜವಾಬ್ದಾರಿಗೆ ಕೊಡಬೇಕೆಂದು, ಆ ಸಮಿತಿ ಮೀನು ವ್ಯಾಪಾರದಿಂದ ಬಂದ ಲಾಭವನ್ನು ಗ್ರಾಮದ ಅಭಿವೃದ್ಧಿಗೆ ವಿನಿಯೋಗಿಸುವುದೆಂದು ಮಂಡಲ್ ಪಂಚಾಯ್ತಿಗೆ ಒತ್ತಾಯಿಸಲಾಯಿತು ಮಂಡಲ್ ಪಂಚಾಯ್ತಿಯವರು ಇದಕ್ಕೆ ಸಮ್ಮತಿಸಿದ್ದಾರೆ. ಜವಹರ್ ರೋಜಗಾರ್ ಕೆಲಸವನ್ನು ಸಹ ಕಂಟ್ರಾಕ್ಟರ್ ಬದಲು ಯುವಕ ಸಮಿತಿಯ ಮೇಲ್ವಿಚಾರಣೆಗೆ ವಹಿಸಲಾಗುವುದೆಂದು ಆಶ್ವಾಸನೆ ಬಂದಿದೆ. ಗ್ರಾಮಸ್ಥರು ಅಭಿವೃದ್ಧಿ ಸಮಿತಿಗಳನ್ನು ರಚಿಸಿಕೊಂಡು, ತಮ್ಮ ಸಮುದಾಯ ಆಸ್ತಿಯ ನಿರ್ವಹಣೆಗೆ ಮುಂದಾಗಿದ್ದಾರೆ. ಕೆ. ಎಸ್. ಮೋಹನ್ ಈ ಪ್ರಯತ್ನಗಳ ಪ್ರೇರಕರಾಗಿದ್ದಾರೆ.

ಕೆರೆ ಉಳಿಸಿ ಕಮಿಟಿ ಅಸ್ತಿತ್ವಕ್ಕೆ

ತುಮಕೂರಿನ ‘ರೆಡ್ಸ್’ ಸಂಸ್ಥೆಯಲ್ಲಿ “ಕೆರೆ ಉಳಿಸಿ ಕಮಿಟಿ” ಎಂಬ ಉಪ ಸಮಿತಿಯನ್ನು ಅಸ್ತಿತ್ವಕ್ಕೆ ತರಲಾಗಿದೆ.

ಈ ಸಮಿತಿಯಲ್ಲಿ ಜಿಲ್ಲಾ ಕಮಿಟಿ ಸದಸ್ಯರಾದ ಅಡವಿಶಯ್ಯ, ವೀರಪ್ಪ, ಕದ್ರಪ್ಪ, ಸರ್ವಮಂಗಳ ಮತ್ತು ಸಣ್ಣಪ್ಪ ಇವರ ಜೊತೆಗೆ ಡೇವಿಡ್, ಎ. ರಾಜಣ್ಣ, ವೆಂಕಟೇಶ್‌ವರರುಗಳಿದ್ದು ಈ ತಂಡ ಜಿಲ್ಲಾ ಪರಿಷತ್‌ಗೆ ಫೆ. 5 ರಂದು ಭೇಟಿ ನೀಡಿ ಸರ್ಕಾರದಿಂದ ಕಾಮಗಾರಿ ಕೆಲಸಗಳಿಗೆ ಬಿಡುಗಡೆಯಾಗಿರುವ ಹಣವನ ಕೆರೆ, ಭೂಮಿ ಮತ್ತು ಸಸ್ಯ ಸಂರಕ್ಷಣೆಗೆ ಬಳಸಬೇಕೆಂದು ಒತ್ತಾಯಿಸಿದೆ.

ಈ ಒತ್ತಾಯಕ್ಕೆ ಮಣಿದ ಜಿಲ್ಲಾ ಪರಿಷತ್ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಯವರು ಮಂಡಲ್‌ಗಳಿಗೆ ಹಣ ಬಿಡುಗಡೆ ಮಾಡುತ್ತೇನೆ ಅಲ್ಲಿ ಪ್ರಧಾನರ ಜೊತೆ ಈ ಬಗ್ಗೆ ಚರ್ಚಿಸಿ ಕೆರೆ, ಭೂಮಿ, ಸಸ್ಯ ಸಂರಕ್ಷಣೆಗೆ ಬಳಸುವಂತೆ ಒತ್ತಾಯಿಸಿ ಎಂದು ಆದೇಶ ನೀಡಿದ್ದಾರೆ. ಈ ಆದೇಶ ಹೊತ್ತ ತಂಡ ಮಂಡಲ್ ಪ್ರಧಾನರುಗಳನ್ನು ಭೇಟಿಮಾಡಿ ಈ ಬಗ್ಗೆ ಒತ್ತಾಯಿಸುವ ಕೆಲಸದಲ್ಲಿ ಮುಂದುವರಿದಿದೆ.

ಕೆರೆ ಅಧ್ಯಯನ

ತುಮಕೂರು ತಾಲ್ಲೂಕು ಬೆಳ್ಳಾವಿ ಓಬಳಿ ಗೌಡನಹಳ್ಳಿಯಲ್ಲಿನ ಒಂದು ಕೆರೆಯನ್ನು ರೆಡ್ಸ್ ಅಧ್ಯಯನ ಮಾಡಿದೆ. ಈ ಕೆರೆ ಪುರಾತನ

ಕಾಲವು, ಈಗ 5 ಅಡಿ ಯವರೆಗೆ ಹೊಂಡು ಮುಚ್ಚಿಕೊಂಡು ಕೇವಲ 18 ಎಕರೆ ಭೂಮಿಗೆ ನೀರು ಒದಗಿಸುತ್ತದೆ. ಈ ಅಧ್ಯಯನದ ಪ್ರಕಾರ ತೂಬು, ಕೋಡಿ, ಉತ್ತಮವಾಗಲು ಸುಮಾರು 1 ಕಿ.ಮೀ ಹಿಡುವಳಿ ಪ್ರದೇಶದಿಂದ ನೀರು ವೇಗವಾಗಿ ಹರಿದು ಈ ಕೆರೆಗೆ ಬರುತ್ತವೆ. ಇದರಿಂದ ಭೂಮಿ ತುಂಬಾ ಕೊರಕಲುಗಳಾಗಿವೆ. ಈಗ ಈ ಕೆರೆಯಲ್ಲಿ 6 ಅಡಿ ಅಳವಡವೆಗೆ ಸುಮಾರು 200X250 ವಿಸ್ತೀರ್ಣದಲ್ಲಿ ಹೊಂಡು ತೆಗೆಯಬೇಕಾಗಿದೆ.

ಕೆರೆಗಳ ಸಂರಕ್ಷಣೆ ಕಾರ್ಯಕ್ರಮ

‘ಪ್ರಯೋಗ’ ಸಂಸ್ಥೆಯು ತನ್ನ ಕಾರ್ಯಕ್ಷೇತ್ರವಾದ ಕೋಲಾರ ಜಿಲ್ಲೆ, ಮಾಲೂರು ತಾಲ್ಲೂಕು, ಹುಳದೇನ ಹಳ್ಳಿ ಟೀಕಲ್, ಹಸಾಂಡನಹಳ್ಳಿ, ವಂಡಲ್ ಗಳ ಕೆಲವು ಹಳ್ಳಿಗಳಲ್ಲಿ ರೈತರಿಂದಿಗೆ, ಚರ್ಚೆಗಳನ್ನು ನಡೆಸುತ್ತಿರುವಾಗ ಆಹಾರದ ಉತ್ಪಾದನೆಯ ಕೊರತೆಗೆ ಕೆರೆಗಳು ಎಂದಿನ ಸ್ಥಿತಿಯಲ್ಲಿಲ್ಲದಿರುವುದೇ ಕಾರಣವೆಂದು ಅರಿತು ಅದಕ್ಕಾಗಿ ಕೆರೆಗಳು ಮೊದಲ ಸ್ಥಿತಿಗೆ ಬರಬೇಕಾದರೆ, ರೈತರೇ ಮುಂದಾಗ ಬೇಕೆಂಬ ಭಾವನೆ ರೈತರಲ್ಲಿ ಬಂದು “ಕೆರೆಗಳ ಉಳಿಸಿ” ಕಾರ್ಯಕ್ರಮವನ್ನು ಪ್ರಾರಂಭಿಸುವ ಎಂದು ರೈತರು ತೀರ್ಮಾನಿಸಿದರು. ಅದಕ್ಕಾಗಿ ಕಣಗಲ, ಗುಂಡ್ಲಹಳ್ಳಿ, ನಲ್ಲಾಂಡಹಳ್ಳಿ ತಿಪ್ಪಸಂದ್ರ, ದೊಡ್ಡನಾಯನಹಳ್ಳಿ ಮತ್ತು ಚಿಕ್ಕನಾಯನಹಳ್ಳಿ, ಗ್ರಾಮಗಳಲ್ಲಿ ಕೆರೆ ಉಳಿಸಿ ಸಮಿತಿಗಳನ್ನು ರಚಿಸಲಾಯಿತು. ಈ ಸಮಿತಿಗಳು ಪ್ರತಿ 15 ದಿನಕ್ಕೊಮ್ಮೆ ಸಭೆ ಸೇರಿ ಚರ್ಚೆಗಳನ್ನು ನಡೆಸುತ್ತಿದ್ದಾರೆ.

ಜಲಾನಯನ ಪ್ರದೇಶದ ಅಭಿವೃದ್ಧಿ

ಪ್ರಯೋಗ ಸಂಸ್ಥೆಯು ಕೃಷಿ ಇಲಾಖೆಯೊಂದಿಗೆ ಚರ್ಚಿಸಿ ಖುಷ್ಕಿ ಭೂಮಿಯ ಅಭಿವೃದ್ಧಿಗಾಗಿ ಜಿಲ್ಲಾ ಪರಿಷತ್ ಕೋಲಾರದ ಮೂಲಕ ರಾಷ್ಟ್ರೀಯ ಜಲಾನಯನ ಪ್ರದೇಶದ ಅಭಿವೃದ್ಧಿ ಯೋಜನೆಯನ್ನು ಅನುಷ್ಠಾನಕ್ಕೆ ತಂದಿದೆ. ಅದರಂತೆ ಈ ಯೋಜನೆಯಿಂದ 42 ಕೆರೆಗಳ ಜಲಾನಯನ ಪ್ರದೇಶದಲ್ಲಿ ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಕ್ರಮ ನಡೆಯುತ್ತಿದೆ. ಈ ಯೋಜನೆಗಳು 4 ವರ್ಷದ ಅವಧಿಯಲ್ಲಿ ಭೂಸಾರ ಸಂರಕ್ಷಣೆ ಮತ್ತು ಆಹಾರ ಉತ್ಪಾದನೆಯ ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಒಳಗೊಂಡಿವೆ.

ಈಗಾಗಲೇ 10 ಗ್ರಾಮಗಳ ಕೆರೆಗಳ ಜಲಾನಯನ ಪ್ರದೇಶಗಳು ಭೂಸಾರ ಸಂರಕ್ಷಣೆ ಕೆಲಸ

ಗಳನ್ನು ಪೂರೈಸಿದೆ ಮತ್ತು 6 ಹಳ್ಳಿಗಳ ಜಲಾನಯನ ಪ್ರದೇಶದಲ್ಲಿ ಆಹಾರದ ಬೆಳೆಗಳ ಅಭಿವೃದ್ಧಿಯ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಪೂರೈಸಿದ್ದು, ಮುಂದಿನ ವರ್ಷಕ್ಕೆ 5 ಹಳ್ಳಿಗಳ ಜಲಾನಯನ ಪ್ರದೇಶದಲ್ಲಿ ಆಹಾರದ ಉತ್ಪಾದನೆಯ ಅಭಿವೃದ್ಧಿಗಾಗಿ ಸಿದ್ಧತೆಗಳು ಮಾಡಲಾಗಿದೆ.

ಈ ಕಾರ್ಯಕ್ರಮಗಳಲ್ಲಿ ರೈತರನ್ನು ಸಕ್ರಿಯವಾಗಿ ಭಾಗಿಗಳಾಗುವಂತೆ ಮಾಡಲು “ಕೆರೆ ಉಳಿಸಿ” ಸಮಿತಿಗಳು ಪ್ರಯತ್ನಿಸಿವೆ. ಈ ಸಮಿತಿಗಳಿಗೆ ‘ಪ್ರಯೋಗ’ ಸಂಸ್ಥೆಯು ಜಲಾನಯನ ಪ್ರದೇಶದ ಅಭಿವೃದ್ಧಿಯ ಕಾರ್ಯಕ್ರಮಗಳ ಅಭಿವೃದ್ಧಿಯಲ್ಲಿ ತೊಡಗಲು ಕೃಷಿ ಇಲಾಖೆ ಮಾಲೂರು ಇವರೊಂದಿಗೆ ಚರ್ಚೆ, ತರಬೇತಿಗಳನ್ನು ನಡೆಸುತ್ತಿದೆ.

ರೈತರಿಗೆ ಕೃಷಿ ಇಲಾಖೆಯಿಂದ ನಡೆದಿರುವ ಭೂ ಸಂರಕ್ಷಣೆ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಸಂರಕ್ಷಿಸಿಕೊಂಡು ಬಂದರೆ, ಜಲಾನಯನ ಪ್ರದೇಶದಿಂದ ಮಳೆ ನೀರಿನೊಂದಿಗೆ ಕೆರೆಗಳಿಗೆ ಹರಿದು ಬರುವ ಮಣ್ಣನ್ನು ತಡೆಗಟ್ಟಲು ಸಹಾಯವಾಗುತ್ತದೆ, ಅಲ್ಲದೇ ಎಲ್ಲಾ ಖುಷ್ಕಿ ಪ್ರದೇಶದಲ್ಲಿ ಸಹ ರೈತರ ಸ್ವತಃ ಭೂ ಸಾರ ಸಂರಕ್ಷಣೆ ಕೆಲಸಗಳನ್ನು ಮಾಡಿಕೊಳ್ಳಬೇಕೆಂಬ ಹೊಣೆಗಾರಿಕೆಯನ್ನು ರೈತರೇ ತೆಗೆದುಕೊಳ್ಳಬೇಕೆಂಬ ಅರಿವನ್ನು ಕೊಡುತ್ತಾರೆ. ಇದಕ್ಕಾಗಿ ಕೆಲವು ಪ್ರಕಟಣೆಗಳನ್ನು ‘ಪ್ರಯೋಗ’ ಸಂಸ್ಥೆಯು ಸೇವಾ ಸಂಸ್ಥೆ ಮತ್ತು ಕೃಷಿ ಇಲಾಖೆ, ಮಾಲೂರು ಇವರು ತಂದಿರುತ್ತಾರೆ.

ಕಣಗಲ, ಗುಂಡ್ಲಹಳ್ಳಿ, ತಿಪ್ಪಸಂದ್ರ, ನಲ್ಲಾಂಡಹಳ್ಳಿ ಮತ್ತು ಅನಿಮಟ್ಟಗಾನಹಳ್ಳಿಯ “ಕೆರೆ ಉಳಿಸಿ” ಸಮಿತಿಗಳೊಂದಿಗೆ ಪ್ರಯೋಗ ಸಂಸ್ಥೆಯು, ಬೇಸಿಗೆ ದಿನಗಳಲ್ಲಿನ ಬಿಡುವಿನ ಸಮಯದಲ್ಲಿ ಕೆರೆಗಳಲ್ಲಿರುವ ಹೂಳು ಮಣ್ಣನ್ನು ರೈತರು ತಮ್ಮ ತಮ್ಮ ಹೊಲ, ತೋಟಗಳಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಲು ಕೈಗೊಳ್ಳಬಹುದಾದ ಕ್ರಮಗಳ ಬಗ್ಗೆ ಚರ್ಚೆ ನಡೆಸಿದೆ. ಇದರಿಂದ ಈ ವರ್ಷದ ಬೇಸಿಗೆಯಲ್ಲಿ ಕೆರೆಗಳಿಂದ ಹೂಳು ತೆಗೆಯುವ ಕಾರ್ಯಕ್ರಮ ಹೆಚ್ಚಿನ ರೀತಿಯಲ್ಲಿ ನಡೆಯುವಂತೆ ಪ್ರೇರೇಪಿಸುತ್ತಿದೆ.

ಸೀಗೇನಹಳ್ಳಿ ಸುತ್ತಮುತ್ತ

ಗ್ರಾಮಾಭಿವೃದ್ಧಿ ಪ್ರಧಾನ ಸಂಸ್ಥೆಯು ಕೋಲಾರ ಜಿಲ್ಲೆಯ ಮುಳಬಾಗಿಲು ತಾಲ್ಲೂಕಿನ 20 ಗ್ರಾಮಗಳಲ್ಲಿ ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು

ಕೈಗೊಂಡಿದೆ. ಈ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ನಡೆಸಲು ಗ್ರಾಮ ವಿಕಾಸ ಸಂಸ್ಥೆಯು ಅರ್ಥಿಕವಾಗಿಯೂ ಗ್ರಾಮಾಭಿವೃದ್ಧಿ ಪ್ರಧಾನ ಸಂಘವು ಸಂಘಟಿತವಾಗಿಯೂ ನಿರತವಾಗಿವೆ.



ಚಿತ್ರದುರ್ಗ ಜಿಲ್ಲೆಯಲ್ಲೊಂದು ತರಬೇತಿ ಶಿಬಿರ

ಶ್ರೀ ಮುರುಘ ರಾಜೇಂದ್ರ ಮಹಾವಿದ್ಯಾಲಯದ ರಾಷ್ಟ್ರೀಯ ಸೇವಾ ಯೋಜನೆಯ ಅಡಿಯಲ್ಲಿ ಸಂಯುಕ್ತ ವಿಶೇಷ ವಾರ್ಷಿಕ ಸೇವಾ ಶಿಬಿರ ಚಿತ್ರದುರ್ಗ ತಾಲ್ಲೂಕಿನ ಹುಣಸೇಕಟ್ಟಿ ಗ್ರಾಮದಲ್ಲಿ ದಿನಾಂಕ 6-1-90 ರಂದು ನಡೆಯಿತು. ಇದರಲ್ಲಿ ಎಸ್. ಎಸ್. ಎ. ಎಸ್. ಸಂಸ್ಥೆಯ ಟಿ. ತಿಪ್ಪೇರುದ್ರಪ್ಪ ಹಾಗೂ ಗುರುಮೂರ್ತಿ ಭಾಗವಹಿಸಿ ತರಬೇತಿಯನ್ನು ನೀಡಿದರು.

ಕರ್ನಾಟಕ 43,474 ಕೆರೆಗಳಲ್ಲಿ 25,000 ಕೆರೆಗಳು ಜೊಳು ತುಂಬಿ ಅನುಪಯುಕ್ತವಾಗ ತೊಡಗಿವೆ ಎರಡು ಬೆಳೆಗಳಿಗೆ ಆಗುತ್ತಿದ್ದ ನೀರು ಈಗ ಒಂದೇ ವೇಳೆಗೆ ಆಗುತ್ತಿದೆ. ಪರಿಸ್ಥಿತಿ ಮುಂದುವರೆದರೆ ಹೆಚ್ಚಿನಂಶ ಎಲ್ಲಾ ಕೆರೆಗಳು ನಾಶವಾಗುತ್ತವೆಂದು ವಿವರಿಸಲಾಯಿತು. ಇದಲ್ಲದೇ ಕೆರೆಗಳಲ್ಲಿ ನೀರು ಇಲ್ಲದಿರುವಿಕೆ ಅಂತರ್ಜಲ ಪ್ರಮಾಣವನ್ನು ಕಡಿಮೆ ಮಾಡಿದೆ ಎಂದು ತಿಳಿಸಲಾಯಿತು.

ಭೂಮಿಯ ಫಲವತ್ತಾದ ಮೇಲ್ಮೈ ಮುಖ್ಯ ಭೂ ಸವಕಳಿಯಿಂದಾಗಿ 1 ವರ್ಷಕ್ಕೆ 1200 ಕೋಟಿ ಟನ್ ಗಳಷ್ಟು ಕೊಚ್ಚಿ ಹೋಗುತ್ತಿದ್ದು ಇದರಿಂದಾಗಿ 3 ರಿಂದ 5 ಸಾವಿರ ಕೋಟಿ ಟನ್ ಆಹಾರ ಉತ್ಪಾದನೆ ಕಡಿಮೆಯಾಗುತ್ತಿದೆ ಎಂಬ ಅಂಶದ ಬಗ್ಗೆ ವಿವರ ನೀಡಲಾಯಿತು.

ಮಾಸಾಶನ ಬ್ಯಾಂಕುಗಳ ಸಾಲ ಇತ್ಯಾದಿಗಳಿಗೆ ಪ್ರಾಶಸ್ತ್ಯ ಕೊಡುವ ಬದಲು ಗಿಡ, ಮರ ನೆಡುವೆ ಜಲಾನಯನ ಪ್ರದೇಶ ಅಭಿವೃದ್ಧಿ, ಕೆರೆಗಳ ಪುನರುಜ್ಜೀವನ, ಅಂತರ್ಜಲ ಸಂರಕ್ಷಣೆ ಮುಂತಾದ ಕಾರ್ಯಕ್ರಮಗಳಲ್ಲಿ ಎಲ್ಲರೂ ಸಕ್ರಿಯರಾಗುವ ಮೂಲಕ ಅಭಿವೃದ್ಧಿ ಸಾಧ್ಯವೆಂಬ ಭಾವನೆ ಶಿಬಿರಾರ್ಥಿಗಳಲ್ಲಿ ಮೂಡಿತು. ಕಾರ್ಯಕ್ರಮದಲ್ಲಿ ರಾಷ್ಟ್ರೀಯ ಸೇವಾ ಯೋಜನೆಯ 80 ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸುಮಾರು 500 ಜನ ಗ್ರಾಮಸ್ಥರು ಭಾಗಹಿಸಿದ್ದರು.

ಸೀಗೇನಹಳ್ಳಿಯ ಸುತ್ತ-ಮುತ್ತ

ಒಣ ಬೇಸಾಯ ಅಭಿವೃದ್ಧಿ

ಹೊಲಗಳಲ್ಲಿ ಬದುಗಳನ್ನು ಹಾಕಿ ನೀರು ಜಮೀನಿನಲ್ಲಿಯೇ ಉಳಿಯುವಂತೆ ಮಾಡುವುದು ಕೆರೆ ಯ ಗೋಡೆ ನ್ನು 1 ಎಕರೆಗೆ 50 ಗಾಡಿ ಹೊಡೆಯುವುದು. ಹೀಗೆ 200 ಎಕರೆ ಅಭಿವೃದ್ಧಿ ಮಾಡಲಾಗಿದೆ. ಮತ್ತು 30 ಎಕರೆ ಮಾವಿನ ಗಿಡಗಳನ್ನು ನಾಟಿ ಮಾಡಲಾಗಿದೆ. ಈ ವರ್ಷದಲ್ಲಿ (1990) 500 ಎಕರೆ ಅಭಿವೃದ್ಧಿ ಮಾಡಲಾಗುವುದು ಮತ್ತು 100 ಎಕರೆ ಮಾವಿನ ಗಿಡಗಳನ್ನು ಬೆಳಸಲಾಗುವುದು. ಫಲಾನುಭವಿಗಳ ಇತರೆ ಕಾರ್ಯಕ್ರಮಗಳಿಂದ ಮತ್ತು ಇಲಾಖೆವತಿಯಿಂದ ಬೇಕಾದ ಬೀಜಗಳನ್ನು ಪೂರೈಸಿಕೊಳ್ಳಲಾಗುವುದು.

ಕೆರೆಗಳನ್ನು ಉಳಿಸುವುದು

ಕುನಿಬಂಡೆ ಎಂಬ ಗ್ರಾಮದಲ್ಲಿ ಒಂದು ಸಣ್ಣ ಕೆರೆಯಲ್ಲಿ ಹೊಳು ತೆಗೆಸಲಾಗಿದೆ. ಕೆರೆಯ ಮೇಲ್ಭಾಗದ ಹೊಲಗಳಲ್ಲಿ ಬದುಗಳನ್ನು ಹಾಕಲಾಗಿದೆ. ಮತ್ತು ಸ್ವಲ್ಪ ಪ್ರದೇಶದಲ್ಲಿ ಮಾತ್ರ ಗಿಡಗಳನ್ನು ನೆಡಲಾಗಿದೆ. ಈ ವರ್ಷ (1990) ಸೀಗೇನಹಳ್ಳಿಯ ಒಂದು ಕೆರೆಯನ್ನು ಹೊಳು ತೆಗೆಸಲಾಗುವುದು. ಇದಕ್ಕೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಕೆರೆಯ ಜಾಗವನ್ನು ಮಾಪನ ಮಾಡಲಾಗಿದ್ದು ಫಲಾನುಭವಿಗಳ ಕಮಿಟಿಗಳನ್ನು ರಚಿಸಲಾಗಿದೆ. ನಮ್ಮಿಂದ ಪ್ರೇರಿತವಾಗಿ 3 ಮಂಡಲ್ ಪಂಚಾಯ್ತಿಗಳು ಕೂಡುಗಾಲುನೆ ಕೆಲಸಗಳನ್ನು ಮಾಡಿಸಿರುತ್ತಾರೆ.

ಗಿಡಮರಗಳನ್ನು ಬೆಳೆಸುವುದು

1989 ರಲ್ಲಿ 50 ಸಾವಿರ ಸಸಿಗಳನ್ನು ಬೆಳೆಸಿ ನಾಟಿ ಮಾಡಲಾಗಿದೆ. ಈ ವರ್ಷದಲ್ಲಿ 2 ಲಕ್ಷ ಸಸಿಗಳನ್ನು ಬೆಳೆಸಲು ಈಗಾಗಲೇ ಪ್ರಾರಂಭಿಸಲಾಗಿದೆ.

ಈ ಮೂರು ಕಾರ್ಯಕ್ರಮಗಳ ಬಗ್ಗೆ ನಾವು ಮಾಡುವುದರ ಜೊತೆಗೆ ಮಂಡಲ್ ಪಂಚಾಯ್ತಿ, ಕೃಷಿ ಇಲಾಖೆ ಮತ್ತು ಅರಣ್ಯ ಇಲಾಖೆಗಳೊಂದಿಗೆ ಚರ್ಚೆಗಳನ್ನು ನಡೆಸಲಾಗಿದೆ. ಗ್ರಾಮಗಳಲ್ಲಿ ವಿಚಾರ ಸಂಕೀರ್ಣಗಳನ್ನು ಏರ್ಪಡಿಸಲಾಗುತ್ತಿದೆ

ಪ್ರಗತಿಯಲ್ಲಿ ಕೆರೆಗಳ ಕಾರ್ಯ

ಶಿವನೊಗ್ಗ ಜಿಲ್ಲೆ ಚನ್ನಗೀಯ ಪ್ರಗತಿ ಗ್ರಾಮೀಣ ಅಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆ ಕೆರೆಗಳ ಪುನರ್ ಜೀವನ ಮತ್ತು ಒಣ ಬೇಸಾಯದ ಬಗ್ಗೆ ತನ್ನ ಕಛೇರಿಯ ಸಿಬ್ಬಂದಿ ವರ್ಗಕ್ಕೆ ಎರಡು ದಿನಗಳ ತರಬೇತಿ ಶಿಬಿರವನ್ನು ಏರ್ಪಡಿಸಲಾಗಿತ್ತು. ಈ ತರಬೇತಿ ಶಿಬಿರದಲ್ಲಿ 10 ಜನರು ಭಾಗವಹಿಸಿದ್ದರು.

ತರಬೇತಿ ಪಡೆದ ಸಿಬ್ಬಂದಿ ತಂಡ 10 ಹಳ್ಳಿಗಳಲ್ಲಿ ಪುರುಷರ ಮತ್ತು ಮಹಿಳಾ ಸಂಘಗಳಲ್ಲಿ ಚರ್ಚೆ ಮಾಡಿ ಒಣ ಬೇಸಾಯ ಕುರಿತಾಗಿ ಪುರುಷ ಸಂಘಗಳು ಕೆರೆಯ ಮೇಲ್ಭಾಗ ಮತ್ತು ಇಳಿಜಾರು ಪ್ರದೇಶಗಳಲ್ಲಿ ಹೊಲಗಳಿಗೆ ಬದುಗಳನ್ನು ಹಾಕುವಂತೆ ಮತ್ತು ಬೀಸಿಗೆಯಲ್ಲಿ ಹಳ್ಳಿಯ ಜನರಿಗೆ ಕೆಲಸ ಕೊಡುವಂತೆ, ಮಂಡಲ್ ಪಂಚಾಯ್ತಿಗೆ ಒತ್ತಾಯ ಮಾಡಿದೆ.

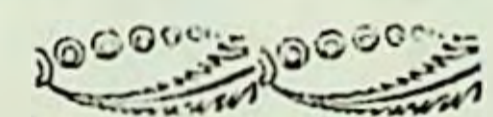
ಅರಣ್ಯ ಅಭಿವೃದ್ಧಿ ದೃಷ್ಟಿಕೋನದಿಂದ ಪ್ರಗತಿ ಸಂಸ್ಥೆಯು 20,000 ಗಿಡಗಳನ್ನು ಬೆಳೆಸುವ ಯೋಜನೆಯನ್ನು ಹಾಕಿಕೊಂಡಿದೆ. ಈ ನರ್ಸರಿಯಲ್ಲಿ ಬಂದ ಸಸಿಗಳನ್ನು ರೈತರು ತಮ್ಮ ಹೊಲಗಳ ಬದುಗಳಲ್ಲಿ ಖಾಲಿ ಜಾಗಗಳಲ್ಲಿ, ರಸ್ತೆಯ ಎರಡೂ ಬದಿಗಳಲ್ಲಿ ಹಾಕುವಂತೆ ಯೋಜಿಸಲಾಗಿದೆ.

ಇಟ್ಟಿಗೆ ತಯಾರಿಕೆ

ಕೆರೆಗಳಲ್ಲಿ ತುಂಬಿರುವ ಹೂಳೆತ್ತಲು ಗ್ರಾಮ ವಾಸಿಗಳು ಇತ್ತೀಚೆಗೆ ಮುಂದೆ ಬರದೇ ಹೋಗುತ್ತಿರುವುದು ಕೆರೆಗಳ ದರ್ಜೆಯವೇ ಸರಿ ಆದರೆ ಇಟ್ಟಿಗೆ ಹಾಕುವುದರ ಮೂಲಕ ಕೊಂಬವಾದರೂ ಈ ಹೂಳನ್ನು ತೆಗೆಯುವುದರ ಜೊತೆಗೆ ಜನರಿಗೆ ಕೂಲಿ ದೊರೆಯುವ ಹಾಗೆ ಮಾಡಬಹುದಾಗಿದೆ. ಈ ರೀತಿ ತಯಾರಿಸಿದ ಇಟ್ಟಿಗೆಗೆ ಇತ್ತೀಚೆಗಂತೂ ಪಟ್ಟಣಗಳಲ್ಲಿ ಬಹಳ ಬೇಡಿಕೆಯಿರುವುದರಿಂದ ಜನರು ಆರ್ಥಿಕ ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಕ್ರಮವೂ ಗಿಯೂ ಸಹ ಇದನ್ನು ಉಪಯೋಗಿಸಿಕೊಳ್ಳಬಹುದು.

ಈ ದಿಸೆಯಲ್ಲಿ ತುಮಕೂರು ಜಿಲ್ಲೆ ಶಿರಾ ತಾಲ್ಲೂಕಿನ ಗ್ರಾಮ ಕಲ್ಯಾಣ ಗ್ರಾಮೀಣ ಅಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆ ತನ್ನ ಕಾರ್ಯಕ್ಷೇತ್ರದ ಎರಡು ಗ್ರಾಮಗಳಲ್ಲಿ 1,25,000 ಇಟ್ಟಿಗೆಗಳನ್ನು ತಯಾರಿಸುವುದರೊಂದಿಗೆ ಈ ಕಾರ್ಯಕ್ರಮಕ್ಕೆ ನಾಂದಿ ಹಾಡಿದೆ.

ಈ ಕಾರ್ಯಕ್ರಮದ ಹೆಚ್ಚಿನ ವಿವರಗಳನ್ನು ನಮ್ಮ ಮುಂದಿನ ಪತ್ರಿಕೆಯಲ್ಲಿ ಪ್ರಕಟಿಸಲಿದ್ದೇವೆ.



ಸಹಭಾಗಿಗಳಲ್ಲಿ ಮನವಿ

‘ಕೆರೆ ಉಳಿಸಿ’ ಪತ್ರಿಕೆಯಲ್ಲಿ ನಿಮ್ಮ ಸಂಸ್ಥೆಯ ಕಾರ್ಯ ಚಟುವಟಿಕೆಗಳ ವರದಿ ಪ್ರಕಟಣೆಗಾಗಿ ಕಳುಹಿಸಿ.

ಬರಹ ಸಂಕ್ಷಿಪ್ತವಾಗಿರಲಿ, ವರದಿಯಲ್ಲಿ ಕಾರ್ಯ ಚಟುವಟಿಕೆ ನಡೆದ ಸ್ಥಳ, ಭಾಗವಹಿಸಿದ ವ್ಯಕ್ತಿಗಳು, ಕೈಗೊಂಡ ಚಟುವಟಿಕೆ, ಬೆಂಬಲಿಸಿದ ಸಂಸ್ಥೆ, ಇತ್ಯಾದಿ ಮುಖ್ಯ ವಿವರಗಳು ಮಾತ್ರ ಇರಲಿ. ವರದಿಗಳನ್ನು ಬಿಡಿಯಾದ ಅಕ್ಷರದಲ್ಲಿ ಬಿಳಿ ಹಾಳೆಯ ಒಂದೇ ಮಗ್ಗುಲಿನಲ್ಲಿ ಬರೆದು ಕಳುಹಿಸಬೇಕು.

ವರದಿಗಳು ಪ್ರತಿ ತಿಂಗಳ 20ನೇ ತಾರೀಖಿನೊಳಗೆ ತಲುಪಬೇಕು. ಇದು ನಮ್ಮೆಲ್ಲರ ಸಾಮೂಹಿಕ ಹೊಣೆಗಾರಿಕೆಯ ಕೆಲಸವಾದ್ದರಿಂದ ವಿನಂತಿಯ ಅಗತ್ಯವೆಲ್ಲವೆಂದು ಭಾವಿಸುತ್ತಿದ್ದೇವೆ.

ವಿಳಾಸ: ಸಂಪಾದಕ ಮಂಡಳಿ
C/O ಗ್ರಾಮ ಕಲ್ಯಾಣ,
ಕೋಟೆ, ಸಿರಾ-572 137.

THE EARTH IS PRECIOUS

In 1884, the "Great White Chief" in Washington made an offer for a large area of Indian land and promised a "reservation" for the Indian people. Chief Seattle's reply, published here in full, has been described as the most beautiful and profound statement on the environment ever made.

How can you buy or sell the sky, the warmth of the Land?
The idea is strange to us.

If we do not own the freshness of the air and the sparkle of the water, how can you buy them?

Every part of this Earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing and humming insect, is holy in the memory and experience of my people.

The sap which courses throughout the trees carries the memories of the red man.

The white man's dead forget the country of their birth when they go to walk among the stars. Our dead never forget this beautiful Earth, for it is the mother of the red man.

We are part of the Earth and it is part of us.

The perfumed flowers are our sisters; the deer, the horse, the great eagle, these are our brothers.

The rocky crests, the juices in the meadows, the body heat on the pony, and man - all belong to the same Family.

So when the Great Chief in Washington sends word that he wishes to buy our land, he asks much of us.

The Great Chief sends word he will reserve us a place so that we can live comfortably to ourselves.

He will be our father and we will be his children. So we will consider your offer to buy our land.

But it will not be easy. For this land is sacred to us.

This shining water that moves in the streams and rivers is not just water but the blood of our ancestors.

If we sell you land, you must remember that it is sacred, and you must teach your children that it is sacred and that each ghostly reflection in the clear water of the lakes tells of events and memories in the life of my people.

The water's murmur is the voice of my father's father.

The rivers are our brothers, they quench our thirst. The rivers carry our canoes, and feed our children. If we sell you our land, you must remember, and teach your children, that the rivers are our brothers, and yours, and you must henceforth give the rivers the kindness you would give any brother.

We know that the white man does not understand our ways. One portion of land is the same to him as the next, for he is a stranger who comes in the night and takes from the land whatever he needs.

The Earth is not his brother, but his enemy, and when he has conquered it, he moves on. He leaves his father's graves behind, and he does not care.

He kidnaps the Earth from his children and he does not care.

His fathers' grave, and his children's birthright, are forgotten. He treats his mother, the Earth, and his brother, the sky, as things to be bought, plundered, sold like sheep or bright beads. His appetite will devour the Earth and leave behind only a desert.

I do not know. Our ways are different from your ways.

The sight of your cities pains the eyes of the red man.

But perhaps it is because the red man is a savage and does not understand.

There is no quiet place in the white man's cities. No place to hear the unfurling of leaves in spring, the rustle of an insect's wings.

But perhaps it is because I am a savage and do not understand.

The clatter only seems to insult the ears. And what is there to life if a man cannot hear the lonely cry of the whippoorwill or the arguments of the frogs around a pond at night? I am a red man and do not understand. The Indian prefers the soft sound of the wind darting over the face of a pond, and the smell of the wind itself, cleaned by a midday rain, or scented with the pinon pine.

The air is precious to the red man, for all things share the same breath - the beast, the tree, the man, they all share the same breath.

The white man does not seem to notice the air he breathes. Like a man dying for many days, he is numb to the stench.

But if we sell you our land, you must remember that the air is precious to us, that the air shares its spirit with all the Life it supports.

The wind that gave our grandfather his first breath also receives his last sigh.

And if we sell you our land, you must keep it apart and sacred, as a place where even the white man can go to taste the wind that is sweetened by the meadow's flowers.

So we will consider your offer to buy our land. If we decide to accept, I will make one condition: the white man must treat the beast of this land as his brothers.

I am a savage and do not understand any other way.

I have seen a thousand rotting buffaloes on the prairie, left by the white man who shot them from a passing train.

I am a savage and I do not understand how the smoking iron horse can be more important than the buffalo that we kill only to stay alive.

What is man without the beasts? If all the beasts were gone, man would die from a great loneliness of spirit.

For whatever happens to the beasts, soon happens to man. All things are connected.

You must teach your children that the ground beneath their feet is the ashes of you grandfathers. So that they will respect the land, tell your children that the earth is rich with the lives of our kin.

Teach your children what we have taught our children, that the earth is our mother.

Whatever befalls the Earth befalls the sons of the Earth. If men spit upon the ground, they spit upon themselves.

This we know: The earth does not belong to man; man belongs to the earth. This we know.

All things are connected.

Whatever befalls the earth befalls the sons of the earth. Man did not weave the web of life; he is merely a strand in it. Whatever he does to the web, he does to himself.

Even the white man, whose God walks and talks with him as friend to friend, cannot be except from the common destiny.

We may be brothers after all. We shall see.

One thing we know, which the white man may one day discover - our God is the same God. You may think now that you own Him as you wish to own our land; but you cannot. He is the God of man, and his compassion is equal for the red man and white.

This Earth is precious to Him, and to harm the Earth is to heap contempt on its Creator.

The whites too, shall pass; perhaps sooner than all the other tribes.

Contaminate your bed, and you will one night suffocate in your own waste.

But in you perishing, you will shine brightly, fired by the strength of the God who brought you to this land and for some special purpose gave you dominion over this land and over the red man.

That destiny is a mystery to us, for we do not understand when the buffalo are all slaughtered, the wild horses are tamed, the secret corners of the forest heavy with scent of many men, and the view of the ripe hills blotted by talking wires.

Where is the thicket? Gone.

Where is the eagle? Gone.

The end of living and beginning of survival.

VOLUNTARY HEALTH ASSOCIATION OF KARNATAKA

Report of the Workshop 'CLEAN ENVIRONMENT' held in connection with AGBM on 15.6.1996 at National Institute of Personnel Management, Bangalore 560 001.

The Programme began with invocation song by Ms. Amrutha, followed by welcome speech by Fr. Patrick Rodrigues. The theme of the Workshop was introduced by Mr. S. M. Subramanya Setty. Sri. K. V. Bengeri, Chairman of Karnataka State Pollution Control Board inaugurated the programme and Key note address was delivered by Mr. Sridhar, I.A.S. Transport Commissioner and Dr. Channabasavanna, Director, NIMHANS presided over the function. Mr. Ramakrishna, Administrator spoke on Health Implications of Water Pollution. Dr. Anand, ENT Surgeon spoke on Health Implications of Air Pollution.

Fr. Patrick Rodrigues in his welcome address outlined how these various pollutions effect our health with live examples by co-relating bad weather with the pollution saying 'The bad health may dampen only our spirit, bad environment will effect physically, mentally and spiritually'. He expressed his happiness of the efforts of Voluntary sectors since they form a vital organ in the development, where health is very essential and right of each individual specially the childrens of today are citizens of tomorrow, who need healthy life.

The introduction of theme was done by Mr. S. M. Subramanya Setty. He opined Annual General Body Meeting is business session of VHAK. It creates a platform where the participants from all over the Karnataka will be enriched with adequate knowledge and skills and sharing the experiences regarding the happenings at global situation. Since the WHO theme for this year is 'Clean Environment' VHAK Board members felt it would be most appropriate to choose the above subject during its AGBM. Every year most important and essential issue was selected and deliberated on. Programmes were proposed to the Member Institutions which will be more ideal and suitable and would become the part of programme for the ensuing year. He expressed his happiness for the gradual increase in number of Member Institutions from 20 to 171 over the period of years.

Shri K. V. Bengeri, Chairman of Karnataka State Pollution Control Board, in his inaugural address, outlined the close relation between 'Health and Pollution'. Various

types of pollutions like Air, Water, Drug, Soil and Solid waste ultimately lead to gaseous pollution and under ground Water pollution, definition and norms of the pollutants beyond which lead to the ill health of an individual. He said State Pollution Control Board staff would have more teeth in checking pollution in collaboration with Forest Department, Transport Department and Municipal Corporation. Whereas Bangalore City Corporation had been issued civil notice to dispose of garbage expeditiously. The BCC had promised to clean up the city by removing the garbage during 1996-97. Industrial units producing hazardous wastes has been asked to store them scientifically. The wastes would be disposed off once an efficient and fool-proof technology was developed. While the SPCB exercised control over the polluting Industrial units it had no say in vehicular emission, he lamented, and added that individual notices have been sent to industrial units for not adhering to the pollution control norms.

While he admired Transport Commissioner Mr. Sridhar for the effort taken by his department in conducting 'Clear air campaigns', He mentioned pollution from vehicles was the major form of pollution plaguing Bangalore, and two-wheelers had to share the blame for the rising pollution. Even if all the vehicles in the city conformed to the pollution standards, the cumulative effect was high, and the atmosphere was not in a position to absorb it fully. The SPCB had tried to determine the ambience of the air by installing monitoring units to measure it in several parts of Bangalore City. He assured that the Board too would make efforts to ensure that the residents of the City breathed clean air.

The Transport Commissioner, Mr. B. L. Sridhar, IAS delivered Key Note address by congratulating VHAK for the exclusive subject, which is most essential, vital and crucial to every individual, irrespective of her/his life. He voiced saying that man being an intelligent animal masters over others and thus with the quest for knowledge, science and development, his struggle with the nature perpetuates enhancing him to indulge in research in every field of science. It applies even to the field of environment also.

He said that studies conducted in Bangalore had proved that the quality of air had deteriorated and vehicular pollution was one of the major causes for this. The rise

in the number of vehicles in Bangalore and other parts of the state had led to a steady increase in pollution. While there were only 1.39 lakh vehicles in Karnataka in 1960 it went up to 4 lakhs in 1980. 14.3 lakhs in 1990 and had touched 22.5 lakhs in 1996. By 2,000 A.D., the number of vehicles in the state was likely to touch 30 lakhs. Similarly, the number of vehicles in Bangalore had gone up from 78,000 in 1976 to 3.6 lakhs in 1986 and by the end of the year was likely to touch 10 lakhs.

Many of the pollutants, particularly, matter emitted from vehicles were heavier than air, and settled down at a height of about three to four feet from the ground. This would affect children most, since they breathed the air at that level, he said. Regretting the steady rise in suspended particulate matter in Bangalore, he said on Mysore Road the peak value of Sulphur dioxide was four times the permissible limit for residential areas and two times the permissible limit for Industrial areas.

Mr. Sridhar shared that the Transport Department had taken steps to check noise pollution in the city. The honking horns not only contributed to the noise pollution but also disturbed the concentration of other road users. In several cases, the use of air and musical horns had led to accidents. He said the department had taken up a continuous clean air programme by involving Voluntary Organisations, students and Environmentalists. The aim of the programme is to educate the people about the need to keep the environment clean.

Mr. Ramakrishna, Administrator Environment Training Institute speaking on water Pollution opined that water is one of the basic necessities for the life. Man cannot afford it, without exploring water resources like river, streams, etc., Therefore he cannot pollute it. Water is polluted due to various Industrial activities and urban waste especially sewage waste, solid wastes and garbage etc., since we lack in the proper treatment of these pollutions i.e. improper sewage disposal and poor sanitary conditions are main causes for water borne diseases which affect the people, due to water borne poisons and the sources of same are as follows:

- * Toxic substances leached from mineral formations such as fluorapatite.

- * Phyto toxins manufactured by specific algae
- * Heavy metals dissolved from water works structures.
- * Poisonous compounds contained in Industries and household wastes.
- * Radio active substances from Nuclear plants
- * Pesticides leaching water bodies from agricultural fields.

Flourine, Selenium, Arsenic acid, Boron are some of the Natural contaminants.

Drinking water is the store house of infectious both in rural and urban/semi urban areas but in urban, added to this, the other forms of common modes of transmission of infections are:

1. Through water cress or shell fish harvested from or stored in sewage polluted water.
 - Typhoid, Paratyphoid, Bacillary dysentery and infectious hepatetis.
2. Through vegetables and fruits contaminated by faeces, sewage or sewage sludge.
 - Typhoid, Paratyphoid, Bacillary dysentery, Parasitic worms and Infectious hepatitis.
3. Through exposure to soil contamination by human exereta
 - Hook worm

The impact of water pollution on an individual begins when:

1. Sewage waste/industrial waste is let into the flow of river. For eg. Survey conducted in Bangalore reveals 80% of vegetables like Raddish, Carrot, Cabbage (suppose to be more nutritive) grows in sewage water which is let into the Arakavathi river. If these vegetables eaten raw it leads to number of health problems.
2. If the organism feeds on Organic waste it multiplies tremendously by exploding, which is responsible for number of diseases.

'Shifting of water pollution is not a solution', rather it leads to water pollution problems.

Solid waste and garbage shifted from one place to other place is of no use. Hence, it is unscientific method, after it dries the most concentrated pollutants flow into the underground water. This polluted underground water is very difficult to dilute it. Therefore it is essential to take up preventive measures while treating the solid waste, This has to be done scientifically. Apart from scientific method there are conventional method and cost effective. for eg. Oxidation is a low cost method which requires less energy i.e. it needs just photosynthetic action.

Since India is progressing in the field of science and technology and Industrial sector, it cannot be said that India is developed, until and unless it takes up intensive measures in controlling various pollutions with broader perception on Health for the Society. Till now in Karnataka only in 8 places Sewage treatment plants are installed. Mr. Ramakrishna assured that shortly Pollution Control Board is proposing to start in other parts of Karnataka. In Bangalore Sewage Treatment plant is constructed in 3 places. But it is not maintained properly. Therefore training of the public, Government and NGO is essential.

The responsibility of Clean environment does not solely depend on the Government and Non-government organisations alone, it needs public co-operation also, Awareness and change in their attitude towards 'Clean Environment' is necessary. (Cleaning the house alone is not sufficient but maintaining the clean environment is important). For eg. In other countries like Denmark, Scotland people donate generously to build sewage treatment plants whereas in India people donate to build temple. Hence Mr. Ramakrishna's plea to the people is to co-operate with KSPCB in maintaining 'Clean Environment', 'Our city is our temple', so, he appealed to donate for building sewage treatment plant rather than for temples.

The study of United Nations Environment Project (UNEP) gives the following statistics in water, sanitation and health:

* In developing countries unsafe water is responsible for 80% of diseases and 33% of Deaths.

- * 15 per 1000 children born in the developing country die before he/she reaches 5th birthday from Diarrhoea caused by drinking polluted water.
- * There are 1.2 Billion people suffering from diseases caused by polluted water or transmitted by inadequate/poor sanitation.
- * Our 2 Million Tonnes of human excreta is produced daily in cities around the world, less than 2% is treated and the rest discharged in water courses.
- * Water borne diseases account for more than 4 million infant and child deaths per year in developing countries.

The speech on Health Implications of Air, Pollution was addressed by Dr. Anand, ENT Surgeon. Dr. Anand mainly concentrated on the causes of Allergy due to different allergants.

Allergy is one of the common diseases affecting about 15-20% of the total population, especially in urban areas. Children and younger adults are the common victims of this disease. The incidence of this disease has been gradually increasing over the last one or two decades. The common allergic diseases are Allergic Rhinitis affecting the nose, Allergic Conjunctivitis affecting the eye, Allergic Pharyngitis affecting the throat, Allergic Laryngitis affecting the voice box, Allergic Tracheitis affecting the main wind pipe, Bronchial Asthama, Allergic Otitis media affecting the middle ear, Atopic Dermatitis causing eczematous skin lesions, Urticaria causing hives on the skin and Angio-Oedema causing diffuse swelling of the skin and mucous membrane.

A susceptible individual and an allergen rich environment are the two fundamental requirements for anybody to develop an allergy. Susceptibility is mainly genetically transferred. If there is no history of allergy among parents, it is estimated that there is a 10% risk for a sibling to develop an allergy. If one of the parents has an allergy, the risk goes up to 20%. If both parents have an allergy, the risk could be 40-45%. If both parents have same type of allergy like asthma in both or dermatitis in both, the risk could be as high as 70-75%. First year of life is the period when most of allergic sensitization happens and the first three

months in one's life is the most crucial period, it is learnt.

The causes or the environmental factors can be divided into two major categories viz., basic allergens and Aggravating factors.

Basic allergens can be further classified into different groups. Some substances can act as contact allergens causing Contact Dermatitis. Metals, Chemicals, Medicines, Cosmetics, Fabrics, Plastic, Epoxy & Latex are some such examples. Some substances act as Injectant allergens. Injectable medicines, Contrast Dyes and Honey bee sting are some such examples. There are ingestant allergens. Various foods can act as such allergens. Though any substance can become an allergen, nuts, oil seeds, egg, pulses, milk, wheat, chocolate and sea food are common examples. Apart from foods, food additives, colouring agents, preservatives and orally ingested drugs can act as allergens.

Airborne group of allergens are the most important and predominant allergens especially in respiratory allergy. They can be further classified into extramural allergens present inside a living house.

Among the extramural allergens, though fungi present in the air can act as allergens, they are uncommon. Plant pollen grains are the predominant allergens. Anemophilous plants, the pollen grains of which are very tiny and non-sticky, disperse their pollen grains by means of wind. These are microscopic in size and gain easy entry into the respiratory tract to cause allergy. Grasses like Bermuda, Imperata, Pennisetum, Zea mays, Weeds like Parthenium, Amaranthus, Chenopodium, Anthium and trees like Cassia siamea, Prosopis juliflora, Holoptelia and Albizia are some of the common causes of allergy.

Among the intramural allergens, fungal spores would be present inside a dwelling house but more than them, house dust is the commonest substance complained to be as a cause. House dust is a complex substance of various organic and inorganic material. There is a microscopic insect called House Dust Mite which is the major allergenic component of

the house dust. The mites, their dead or alive parts and faecal pellets cause allergy. Mites are abundantly present in ill ventilated unclean houses and rapidly multiply in humid months. Pets like dogs and cats can cause allergy. Similarly the cockroaches can cause allergy.

Aggravating factors are not the basic causes. They aggravate or precipitate an existing allergy. Various other dusts, smokes, fumes, smells, infections, worm infestations, hormonal and emotional disturbances can aggravate allergies. Air pollution with increases green house gases caused by industry and traffic emissions has been the main cause of concern during the recent years. Allergies specially related to respiratory system, get easily aggravated by this.

Apart from medical treatment to provide symptomatic relief, allergy patients are evaluated in detail in allergy-immunology clinics. Allergy tests are done to determine the causative allergens because they differ in different patients. Counselling to avoid the exposure is done for such allergens which can be avoided. For airborne allergens which cannot be avoided, immunotherapy is done to immunise the patients on a specific line.

A concerted effort must be made to cleanse our neighbourhood of unwanted weeds, smoke, dirt and garbage and health-friendly trees and plants must be cultivated, preserved and restored where necessary to control the menace of increasing allergy in the population.

A open house discussion was held which was chaired Dr. Bhavani Belvady, President, VHAK. There was good interaction.

Vote of thanks was proposed by Mr. Premanand N. Thambi Hon. Secretary of VHAK to one and all.

* * * * *

PHYSICAL
AIR
WATER
SOIL
NOISE
RADIATION

CHEMICAL
INDUSTRIAL
HAZARDS
HEAVY METALS
PESTICIDES

ENVIRONMENT
AND
HEALTH

BIOLOGICAL
MICROBES
PLANT
ANIMAL

MECHANICAL
ACCIDENTS
/ INJURIES
TRANSPORT
Related

PSYCHO -
SOCIO -
CULTURAL
VIOLENCE
COMMUNALISM
CONFLICT !

DEVELOPMENT STRATEGIES
- ECO-HAZARDS?

DEVELOPMENT STRATEGIES
- WHO BENEFIT?

WASTEFUL LIFE STYLES!

INDUSTRIAL DEVELOPMENT
- Pollution
- Irresponsible

ISSUES IN ENVIRONMENT & HEALTH

AGRICULTURAL DEVELOPMENT
- CASH CROPPING

GLOBAL MARKET ECONOMY

CASTE / CLASS

POPULATION

LAND OWNERSHIP

GENDER

CHIPKO

MOVEMENTS - STRUGGLES

NARMADA
BACHAO

FISHERMANS
STRUGGLE

ANTI-LIQUOR
MOVEMENT

BHOPAL
STRUGGLE

EXPERT
REPORTS
CSE

WHAT
IS
BEING
DONE →

MEMO-
RANDA

SITUATION ANALYSIS

LEGAL ACTION

INFORMATION
SHARING
DOE

PUBLIC
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???

RIGHT
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INFORMATION

ECO-
SENSITIVE
DEVELOPMENT
EXPERIMENT

WHAT CAN YOU DO?

LEARN ABOUT THE ISSUES



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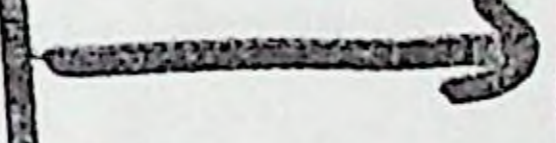
LINK IN TO RESOURCE CENTRES / MAGAZINES



STUDY YOUR LOCAL SITUATION

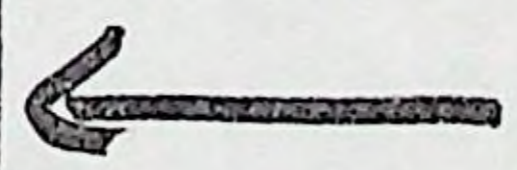


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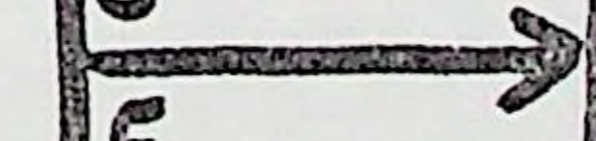


BUILD ON PEOPLES KNOWLEDGE

BUILD ENVIRONMENT DIMENSION IN YOUR WORK



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SHARE KNOWLEDGE INFORMATION WITH PEOPLE

PRACTICAL ACTION TO IMPROVE YOUR ENVIRONMENT



FOCUS ON CHILDREN: CITIZENS OF THE FUTURE

??? CREATIVE INNOVATION



JOIN / SUPPORT THE MOVEMENTS

Tree
Planting

AFFOREST
- ATW

SANITATION

MIZURAM

PESTICIDES
vs

NAGA

How
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DELHI

DISASTER
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NEPAL

ENVIRONMENT
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Educational
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RAJASTHAN

MALARIA
✓✓

TAMILNADU

POLLUTION
+
Eco
balance

SMOKE

SOIL
✓✓

PREVENT

GLOBA
WARMING

PRESERVE
FOREST

SOCIAL
ENV

PARTICIPANTS EXPECTATIONS.

*Dr. V. E. Benjamin,
8, Lane Road,
Bangalore-550005.*

**Strategy
for Environmental Education
An Approach for India**

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Paper presented at the Annual Conference of the North American Association for Environmental Education, Washington, D.C., U.S.A., September 27 - October 2, 1985.

The ideas and programmes discussed in this paper have been generated through discussions with my colleagues at the Centre for Environment Education, Ahmedabad.

Strategy for Environmental Education

An approach for India

India today is engaged in an enormous development effort. During 38 years of independence we have concentrated on building the country's economic infrastructure and dealing with problems of political and linguistic integration. Modern medicine has brought down death rates faster than education can bring down birth rates. The country faces a critical population problem. The population has doubled over the past 40 years, now standing at over 750 million people, roughly one-seventh of mankind. New technology, especially the development of high yielding varieties of seeds, has kept the country's food production ahead of its population. But many of the gains are far short of expectations. The combination of a rapidly growing population and a fast deteriorating environment has denied the expected benefits of growth to a majority of our citizens. The country's forest resources are being rapidly depleted. The needs of housing and industry have taken some of the most fertile lands away from agriculture or forestry. The disappearance of tree cover is most acutely felt in our hilly regions, especially in the Himalayas. Precious topsoil is being eroded and floods have had devastating effects on the plains. The disappearance of tree cover in the catchment areas of major dams has led to increased silting reducing the life of the reservoirs. The wildlife situation in the country came very close to disaster and we would have lost several important species had action not been taken in time.

Four thousand five hundred years ago, the Indus Valley civilisation could boast of the first city that had a well-planned drainage system. Today, unfortunately, we cannot say the same thing about many of our towns. Water-borne diseases are a major component of the country's health problems. Industrial growth has not been without a heavy toll, Bhopal being the worst of it. Most of our cities have pollution levels far in excess of what is acceptable. The working class and urban poor are particularly badly hit, both in their work environment and in the places where they live — usually around the factories. India's rivers, so integrated with our culture and considered in many ways the ultimate

cleanser, are themselves choking from effluents discharged into them.

In 1972 at the Stockholm Conference, Prime Minister Indira Gandhi proposed the framework for an environmental policy that would be consistent with the problems of development that a country such as India faced. Over the last decade India has been initiating programmes to bring environmental considerations into development plans. Legislation has been passed for the protection of wildlife and forests as well as for the control of pollution both of the air and water. Policies on land use have received increasing attention. Several non-governmental agencies have highlighted local environmental problems. Action Groups sprang up as environmental awareness grew. Programmes aimed at school children, including the formation of Nature Clubs and organising of nature camps, developed during these years. In 1980 the Government of India set up a Department of Environment to act as the focal agency for planning, promotion and coordination of environmental programmes in the country. The new Department started supporting a number of agencies in the field of research and monitoring. A few pilot projects aimed at creating environmental awareness were also begun. But the attainment of such awareness at the national level was possible only if a concerted effort was made using several agencies, both governmental and other, working together to form a network.

The task before the Department was stupendous. It was clear that the only way in which environmental considerations could get integrated with development plans was through widespread awareness about the environment and of man's role in shaping it, for better or for worse.

Environmental consciousness, sensitivity, and values need to be built up at all levels. Legislation without awareness and education cannot be effective. True understanding of the environment has to start at the school level; but simultaneously a wider community, both urban and rural, has to become aware. There is a need for special programmes focussing on specific target groups such as decision makers. The network of agencies that can tackle such a problem will have to involve schools, voluntary agencies, government departments, extension agencies, and teacher-training and other educational institutions. In order to manage

such a programme there is need for a sustained effort at generating innovative programmes, developing appropriate educational material, testing and monitoring the effectiveness of the programmes, training personnel, researching and preparing basic reference material, using existing media of communication and experimenting with traditional as well as new media.

One of the strategies of the Department of Environment was to set up "Centres of Excellence" for research, training and education — centres that would play a pivotal role in strengthening the country's infrastructure and thereby its ability to deal with these issues. The Centre for Environment Education was proposed under this programme.

There has been a tradition in India, started by the Atomic Energy and Space Agencies, of building institutions around people rather than the other way round. The Nehru Foundation for Development had through its institutions, the Vikram A. Sarabhai Community Science Centre, VIKSAT, and the Centre for Health Education, Training and Nutrition Awareness (CHETNA), built up groups engaged in developing innovative educational programmes and material, conducting teacher-training programmes and using the audio-visual and mass media in the fields of science, mathematics, health, nutrition, and environmental education. These institutions had many experiences that could be shared amongst them and there was an obvious synergetic advantage which could be utilised for environmental education. The Nehru Foundation's associated activities, Sundarvan, a small animal and snake park, and Darpana, a centre for performing arts, brought in other opportunities that could prove very useful in devising an environmental education programme. The Centre for Environment Education was established in August, 1984 as an associated activity of the Nehru Foundation for Development with support from the Department of Environment, Government of India. Sundarvan became part of the new Centre.

Starting with a core group of 18 people taken from VIKSAT, the Centre, along with Sundarvan, envisages a staff of about a hundred people whose skills would include communication, design, subject expertise, training, technical and support functions. At VIKSAT an effective model of working together in terms of interdisciplinary groups to generate programmes on environmental

education had been developed. We are trying to retain this method of working together though the institution is growing and its tasks are becoming more complex. This is in recognition of the fact that different professional skills and backgrounds are required in order to develop a successful programme. Typically a group would consist of a subject expert, a person familiar with the target group, a designer, and a writer. The Centre is organised into the following groups:

- Children's,
- Urban,
- Rural,
- Graphic Design and Visual Communication,
- Exhibit Design,
- Writing,
- Reference and Resource, and
- Sundarvan — a nature discovery centre.

During its first year the Centre has planned and begun working on a number of programmes, while recruiting staff and establishing the required facilities. The current programmes of the Centre can be broadly classified into the following seven areas:

- (1) Children's Programmes
- (2) Sundarvan Programmes
- (3) Urban Programmes
- (4) Rural Programmes
- (5) Interpretive Programmes
- (6) Publications/Exhibits/Films and TV Programmes
- (7) Training Programmes

Children's Programmes

There are over 625,000 primary and middle schools and about 50,000 secondary schools in the country, with a total enrolment of over 110 million students. They range from the sophisticated urban schools with modern equipment and facilities to single-teacher schools in rural areas where children in four grades or more share a classroom. Instruction across the country is in over 20 languages.

In some ways any attempt at developing uniform educational pro-

grammes and material for a country so diverse is bound to run into difficulties. While it might work in one region in one set of circumstances, it would be inapplicable in another. On the other hand, an attempt at studying, analysing and developing material for the different situations of Indian schools would mean that the Centre would only be able to design for a few such situations. Therefore, we are exploring a different concept of design.

The saree is a designed piece of clothing worn all over India. Over the years very beautiful designs, patterns and textures have been printed and woven into the Indian Saree and yet, several thousand years of Indian history has not tried to stitch the saree. It is worn in many ways and fits all sizes. It is equally good for working, dressing up or sleeping in. The final effect is the combined effort of the person who designs the cloth and the person who wears it — of the designer and the user. This is a very different concept from that of designing, say, a well-stitched dress. The garment either fits or doesn't fit and, where it fits, leaves little room for the wearer to be innovative in its use.

Our educational designing would have to be somewhat like the saree, more a tool than a finished product, a tool that comes alive in the hands of each teacher, its application being the combined effort of the designer and the user.

How does one translate this concept into educational media? We were recently working on designing an educational activity around a pond. A chart with an illustration of the pond is used with this activity. An attempt at preparing a ready chart, however beautifully done, had problems. It looked like one pond but not at all like the next one. One approach being developed is to make sheets with illustrations of individual elements like insects, shrubs, birds, fishes, trees, people, cattle, etc. The making of the chart using these elements and adding to them where necessary, rather than just using the chart, would become a classroom activity. The elements would be selected to show a category rather than a specific species. The chart made in the classroom would now not only look more like their own pond but the preparation of it would itself be an effective observing and learning activity.

Another question that the Centre faced was to seek appropriate media that would be cost-effective in an Indian context. We could

consider educational material at a variety of levels — from material for each student to classroom material, to school material, to material for a cluster of schools, or to an even larger unit. If there were 50 students in a class, one had to think whether preparing 50 copies of single-use student material at say Rs. 2/- each was going to be more effective or classroom material that might cost Rs. 300/- and last at least three years; whether it was better to give teaching aids or only instructions as to how to make them. At the Vikram A. Sarabhai Community Science Centre at Ahmedabad, a mathematics teaching aid was developed for primary school children. The gadget might have been much too expensive had an attempt been made to manufacture and sell it as a finished product. Instead, the centre decided to develop a booklet and a teacher-training programme on how to make the teaching aid using low cost material. The programme was very successfully implemented at a number of schools.

There is another aspect to the dissemination of teaching aids which needs mention. The way the school system in India is organised today, many teaching gadgets end up locked in cupboards. The material are alien to the teachers, who are afraid that if they lose or break any part of the gadget, they will not be able to replace it. They thus end up not using it at all. Teaching aids developed by the teachers and students themselves do not have this problem and have better chances of being used.

A third aspect that we have to consider is the logistics of working in so many languages. We have decided that we would like to try out our educational programmes nationally right from the beginning rather than develop them based on one region. We are therefore experimenting with printing the graphic material in large quantities and letting the teacher or a State level organisation put in the words through less expensive printing techniques or in some cases by hand.

The Centre has decided to focus its attention over the next few years on standards V to VII (age group 10 to 12). We felt that at this middle school level, children would have acquired basic skills and concepts in language, mathematics, and science and at the same time were not so pressurised with examinations that the teacher would be unwilling to participate in new educational activity. Later we would expand our programmes and develop

material for both the primary standards I to IV and secondary school VIII to X.

Testing such educational material is a difficult task for, not being a product, its treatment will vary from situation to situation. Its effectiveness depends as much on the teacher as on the material. Teacher training thus becomes an important component for the effectiveness of the Centre's Programmes. At the first level, which we call lab testing, we bring students to the Sundarvan facility and the educational staff try it out themselves. At this level we are concerned mostly with the question of whether it works, whether it is interesting and how long it sustains children's interest at different age groups. At the next level a programme is tried in 10 schools around Ahmedabad. This constitutes our first trial with teachers conducting the programme. We study the variations in the programme in different situations. At this stage we are trying out the programmes in three languages — Gujarati, Hindi and English.

The Centre is in the process of developing a network of 1,000 schools across the country. These schools are being selected on the basis of their motivation and record of interest in innovative educational work. They may have started a Nature Club, have participated in one of the many programmes of the Department of Environment, be associated with the voluntary agencies dealing with education or have worked in areas other than environment and shown their interest in innovative ideas. Teachers from these schools will participate in teacher-training programmes and will receive the educational material developed by the Centre. This will then be tried in their school but, as mentioned earlier, not in a passive way, but through the active involvement of the teacher. In this sense this part of the process is not merely a trial but is very much a part of the development process itself. Over a few years, it is hoped that each of these schools will itself become a centre generating new ideas and, acting as a lead school, spread them to schools around it. NGOs and government agencies working in the field of education, such as the National Council of Education, Research and Training (NCERT), and the State institutions of education will also be intimately involved at this stage of programme development and trial.

Motivated groups of students have formed Nature Clubs in many

parts of the country. The World Wildlife Fund-India has played a pioneering role in establishing Nature Clubs and running Nature Camps. Five regular camping programmes are being run — one each in a desert, a marine park, a scrub forest, a dry deciduous forest and in the hills. These programmes have proved very effective in firing the imagination of children and in inculcating love for nature. There is a need now to go beyond this level and to add a deeper understanding of the environment amongst the students and to develop skills of studying and appreciating the environment. The Centre is developing educational material for use at such camps and by students who have joined Nature clubs. The Centre itself plans to develop a Young Naturalists' Club for students who want to do small research projects in their own environment. Activity sheets, observation cards, and guidebooks and handbooks are being developed. Such students in the future could form a core constituency for any environmental action group or programme. For places where Nature Clubs do not exist, the Centre is also preparing material on how to form Nature Clubs and training programmes for Club Organisers.

Sundarvan Programmes

Some 54,000 people visited a week-long snake show organised in Ahmedabad in October 1978 by the Vikram A. Sarabhai Community Science Centre in collaboration with the World Wildlife Fund-India and the Madras Crocodile Bank. Seventy volunteers talked to the visitors about snakes and their importance in the ecosystem, answering questions based on the many myths and beliefs that surround this animal. The tremendous success of this show and others held around the country demonstrated the potential of using snakes to begin an enquiry into nature. It underlined the need for a permanent facility where one not only could see animals but understand them.

In the wake of this experience, Sundarvan was established in 1979 as a small animal park with a modest collection of snakes and small animals that children could get quite close to. In the first few years, the park has attracted visitors of all age groups. School groups have come for general and specific programmes. Sundarvan has participated in making documentaries for television on themes related to animals. Regular snake shows are ar-

ranged and at times a new animal has been on display. Film shows on wildlife and nature are held over weekends. Snake shows have also been held in rural areas around Ahmedabad.

Sundarvan today is part of the Centre for Environment Education. The park facilities are being developed with new animals and birds. The selection is being made on considerations of the educational value of the enclosure rather than whether the animal is exotic or a novelty. Emphasis is being laid on creating natural viewing situations in the park. Mango trees and a pond have attracted fascinating birds. The pond was our first attempt at creating a natural viewing situation. Another shallower pond is being built for wading birds.

The Centre is initiating a programme for young naturalists in the age group 13 to 19. With the growth in Nature Clubs, it was felt that there is a need for programmes for the motivated students involving more detailed and focussed observation of the environment. Simple research projects are being drawn up and these will be sent to students who join the Young Naturalists' Club from all over India. Through correspondence and a newsletter these programmes will be communicated to the network of students who will be able to write back their experiences to be shared with others.

Sundarvan gets several calls from in and around Ahmedabad from people who have spotted a snake and want it caught rather than killed. Usually there is a crowd gathered when the snake catcher arrives and it forms an ideal occasion to inform people about snakes in general and the snake caught in particular. A simple pamphlet on snakes is distributed.

In a more formal sense an outreach programme of taking small animals to schools is being developed and the initial trials using frogs, mice, turtles and non-venomous snakes have been very successful. A series of educational flip charts and other teaching material have been developed to aid this programme. This outreach programme can be undertaken at several centres in the country. We are contacting agencies that would be interested in taking up such a programme and training their educational staff in conducting it. The flip charts are being made with the illustration screen printed and a guide for writing-in the text in the local language.

We are trying to utilise the existing snake charmers in the country to present a more scientific view of snakes without, of course, making their show less entertaining. A rural snake show with a mobile exhibit using snake charmers as extension staff is being developed.

Urban Programmes

The urban environment in India is characterised by phenomena common to cities in most large developing countries. Foremost among these is the high growth rate of population. This is due as much to natural increase as to rural-urban migration resulting from the incapacity of the impoverished countryside to support an increasing population on a narrow resource base. The familiar stresses attendant upon this phenomenon — overcrowding, slums, inadequate services, an informal sector all but fugitive from the law providing marginal employment to a sizeable proportion of the population, environmental pollution — are compounded by some features unique to India.

To overcome these formidable problems it is necessary to create an educated opinion among all segments of the urban population who are affected by the situation or are in a position to influence the course of urban development. Towards this end, over the past few years, we have been running an urban programme trying to focus people's attention on planning issues that have a major environmental implication and on areas where action was called for. By running a magazine, using the popular press, organising public seminars and workshops, and through a mobile exhibit, we have tried to create an awareness both at the community level and amongst decision makers and administrators. Our experience has shown that while people understand the issues, there remains a basic credibility problem. There are many who think that there are no alternative ways of planning. Many feel that cost factors for any such environmental programmes would be prohibitive. There are those who think that the difference would, at best, be marginal. Under these conditions, it was felt that we needed to talk in terms of specifics, highlighting cases where environmental improvement has been achieved. As a follow-up of this, we are working on creating demonstration projects in which a communication intervention can lead to a major environmental improvement of the area and can be used as

an example at the national level. Seven such projects have been selected. These deal with problems such as urban open spaces, development of waterfronts, the environment of the market place, the environment of the urban poor, and the preservation of a monument within an urban area. The national relevance of the project would not be in terms of the solution adopted but rather in terms of the approach. Relevant Government and voluntary agencies are being identified for each project. Communication material is being developed aimed at the local community and the relevant decision makers. Once the project can be successfully carried out, a much wider reaching communication effort would be undertaken. A national level seminar is being organised on some of these issues inviting people from other towns and cities to share their experiences and give details of the demonstration project.

At a very different level, an urban awareness programme in the form of activities titled "Know Your City" is being developed for use in schools.

Rural Programmes

With increasing population, rural India faces a major shortage of natural resources on which the life of the village depends. Firewood and fodder are two areas where the stress is particularly severe. The increasing pressure on these resources leads to overutilization making the long-term problems even worse. Overgrazed lands become susceptible to erosion leading to lesser production of fodder in every successive year.

Efforts at both increasing production and making more efficient use of available resources are required. Many techniques have been developed but their dissemination is slow and at times does not lead to the desired result. The government has launched several schemes which remain unknown to the intended beneficiaries. Many innovative programmes started by NGOs remain confined to the small cluster of villages where the agency works.

The Centre's rural programmes aim at developing effective communication strategies for the dissemination of environmentally sound technologies, processes and programmes. There is a large

network of voluntary agencies as well as government field organisations in the country. The Centre's strategy is based on working with this network and developing communication programmes that can be used by the existing network rather than attempting to directly communicate with the end-beneficiaries. Two specific programmes have been selected for the initial years. Both these deal with the severe shortage of fuelwood and fodder in the country. Several versions of a smokeless chulha (a wood burning stove) have been developed in India and tried with varying degrees of success. The chulha is stated to reduce the requirement of fuelwood by about 40 per cent. However, in many places where it has been introduced, women complain that while it reduces smoke, the chulha increases the requirement of fuel. The problem has to do with developing the right design for the right application. Initially, two pilot communication programmes are being carried out, one in an area where chulhas are to be introduced, and the other where they have already been introduced and certain problems relating to their use have to be dealt with.

India has vast areas of land which have been laid waste through overexploitation. The country has given the development of wastelands a major priority and a Wastelands Development Board has been set up at the national level. This is another area where most of the technical problems have been solved. But the logistics of involving people in planting fuelwood species is preventing rapid greening of these areas. The Centre, in collaboration with VIKSAT, is collating information on a variety of basic and functionally pertinent topics such as how to form a co-operative, what tree to plant, how to find finance for the project, etc.

While natural resources have rapidly deteriorated, the position is particularly critical for people who live in and around a sanctuary or a national park. With such areas coming under 'protection' the entire resource base of many of the people living around these areas has become out of bounds to them. For tribals who have been relocated outside such areas, there is the further problem of adjusting to a new environment. This has created hostility between the tribals and villagers on the one hand and the park authorities on the other.

A programme directed at bringing about a new relationship would consist of identifying the existing needs and available resources, exploring possibilities of augmenting these resources and modifying the needs, evolving educational components to create awareness about the need for the sanctuary, and management of the sanctuary and tourism so as to benefit the people of the surrounding areas.

A pilot project is being developed around a wildlife sanctuary in Rajasthan.

Interpretive Programmes

India has over 200 national parks and sanctuaries, over 2,000 important historical and cultural monuments and about a 100 botanical and zoological gardens. Many of these have become important places of interest. During a visit, people want to know more about what they see and this is the right moment to impart environmental messages. An interpretive programme that can make people understand the various aspects of the place and their relationship to the surroundings is an important method of creating environmental awareness amongst the general community.

It is very important to understand the spirit in which the visitor comes to see a park or a monument and to evolve educational components which do not seem to be an imposition. The programmes involve identifying the right message and selecting an appropriate medium for it. The visitor must feel that the information provides answers to the questions in his mind.

Earlier, as VIKSAT, the group developed an exhibit area for the Gir National Park and educational material for the Bandipur Sanctuary and other tiger reserves in the country. The group had also worked closely with the National Museum of Natural History, New Delhi, in developing Take Home Labels. Today we are engaged in developing interpretive programmes for the Kanha National Park in Madhya Pradesh and the National Zoological Park in New Delhi. These are being developed in collaboration with the U.S. National Park Service.

One of the most challenging tasks in this project is the develop-

ment of suitable material that can stand the onslaughts of weather and at times vandalism. The media will include pamphlets, road-side guides, exhibits at museum and waysides, signage, audio-visuals and other non-print media.

More than a million people visit the Delhi Zoo every year. The programmes undertaken in this park will enable visitors to gain a better understanding of the animals in the Zoo and the role that the Zoo plays in the country's conservation efforts. The work involves designing and fabrication of a signage system, wayside exhibits, an illustrated information folder, a handbook and a visitor centre.

The interpretive programme for the Kanha National Park is being developed as a model for such facilities at national parks and sanctuaries. This visitor centre will be housed in an old dak bungalow, built during the British period. Part of the exhibit area will be on the research in the national park. This will not only show the results of the research but will also try to elaborate on the process by which these results were obtained. For instance, an exhibit describes what a tiger eats through displaying the method of collecting the information. Other media designed for Kanha are a roadside guide, a handbook, a tabloid, pocket cards and wayside exhibits.

Publications/News Service/T V Programmes

There is a great dearth of basic reference works and popular books on environment and related subjects focussing on the Indian context. The Centre has, therefore, taken up a programme of publishing a series of handbooks and field guides and books specially designed as supplementary reading for students. The first twelve of these — on the birds, mammals, trees, etc. of Gujarat State — are being published in collaboration with World Wildlife Fund - India. A series of four illustrated books on India's natural resources is also being published. With increasing environmental awareness there is need today to provide information on what an interested person can do to participate fruitfully in the conservation movement. To meet this need, the Centre proposes to publish catalogues providing comprehensive and relevant access information. The first of these is an Indian Wildlife Catalogue.

While a dozen national dailies and periodicals have been giving increasing coverage to environment-related stories in recent times, the vast majority of Indian newspapers in different languages pay little attention to the environment. One reason for this is that there is no centralised agency in the country which regularly supplies environmental news and articles to the press. The Centre has, therefore, started an environment News and Features Service. Through this service we provide authentic information to over a thousand dailies and periodicals in the country. Much of this information is a bye-product of the various programmes of the Centre. The service offers a weekly package of news, features, articles and photographs.

The Centre will be establishing basic audio-visual facilities next year and will be developing programmes in the non-print media. Television is becoming a major medium of mass communication in the country. Special educational telecasts have also commenced. The centre has proposals to develop a regular programme on environment for television.

Training Programmes

The Centre's overall approach is to work through existing networks. This would involve working with teachers, members of voluntary bodies, field workers of government agencies, educational staff at national parks and sanctuaries as well as at museums and zoos. In order to make any such programme successful, training programmes are essential. At present, the Centre envisages training workshops of about five days each. But besides the function of training and making people familiar with educational material developed by the Centre, the programmes will be very useful as a forum for the exchange of ideas and experiences. The people trained by the Centre, in turn, become another network that will be useful in disseminating ideas on environmental education, programmes and material throughout the country and getting feedback on programmes carried out.

Conclusion

I have tried to outline the strategy for environmental education that is being developed by the Centre for Environment Educa-

tion at Ahmedabad to fulfil an important function at the national level. The basic components of this strategy are:

1. To help national networks for environmental education and to work with the existing networks both for the purpose of development and trial which can be a simultaneous process;
2. To use both modern and traditional media and to experiment with innovative communication ideas for the promotion of environmental awareness;
3. To develop educational material intended for widespread use in a way in which the user can adapt it to particular situations. In this sense, to develop the material more in the form of a tool rather than a finished product;
4. To develop for implementation through centralised agencies programmes which may be in the form of very clearly defined projects and programmes with a large training component for the relevant educational staff;
5. To use existing situations and develop interpretive programmes around them;
6. To use successful environmental programmes and build communication strategies around them and to develop demonstration projects where, through a communication intervention, a major environmental improvement can be shown;
7. To demonstrate the efficacy of communication programmes in terms of the requirements of diffusing specific technologies and processes.

There are many experiences and approaches from all over the world that are relevant to the Indian situation. Whenever I have discussed with colleagues from various parts of the world, aspects of their programmes, one becomes all too aware of how global some of the underlying issues are. We would, therefore, welcome suggestions, comments and inputs in terms of experiences and insights as well as in terms of specific ideas as we develop material for India.

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Ahmedabad 380 054, India

BEYOND THE BIODIVERSITY CONVENTION

Empowering the Eco-system people



***Need for India to also pursue a
village oriented agenda***

Published by
Foundation for Revitalisation of Local Health Traditions
No.50, MSH Layout, 2nd stage, 3rd main, Anandnagar, Bangalore 560 024.

It cannot be denied that the initiative for the biodiversity convention was a northern initiative, one inspired by two compelling needs:

First, a sense of insecurity due to the precarious nature of the planet's ecology (caused in the first place almost entirely by the western model of unsustainable development); and second, a desire to have access to the South's rich bio-genetic resources.

The South has reacted to the North's agenda by asking for financial compensations to conserve its tropical forests and has demanded transfer of the North's bio-technology on favourable terms.

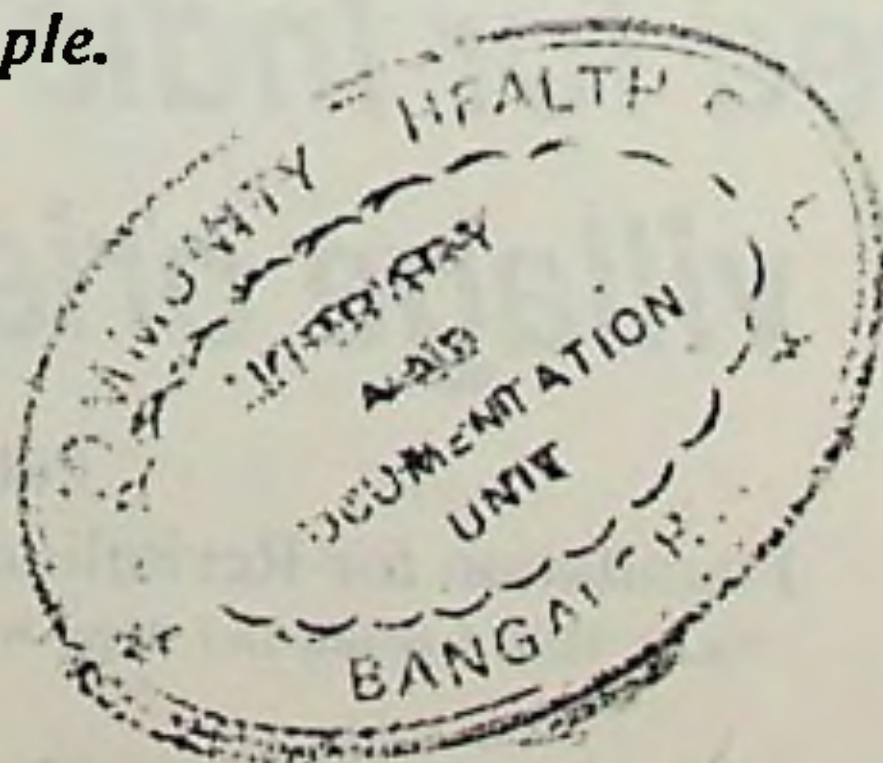
The North has accepted some of the South's demands after hard bargaining and negotiations are still going on...

Amidst all these feverish negotiations on biodiversity conservation and its high-tech utilisation, we in the South seem to have paid insufficient attention to the fact that millions of our people have been traditionally using biodiversity for a wide variety of purposes.

Many of these traditional uses have a contemporary relevance for the present and the future as they are likely to represent the most ecologically sound, safe and sustainable ways of using our bio-resources.

India's own agenda in biodiversity conservation should not be merely to see on what financial terms access to our bio-genetic raw materials should be granted but also to engage very seriously in the revitalisation of our traditional sciences and technologies.

The revitalisation of indigenous knowledge systems related to biodiversity may not be India's only agenda beyond the Biodiversity Convention, but it should certainly be one of the major focal points in the interests of our eco-system people.



1.0 SCOPE OF THE VILLAGE-LEVEL BIO-RESOURCES DOCUMENTATION FORMAT

The Bangalore meeting acknowledged the practical fields of people's knowledge of biodiversity, for example: biodiversity used in medicine, weather forecasting, animal husbandry, food and nutrition, agriculture, fisheries locating ground water and minerals, vegetable dyes, fibres, craft, cultural practices, etc. People's profound knowledge of conservation & ecology was also noted.

The participants appreciated that no "single" questionnaire for documenting local knowledge could ever do justice in recording the wide spectrum of local know-how of biodiversity. So the meeting accepted that it was realistic to only design a common, or 'baseline' format. Other specialised formats could be built upon the baseline format depending on the nature of special interests involved.

However, the baseline format should give an overview of the diverse bio-resources known to a village, general information on their multiple uses and on local conservation practices related to these resources.

2.0 PURPOSE OF DOCUMENTATION

The Bangalore meeting affirmed that the CR should serve a number of purposes:

2.1 Direct benefit to the Village Community

It would act as a record of local knowledge for the use of present and future generations of the village community itself. There is an urgent need to document these traditions as there has been a steady erosion of traditional knowledge of biodiversity and its uses from previous generations to the present and the trend seems to be continuing.

2.2 Revitalisation of local knowledge

The CR documentation could serve as a preliminary basis for revitalisation of local knowledge by enabling agencies concerned with linking biodiversity and cultural diversity to:

- a. Recognise the range of local knowledge
- b. Reward outstanding traditional knowledge / skills / techniques
conservation practices
and
- c. Confirm and promote sound local traditions in various fields.
- d. Promote inter-community transfer of knowledge for capacity
enhancement

It was, however, observed that a revitalisation program could not end with mere baseline documentation of local knowledge of biodiversity but would need to undertake several other creative and practical steps for conserving both biodiversity and cultural diversity.

2.3 Guideline for conservation action and protection of local rights

The baseline documentation could also alert conservationists about the need for conservation action for a resource that is under threat and for protection of local rights over the use of resources that are essential for the basic needs of the community.

2.4 Guideline for development and utilisation of bio-resources

This kind of village-level documentation across a region could also draw notice to the 'use-value' of a resource (quantified in money terms) to the local community, so that purely market-oriented plans and strategies for development of bio-resources could be avoided and community interests could also be kept in view.

2.5 Protection from Piracy

Finally, the baseline community register could also be used to protect local biodiversity and local knowledge from being privatised by commercial interests who may file patents on modified products, processes and biological materials that were designed and built upon local resources and knowledge. The Bangalore meeting took note of the fact that there are hundreds of examples of the knowledge of tribals, farmers and other communities being commercially exploited without acknowledgement or compensation and that this piracy may continue, especially in the light of the recent GATT provisions permitting the patenting of life forms.

3.0 STATUS OF COMMUNITY REGISTER IN BIODIVERSITY LEGISLATION

The Ministry of Environment and Forests, Government of India, which also participated in the Bangalore Meeting, is examining how the village-level community register can be used as an instrument to protect traditional knowledge of bio-resources. It is currently engaged in finalising a comprehensive legislation on biodiversity within the context of which this register could be used.

It is expected that under the new legislation material transfer agreements will need to be entered into for commercial use of all Indian genetic materials. Access shall be provided only to organizations from countries which have changed their IPR laws to incorporate provisions for identifying (a) source of biological materials and (b) source of the traditional knowledge based on which a new application or modified product has been designed. and (c) evidence that informed consent and due compensation and fees has been paid for use of the biological material and or the traditional knowledge about the bio-material.

4.0 ACCESS TO COMMUNITY REGISTER

It was noted that in the Indian tradition, knowledge of bio-resources has generally been considered to be of sacred value and therefore not for sale.

It was observed that such knowledge has been freely accessible for non-commercial uses, although some aspects of traditional knowledge are closely guarded for various reasons and thus restricted in terms of their free transmission.

The Bangalore meeting visualised that the information documented in the village-level community register would reflect the above mentioned cultural attitudes of the people with regard to sharing of their knowledge.

Members felt that whereas there should be no attempt to change the cultural values and attitudes of the people with respect to sharing and access to their knowledge, it was absolutely necessary to find ways in which commercial users could be prevented from privatising knowledge that belongs to the public domain.

It was expected that the bio!diversity legislation which the Government of India is contemplating would take care of the danger of misuse.

Even with respect to non-commercial use it was felt that it was very important to always acknowledge the traditional sources of information and give them due recognition.

It was thought necessary to encourage & promote public awareness & mobilisation to guard against misuse without creating a paranoia.

More importantly it was considered necessary to enhance local capacities to put together, maintain and use the register.

5.0 COMMUNITY BIODIVERSITY FUND

The Bangalore meeting endorsed the idea of a "community biodiversity fund", which could be used to reward conservation practices & outstanding traditional knowledge and skills.

It was observed that it would be very difficult to exclusively attribute knowledge of a particular resource to any particular village or ethnic community or individual in the absence of rigorous survey of the complete distribution of the particular resource or knowledge. Thus, it was advised that whereas the community register should certainly record the knowledge of individuals and particular communities, exclusiveness of such knowledge would need to be carefully ascertained.

In the context of rewards and compensation for traditional knowledge and resources it was strongly felt that this fund should not be managed & administered only by government, but involve representatives of community organisations and other non-government institutions.

The question of whether there should be one national fund or state level funds also needed consideration.

Sources of bio-diversity funds suggested were: taxes/cess on biological products, royalties from bio-diversity industry using traditional knowledge & resources etc.

The bio-diversity fund allocations would need to be governed by transparent guidelines based on just and fair principles.

6. SUMMARY OF DISCUSSIONS AT THE BANGALORE ORIENTATION CAMP

1. Biodiversity loss alongside loss of associated cultural diversity is proceeding at a rapid pace. The reasons for biodiversity loss are better understood and range from evolutionary losses to more recent losses that are caused due to habitat losses in the course of an unsustainable development process.
2. The reasons for loss of cultural diversity are less well understood. There are a number of factors responsible and loss of bio-diversity is only one of them. It is also due to the Euro-centric outlook and policies of the Indian establishment which has hitherto looked down upon all forms of indigenous and traditional knowledge.
3. It was recognised that Traditional Knowledge flows in two streams. One stream is the folk or the prakrit stream which is purely empirical. It was noted that folk knowledge of biodiversity is ecosystem and ethnic community specific and therefore is very rich and diverse. The other stream is the samskrit or codified stream which has sophisticated theoretical foundations very different from that of western knowledge systems.
4. It was recognised that a lot of folk knowledge could therefore be validated and understood in terms of the codified indigenous knowledge systems. It was however, appreciated that modern scientific knowledge systems may also be able to explain the rationality of folk knowledge and therefore scientific and technological pluralism was necessary to promote sustainable utilisation patterns of bio-diversity.

5. It was recognised that traditional knowledge of biodiversity is important not merely because it is a part of our heritage but because it may be of great practical importance and contemporary value.

6. It was appreciated that traditional knowledge of biodiversity is not something stagnant but is essentially dynamic and evolving. There are for examples of local communities having found out the use of exotic species that have been recently introduced or having adapted some modern technology to suit a local need.

7. It was recognised that biodiversity can best be documented by looking at its presence in the diverse elements of the landscape and not only in conspicuous landscape elements such as forests. Thus biodiversity may be seen in landscape elements like agricultural fields, plantations, backyard gardens, hedges, quarries, mines, road sides, river banks, swamps, water falls, ponds, coastal belts etc.

ACTION AGENDA

7.0 DECISION TO CARRY OUT NATION-WIDE FIELD-TESTING

It was decided to field-test the draft in collaboration with network members and their grassroots field associates and field programs in specific locations all over the country. 127 organizations have indicated willingness to field test the CR in 134 villages across 18 states.

7.1 Co-ordination of the field-testing exercise

World Wide Fund for Nature(WWF), New Delhi, Centre for Ecological Sciences (CES), Indian Institute of Science, Bangalore & Foundation for Revitalisation of Local Health Traditions (FRLHT), Bangalore, were made responsible for co-ordinating the field-testing program.

7.2 Community Register Field-Testing Secretariat

The Bangalore meeting requested FRLHT to continue as the Secretariat for the Community Register till the Field-Testing program was completed. The Community Register Secretariat's address is C/o FRLHT, 50 MSH Layout, Anandnagar, Bangalore -560 024, Tel: 3336909, 3330348, Fax. 3334167, Email: ravi@frlht.ernet.in All communication from field agencies for participating in the field test may be sent to this address.

7.3 Last date for field agencies to send in the field tested CR Format

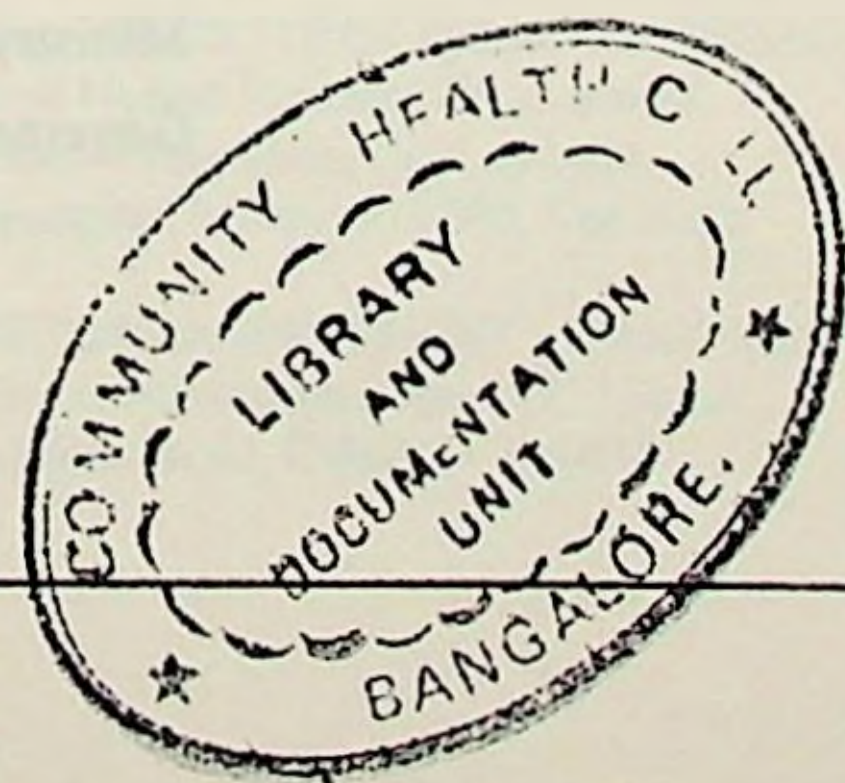
30th June 1995

7.4 Financial support for field-testing

No financial support is available for conducting the field test. The field-testing is expected to be carried out by each agency in at least ONE village in a particular taluka. Since this exercise is only for field-testing the format it is not necessary to carry out extensive surveys.

8. NEXT STEPS

1. It was decided that after the field testing the Community Register format would be suitably revised. It may be necessary to prepare an illustrated manual as a guide for the Community Register Format.
2. It was recommended that the Ministry of Environment should be asked to give a commitment to publish the Community Register format in regional languages for distribution to field agencies all over the country as the suggested format for documenting community knowledge of bio-resources in the villages of India.
3. It was decided to encourage and identify nodal agencies in every state to take up the responsibility to train field workers in the state for building village level Community Registers.
4. It was strongly felt that while Ministry of Environment and Forests should ensure a role for the village community register in its biodiversity legislation, **in the meanwhile, grass-root organisations should take initiative to build up community registers in thousands of villages and use them for revitalisation of local traditions, sharing and exchange of knowledge with other local communities and for protecting their knowledge from misuse by commercial interests.**



List of resource persons who contributed to the Bangalore orientation camp

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IIPA, New Delhi

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READS, Bangalore

Mr. Muneer Alavi,

Rural Communes, Bombay

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Mr. B. Majumdar,

FRLHT, Bangalore

Prof. Subash Chandra,

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Mr. K. Sethuraman,

Ministry of Environment and Forest,

Government of India, New Delhi

**LIST OF ORGANIZATIONS WHO ARE PARTICIPATING
IN THE NATION-WIDE FIELD-TESTING PROGRAM OF
THE COMMUNITY REGISTER**

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A Y U S H Y A

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ASARA & SEVAK

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Chikkanaikanahally Tq., Karnataka

BHUVANENDRA NATURE CLUB-INDIA

Sri Bhuvanendra College, Karkala-574 104
Karnataka

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BIORAMA TRUST

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Tamil Nadu - 642 122

BOMBAY NATURAL HISTORY SOCIETY

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BOMBAY NATURAL HISTORY SOCIETY

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C.I.M.H.

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Coimbatore - 641 045, Tamil Nadu

CENTRAL INSTITUTE OF INDIAN LANGUAGES

Ministry of Human Resource Development
Department of Education, Govt. of India
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CENTRE FOR ENVIRONMENT AWARENESS

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CENTRE OF WILDLIFE & ORNITHOLOGY

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Karnataka

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DHARAMITRA

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ECO FARM

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GRAMIN SHRAMIK PRATISHTHAN

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GREENS INDIA

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INDIAN INSTITUTE OF YOUTH WELFARE

134, Shivaji Nagar, Nagpur - 440 010

IRULA TRIBALS WOMEN'S WELFARE SOCIETY

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Chinglepet-603 001

JANARTH

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**JAI HIND COLLEGE OF ARTS, SCI. & COM-
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Korit road, Nandurbar - 425 412, Maharashtra

JAWAHARLAL NEHRU COLLEGE

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Mundur P.O.-678 592, Palghat Dist., Kerala

**KHA-MANIPUR YOGA & NATURE CURE
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Coimbatore - 641 002, Tamil Nadu

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3rd flr., 48-49, Agarwal Society
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C-2, RAMS, MIG 180, Lawsons Bay Colony
Visakhapatnam - 530 017

LALBHAI GROUP RURAL DEVELOPMENT FUND
Arvind Mills Premises, Naroda Road
Ahmedabad - 380 025, Gujarat

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Sagar - 577 401, Shimoga (Dist.)
Karnataka

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Sri paramakalyani Centre for Env. Science
Tirunelveli - 627 412, Tamil Nadu

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Div. of Taxo., Herbarium & Ethnobotany
Rana Pratap Marg, Lucknow - 226 001
Uttar Pradesh

NATIONAL INS. OF RURAL INTEGRATED
DEV.
45 A, Marina Apartment Comd
Juhu Tara Road, Bombay-400 049, Maharashtra

NATIONAL INSTITUTE OF NATUROPATHY
Bapu Bhavan, 6, Ramabai Ambedkar Road
(Old Tadiwala Road), Pune - 411 001

NATURE CLUB
M6/20, KSHB colony, Malaparamba
Calicut - 9, Kerala

NAVDHANYA
A-60, Hauz Khas (Grd Flr.), New Delhi-110 016

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ASSOCIATION
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Mount Stewart Hill, Udthagamandalam - 643 001
Niligris

NIRMALA COLLEGE
Dept. of Zoology, Muvattupuzha - 686 661
Kerala

NSC SCIENCE COLLEGE
Gokhale Education Society
Department of Statistics
Nasik Road, Nasik - 422101, Maharashtra

PADMA RAMADAS MEMORIAL TRUST (R)
Basavani P.O. Thirthahalli Tq.
Shimoga dist., Karnataka - 577 432

PADMASHRI VIKHE PATIL COLLEGE OF
ARTS, SCI. & COMMERCE,
Pravaranagar, A/P, Loni - 413 713
Shrirampur (Tq.), Ahmednagar

PARAMPARIK BASTAR SHILPI PARIWAR
Bhelvapadar, Para, P.O. Kondagaon
Dist. Bastar-494 226, Madhya Pradesh

PARISARA SAMRAKSHANA KENDRA
Hulemalgi Building, Chowki Math, Sirsi-581 401

PATNA UNIVERSITY
Environmental Biology Laboratory
Department of Zoology, Patna - 800 005, Bihar

PEERMADE DEVELOPMENT SOCIETY
P.B.No 11, Peermade, Idukki - 685 531, Kerala

PEOPLE'S ORGANISATION EDUCATION AND
TRAINING SOCIETY (POETS)
1/103, Bazaar Street, Paradarami - 632 003
Gudiyattam Tq., Tamil Nadu

POORNAPRAJNA COLLEGE
Department of Botany, Dakshina Kannada Dist
Udupi - 576101, Karnataka

PRAKRUTHI
Seegenahalli, Mulbagal - 563 131, Karnataka

PRAKRUTI : CENTRE FOR ECOCENTRIC DEV.
AND PEOPLE'S ACTION (CEDAP)
L/114, Swatantray Senani Nagar
New Wadaj, Ahmedabad - 380 013

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Huladenahalli Post, Via Tyekal
Malur Tq. - 563 137, Karnataka

PROGRESSIVE FRIENDS CIRCLE
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RES. AND ACTION IN NATURAL WEALTH
ADMINISTRATION (RANWA),
505, Shanwar Peth, Pune - 411 030

RESEARCH FOUNDATION FOR SCIENCE,
Technology and Natural Resource Policy,
105, Rajpur Road, Dehradun - 248 001
Uttar Pradesh

RUGNA SEVA PRAKALP
21-41, Brahmanpuri, Miraj-416 410, Maharashtra

RURAL COMMUNES
70, 11nd Floor, 1st Marine Street
Bombay-400 002, Maharashtra

RURAL COMMUNES FOUNDATION
Shop No. 16, Rajdipak Complex
Plot No. 114, Opp. Dr. Rohit Joshi (Clinic)
Silvassa - 396 230

RURAL COMMUNITY HEALTH & DEV. PROJECT
Post Box No. 38, Holdsworth Memorial Hospital,
Mysore - 570 021, Karnataka

RURAL MEDICAL INSTITUTE
Mayeng Lamjao B.P.O., Langmel Dong (KAK)
Manipur-795 103

S.D.M COLLEGE
Dept. of Geography, Honnavar
Uttar Kannada - 581 334, Karnataka

S.I.B.S.
H & R.D. Department, PB. No. 20
Anandagiri, Bangarapet - 563 114, Karnataka

SAHAYOG SOCIETY FOR PARTICIPATORY
RURAL DEVELOPMENT,
Heera Dungri, Almora - 263 601, Uttar Pradesh

SAHYADRI SCIENCE COLLEGE
Shimoga - 577 203, Karnataka

SAVE FOREST MAKE HOME FOR WILDLIFE
5, Bhabanath Sen Street, Calcutta - 700 004
West Bengal

SCOTTS CHRISTIAN COLLEGE
Department of Botany
Nager Coil-629 001, Tamil Nadu

SELF EMPLOYED WOMEN'S ASSOCIATION
SEWA Reception Center, Opp. Victoria Garden,
Bhadra, Ahmedabad - 380001, Gujarat

SEVA MANDIR
Udaipur - 313 001, Rajasthan

SHRI KADASIDDHESHWAR ARTS COLLEGE AND
H.S.KOTAMBAR SCIENCE INSTITUTE,
Hubli - 580 031, Karnataka

SOCIAL CENTRE
Market Yard Road, Ahmednagar-414 001, Maharashtra

SOCIO ECONOMIC DEVELOPMENT TRUST
Dreamland, A & P: Kerwadi, Tal. Palam
Dist. Parbhani, Maharashtra 431 720

SREE NARAYANA COLLEGE

Department of Zoology
Kollam - 691 001, Kerala

SRINGERI NATURE ADVENTURE CLUB

JCBM College Quarters, Sringeri-577 139
Chikmagalur Dist, Karnataka

STATE COUNCIL FOR SCI., TEC & ENV.

Indira Bhavan, Shimla-171 001, Himachal Pradesh

T.B.G.R.I.

Sandhan, B-104, Manumarg, Tilak Nagar,
Jaipur - 302 004, Rajasthan

T.B.G.R.I.

Karimancode PO, Palode
Thiruvananthapuram - 695 562, Kerala

THE RURAL EDUCATION SOCIETY

Ghataprabha, Gokak Tq. Belgaum Dist
Karnataka

UNIVERSITY OF AGRICULTURAL SCIENCES

G.K.V.K Campus, Bangalore - 560065, Karnataka

UNIVERSITY OF AGRICULTURAL SCIENCES

Dharwad, Forestry Degree Programme
Banavasi Road, Sirsi - 581 401, Karnataka

UNIVERSITY OF CALICUT

Dept. of PG Studies & Research in Botany
Calicut University P.O., Pin - 673 635, Kerala

VIGYAN ASHRAM

Pabal, Pune Dist. - 412 403

VIGYAN SHIKSHA KENDRA

Vigyan Samachar Sansthan, Civil Lines
Banda - 210 001, Uttar Pradesh

VIKASANA

No. 350, Kuvempu road, Tarikera - 577 228
Chikmagalur dist, Karnataka

VIMOCHANA DEVADASI PUNARVASATI

SANGHA, Athani, Belgaum dist, Karnataka
591 304

VISHWA MANDAL SEVASHRAM

Shirpur, Dt. Dhule, Maharashtra - 425 405

**VIVEKANANDA GIRIJANA KALYANA
KENDRA**

Chamrajanagar, B R Hills - 571 441
Yelandur (Tq.), Mysore (Dist), Karnataka

**VOLUNTARY HEALTH ASSOCIATION OF
INDIA**

Tong Swasthiya Bhavan, 40, Institutional Area,
Near Qutab Hotel, New Delhi - 110 016

**WESTERN GHATS BIO-DIVERSITY
CONSERVATION NETWORK**

The American College, Madurai - 625 001

**WESTERN GHATS BIO-DIVERSITY
CONSERVATION PROGRAM**

A.V. Baliga College of Arts and Science
Department of Zoology, Uttar Kannada
Kumta-581 343, Karnataka

**WESTERN GHATS BIODIVERSITY
INVENTOR**

M.G.M. College, Dept. of Statistics
Udupi - 576 102, Karnataka

WORLD WIDE FUND FOR NATURE-INDIA

Sikkim Field Office, Opp. NCC office
Tadong, Gangtok, Sikkim-737 102

WYNAD SOCIAL SERVICE SOCIETY

P.B.No 16, Mananthawady
Wynad - 670 645, Kerala

ZOOLOGICAL SURVEY OF INDIA

M Block, New Alipore
Calcutta - 700 053, West Bengal

Community Health Cell

From: "India Resource Center" <amit@igc.org>
To: "India Resource Center" <amit@igc.org>
Sent: Thursday, May 15, 2003 2:58 AM
Subject: Monsanto, Unilever Use Child Labor in India

WHAT'S NEW ON INDIA RESOURCE CENTER

Building Global Links for Justice <<http://www.IndiaResource.org>>

May 14, 2003

Note: CorpWatch India is undergoing transition. It is being renamed the India Resource Center and is now a project of Global Resistance. Our mission remains the same and our new contact details are provided below.

AGRICULTURE

Monsanto, Unilever Use Child Labor in India

<http://www.corpwatchindia.org/issues/PID.jsp?articleid=4023>

Major corporations, including Monsanto, Unilever, Syngenta and ProAgro, are making large-scale use of hazardous forms of child labor in cotton seed production in India. A report commissioned by the India Committee of the Netherlands documents the abuses and also marks the beginning of a campaign to combat the use of child labor.

IN THE NEWS

<http://www.corpwatchindia.org/news/PNR.jsp>

- *U.S. Challenges Europe's Biotech Crop Ban in WTO
- *Royal Dutch Shell to Enter India with 2,000 Petrol Stations
- *Unilever's Mercury Waste from India Heads for US
- *Alang Shipbreakers Face AIDS Crisis
- *Unilever Denies Child Labour Link
- *India Rejects Bt Cotton and GM Mustard Commercialization
- *World's Wettest Area - Cherrapunji- Dries Up
- *High Tech Workers Exploited in Australia
- *World Bank Asks Delhi to Raise Water Prices

BULLETIN BOARD

<http://www.corpwatchindia.org/bulletins/PBR.jsp>

- *Fuelling Poverty - Oil, War and Corruption
- *Study Shows Failure of Bt Cotton in India

India Resource Center
 7404 Potrero Avenue, CA 94530, USA
 Email: amit@igc.org
 Web: <http://www.IndiaResource.org>

India Resource Center -- "Building Global Links for Justice"

JH
 A
 5/15

lib - Enron + health file
 Ju
 5/15

5/15/03

Main Identity

From: ESG India <esg@ngl.vsnl.net.in>
To: <sochara@blr.vsnl.net.in>
Sent: Wednesday, August 13, 2003 5:45 PM
Subject: RELEASE: FOREST DEPT. WITHDRAWS TREE FELLING ORDERS IN BANGALORE

PRESS RELEASE

13 AUGUST 2003

FOREST DEPT. WITHDRAWS TREE FELLING ORDERS IN BANGALORE

ESG Helpline to Prevent Tree Felling

The Karnataka Forest Department, Bangalore Urban Division, has withdrawn with immediate effect all orders issued to fell trees. This action was taken on the basis of a complaint from Environment Support Group, when it pointed out cases where Bangalore Mahanagara Palike officials were accomplices to illegal tree felling in broad daylight at prominent places in the city.

Mr. Parameshwara, IFS, Deputy Conservator of Forests (Bangalore Urban Division), in his letter dated 02 August 2003, No. M.V.CR.012/2003-04 (copy enclosed) addressed to the Horticulture Department of Bangalore Mahanagara Palike and Bangalore Development Authority, has stated that any violation of this order would bear consequences such as Contempt of Court and action per the Karnataka Tree Protection Act, 1976.

It may be recalled that the Hon'ble High Court of Karnataka has expressed deep concern and shared the anguish of the public at large over the massive felling of trees all over Bangalore. Hon'ble Justice Shri. M. F. Saldanha and Hon'ble Justice Shri M. S. Rajendra Prasad have set out clear guidelines that would have to be complied with by all agencies before any tree is felled, per their directions in Writ Petition 8178/1999. In effect this would involve planting two saplings prior to felling any tree.

In recent years the Bangalore Development Authority (BDA), Bangalore Mahanagara Palike (BMP), Public Works Department (PWD) and various other agencies have felled trees on the basis of blanket permissions accorded by the Urban Division of the Karnataka Forest Department. Reasons for felling have commonly included widening of roads, infrastructure development and layout formation. However, it has been widely noticed that felling has been carried on more with vengeance against trees, than based on carefully assessed need. In fact there has been hardly any public involvement or consultation to ascertain the need for tree felling on such a massive scale, and never any significant attempt to plant saplings. The environmental consequences have been significant indeed.

AS the Hon'ble Court has observed with concern, about 20,000 trees have been

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for lib - Environment file
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felled for the expansion of the Bangalore Mysore highway alone. But there is really no count of the thousands more that BDA has felled in the formation of various residential layouts all around Bangalore. In most cases these trees were several decades old, in some cases over a century, and formed an enchanting part of the city's heritage and landscapes. Trees that could have been left standing without any impact on ongoing work or future "development" has often been unnecessarily felled, resulting in barren landscapes, massive soil erosion and needless runoff of rainwater.

In two recent instances, ESG has initiated action against the Horticulture Department of the Bangalore Mahanagara Palike for felling trees on 4th Main Road ("Nanda Theatre Road") of Jayanagar and opposite West Gate of Lalbagh on Vani Vilas Road.

It was noticed that reasons for felling these trees were not legitimate, that BMP officials had no authority to order such felling and private contractors were beneficiaries in both instances. It is likely that such vandalism is taking place in many parts of the city.

HELPLINE AGAINST TREE FELLING:

To prevent further vandalism and unnecessary tree felling, and to encourage progressive citizen engagement for protecting Bangalore's Trees, ESG has set up a HELPLINE @ Telephone 6534364 (Contact Person: Deepa).

We request anyone who witnesses such vandalism in the Bangalore Urban Region to call 6534364 and provide necessary details. ESG would periodically gather this evidence and follow up with the Karnataka Forest Dept. for necessary action.

Leo F. Saldania Deepashtee

Environment Support Group @

S-3, Kajashree Apartments, 18/57, 1st Main Road, S. K. K. Gardens, Javanagar,
Bannerghatta Road, Bangalore 560041, INDIA. Telefax: 91-80-6341977/6534364
Email: esg@ngi.vsnl.net.in Website: <http://www.esgindia.org>

ENCLOSURE: ORDER OF KARNATAKA FOREST DEPARTMENT

No. M. V. CR. 912/2003-04.

Dated: 02.08.2003

From:

8/14/03

Office of the Deputy conservator of forests,
Bangalore Urban,
Bangalore.

To:

The Director,
Horticulture Department,
Bangalore Mahanagara Palike,
South, East, West,
Bangalore.

Respected Sir,

Subject: Regarding Felling of trees.

On the basis of requests for tree felling from the public and from your office this office has issued orders for felling trees on several instances.

In Writ Petition WA 8178/1999 (directions) dated 29.07.2003 the Hon'ble High Court has described rules and procedures and stated that before cutting a tree, two saplings have to be planted. On the basis of this direction you are being informed that all tree felling orders given till date where the trees have not been cut are being withdrawn under Sec.3 (1) of The Karnataka Preservation of Tree Act, 1976 with immediate effect.

You are being informed that the trees are not to be cut for any reason whatsoever. If trees are cut then you will be held solely responsible for the resulting Contempt of Court or other consequences.

Yours faithfully,

Sd/
Deputy conservator of forests,
Bangalore Urban,
Bangalore.

8/14/03

Main Identity

From: "N. Thirumalai" <niru@ias.ernet.in>
Sent: Thursday, July 24, 2003 11:23 AM
Subject: Academy lecture

Indian Academy of Sciences
Bangalore

PUBLIC LECTURE

Atmospheric Brown Clouds: South Asian and Tropical Impacts

by

Prof. V. Ramanathan
Scripps Institution of Oceanography, University of California, San Diego, USA

The Indian Ocean Experiment (INDOEX) provided one of the best and well-known evidences for how long-range transport of man-made aerosols transforms the so-called urban haze into a regional and continental-scale brown "cloud". The recently launched TERRA satellite not only confirmed INDOEX findings, but has also revealed the presence of widespread pollution haze layer downwind of many other continents.

This lecture summarizes INDOEX findings on the South Asian haze and compares these with the impacts of anthropogenic haze in other parts of the world; and then illustrates, with model studies, the unique vulnerability of the South Asian and tropical hydrological cycle to the radiative forcing by the absorbing aerosols within the haze layer.

Date : 28 July 2003 (Monday)

Time : 3.30 p.m.

Venue : Faculty Hall
Indian Institute of Science
Bangalore 560 012

*CHE lib
environment + health file
Jw
14/8*

*MS
15/8*

All are welcome

Kind pensal of Manya, Nirdehok, Dr. Ravi Waman

ENVIRONMENT, POLLUTION AND HEALTH

T. G. K.,
20/12/99
E-3.

1. ENVIRONMENT AND POLLUTION ARE TWO INTEGRATED, INSEPARABLE ENTITIES INTERDEPENDENT AS FAR AS THEIR IMPACT ON HEALTH IS CONCERNED.
2. IT IS RATHER VERY SAD AND PATHETIC TO SEE EVERY MORNING THE SAFAI KARMA CHARIS AS THEY ARE CLASSIFIED, HANDLING BARE FOOT BAREHAND THE ENORMOUS VOLUME OF GARBAGE. HAND GLOVES AND LONG SHOES MUST BE PROVIDED.
3. SPILLING OF THESE ON THE ROADS BY THE LORRIES TRANSPORTING THEM IS MORE HAZARDOUS THAN THE MOST HAZARDOUS MEDICAL/HEALTH CARE WASTES WHICH ARE CONFINED TO THE HOSPITAL ENVIRONS.
4. ABOUT FIVE PERCENT OF MEDICAL WASTES ARE HAZARDOUS. MEDICAL INSTITUTIONS AND HOSPITALS UNDER GOVERNMENTAL VOLUNTARY AGENCIES HAVE BEEN SO FAR MANAGING DISPOSAL THEIR OWN.
5. IT IS MOST HEARTENING THAT MOST OF THESE ENJOY EXCELLENT INFECTION FREE RECORD THOUGH LOCATED IN HIGHLY POPULATED LOCALITIES.
6. MORE HAZARDOUS IS THE FORCED INVOLUNTARY INHALATION OF SMOKE, DUST, NOISE AND VARIOUS POLLUTANTS BY THOSE ON TWO WHEELERS PEDESTRIANS, TRAFFIC REGULATING POLICE ON THE ROADS OF CITIES.
7. FUNDING OR MANDATORY REGULATIONS ALONE HAVE NEVER IN THE PAST, OR AT PRESENT OR IN FUTURE CAN IMPROVE THE ENVIRONS.
8. IT IS FUTILE TO BLAME THE CIVIL AUTHORITIES OR GOVERNMENTS FOR ALL THE ILLS IF THE SOCIETY AND PEOPLE ARE EVASIVE AND AVOID PRACTISING BASIC HYGIENE AND CLEANLINESS.
9. MORE THAN THE INPATIENTS OR OUTPATIENTS AND MEDICAL STAFF AND THEIR PROCEDURAL WASTES, ATTENDANTS AND VISITORS OF PATIENTS ARE MAJOR CONTRIBUTORS TOWARDS THE EVER INCREASING VOLUME OF NON HAZARDOUS WASTES IN AND AROUND HOSPITALS, NURSING HOMES AND MEDICAL-HEALTH CARE CENTRES.
10. ENVIRONMENTALISTS AND POLLUTION CONTROL AUTHORITIES AT ALL LEVELS MUST EVOLVE STRATEGIES THAT ARE COST EFFECTIVE, REALISTIC, FEASIBLE IN DAY TO DAY PRACTICE. THIS VERY OBVIOUSLY INVOLVES INTEGRATED INTERDISCIPLINARY INTERDEPARTMENTAL COORDINATION AND TEAMWORK INVOLVING POLICE, TRANSPORT, HEALTH CARE AUTHORITIES AS WELL.

Handwritten notes at the bottom left:
28/12/99
590
28/12

11. THE URBAN, SEMIURBAN, RURAL ENVIRONS ARE VERY WIDELY DIVERGENT AND REQUIRE DIFFERENT APPROACHES, IN FACT COMPARED TO THE URBAN SITUATION, WHERE NEARLY FORTY PERCENT OF THE POPULATION LIVE UNDER PATHETIC SUB HUMAN CONDITIONS. IN THEIR DWELLINGS AND HUTMENTS, THE SEMI URBAN AND RURAL SCENARIO IS BETTER, HOWEVER UNDER GROUND DRAINAGE AND FILTERED WATER SUPPLY NEED ATTENTION IN THESE AREAS.
12. AS FAR AS MEDICAL WASTES ARE CONCERNED, SEGREGATION IS THE TOP PRIORITY FACTOR. THIS MUST BE DONE ON SITE. IN ANY HOSPITAL/NURSING HOME, ONLY IN CERTAIN AREAS, MAJOR PORTION OF HAZARDOUS WASTES ARE GENERATED. THIS FORMS ABOUT FIVE PERCENT OF TOTAL MEDICARE WASTES, A WELL-MANAGED SEGREGATION AVOIDS CONTAMINATION HAZARDS.
13. ALL WASTES CAN BE DISINFECTED AND STERILISED BEFORE THEY LEAVE THE PREMISES. INCINERATORS APPEAR INEVITABLE AND UNAVOIDABLE FOR DISPOSAL OF CERTAIN WASTES, SOME OTHERS MAY GO FOR RECYCLING SO A LOCALISED AS WELL AS CENTRALISED APPROACH WILL BE NEEDED.
14. A CONSORTIUM APPROACH IS THE ANSWER IF WASTES DISPOSAL IS UNDERTAKEN ON AN INTEGRATED BASIS. THIS INVOLVES VERY HIGH INITIAL NON RECURRING EXPENSES FOLLOWED BY SIZABLE ANNUAL RECURRING ONES.
15. IMPLEMENTATION OF RECOMMENDATIONS IS A REALLY FORMIDABLE CHALLENGE AND INVOLVES A VERY LONG TIME DELAY DUE TO THE VERY WIDE RANGE OF HURDLES, BOTTLENECKS BARRIERS ONE IS BOUND TO ENCOUNTER DUE TO VERY OBVIOUS REASONS.

Prof.T.G.KRISHNA MURTHY,
Vice Chairman, Board of Examiners,
Paramedical Courses, CEP-AICTE,
UVCE Campus, KR Circle, Bangalore-560 001.
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HRC Technologist
24, Shanti Kutir,
15th Cross, 4th Temple Street,
Malleswaram,
Bangalore-560 003.
Tel: (080) 334 15 59

Secretary,
Clinical Engineering Society,
31/32, Crescent Road,
Bangalore-560 001.
Tel: (080) 226 11 35
Fax: (080) 226 52 98

HEALTH SCIENCES TECHNOLOGY EDUCATION AND TRAINING – THE NEED

1. Human Resources Potential has to be developed based on the needs in the Urban, Semiurban, Rural areas.
2. Socio Economically Backward who are talented, after their 10 or 10 + 2 courses must get an opportunity to nurture and harness their potential based on their aptitude.
3. It becomes a mandatory duty in all democratic nations to provide education and training at a reasonable costs.
4. It is most desirable to locate these centres in the semiurban – rural areas, as far as practically feasible
5. Considering the affluence of 10 to 15 percent, medical, engineering education is beyond the reach of majority of talented youth, even merit seats are not accessible in view of the escalating fees.
6. Capitation/management seats in engineering, medicine, nursing, pharmacy, dental are almost exclusively meant for the very highly affluent.
7. Considering the sad and pathetic situation after more than 50 years of independence, strategies have to be evolved to improve the knowledge base and placement potential of those who are less lucky.
8. Health sciences technology education and training at the graduate level (6 semesters + 2 of internship). As initiated by S.R.M.C & R.I, Chennai could be a model for being initiated at some selected medical institutions all over the nation. Such a course is within the reach of some of the middle in come group.

Note by:

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APPENDIX

HEALTH REHAB CARE INFO DATA

Population	-	980 Million
Handicapped	-	98 Million
Elderly (Above age of 62 years)	-	30 Million
Medical Colleges (attached Hospitals, 500-1000 beds)	-	175
Major Hospitals (500 beds & above upto 2000)	-	1500
Referral centres of clinical excellence (100 to 500 beds)	-	200
Specialist Medical Institutions (100 – 500 beds)	-	100
District Level Hospitals (150 – 300 beds)	-	550
Rural Hospitals/Community Health Centres (30-100 beds)	-	2500
Primary Health Centres (5-10 beds)	-	30,000
Community Health Sub-Centres	-	1,50,000
Bed Population Ratio	-	1 : 1300
Total Number of Hospital beds	-	8,00,000

Note by:

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HUMAN RESOURCES POTENTIAL DEVELOPMENT ROLE OF CEP-AICTE

As integrated interdisciplinary interdepartmental team work approach spanning various levels based on the actual needs of the Urban, Semi Urban, rural areas are almost an inevitable mandatory, necessity.

The process of Education and Training is a continuous one to update the knowledge base of working professionals which, in turn, enable them to improve their placement potential and career. From the certificate level through diploma onto the degree, PG and doctoral levels, a phased step ladder for those with aptitude and urge to come up. This process very obviously takes them from the low tech level onto medium and to high tech levels. Programmes like CEP, CME, QIP enhance the quality of education and training both in basic disciplines as well as integrating interdisciplinary areas. Irrespective of the extent of utilisation, the knowledge base at the urban, semi Urban, rural areas must be updated by organising workshops, seminars, short term courses by way of winter and summer schools in the semi urban & rural areas as well. It must be conceded those living in rural areas are also endowed with intellectual intelligence, harnessing this HR Potential is the challenge to leaders who must be dynamic, innovative open minded, broad based to accommodate a very wide range of diverse viewpoints to optimise utilisation.

Integrated interdepartmental interdisciplinary teamwork integrating the advancements in the fields of medicine, engineering, Science and technology to benefit humanity by evolving cost effective strategies to meet the Urban, semi Urban, rural needs, Implementation needs KARMAYOGIS with HUMANISM and OPTIMISM, at every level of the hierarchy. Both the Governmental and non-governmental agencies have to be partners in meeting the gigantic challenge of human welfare in the largest democratic nation in the world, which is also very unique for its multilingual, multi religious population which is approaching the 1000 million mark with nearly 10 percent handicapped and 3 percent elderly. Affluence ranges from 10 to 15 percent and nearly 80 percent living in semi Urban or rural areas. An autopsy of the past 50 years and a biopsy of the present enables one to apply realistic, feasible, need based correctives to improve the quality of human life at various levels.

Preventive and promotional measures need top priority in view of the ever escalating modern Medicare costs. Holistic Medicare approach utilising other systems of Medicine and wide range of techniques need wider utilisation. Besides, rehabilitation of handicapped and elderly, mobility, transportation, accessibility, need very urgent attention from the humanism angle. Safety, standardisation, Calibration, operation, maintenance aspects are an inevitable part of any programme. To ensure quality, approval, assessment, accreditation are a mandatory necessity. A planned scientific approach is a MUST for optimising HRP development and utilisation. Funds alone can never ensure quality. Social participation is inevitable to achieve time-bound techno-social humanitarian targets. For the Socio-economically backward, the courses on computers, management, engineering topics, paramedicals approved by CEP-AICTE will be of immense value for the youth of the nation in the Semi-urban and rural areas to improve their knowledge base and thereby placement potential. This could be the

basic step for those with intelligence and aptitude to progressively improve their level of education and training by various available means. One must be very cautious about mushroom growth of centres which practice deception. Course contents, duration, fee structure has to be standardised. In view of the rather sad and pathetic conditions actually prevalent in the rural areas, reduced tuition fees must be charged. HRP development strategy lies in guiding and assisting the intelligent teenagers with aptitude to come up by inspiring and encouraging them to develop their inborn potential resources. A lot depends on the rural youth response and the leadership in the rural areas to overcome traditional barriers. We can be optimistic and hope for the best.

Medical and Engineering educationists committed to promote interdisciplinary training programmes must join hands to promote setting up of paramedical education centres in the Semi Urban and rural areas to enable the Socio-economically backward youth to join these Courses after their 10 or 10+2 studies. The Directors of Health, Medical Education, Health Science Universities can closely interact with the CEP-AICTE in evolving strategies to develop standardised curricula, duration, fee structure on a national level. Depending on the needs, various levels of Courses have to be planned to suit the Urban, Semi Urban rural needs. This interaction is inevitable in view of the Science, Engineering, technology components essential for these.

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more than 25 technical papers have been approved for presentation and more than 100 organisations have already confirmed their participation in the Conference. The occasion & inaugurate the conference at 1000 hrs on 16th October, 2003.

The Conference would offer a unique opportunity of two days full of informative and innovative conference sessions, and many networking opportunities. The conference will have participation of senior decision makers from the Government, PSUs, SEBs, regulators etc. It would provide direct access to policy makers, decision taking authority and senior executive power sector and various utilities as also manufacturers & consultants.

For those exploring business opportunities in the power sector, this Conference by virtue of being a platform offered jointly by Council of Power Utilities and IndiaCore.com will provide access to almost the entire spectrum of the power industry. It will also be a unique opportunity for all the players to not only voice their views and concerns but also to reassess their positions in the changing environment and to network with senior players in the industry.

Participation

IndiaCore.com on behalf of World Council of Power Utilities and Council of Power Utilities extends cordial invitation to the international community, individuals and organisations with interest in the Power & Allied Infrastructure sectors like worldwide developers of Power & All Infrastructure Projects, Utilities, IPPs, SEBs, PSUs, Transmission Companies, Distribution Companies, EPC Contractors, Equipment Suppliers, Financial Institutions, Lenders, Investors, Consultants, Law firms, IT firms, Telecommunication Cos, Environmental groups to participate in the Conference.

The major objective of this Conference is to provide a forum for:

- Sharing of experiences of major manufacturers of power plant equipment, engineering consultants, academicians, environmentalists and leading utilities in the world in the area of eco friendly power generation, water resources development focusing on the theme 'Sustainable Energy Development for Improved Quality of Life'
- Discussing environmental concerns some of which transcend the local/ regional ambit and have global consequences.
- Discussions regarding technological advancement that are taking place in power generation in the areas of improved efficiency and environment.
- Developing close working relationship between experts from users and developers of power units and all other concerned for future consultations, assessment of problems and for finding out remedial solutions.

Objective

www.IndiaCore.com is pleased to announce the International Conference 'Green Power 4 - Sustainable Energy Development for Improved Quality of Life' - the fourth in a series of successful biannual Conferences. The Conference is being organised by World Council of Power Utilities and Council of Power Utilities from October 16-17, 2003 at New Delhi, India.

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 Sent: Monday, July 14, 2003 11:01 PM
 Subject: International Conference - GREEN POWER 4 - Sustainable Energy Development for Improved Quality of Life, October 16-17, 2003, New Delhi, INDIA

World Council of Power Utilities

Handwritten notes and signatures in the top right corner, including 'LS', '15/10', and a signature.

incentive. There are also attractive business development and sponsorship opportunities to be explored.

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SOUTH AFRICAN EXCHANGE PROGRAM

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ACTIVITY REPORT, 2002

Ten years ago, I was preparing for a trip to South Africa where I was to meet toxics and environmental justice activists and further discuss the ideas of what was to become SAEPEJ. Now, a decade later, our strong relationship with groundWork in South Africa has resulted in two important collaborative projects. The first was Project X-Change, an environmental justice youth exchange where we brought five young South African activists to the U.S. Under the banner of "building bridges for global environmental justice", this effort highlighted our dedication to training the next generation of leadership and forging the linkages to their counterparts in the U.S. We traveled over 3,000 miles by mini-van visiting impacted communities and sharing sto-

ries, strategies, meals, languages and cultures.

Our second effort involved sending Ravi Dixit down to South Africa to work with groundWork in preparation for their Corporate Accountability Week held during the World Summit on Sustainable Development in Johannesburg.

This year further allowed us to focus on our educational materials: we developed an environmental justice curriculum with accompanying case studies and videos. We are also in the process of completing our video on Project X-Change. You can read more about our activities and educational materials in this report.

— Heeten Kalan, Director



Caroline Ntaopane, a Project X-Change participant from the Sasolburg Environmental Committee, seen here leading a WSSD protest this past September, shared the following with us prior to returning to South Africa, "I am going to use everything I learned. I'll go back home without a regret, but with confidence and fresh ideas."

From May 18 to June 8, 2002, five young South African activists visited communities of color around the U.S. as a part of Project X-Change, an environmental justice youth exchange. The South African youth met youth of color organizing for environmental and economic justice to learn from the struggle for justice in the U.S. and also to share their organizing experiences in South Africa. The seven stops included Boston (Massachusetts), Jackson (Mississippi), Cancer Alley (Louisiana), San Antonio (Texas), El Paso (Texas), Los Angeles (California) and the Bay Area (California). Along the way, they had the opportunity to stop at the Grand Canyon and appreciate its beauty.

"Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations."

— South African Bill of Rights

Project X-Change: Building Bridges for Global Environmental Justice

We have all heard that the 'children and the youth are the future,' but what are we doing to prepare young people to not only be the future, but also to change it? If we hope for a better future for our children and their children, we must support young people fighting for social change today. Youth must be an integral part of any movement to ensure that movement's future. Project X-Change was envisioned with the future of the environmental justice movement in South Africa and the U.S. in mind. From May 18 to June 8, 2002, five young South African environmental justice activists toured to meet with U.S. environmental justice groups from Boston to San Francisco. The South African delegation represents communities fighting oil refineries, mining pollution and water pollution. Representing Sasolburg, Secunda and Soweto, these five young activists brought a long history of social justice activism to Project X-Change. In addition they brought the culture and struggles of South Africa to help young people in the U.S., many of whom know little about the history of apartheid and the liberation struggle, understand the connections between the U.S. and South Africa.

Project X-Change kicked off at a SAEPEJ/ACE event in Boston where young and old activists came together to celebrate, share and have fun. The next few days in Boston included: tours of Roxbury and the South End; learning about diesel buses in Dudley Square; and becoming acquainted with the African Meeting House and the Underground Railroad.

Thulisile Ngcobo captured the sentiments of the group when she explained, "I was surprised to hear about the racism and the [toxic] dumping in Dudley Square, because when they advertise the USA on television [in South Africa] they only show the best parts. But the thing that impressed me was that the ACE youth have worked hard and have achieved a lot because some dumping sites were cleaned up. I think I need to work as hard as they do."

David Noiles, a youth leader with ACE, was quick to make the connections after he spent a few days with the South Africans. He said, "The exchange changed my perspective on EJ because before when I thought about EJ I only thought about what was going on in Roxbury and in Boston. But after meeting the youth

from South Africa, who told us about how serious things were in their neighborhoods and how it was even worse there, I realized that EJ is not just a Boston thing, or even a U.S. thing but it is global."

From Boston we flew to Jackson, MS, where we met with veteran civil rights and anti-apartheid activist Hollis Watkins. We spent the next few days exploring the Mississippi Delta and learning more about cotton-spraying, redistricting and educational reforms there. The South Africans went bowling and horse riding for the first time during their Mississippi stay.

We began our 3,000 mile road trip from Jackson to Baton Rouge where we explored issues of forced resettlement by chemical companies, the export of mercury waste by Borden Chemicals, and the confluence of corporate and state power.

From Baton Rouge we drove to San Antonio where we heard from communities impacted by the polluting Kelly Air Force Base, the implications of its closure, the health effects of the lead smelter and the slaughterhouse, the struggles of the former women workers at the Levi's plant and the living wage campaign of the elected schoolboard. We also spent a day making the connections with artists who paint murals to document community's history while sending strong political messages. Genaro Lopez, an organizer with the Southwest Workers Union shared his

insights with us at a recent conference, "The personal connections between different organizations and nations was an important part of the exchange between South Texas and South Africa. We heard from real people about their struggles in South Africa and learned first hand that the struggle against environmental racism is global, whether fighting against multinationals or the military." Elisa Hlongwane, moved by the resilience of local activist Yolanda Johnson, added, "I won't forget San Antonio. The people there taught me that to be united is the best thing."

We then crossed Texas to El Paso where we were taken on a tour of the U.S. border with Ciudad Juarez, Mexico, along with members of the Southwest Organizing Project who drove down from Albuquerque. Here thousands of migrant workers cross to come and work in the U.S. From the end of July to September, during the intensive chili picking season, the Border Patrol mysteriously disappears while Mexican workers come over to fill the jobs in the chili fields. Chili pickers



Project X-Change with Southern Echo. (l-r) Seipati Mokoka, Hollis Watkins, Caroline Ntaopane, Thulisile Ngcobo, Patrick Duma, (seated) Elisa Hlongwane & George Ross.

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get paid 55 cents for a 15 pound bucket of chilies. This region of the U.S. produces more than one third of all the chilies used in the U.S. hot sauce market. After the season is over, the Border Patrol makes its presence felt once again. We also spoke to onion pickers, some of whom were descendents of the Brasero Program, about their working conditions. The Brasero program was established after W.W. II to bring some of the best Mexican agricultural workers to the U.S. At least five million Braseros came over to the U.S., destroying Mexico's agricultural base. Ten percent of their wages were taken out to be paid to them upon their return to Mexico. This money has never been paid back.

En route to Los Angeles, we made a brief stop at the Grand Canyon where we hiked parts of the southern rim. In Los Angeles, we toured Long Beach and Wilmington, home to dozens of oil



Seipati Mokoka from Kliptown giving Ravi Dixit a tour of her neighborhood in September, 2002. Inspired by the X-Change, she is organizing toxic tours of her area.

refineries and polluting industries. We learned about the youth struggles in Huntington Park and the role they played in stopping a new power plant from being built. We saw the school next to the chrome plant and learned about the serious effects of chrome poisoning. We witnessed first hand the discrepancies in U.S. society by visiting Skid Row, a homeless community, and Rodeo Drive.

From Los Angeles, we flew to the Bay Area where we learned about gentrification and displacement in the Mission District and about the oil pollution in Richmond. The struggles in both those communities were inspiring and encour-

aging. We also learned about how young activists from the Mission and Chinatown are working and acting together in San Francisco. We were shown single resident occupancy buildings and experienced their plight, even if it was for a brief moment, when we got stuck in an elevator in one of these buildings.

Project X-Change ended in the Bay Area with a wonderful send-off organized by PODER.

"The Send-Off event at PODER made me feel at home, especially the Aztec dance group, who prayed to the ancestors for our safe journey back to South Africa. I was amazed that their culture was so similar to our African culture," exclaimed Patrick Duma.

Teresa Almaguer added the following observation, "I loved the time that we got to spend living with the young people from South Africa, because we were able to ask each other questions and break down stereotypes about the U.S. and South Africa. We learned that our people and communities in the U.S. and South Africa are both messed up by environmental racism. We also learned how much our cultures have in common. We shared our traditions of drumming, singing, and honoring our ancestors and we learned how similar we are, even though at first we didn't know it."

After an exhausting but invigorating three weeks, the delegation returned to South Africa. On his most recent trip there, Ravi Dixit met with all the participants to follow up on their activities and explore ways for SAEPEJ to support their work. We will provide resources for them to periodically convene in South Africa and continue to encourage communication with their new friends and allies in the U.S.

To learn more about Project X-Change visit: <http://saepej.igc.org/xchange.html>

Corporate Accountability Week

As the world focused its attention on the World Summit on Sustainable Development (WSSD) in Johannesburg at the end of August 2002, groundWork hosted a Corporate Accountability Week to highlight the human rights and environmental abuses of multinational corporations, many of whom were sponsors of the WSSD process. This Corporate Accountability Week brought together international NGOs and local grassroots groups to share knowledge and experiences of corporate abuse on the local and international level. The week culminated with a statement, signed by over 60 organizations, to the WSSD process calling governments and the UN to hold corporations accountable for their abuses against people and the environment.

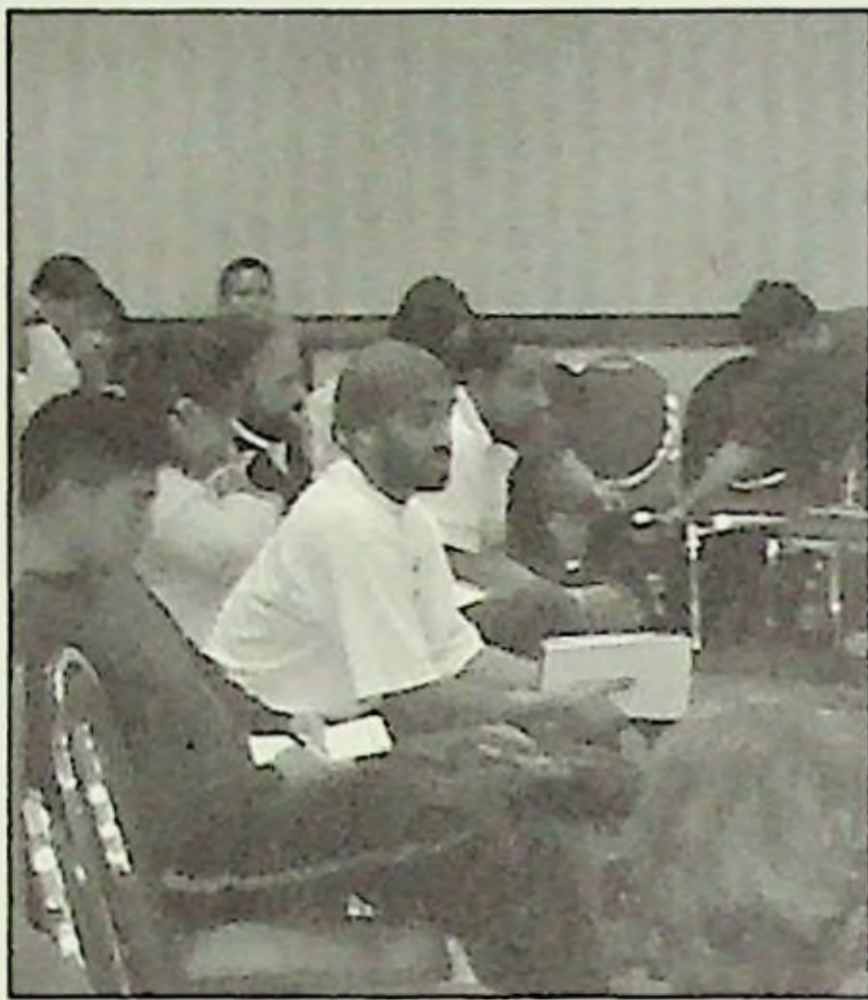


The Greenwash Academy posing with winners of the Greenwash Awards after the ceremony in Johannesburg, South Africa.

The week was full of panel discussions, workshops and presentations with topics including: 'communities challenging Shell,' 'climate justice,' 'genetic engineering,' and 'the Bhopal principles.' Sponsoring organizations included the South African Exchange Program on Environmental Justice (SAEPEJ), Third World Network, Friends of the Earth International, Environmental Monitoring Group, EarthRights International, Greenpeace, Earthlife Africa, CorpWatch, and Corporate Europe Observatory.

In addition, the Greenwash Academy (hosted by groundWork, CorpWatch and Friends of the Earth International) hosted their award ceremony for companies who pretend to be friends of the environment and leaders in the struggle to eradicate poverty while destroying the environment and social conditions of the local people. Some of the winners included Shell for Lifetime Achievement, the United States of America for Best Supporting Government and South Africa's own Sasol for Best Picture for their billboard proudly stating: "We put as much into the community as we do in our petrol." Has anyone checked their benzene, xylene and sulfur dioxide levels lately?

Second People of Color Environmental Justice Leadership Summit, Washington, D.C.



Ravi Dixit talks about the linkages between South Africa and the U.S. during a Summit II workshop on Trade and Globalization.

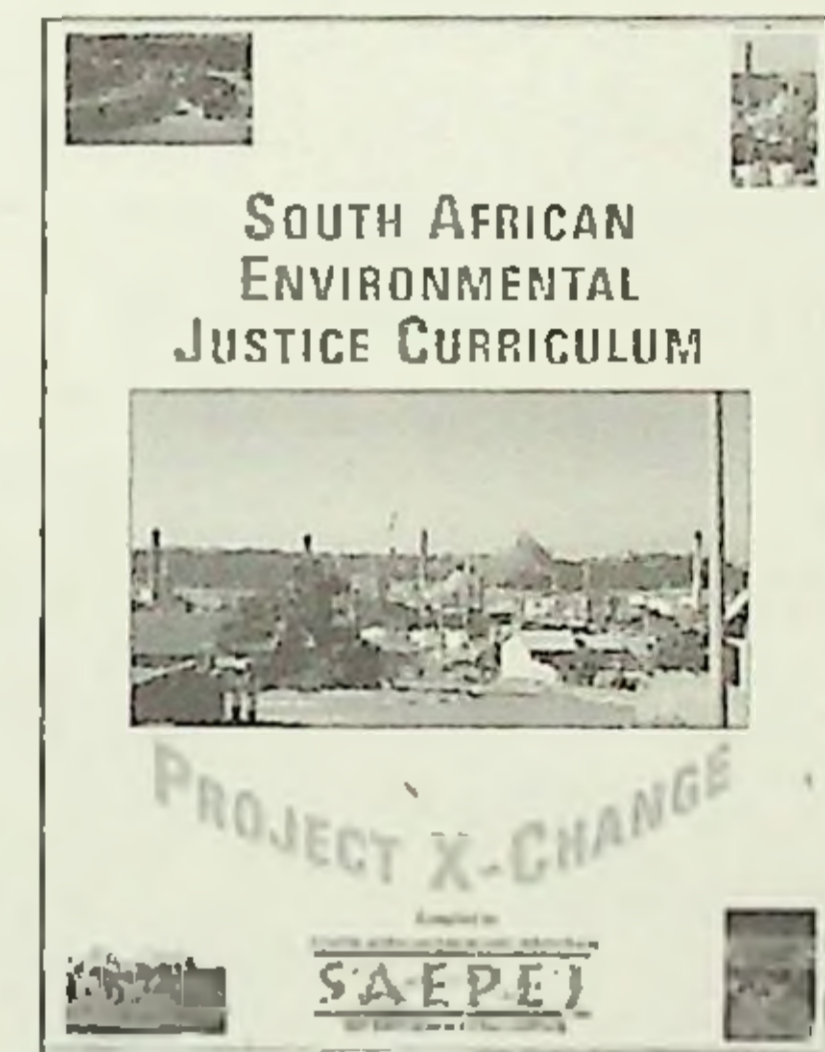
The Second People of Color Environmental Justice Summit held in Washington, D.C., from October 16 to 21, 2002 celebrated the U.S. Environmental Justice movement and its accomplishments. SAEPEJ's U.S. Coordinator, Ravi Dixit, was invited to speak at the workshop on Trade and Globalization. Here he shared his most recent experiences with the Corporate Accountability Week held during WSSD in South Africa. We also took this opportunity to solicit reactions about the Summit and the youth exchange from Project X-Change U.S. host organizations attending the gathering.



SAEPEJ with members of Alternatives for Community and the Environment, Southwest Workers Union, Border Agricultural Workers Project, Southwest Organizing Project, Communities for a Better Environment, PODER and China Progressive Association at Summit II.

New Teaching Tool: South African Environmental Justice Curriculum

In preparation for Project X-Change, we compiled the South African Environmental Justice Curriculum (shown on right) for the U.S. and South African participants. The curriculum is made up of three sections focusing on 1) the history of South Africa, 2) apartheid and the environment, and 3) environmental justice in South Africa today. The last section examines three case studies with accompanying videos. This is a great teaching tool for all age groups. Please contact us if you want to purchase the curriculum. We will also have a video of Project X-Change available for sale in early 2003.



South African People and Environments in the Global Economy, a series published by groundWork

Published to coincide with the World Summit on Sustainable Development held in South Africa this past August, this series of five booklets gives an environmental justice perspective on challenges for sustainable development in South Africa. The booklets report from several fronts of the struggle we call development. They look at how South Africa has adopted critical aspects of international governance, at whose interests are served, and at the impacts on people and their environments. They indicate that, while another world is possible, it is not being built in South Africa. The booklets cover issues relating to development policies, voluntary agreements, privatisation of basic services, genetic engineering and farming, and dependence on the petrochemical industry. These booklets can be downloaded in pdf format from groundWork's website:

www.groundwork.org.za

SAEPEJ thanks the following foundations for their generous support:

Public Welfare Foundation, Mitchell Kapor Foundation, South Africa Development Fund, Samuel Rubin Foundation, Lawson Valentine Foundation, Jessie B. Cox Charitable Trust and the United Church of Christ.

We are also grateful to all the individuals who provide various resources for SAEPEJ. We thank the following U.S. organizations that made Project X-Change a success: Alternatives for Community and the Environment, Southern Echo, Louisiana Environmental Action Network, Southwest Workers Union, Border Agricultural Workers Project, Communities for a Better Environment and PODER. We acknowledge the incredible support we get from Judie Blair and the South African Development Fund. Thank you!

Visit our website saepej.igc.org, call us at 617/522-0604 or email saepej@mindspring.com

Environmental Justice Forum:

Speak Out!

Saturday, August 25, 2001

Durban, South Africa

**Hosted by groundWork
International Possibilities Unlimited
South African Exchange Programme
on Environmental Justice**

**Documented by David Hallowes
of Critical Resource**



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Cover photograph by Richard Pratt

Children in Madagascar

Introduction

Bobby Peek, groundWork, South Africa

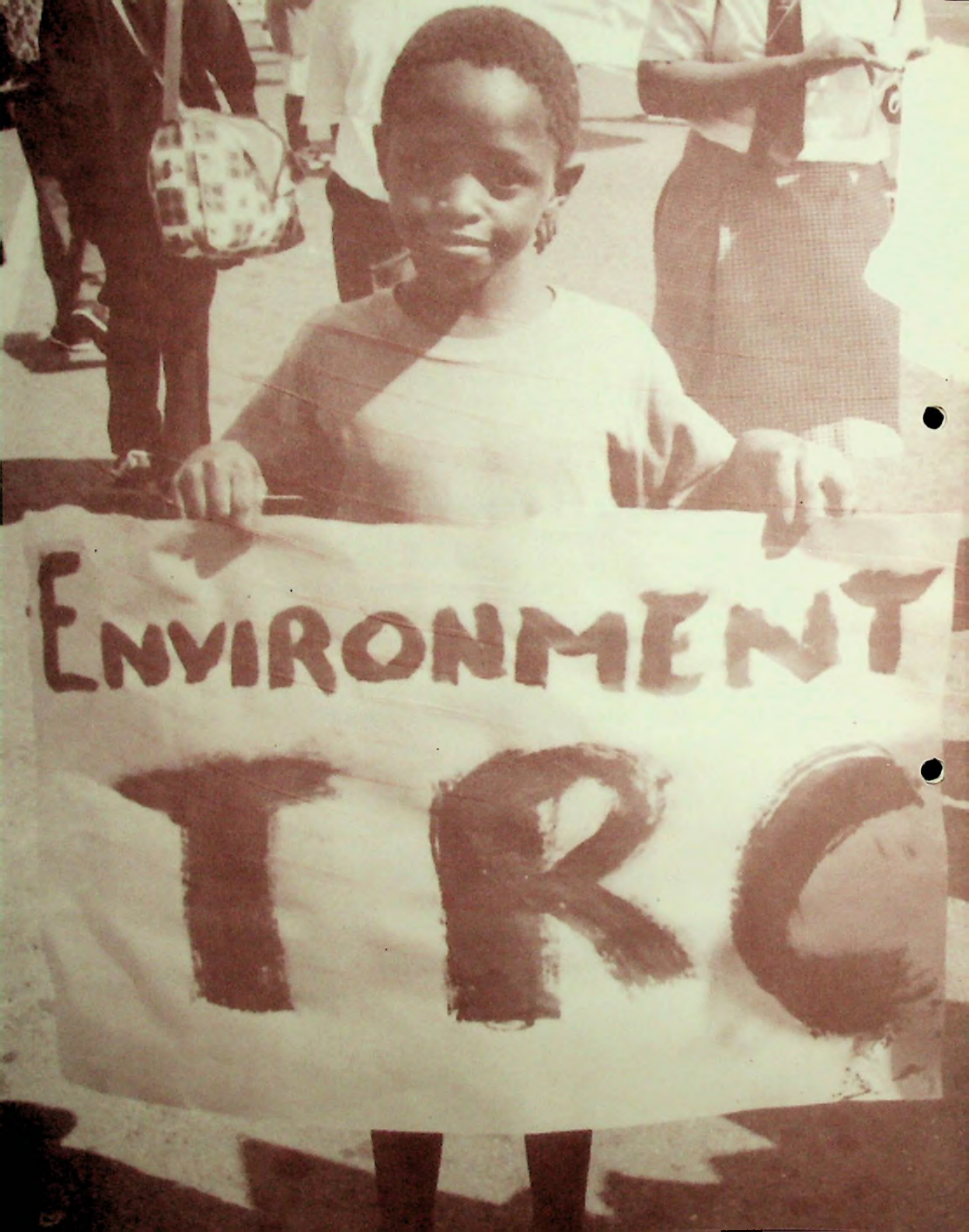
The Speak Out is being held in advance of the World Conference Against Racism (WCAR) and will feed into both the NGO Forum and the governmental proceedings.

The concepts of environmental racism and environmental justice have their origins in the U.S.A. but respond to a global phenomenon. With these concepts people of colour around the world recognise our common experience and can build links across race, class and gender lines. Many of the pioneers of the movement are here and this meeting, with people from eleven countries, comes out of working these debates over the past two decades. We welcome you to South Africa.

These concepts were introduced to South Africa by Dana Alston, a pioneer of the movement, at a conference hosted by Earthlife Africa in 1992. Reflection and debate on environmental justice in South Africa has resulted in its formal adoption as a principle of law.

Dana Alston told us: "The people who benefit the most from technological and industrial development do not have to bear as much of the burden. That is the centrepiece of the injustice, not only for people of colour in the USA, but throughout the world"

At the heart of the experience of environmental injustice is the abuse of power. Poor people, and particularly people of colour, live in damaged environments which damage their health. So the struggle for environmental justice is a struggle about relations of power. This is the common theme to the range of diverse struggles against various forms of inequitable development, from shrimp farming to uranium dumping, that we will hear about today.



ENVIRONNEMENT

TERRE

Globalisation: A system for entrenching environmental racism

Session 1: Panel discussion on the origins, status and future
of environmental racism in the period of globalisation.

Moderator: Bobby Peek

Reflecting on the present struggles in Nigeria

Nnimmo Bassey, Environmental Rights Action, Nigeria.

Oil was discovered in Nigeria in 1908 and commercially exploited from 1958. Local people were at first optimistic. They thought they would get jobs, schools, hospitals, electricity and other modern services. They did not get electricity but they did get light. The flares burn 24 hours a day so there is no night. And air, earth and water are polluted destroying people's livelihoods from farming and fishing. Now fish are imported to the region but people have no money to buy them.

The people wanted to talk to the companies and to the government. We ask for a chance to say that there must be a better way things could be different but are met with the dialogue of guns. We use culture singing, dancing and waving leaves as a weapon of resistance and are accused of being prejudiced and violent. We are killed but have no right to cry. Our environments are destroyed and we have no right to complain.

On November 10, 1995, Ken Sarowiwa was executed because he said people have rights. And the people of Ogoniland have taken the right to resist and driven Shell from their land. Others are learning from that example of standing together to resist evil. Yet even still there are oil spills in Ogoniland and people are killed on the instruction of Shell in Ogoniland.

«« Local child protesting against pollution in South Durban calls for a Truth
and Reconciliation Commission on industrial pollution

The companies involved in Nigeria are the global giants such as Shell and Chevron. They are driven by profit and the growing rate of consumption in Northern countries to take from places where people have no voice. They want crude by crude methods. They want it cheap. So pipelines with a 20 year design life are not replaced and burst pipes are frequent.

Our struggle is to control our resources so we can look after our environment. But it is the companies that in fact control our resources and they do it under military cover. So we say, "When you buy a litre of petrol, you buy a litre of blood."

Reflecting on the history of environmental racism in the USA

Robert Bullard, National Black Environmental Justice Network, USA.

Environmental racism is located in any policy which disadvantages people based on colour, whether intentionally or not. To understand it, we must understand the roots and legacy of racism. The roots lie in an ideology of freedom: Free land - stolen from the indigenous people; Free labour - stolen from slaves; Free men - the white men who could vote; Free enterprise - and there is no such thing. The legacy is about the relation of people to labour, land and services housing, education, health care.

The elements of environmental racism are:

- Unequal participation: Authorities take longer to act, and act less decisively when people of colour make demands than when white people make demands.
- The rights of companies are given precedence over people's rights: Companies can go into communities of colour claiming to provide jobs. Risk assessments are done to justify the trading of people's health and environments for profit. We say they have no right to kill us and are closing the loopholes in environmental protection. In response, companies are moving off shore so we need global action.
- Corporate welfare: Companies are subsidised to kill us. Louisiana is one of the poorer states but still finds enough money to subsidise toxic industries.
- Residential segregation: Race still talks about where you are allowed to live and toxic industries are sited where people of colour live. This is not just about private companies. The US military is the most toxic of industries and has left a trail of toxic death all the way to the Marshall Islands.
- Unequal economic opportunity: Children of colour grow up with toxic poisons and their schools are often located on closed dumpsites. There is a link between what you learn and what you earn. Lead poisoning, for example, takes away children's mental capacity and therefore their future earning capacity.

- Unequal enforcement: The US has the best environmental protection laws in the world, but when it comes to people of colour, they are not enforced. Government is now rolling back the basic protections and rights that we have won. The Supreme Court has ruled that it is not enough to show a consistent pattern of abuse but intent to abuse must be shown.

The National Black Environmental Justice Network is a response to an emergency in the US. It is the emergency of a community under attack. Black people have pushed the civil rights movement and the achievements of that movement are under attack by a conservative racist movement.

The US is the richest nation on earth, but people of colour are constituted as the South within the North. The global movement for environmental justice emerges out of struggle and that struggle is also the struggle for economic justice and for social justice. When we visit each other we can see the same enemy. We are still learning but we are moving forward.

The Maquilladora experience

Teresa Leal, Southwest Network on Environmental and Economic Justice, USA and Mexico

I am from an indigenous group whose land straddles the metal border between Mexico and the USA. On either side of the border, I am constantly asked, "Where are you from?"

The Maquilladora industries are assembly plants located in an autonomous industrial zone on the Mexican side. These industries were accused of creating environmental, labour and social problems and so relocated in Mexico but only just across the fence. The products are now labelled: Made in the USA, assembled in Mexico.

There was 58% sub-employment in the area, so no one questioned it when they arrived. Since then, we have experienced:

- Economic extortion: One week's wage in Mexico is equivalent to one day's wage in the US but the price of the goods remains the same.
- Double standards on gender: Women constitute 75% of the labour force because, in a macho society, they can be predicted to make for a docile labour force. Many of them are single parents but no provision is made for child care. Children left without adult care givers for much of the day take to the streets and form gangs.
- Pollution: The original agreement was that assembled goods would be returned to the US together with the wastes. The wastes in fact remain behind, poisoning our soils and water.
- Inadequate infrastructure: The population has grown but the infrastructure and services have not. Housing is unaffordable and people have to squat.

Resistance was difficult because the unions were corrupted and people became fatalistic. But the North America Free Trade Agreement (NAFTA) sparked immediate opposition in the border area and in the South with the Zapatistas. This was not coordinated but was an existential response. NAFTA described globalisation as we were already living it. It describes an open door for free trade but it is a Dutch door with the top half open and the bottom half closed by the militarisation of the border. Now the Maquilladora concept is being expanded with a new fast-track process for a free trade agreement covering the whole of the Americas.

We need to share our experiences to develop a people's response to globalisation by the transnational companies. We need to be able to defend the quality of our lives and our environments.

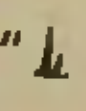
Environmental racism in South Africa

Heeten Kalan, South African Exchange Programme on Environmental Justice, U.S.A.

Growing up in South Africa, my thinking on environmental issues was based on a definition given by others. It was about wildlife and wilderness and had no human component. Linking the American and South African experiences has led to a changed definition.

South Africa created a system of Bantustans to justify crowding the African majority of the people onto 13% of the land while not providing any service infrastructure. The system was designed to provide cheap migrant labour for mining capital. In the cities black townships were created downwind and downstream of pollution sources. People lived in the shadow of power plants but did not get electricity. Worker health and safety was neglected and 50,000 people have been killed on the mines so far. South Africa was also a militarised society and people are now claiming back land which has been seriously contaminated by the military.

There are strong US links to this history. The US and South African officials collaborated on the creation of Native American reserves and Bantustans. American companies have been involved in dirty industries for example, American Cyanamid exported toxic waste to Thor near Durban and American vanadium mining companies poisoned people and land near Brits in North West Province. And the American experience of environmental racism is repeated in the location of toxic wastes near Black communities, for example at Aloes in Port Elizabeth where contaminated water seeps into people's houses.

South Africa's new Constitution gives people the right to a clean and healthy environment but government is dragging its feet on these rights. They are also creating Industrial Development Zones where, in the name of creating jobs, the Maquilladora experience will be repeated. They have ignored the words of Albie Sachs, a noted fighter for liberation, who said, "When we breath the air of freedom let us hope that we do not choke on hidden fumes." 

Telling our stories: Experiences from the Ground

Session 2: Participants related stories from around the world under four thematic headings.

Moderators: Nnimmo Bassey and Heeten Kalan.

Industry and Urban Planning

Desmond D'Sa, South Durban Community Environmental Alliance, South Africa

The South Durban basin is home to 285,000 people and numerous industries, located in five 'industrial belts'. It is repeatedly claimed that people followed industry into the area, but this is false. Industries were located next to people in the '50s on land taken from local market gardeners. The industries include two large oil refineries, major chemicals manufacturers and chemicals storage facilities. A toxic landfill servicing these industries has been closed down but not rehabilitated. Local people suffer from high levels of respiratory illnesses and cancers. Apartheid planning forced racial segregation of South Durban's communities. Recent planning exercises have concluded with proposals that would result in the removal of people. The SDCEA is organising across these divisions to speak out on environmental justice at local, national and international levels.

"Apartheid planning located the Black township in
an area surrounded by chemicals industries."
- Ike Ramatesela, Local Councillor, Sasolburg, South Africa



Ike Ramatesela, Local Councillor, Sasolburg, South Africa

Apartheid planning located the Black township in an area surrounded by chemicals industries. Residents suffer high levels of child mortality and respiratory illnesses. Workers suffering occupational diseases are retrenched and sent home to die. There is high unemployment and people are too poor to afford medicines. In white areas, industry maintains pollution monitoring but claims there is no money for effective monitoring in black areas. Recent action linking wealthy whites living on a polluted water frontage with black residents resulted in industry withdrawing social responsibility funding from a local environmental organisation.

Alex Persent, Secunda, South Africa

Black people used to live in Secunda, which was called Driefontein. When the Sasol refinery industry was developed, black people were relocated downwind at Embalenhle. Secunda became a white town. Embalenhle is now surrounded by mines and adjacent to the local dump. The fence is not maintained and children have access to the dump. The older people do not understand the environmental issues and environmental organising is supported mainly by the youth.

Jose Luis Guevara, Accion Ecologica, Ecuador

Esmarelda is a poor region suffering from a man-made disaster. A massive infrastructure of pipelines, storage facilities and refineries has been built to service the oil industry. Fires and spillages are frequent and illegal waste dumping common. A new pipeline and a 3.5 million barrel oil storage are being planned. The people are left in poverty and suffer a range of ailments with cancer affecting between 35 and 40% of the population. The state has done nothing to defend people and believes that, because we are poor and black, we have no right to protest or organise. So we are demonstrating that we do have these rights. We are organising against the new developments. We are organising in defence of our rights to life, to respect and to a healthy environment.

Pamela Chang, Asian Pacific Environmental Network (APEN), USA

APEN is located in the Bay area of Richmond, California, where 350 polluting industries including such giants as Chevron are located next to communities of colour including Asians, Native Americans and African Americans. APEN's strategy is to build a multi-racial movement linking with the poor of the Pacific Islands. Asian people in the US are constructed as homogenous 'Chinese' and there is a myth that they have 'made it' through hard work in the land of opportunity. Many are in fact refugees from US aggression in South East Asia and the Pacific Islands. There are seven distinct tribal groups from Laos alone, forced out as a result of the Vietnam war. As one Laotian woman told me, "The bombs were less frightening than what we have here. The bombs killed you instantly. Here death stalks you through your life."

Lyn Pinder, Youth Warriors Express, USA.

Environmental issues facing the people of colour in urban Baltimore include lead poisoning, asbestosis and the impact of drugs. The poor live in areas defined as having no value. This is now changing with gentrification crowding out the poor from housing. The Warriors have linked with the North East Environmental Justice Network to connect with the resources and solidarity of the movement.

Susana Almanza, People Organised in Defence of the Earth and its Resources, USA.

We were once all brothers and sisters under the sky and we were led by our parents, mother earth and father sun. In Austin, Texas, our community of Native and African Americans took on 6 of the 7 oil giants and shut them down. They had taken land and contaminated it. Emissions exceeded the allowable limits by 750 times in the case of benzene. The community suffered high rates of cancer and miscarriages. We organised using our bodies and minds against their dollars. We realised that our vote is not our voice, but that our voice is our vote. We showed that it is possible to defend the lives our children, our ancestors and our parents. Through organisation we become brothers and sisters again.

Margaret Williams, Citizens Against Toxic Exposure, USA

In Pensacola there are few places where people of colour can live. When I grew up my parents earned 25 cents an hour and we lived first next to a fertiliser plant and then next to a creosote plant. We did not associate our common ailments with the pollution until government ordered an emergency clean up. They dug out 260 tons of contaminated soil, dumped it in a heap and covered it with plastic and left the hole. We wasted long years writing to authorities. We tried finding lawyers but they refused to take our case. We tried finding doctors to treat us but there are no specialists in environmental diseases. Finally we had the ground in our yards tested and a number of chemicals were found over allowable limits. Now we have negotiated relocation.

"The state has done nothing to defend people and believes that, because we are poor and black, we have no right to protest or organise. So we are demonstrating that we do have these rights."

- Jose Luis Guevara, Accion Ecologica, Ecuador



Mining

Troy Prince, Concerned People Against Asbestos, South Africa

In Kuruman there are more than 80 old asbestos dumps located next to the homes of thousands of people. But it is not only in the dumps. It is in our houses, our schools, our playgrounds, our water, our air. Since '87, 10,000 South Africans have been diagnosed with asbestosis. There is no medicine for it. We must just wait for death. The biggest mining company was UK based Cape Plc. British asbestosis sufferers took Cape to court in '97 and were compensated with R 300m. Our case will now be heard in 2002. Bringing the case has been a slow process and 150 claimants have since died including my parents.

Thuli Makama, Yonge Nawe, Swaziland

In Swaziland we have only recently become aware of the human dimension of the environment. We thought it was just about trees and animals and did not relate our illnesses to pollution. Companies have taken advantage of our lack of awareness. Recently there was an explosion at a coal mine where toxic wastes were being stored. The mine is 75% owned by Koch, a giant US company. In the US, similar claims are settled for millions of dollars. In Swaziland there has been no compensation and the company had not renewed its mandatory insurances. Three days after claims were made, the company filed for provisional liquidation.

Yaluritja Isaacs, The Sovereign Union of Aboriginal Peoples of Australia

In the name of creating jobs, Australia has supported mining companies, led by Rio Tinto Zinc, in bulldozing sacred sites, changing river courses and exterminating species. The mining companies developed a 'native policy' which has been declared racist by the United Nations but which the Australian government still wants to work with. The Australian industry is now moving into Indonesia, claiming it will clean up the mines there. But there is no reason to think they will treat black people in Indonesia different from the way they treat black people at home.



"In Swaziland we have only recently become aware of the human dimension of the environment. We thought it was just about trees and animals and did not relate our illnesses to pollution."

- Thuli Makama, Yonge Nawe, Swaziland



Peace Dlamini, South African Reparations Movement, South Africa

The people of Soweto are no better off now than they were before the '94 elections. We are told development is coming, but it does not come. In the meantime, the mines are polluting the water of the Klip River and government does not want to take on the big mining companies. We are passionate about this country. We destroyed apartheid and our next fight is to remove the mining waste land dams.

Jenice View, Just Transition Alliance, USA

Just Transition is an organisation that brings together workers and communities on the front line. There is a history of racism in US unions just as there is in US companies. But workers and communities are both affected by companies that disregard their rights. At the Arizona Portland Cement Company, workers were without basic contracts for four years and the local community has suffered pollution for 40 years. The municipality ran an environmental education campaign resulting in joint action against abuse. At San Antonio, Texas, the Kelly Air Force Base closed. Workers and the local Mexican American community formed an alliance to clean up the base and provide sustainable jobs.

Toxic Dumps

Bheki Thusi, Yonge Nawe, Swaziland

The dumping and incineration of medical wastes is creating severe consequences for people living downwind and downstream and for waste pickers. The hospitals and clinics have been irresponsible in having no proper controls or systems in place. The Swazi authorities have failed to develop waste management systems and cannot provide coherent information.

Kenneth Bradshaw, Concerned Citizens Against Defence Depot, USA.

The US military is one of the largest, richest and most powerful organisations on earth. It is also one of the biggest polluters but conceals its pollution behind security legislation. It has mismanaged a secret chemical weapons dump at Memphis for 40 years and is responsible for losing a number of nuclear warheads.

Displacement: Dams and Agriculture

O'Brein Gcabashe, Earthlife Africa, South Africa.

Construction of the Inanda Dam outside Durban was proposed in '86. The people to be displaced by the dam were promised other land. When they had to move, there was no other land. They were promised compensation and R 5.6 million was paid out to the chief, but the families who lost land saw none of it. The dam was built to supply water to Durban, but those living next to it have still not got clean water.

Sandile Ndawonde, Greater Edendale Environmental Network, South Africa

The Henley Dam, built 80 years ago to supply water to the white city of Pietermaritzburg, is now decommissioned. Its primary use appears to be to regulate water to an annual canoe marathon from Pietermaritzburg to Durban. The abandoned water works has become a dangerous playground for children. During floods in '87, for fear of a dam burst, water was released damaging black houses. Down stream 10 km of the river is canalised through the white city. During a flash storm in '95 the flood water was channelled through to flood the black township of Sobantu downstream of the canalised section. The communities are calling for the demolition of Henley, the water works and other engineering works, and rehabilitation of the catchment.

Modesto Segura, Accion Ecologica, Ecuador

Ecuador has one of the largest wetland systems in the world and this is an eco-system of global importance. Government has sold 99 year leases on wetland areas to shrimp companies for \$11.11 a hectare. The people who live in the wetlands and depend on them for their livelihoods were not consulted and were dispossessed by the deals. For them, sustainability is a matter of life. With support from Accion Ecologica, Greenpeace and other environmental organisations they have made a claim against the state and held a march in Quito demanding rights. Government has now made a declaration granting the wetlands to the communities.

Carlos Marentes, Border Agricultural Project, USA

Mexican migrant farm workers feed the most powerful country on earth but their interests are largely ignored. This labour force is about 5 million strong and includes about 100,000 minors. They do not have the right to organise and annual earnings average \$6,000, about a third of the lowest paid US wage, and 6 out of 10 do not have a house. They deal with dangerous chemicals in the fields and suffer from a range of ailments, particularly skin diseases. Toxic chemicals cross the border to Mexico freely and rural Mexican communities are also being poisoned. We are fighting for a changed agricultural system that does not use dangerous chemicals so as to protect the lives of farm workers and rural people. ♣



“... there is no reason to think they will treat black people in Indonesia different from the way they treat black people at home.”

- Yaluritja Isaacs, The Sovereign Union of Aboriginal Peoples of Australia



Environmental racism: a system supported by governments

Session 3: Panel discussion on the role of governments in environmental racism.

Moderator: Deborah Robinson, International Possibilities Unlimited.

The Australian Experience

Ellie Gilbert and Yularitja Isaacs, The Sovereign Union of Aboriginal Peoples of Australia

There are 500 Aboriginal nations and 350 distinct languages surviving in Australia despite successive policies of genocide and assimilation. The Australian government now faces two legal problems:

- The Marbo judgement on land rights found that Australia's claim to sovereign title based on the assumption of 'terra nullius' implying that there were no prior native rights is without legal basis;
- Australian courts have only been able to dismiss an Aboriginal charge of genocide against the Prime Minister on the basis that there is no domestic law against genocide. This puts Australia in breach of UN human rights conventions to which it is a signatory. Australia should therefore be excluded from the UN system.

As a result, Australia has refused to sign a trade agreement with the European Union which contains a standard human rights clause. In response to this we have called for a boycott of Australian wine and are considering a sports boycott. Government delegations to the UN exclude Aboriginal people and, together with the US and Canada, Australia is attempting to head off a UN declaration on indigenous rights on the basis that it would lead to the fragmentation of the state.



Photograph by Tony Carnie

Manny Pino, Rose Henry and Tom Goldtooth from the USA at the World Conference Against Racism in Durban.



Within the UN system, we are calling for recognition of indigenous peoples as sovereign peoples with the right to determine their own future. The effect would be to give us a majority over the colonising nations that control the UN. For this reason it has been footnoted in the draft UN declaration that the word 'peoples' is not a legal term.

We are now focusing on the perpetrators and have established an Aboriginal Diplomatic Camp outside Australia's parliament. We burn fires there continuously to focus the spiritual energy to attack the negative spirituality of the colonisers. We believe that indigenous people have the recipe for living with and healing the Earth, our Mother.

Struggles of indigenous peoples in the USA

Tom Goldtooth, Indigenous Environmental Network, USA

Indigenous people resisted the centenary celebrations of Columbus because we saw no reason to celebrate the invasion and occupation of our land. The US is a colonial government of occupation and its instruments are



the church, the military and the lawyers. We believe that there is no difference between the state and the corporations. Each feeds and nurtures the other.

When governments are not held accountable by the people they serve, the door to oppression is opened. In the US, corporate control of Congress makes it harder for the people to hold government to account. International trade agreements signed at the expense of national sovereignty also make it harder for people to hold governments to account. The possibility of protection is threatened by the World Trade Organisation. We believe that civil society must regain control of governments if we are to have progress.

There are 550 indigenous nations recognised by federal law. Despite this, we still struggle for effective recognition of our rights. We face common problems with toxic dumping, clear cutting of our forests and military contamination of our lands. The people themselves have been contaminated and PCBs and dioxins are showing up in breast milk. We face the same problems as other people of colour and are now linking with African, Asian and Mexican Americans around the concept of environmental justice.

The present laws do not protect us and are discriminatory. The standards developed in the Clean Air Act and the Clean Water Act are not about clean air or clean water. They are about acceptable levels of contamination and are adjudicated in risk assessments designed to calculate the trade of their profit against our health. These laws and these assessments do not consider our spiritual values or our values of identification with the land. We are now calling for a Seven Generation Precautionary Approach to put development into the perspective of that time scale.

South Africa: A practical experience

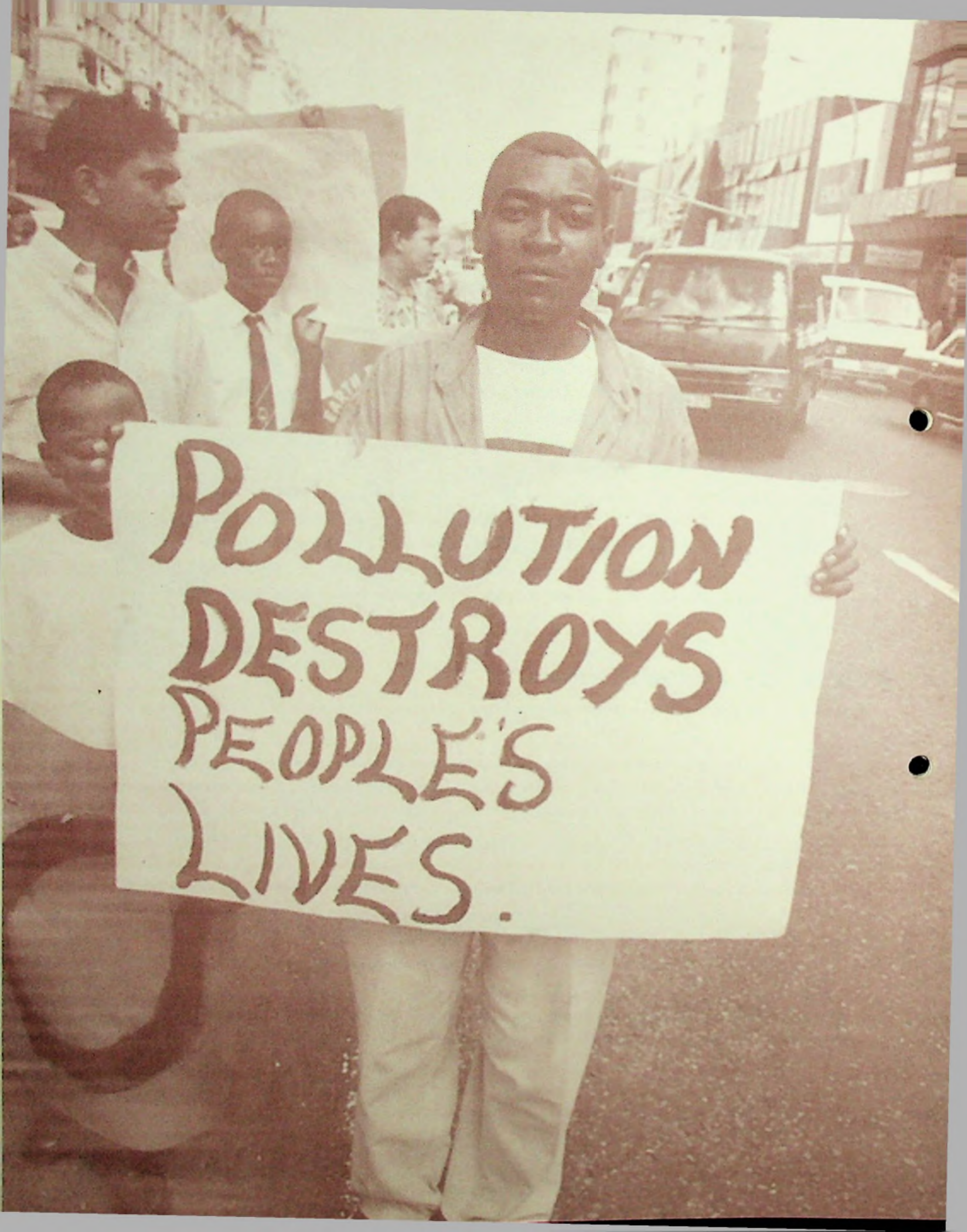
Thabo Madihlaba, Environmental Justice Networking Forum, South Africa

South Africa presents a peculiar situation. We now have democratic rule and a government led by black people, so how can it be possible to talk of entrenching racism in that context? People in South Africa were dispossessed of land by force. With democratic elections in '94 we were promised 'a better life for all'. A land reform process was announced and 70,000 claims for restitution have been made. Seven years later, only 12,000 claims have been settled.

Our Constitution gives people the right to a clean and healthy environment but this right is made subject to economic development. Economic development is now interpreted in terms of government's neo-liberal macro-economic policy which was applauded by the World Bank. We have developed good policies in a number of areas, but they do not deliver because their intent is undermined in the context created by economic policy.

So the democratic government still seems to be promoting an imperialist agenda. We now need a 180 degree turn around. We need to unite to fight globalisation. ♣

POLLUTION
DESTROYS
PEOPLE'S
LIVES.



Turning the Tide on Environmental Racism: The way forward

Session 4: Panel discussion on the work of reversing environmental racism.

Moderator: Chris Albertyn

Mechanisms and strategies to halt and reverse environmental racism

Bobby Peek, groundWork, South Africa

The World Summit on Sustainable Development (WSSD) takes place in Johannesburg next year. Should we be thinking 'Rio+10' or 'Johannesburg-30'? 30 years ago the Stockholm Conference on the Human Environment put the relationship between environment and development on the agenda. Since then the poor have got poorer, women are more vulnerable, industrial pollution has got worse and, in places like Burma, corporations are profiting from slave labour.

Africa thought Local Agenda 21 (La21), agreed at Rio in '92, would prove the panacea for their problems. But A21 has put in place a process for industrial self-regulation, to coincide with globalisation advanced through the international economic governance regime, and has led to more deaths from industrial accidents. In South Durban, proposals for relocating people came directly from an A21 process. Globally, the process has led to the UN sponsored 'Global Compact' which has 9 principles including one on human rights and one on sustainable development. Shell, responsible for human rights violations in Nigeria, was invited to join the process. South African utility Eskom, a proponent of nuclear energy, was invited to join the process. So the perpetrators are invited to make decisions in the chambers of world democracy. Here in South Africa, the President has convened a Business Council to advise him but there is no comparable Community Council.

«« Local resident of Umlazi, one of South Africa's biggest townships,
protesting against toxic landfill sites in Umlazi community



Photograph by SAPEG

International visitors on toxic tour during World Conference Against Racism, August 2001



The Business Council for Sustainable Development recently took out advertisements to the affect that we should trust them and they will develop the world for us. But the resistance of the Ogoni and the Zapatista did not coincide because of any globalised internet links. The link between these struggles is the abuse of corporate power in the process of 'developing the world'. And this is also the root cause of the resistance at Seattle and Genoa. Will Johannesburg be next?

Resistance needs to be built on communities creating their own democracy in their communities, not on cutting deals or brokering power. We need to build it on gender equity, on sharing resources in resisting polluters, on sharing and reflecting on our experiences. Academics should contribute through developing an alternative research agenda, one which investigates the problems faced by communities and workers and which builds on the concepts articulated by communities and workers. And finally, we should note that the age of mass demonstrations is not over. We need to hold our governments, the UN system, the institutions of global economic governance and the corporations accountable for human rights For economic, social and environmental rights.



Globalisation and the future of environmental racism

Atherton Martin, Dominica

We suffer pain in three areas. There is the pain of the spirit and we need to hear more about that. We have allowed it to be set aside and we are hurt through our separation from the ancestral spirit. There is the pain of the body where we are hurt by the impact of abuse. There is the pain of the earth, the water systems and forest systems, the location of our ancestral links, the places where we try to learn and pass on our learning to our children.

We are told that There Is No Alternative (TINA). But it is from the way in which we deal with these three areas of pain that we will find the alternatives. We need to convince ourselves in spirit, body and place that we can create alternatives, that we can find the strength to turn away from TINA. We need to find who we are to find the way because it is we who are the source of our own power.

The recent Summit of the Americas proclaimed democracy while selling it off to TINA. It proclaimed accountability but does not say accountability for whom or for what. It is an abstract accountability. What is not represented in the documents of the summit, or in all the UN documents, is dignity the dignity of people and places. So we dissect ourselves. We move away from our ancestral roots onto a path of destruction rather than construction.

The new concept of democracy is not new. It is about neighbourliness and caring and the challenge is to translate that into economic policy. It is not a democracy of speaking on behalf of, but is about facilitating exchange between people between women, between farmers, between workers for learning and earning.

And we should not be frightened by words and concepts. We should take them back to our roots. 'Technology' is not the invention of corporations. Our people had renewable energy long before they came upon it. 'Tourism' is about exchange. It is corporate tourism that wedged people apart to make it profitable for them. We need to find the ways in which it is profitable for us by bringing people together.

Finally, for myself, I live in a forest from where I see the mountains and the sea. I did not understand it until very recently, but it is from the forest, mountains and sea that I draw strength. If they die, I die. This is an elusive force and it is good that it is so, otherwise it would be separated out, packaged and sold back to us. This is the force of our spirit and, with eyes wide open, we must reconnect with it.

Future challenges facing civil society in the South

Daniel Tailliant, Centro de Derechos Humanos y Medio Ambiente, Argentina

We need to think how we can work inside the system as well as outside it. And we need to understand that we



have taken important steps in reversing environmental racism. The subjects of environmental rights are governments and corporations as well as victims and we need to understand that, in their own terms, governments and corporations have rights and obligations which can be used in defence of people's rights.

Human rights have only recently been inserted into the environmental debate. Previously the debate was exclusively about land degradation or species loss. The link is not obvious to the agents of government because they work in compartments dealing with limited sections of any particular system. It is the task of NGOs to serve as the translators, to show how decisions on health, sanitation, waste management or industrial location relate human to environmental rights.

We need to participate both at the private and public levels. We ourselves, as consumers, have ignorantly bought goods produced in ways which contravene human rights and the ignorance of politicians is a reflection of our own ignorance. Educating ourselves and then others is the key to linking human and environmental rights on the radar screens even of global institutions such as the World Bank. And it must be backed by exposing abuses.

Tools such as EIAs have been developed to measure the impact of proposed projects. In World Bank projects, EIAs are often relegated to a brief section at the end. They function to rubber stamp the project and look only at the environmental impacts, not human impacts. We need to demand more rigorous thinking and processes. We need to show where there is discrimination where people are excluded from participation. And participation needs to be informed. People cannot be expected to have expertise in relation to proposed projects.

The use of judicial instruments has also neglected the relationship between human and environmental rights. NGOs wishing to assist victims of abuse need to understand how to use the law to help people claim economic, social, cultural and environmental rights. Within the Inter-American system we have had some success in presenting environmental degradation cases as human rights cases. We are also working to bring US corporations to court in the USA for what they do in other countries. As we look at new initiatives such as the Global Compact, we need to talk about binding codes on human rights and how they can be enforced.

In summary, an agenda for participation in the system would comprise these points:

- Building awareness within civil society
- Sensitivity to the needs of vulnerable groups
- Familiarity with environmental law and its links with human rights law
- Participation in the public arena
- Informed participation in planning processes
- Education directed at governments and corporations
- Insisting on rigour in the use of tools such as EIAs

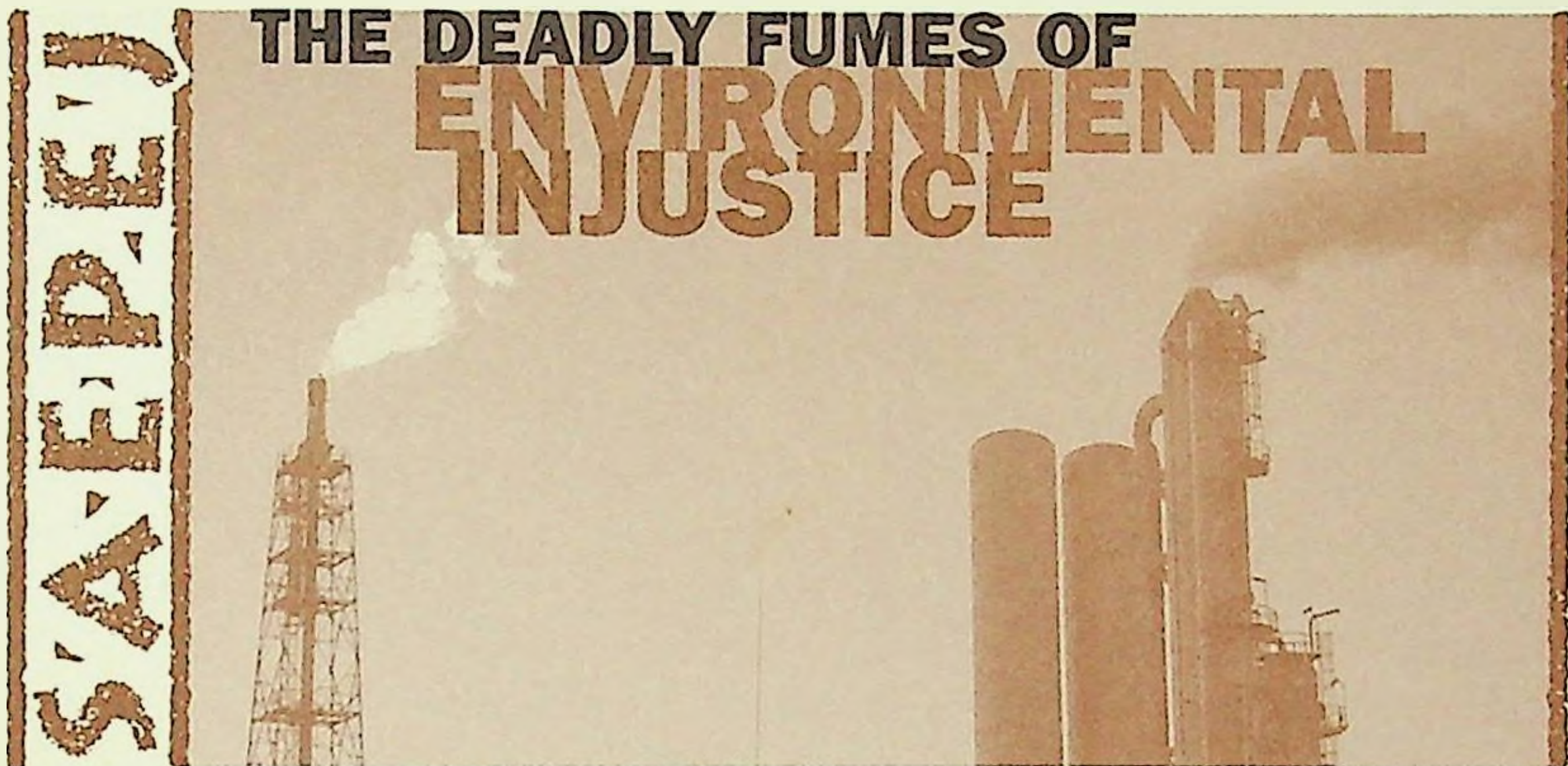
Closing Address

Professor Fatima Meer

To go forward, we need an ideology and an ideologue. We have religious systems to refer to but we have been converted by Adam Smith, the ideologue of Capital, to being people without souls. Through his invention we have been cut into classes those with rights to consume and those without rights. And this invention has been overlaid on the invention of Christ, that all humanity is equal. Thus Calvin preached, "The sign of my grace is on those who are wealthy, and the sign of my curse is on those who are poor." We need to go back to our diverse religious teachings. Adam Smith is part of the rationalist approach that does not admit God. They need to say, "You are only body." And they say it because they get profits from our bodies. There is no profit in the soul.

We are not just victims of the neo-liberals. We are victims of ourselves because it is we who have listened to them. The colonisers persuaded us that they knew the truth. They brought us the choice of Capitalism or Marxism, each proclaiming itself as the only answer. If we are to overcome the globalisers, we the oppressed and the marginalised must unite. We must not allow our issues to be cut up into discrete problems such as poverty or environment or justice. We need to get back to our own prophets and the modern prophet to whom I would commend you is Ghandi. ↓

THE DEADLY FUMES OF ENVIRONMENTAL INJUSTICE



Why Environmental Justice in South Africa?

Millions of South Africans drink contaminated water, work in unsafe mines and live in areas filled with hazardous waste. This is the legacy of racist and inhumane apartheid policies. Many of the nation's poorest communities have been used as dumping grounds by multinational corporations leading to serious and often deadly health issues.

In South Africa, thousands of miners die annually because of hazardous conditions. More than 42,000 workers have died as a direct result of mining accidents since the mining industry began in South Africa. Many more continue to die not only from accidents but from mining-related diseases caused by exposure and inhalation of toxic substances. Farm workers are forced to spray crops with banned pesticides like DDT without protective clothing. In everyday South Africa, rural women walk approximately six miles to find fuel-wood and fresh water and children play among landfills, swim in heavily contaminated waters and breath in a toxic soup of chemicals. This is the ugly face of environmental racism and injustice in South Africa.

The new democratic Constitution states that every South African is entitled to a clean and healthy environment. The National Environmental Management Act of 1998 set out the principles of equity, participation and accountability to address environmental injustices. While these rights exist on paper, the reality on the ground is a different story. New and effective legislation has yet to materialize. Two factors are pertinent here:

1. In the late 1990s, South Africa shifted its economic policy from people-centered development to a one of macroeconomics with an eye toward international investment and private sector growth. This represents a major shift in the philosophy that had characterized the struggle against apartheid and the vision of the new democratic government. As a result, community development has suffered — particularly

in the poorest and least-developed communities where environmental hazards are often present.

2. In recent policy developments, the government has stated it will not police, regulate or monitor the environment. The role of self-regulation is left to industries and corporations and to the communities they pollute. As a result, civil society bears the burden of ensuring its constitutional rights to a healthy environment.

We strongly believe that management of the environment by civil society is the best route to redressing the damage that exists and prevents further degradation of residential communities. Thus, there is an urgent need for civil society to be given the capacity to step into this new role of monitor and enforcer of environmental laws. There is also an urgent need to empower young activists to become the next generation of EJ leaders.

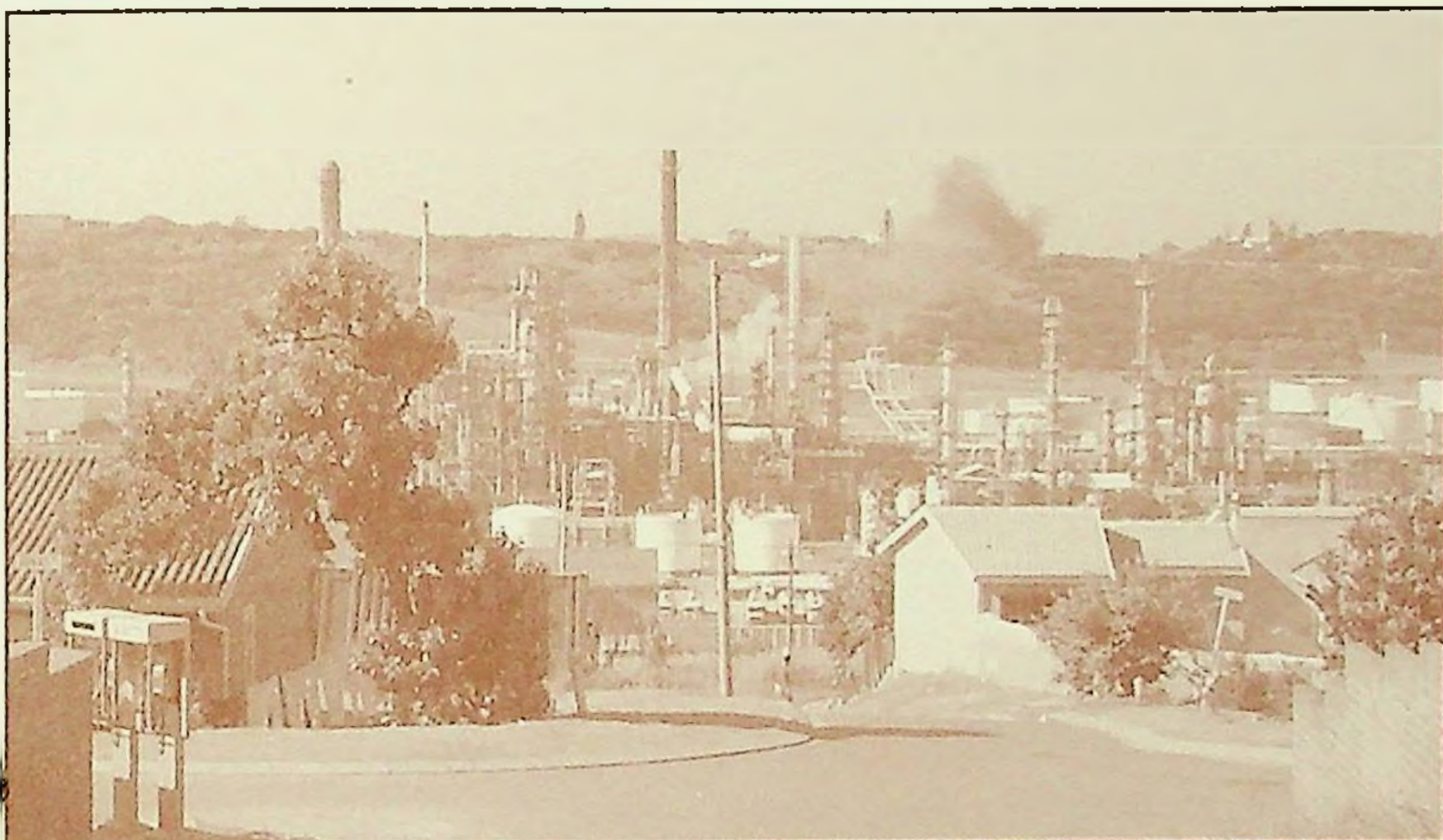
The Ugly Face of Environmental Racism

In order to implement and maintain the racist policies of apartheid, the apartheid regime created 'bantustans' and residential townships. Corporations were given free rein to locate their industrial sites near these areas to access a cheap supply of labor. In addition to the hazardous working conditions, industrial plants have polluted the air, soil and water, thus poisoning the lives and environment of millions of black South Africans. The situation today has not improved as many South Africans are forced to contend with outdated apartheid-era legislation affecting their environment and health:



Children in South Durban play on a site heavily contaminated by lindane, an industrial toxin.

- The 'bantustans' policy had placed 87 percent of the country's population (all black) on 13 percent of the land.
- South African gold mines extract large quantities of uranium as a secondary product, thus exposing nearby black communities to cancer-causing radium and radon which commonly leak from uranium mine wastes.
- Communities living next to the five major oil refineries are continuously exposed to a hazardous toxic soup including high levels of benzene, sulfur dioxide, toluene and xylene.



An unexpected release of toxic gases, a common occurrence, clouds the South Durban basin.

- In July 2001, Shell and BP's leaking underground petrol pipeline in residential South Durban resulted in a leak of over 1 million liters of petrol forcing many families to be relocated.
- The community of Aloes, outside of Port Elizabeth, continues to be exposed to the various smells and leaks from the three adjacent toxic landfill sites that surround them.
- Former workers at the U.S.-owned Vametco Mine outside of Brits are suffering serious illnesses from vanadium exposure while the company continues to deny any link between their former jobs and their current health problems.
- In 1987, 85 percent of South Africa's commercial energy was derived from coal, resulting in accelerated exploitation of coal seams through strip mining and producing some of the worst air pollution in the world. Current air pollution laws do little to change this practice.
- Between 1978 and 1983, 780 of the 3,500 workers at the Penge (Asbestos) Mines in the Eastern Transvaal had contracted asbestosis.
- In Mmafefe, a region of the Lebowa homeland, a health project report documented that 603 out of the 1724 houses in the village, 7 of the 12 schools, and many churches were made from asbestos brick and plaster.
- In the Mngweni River, which flows into the Valley of the Thousand Hills, Thor Chemicals is responsible for mercury concentrations 1,500 times the level at which the U.S. Environmental Protection Agency declares materials toxic. Thousands of barrels of mercury waste, some of it from U.S. companies Borden Chemicals (Louisiana) and American Cyanide (New Jersey), sit on the Thor property waiting for some form of disposal.

About SAEPEJ

Founded in 1993, the Boston-based **South African Exchange Program on Environmental Justice (SAEPEJ)** focuses on the effects of toxics and the deteriorating environment on the health and daily lives of communities in South Africa, and aims to bridge communities in the U.S. with their counterparts in South Africa around environmental justice. We provide resources to South African community, developmental, labor and environmental groups in order to address the neglected environments in which South Africans live, and assist in the building of a strong environmental justice movement which will network closely with the U.S. and other international movements.

SAEPEJ's goal is to provide technical assistance to South African counterparts in order to enhance their capacity to confront current and future environmental injustices. After years of isolation from the international community, it is essential for the country to establish strong and meaningful linkages with the international community. More often than not, communities in the U.S. are faced with the same pollution, the same polluters, and the same health effects as their counterparts abroad. Therefore, SAEPEJ emphasizes exchanges on lessons, strategies, and victories emerging from the South African and U.S. movements for peace and justice so that communities can come together and confront the crisis in a unified and organized approach.

We have a strong track record of exchanges between the U.S. and South Africa along with experience working on campaigns, in conjunction with our South African partners, on vanadium mining, oil refineries, toxic landfills, water pollution, and asbestos.

SAEPEJ has also developed a South African Environmental Justice Curriculum that details the history of apartheid and makes the link to the current environmental and health problems there. Please contact us to find out how you and your organization can obtain a copy.

To find out more contact us at:

SAEPEJ

555 Amory Street
Boston, MA 02130, USA
Tel (617) 522-0604
Fax (617) 522-5511

saepej@mindspring.com

<http://www.igc.org/saepej>



Members of the Bucket Brigade grab a sample of South Durban air for testing.

Tax-deductible contributions are welcomed.



Main Identity

From: "Mona Patrao Apni Dharati" <apnidharati@vsnl.net>
To: "Community Health Cell" <sochara@vsnl.com>
Sent: Monday, July 28, 2003 5:57 PM
Attach: Environment festival Announcement .doc; Registration form Apni Dharati 03.doc
Subject: Apni Dharati

Friends,

It is a great joy for me to inform you that the Center for Initiatives for Change (CICA) at Asia Plateau, Panchgani, is poised to launch a significant move. A process that promises to address the complex and urgent ecological issues facing our Earth -*Apni Dharati*.

An environment and cultural festival *Apni Dharati (Our Earth) 2003* that celebrates the indigenous people of the world, will commence on the 2nd of October. The event will create space and opportunity for sharing indigenous knowledge systems and culture, which are as much at risk as are indigenous flora and fauna. Song, dance, theatre, films, art, craft and discussions will bring to our consciousness the wealth, ecological significance and diversity of indigenous lifestyles.

Come. Enjoy the celebration.....and in the process help catalyze an ongoing and sustained endeavor towards building a just and sustainable world.

Note: The two attachments carry:

1. A detailed background note of the festival.
2. A registration form.

Sincerely yours,

Mona Patrao.

Manager *Apni Dharati 2003*

Email : apnidharati@vsnl.net

Phone: Mumbai: 24929858

Phone: Panchgani: (O) 02168-240242

(R) 02168-240566

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Announcement and Information Document

Apni Dharati 2003

An international environment and culture festival

A combined festival and workshop to recognise and celebrate tribal and indigenous knowledge of the environment, their connectedness to the natural world, and to pledge ourselves to the will and creativity needed to overcome the threats facing our planet.

1-12 October, 2003.

Asia Plateau, Panchgani, Maharashtra, INDIA

Background

The Western Ghats of India has a worldwide reputation as an environmental 'hotspot'. This reflects the widespread degradation of this mountainous area, whose ancient forests and common lands hold a very high proportion of India's flora and fauna.

At the same time, the conservation ethic in this region is more than 1000 years old. Traditional knowledge recognising the importance and rich potential of the natural world can still be found in the tribal and rural populations of the area, and is a treasure trove of ideas and wisdom, art and craft, and survival techniques that we should recognise and value.

Purpose of the Festival

The environment festival and workshop will highlight the cultural practices, traditions and interdependencies of indigenous and village communities in relation to the environment (with an emphasis on biodiversity and sustainability) in which they live. The festival will be a visual feast of performing groups. Through music and dance these artists will create a 'dialogue of the performing arts', with potent environmental themes.

The festival will also recognise the importance of our intertwined dependencies, the threats to our planet posed by our ongoing greed and irresponsibility, and the potential strength we have in working collectively to preserve our physical and biological heritage and to thereby overcome poverty and hunger.

Artists, performers and participants

Performers will be drawn from the tribal and village communities of Maharashtra and other parts of India. *Apni Dharthi 2003* is for those who can express knowledge about the environment through visual or performing arts, and for those who would like to learn about (or teach others about) the environment through these media.

International participation will feature the Kahurangi Maori Dance Theatre from New Zealand, a group currently performing successfully in the United States, China and Malaysia.

Location

The festival will be held in Panchgani, a hill station on the eastern edge of the Western Ghats. The venue will be on the campus of Asia Plateau Initiatives of Change Centre, in the shadow of the famous Panchgani Tableland (the second largest tableland in the world). Outdoors, there will be an open-air stage, with adjacent areas for stalls and food preparation, and possibly some accommodation under canvas if required. Indoors, for workshops and group activities, Asia Plateau provides a modern auditorium with 400 seats and other rooms that can be used for meetings and artistic exchanges.

Provisional programme highlights:

Challenging Trends and Questioning Conventions –

Environmental workshops on key themes, led by national and international speakers, and indigenous knowledge keepers.

Village communities around Panchgani Mahabaleshwar –

will play host to visiting groups from other parts of India and overseas and share their music (drum circles) song and dance .

Share the Light, Ignite the Spirit – Evenings of story telling and music around the fire under the stars.

Pacifika – Experience the food, costumes, music, and dance of the Pacific Ocean rim.

Procession of a Thousand Lanterns – Join school children in a 'river of light' as it weaves and flows in spiral designs to music specially arranged for the festival.

Workshop/tims/demonstrations objective and subject list
 The lists below contain possible objectives and subject areas
 that have been suggested for the festival and workshop.
 Other suggestions are welcome.

Possible objectives:

- Bring together innovative and creative strategies for environmental education
- Create awareness of Gandhi's ideas in the light of the environmental movement.
- "Challenge the hidden curriculum with its unstated assumption that knowledge is everywhere uniform, hence abstract knowledge is more important than practical, local or indigenous knowledge." David Orr - *Greening of Education* - Schumacher Lecture.
- Create awareness of the ecological significance of indigenous lifestyles so as to bring them alive within the educational context and find applications that will be appropriate in the 21st century.
- Sensitize the youth - through dance music and interactive workshops - to the indigenous way of life and its connection to the environment and biodiversity.
- Strengthen pride within indigenous cultures
- Collaborate with local village community groups
- Celebrate what we have and search together for positive action

Possible areas for workshops, films, displays, stalls, performances and presentations:

- Performing arts – theatre, dance, music, puppetry.
- Visual arts- crafts, pottery.
- Traditional toys, games, story telling.
- Food, recipes.
- Indigenous systems of agriculture –livestock management- crop protection-seeds – storage.
- Local health traditions- medicinal plants and their uses.
- Social values, conflict resolution strategies- problems and solutions, misinterpretation of tribal/local people's problems, how present law goes against customary law and land rights, dialogue with tribal communities and urbanites.
- Gandhian perspective and ecological lifestyles - village based cottage industries -Khadhi-spinning – weaving - soap making- hand made paper – *swadeshi* -nature cure. Nai Talim.
- Simple indigenous technologies -hand pounding rice – grinding grain–(along with songs as done traditionally)
- Forest walks- Indigenous techniques of plant identification- minor forest produce- biodiversity – forest ecology
- Customs and traditions with ecological significance
- Traditional festivals of India– bring out their connection to environmental issues and demonstrate innovative and acceptable ways to find substitutes to

the ecologically destructive practices e.g. Ganesh festival - Nag Panchmi.

- Ancient futures
- Local architecture
- Indigenous systems of water harvesting.
- Success stories.
- Strategies for future action and collaboration.

Registration of interest Form Apni Dharati 2003

Please complete and return by:

Email to: apnidharati@vsnl.net

and/or to:

Apni Dharati Secretary.

Initiatives of Change.

Asia Plateau - Panchgani-412805

Date: _____

Name: _____

Address: _____

Tel / Fax: _____

E-mail: _____

If bringing or accompanying indigenous/ village group. Name the group and number of persons

Contact person's name and postal address: _____

Tel / Fax: _____

E-mail: _____

Performing language: _____

Number of artists: Female Male

Is a simultaneous narration or commentary required to help the audience understand the performance?

Type of performance and requirements eg. suitable for indoor/outdoor; stage area required; costumes or properties required to be assembled on site; whether sound system required, etc. _____

As well as perform, would you agree to conduct a workshop, screen a film/audiovisual to share with others your understanding, knowledge or work that has relevance in preserving the natural world? Please briefly describe how the workshop might be conducted

Possibilities or suggestions for financial support and sponsorship: _____

Amount of sponsorship required for your group: _____

Amount of sponsorship you can offer to assist others: _____

Per day contribution at Asia Plateau is Rs. 600 (US\$25) including festival registration accommodation and fees.

Do you have limits on accommodation costs? Please mention details of your limits and needs

Would you need help with alternative arrangements in hotels/hostels/campsites/community hosts village/town (Please specify)? _____

Diet Restriction, if any _____

Arrival Date & Time at Panchgani _____

Departure Date & Time at Panchgani _____

6/30/03

Page 1 of 1

Main Identity

From: "Pauline Doie" <PDoie@idrc.ca>
To: "Social and Political Sciences" <corp-socpolisci-dl@lyris.idrc.ca>
Sent: Saturday, June 28, 2003 12:43 AM
Subject: IDRC Info on Sustainable Development Program / CRDI - Info sur programme de développement durable

version française suit; versión española sigue)

The Global Environmental Change and Human Security (GECHS) project is a core project of the International Human Dimensions Programme on Global Environmental Change (IHDP). The main goal of the GECHS project is to advance interdisciplinary, international research and policy efforts in the area of human security and environmental change. The GECHS project promotes collaborative and participatory research, and encourages new methodological approaches.

The GECHS project includes research projects, workshops, training activities, publications and policy briefings.

AVISO is a publication of the GECHS project. AVISO is published in English but certain issues depending on the subject area are published in other languages. A list follows.

For more information on this publication or about the project, please contact:
Maureen Woodrow, Ph.D.

Global Environmental Change and Human Security Project
Department of Geography and Environmental Studies,
Carleton University, Loeb B349
1125 Colonel By Drive,
Ottawa K1S 5B6

Phone: (613) 520-2600 ex 1984

Fax: (613) 520-4301

Email: mwoodrow@ccs.carleton.ca or GECHS@carleton.ca

Web: www.gechs.org

* Canada's International Development Research Centre (IDRC) supports this activity.

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Main Identity

From: "ESG india" <esg@bgi.vsnl.net.in>
To: <sochara@blr.vsnl.net.in>
Sent: Thursday, July 17, 2003 1:46 PM
Subject: Screening of SHORT FILM on KALI RIVER 19 July 2003, SELECT BOOKSTORE, BANGALORE

Environment Support Group
 &
 Select Bookstore

welcome you

to the Screening of

KALI
 a short film in Kannada

produced by
 Parisara Samrakshana Kendra, Sirsi

Date: 19th July 2003
 Time: 5.30 pm to 7.00 pm

Venue: Select Bookstore, Brigade Road Cross, Bangalore

Background:

On World Environment Day, 5th June 2003, Kall Bachao Andolan, a network of tribal and village communities affected by over 6 major dams, a nuclear power plant and pollution from the Dandeli Paper Mills, gathered to protest the unending pressure on the Kali River. There is now a proposal to build another dam, by Murdeshwar Power Corporation, that will submerge the last flowing stretch of this 185 kms. long river, even as pollution continues unabated due to untreated effluent discharge from West Coast Paper Mills. Earlier this month, a serious incident of pollution has resulted in the death of a newborn baby, renal failure of a 27 year old youth and gastrointestinal infections of over 50 tribals of Kariampally village near Dandeli.

No other river has come under such intense pressure in the name of "development" as the Kali. Over 32,000 acres of thickly forested Western Ghats region of Uttara Kannada district in Karnataka has already been lost due to submergence because of dams across the river. Furthermore, as is the case everywhere in India, very little has been done to compensate the displaced communities over the decades.

KALI BACHAO ANDOLAN, launched in February this year, is intent on ensuring that no more dams are allowed on this river. The campaign also intends to end the pollution of the river by the Dandeli Paper Mills and the illegal and rampant sand mining that is ruining landforms along the river.

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 + Health

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KALI, the film, exposes the wondrous beauty of this region, and the callousness of the Government and industries in ruining the rich biodiversity and liveliness of the river.

Please do attend the Screening of the film, and participate in a discussion thereafter.

We would be happy if you would make a minimum contribution of Rs. 20/- towards this campaign and help us in this initiative. The proceeds would be support towards the victims fighting for life, affected by the polluted waters.

Contact Details:

Environment Support Group, S-3, Rajashree Apartments, 18/57, 1st Main Road, S.R.K.Gardens, Jayanagar, Bannerghatta Road, Bangalore-560041. Telefax: 91-80-6341977/6531339/6534364. Email: esg@bgi.vsnl.net.in <<mailto:esg@bgi.vsnl.net.in>>

Parisara Samrakshana Kendra, Hulomalgi Building, Chowkimath, Sirsi (Uttara Kannada District), Karnataka 581401. Tel: 91-8384-425139/425039; Fax: 91-4435450/427839; Email: appiko@sancharnet.in

RSVP: Bhargavi S Rao, Environment Support Group

Main Identity

From: "ESG India" <esg@bgl.vsnl.net.in>
To: <sochara@vsnl.com>
Sent: Friday, August 29, 2003 4:52 PM
Subject: RADIO CITY BANGALORE (91FM) DISCUSSION ON "FOREST CONSERVATION AND MANAGEMENT" 31 August 2003, 6-7 pm

Radio City Bangalore, 91 FM is coordinating an hour long discussion on "FOREST CONSERVATION AND MANAGEMENT", Sunday, 31 August 2003, 6-7 pm.

The discussion will involve participation of:

Mr Ram Mohan Ray

Principal Chief Conservator of Forests and Chief Wildlife Warden, Karnataka Forest Department. Previously was the Chairman and Managing Director, Karnataka Forest Development Corp and the Managing Director Jungle Lodges & Resorts Ltd., Bangalore

Mr Leo Saldanha

Leo F. Saldanha is Coordinator of Environment Support Group (ESG), a non-profit campaign, research, training and advocacy initiative, that he started in Bangalore, in 1996. He is a trainer on environmental law issues and various NGO training programmes. Recently spoke at the Second Distinguished International Lecture Series on "A Challenge for the 21st Century: Economic Development and Environmental Protection" organized by the Iowa Centre for Human Rights, USA.

You are welcome to call in your questions to Mr. Darius of Radio City 91 FM, Bangalore Station at: 2121971 or Pager: 9604091091.

Thank you and best regards.

Decpa S
 Environment Support Group
 S-3, Rajashree Apts.
 18/57, 1st Main, SRK Gardens
 Bannerghatta Road, Jayanagar
 Bangalore 560041
 Tel: 91-80-6341977/6534364
 Email: esg@bgl.vsnl.net.in
 Website: www.esgindia.org (getting there..)

ESG is a non-profit organisation working on various issues of environmental and social justice. We welcome your voluntary support and monetary contributions. Financial contributions to ESG are eligible for tax exemptions u/s 80 G of the Income Tax Act. If you wish to know more details about our work, please email/call/write to us for a Brochure of ESG.

If you wish to be removed from this mailing list, kindly email us with the subject unsubscribe (please allow two weeks for the unsubscribe request to be acted upon).

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Department for
International
Development

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plans

Achieving sustainability

poverty elimination
and the environment



**Strategies for achieving the international
development targets**

Executive summary

1. This paper looks at the ways the international community might attempt to meet the International Development Target for the environment, as part of the wider goal of sustainable development. The International Development Target states that *"there should be a current national strategy for sustainable development in the process of implementation in every country by 2005, so as to ensure that current trends in the losses of environmental resources are effectively reversed at both global and national levels by 2015"*. The paper argues that development will not be sustainable without effective management of the environment, and that equal attention needs to be given to the three social, economic and environmental pillars of sustainable development. It emphasises the need to take a longer-term perspective, particularly relevant when dealing with environmental problems and issues.

2. Most environmental trends are adverse, with significant detrimental impacts on the health and livelihoods of poor people. The costs of environmental degradation are large and should be routinely included in estimates of real gross domestic product. The main causes of environmental degradation are unsustainable consumption, particularly of the rich, both in developed and developing countries; market failures, which cause goods and services related to the environment to be systematically undervalued, and therefore partly result in unsustainable consumption; and poor and ineffective governance, which leads to the environment being relatively neglected and not integrated into the development of national policies and programmes. A longer-term perspective is required, to take advantage of environmental opportunities, or to take account of environmental costs or impacts.

3. There are many misconceptions regarding the links between poverty and the environment. This paper argues that progress towards meeting the International Development Target can make a significant contribution to a sustainable reduction in the number of people living in absolute poverty. The poor suffer disproportionately from increasing environmental degradation. They are particularly susceptible to the impacts of natural disasters. Nevertheless, they are prepared to invest in the environment if they see tangible benefits and the potential for economic improvement. There should be a greater focus on the underlying causes of poverty, which are often

environmental, rather than simply dealing with the consequences of poverty.

4. National strategies for sustainable development should be seen as processes not new plans. They should seek to ensure that strategic planning takes account of sustainable development issues. They can be compatible with other initiatives such as the World Bank's Comprehensive Development Framework and the Poverty Reduction Strategies which are being adopted in several countries, if these initiatives successfully incorporate the principle of sustainability. A convergence of the three initiatives is both possible and desirable. Work is currently proceeding in the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD) on developing criteria to assist in determining whether a country has successfully incorporated considerations of sustainability in its development policies and programmes. The UK and the European Commission are leading this work. It will be completed in the first half of 2001. It is proposed that the international conference planned for mid-2002, ten years after the 'Earth Summit' at Rio, should focus on the extent to which countries have effective sustainable development processes in place.

5. Actions to meet the International Development Target are looked at primarily from a poor country perspective. Opportunities for reducing poverty and simultaneously protecting and improving the environment are described. Emphasis is placed on working with the poor and on improving often weak and ineffective systems of governance. Mainstreaming environmental considerations into country policies and programmes, and encouraging the private sector and civil society to take similar action, are both important. There are many opportunities to meet local environmental priorities while also contributing to global concerns, such as the build-up of greenhouse gas emissions in the atmosphere. The UK will contribute to this international agenda through its bilateral programme and the established relationships it has with a range of multilateral institutions. It will also work to ensure policy coherence in the UK and within the European Union.

6. More attention needs to be given to the indicators for the target. It requires two related but different kinds. This reflects the fact that the target combines the

implementation of national strategies for sustainable development with the reversal in the loss of environmental resources. The most appropriate indicators will vary from country to country. They should be identified at a national

level or sub-national level as appropriate. Two global indicators are taken as proxies to measure global trends: the size of the hole in the ozone layer and the concentration of greenhouse gases in the atmosphere.

1. Target statement

Introduction

1.1 In a report issued at the end of 1998, the United Nations Environment Programme (UNEP), the World Bank and the National Aeronautics and Space Administration¹ summarised why the environment is important and should not be considered in isolation. "The Earth's physical and biological systems provide humans with essential goods and services. A set of physical, chemical and biological processes link global environmental problems so that changes in one have repercussions for others. Actions taken to meet human needs have local, regional and global consequences. The same driving forces – population size, consumption levels and choice of technologies – underlie all global environmental problems. All people affect the environment, and vice versa, but the rich have a disproportionately higher impact and the poor tend to be the most vulnerable to the effects of environmental degradation".

1.2 This paper does not look at the overall state of the world's environment. It concentrates on the International Development Target and in particular the need for development to be sustainable, taking due account of impacts on the environment. Environmental outcomes are inextricably linked to the actions of people, firms and public and private institutions. For development to be truly sustainable, the environmental dimension must be mainstreamed² throughout the policies and programmes of countries.

Achieving sustainable development

The sustainable development target

1.3 In 1987, the Brundtland Commission³ defined sustainable development as "development which meets the needs of the present without compromising our ability to meet those of the future". The UK's own national strategy for sustainable development⁴ defines sustainable development as "a better quality of life for everyone, now and for generations to come". Both these definitions make clear that poverty reduction and better management of the environment is central to sustainable development.

1.4 This paper examines the effective management and protection of the world's environment, encapsulated in the International Development Target which states that "there should be a current national strategy for sustainable development in the process of implementation in every country by 2005, so as to ensure that current trends in the losses of environmental resources are effectively reversed at both global and national levels by 2015".

1.5 The International Development Targets originate in the United Nations conferences which took place in the 1990s. The specific environment target stems from the UN Conference on Environment and Development held in Rio de Janeiro in 1992. The Conference also agreed Agenda 21, a programme for global sustainable development, as a blueprint of action into the 21st century. They were brought together in the document⁵ issued by the Development Assistance Committee of the OECD in 1996. In 1997, the UN General Assembly Special Session also decided that "by 2002, the formulation and elaboration of national strategies for sustainable development which reflect the contributions and responsibilities of all interested parties should be completed in all countries, with assistance provided, as appropriate, through international co-operation".

1.6 The target is complex. It combines general sustainable development issues with the environment, without really making a distinction between them. It is the first target against which progress will be formally measured.

1.7 The target is especially challenging for two reasons:

- it includes the intermediate output (national strategies for sustainable development) in addition to the final outcome (reversal of loss of environmental resources).
- relative to most of the other targets, progress is particularly hard to measure. Sustainable development strategies are processes. Their assessment will require a qualitative judgement. The reversal of environmental degradation is defined broadly and there is very

¹Protecting our planet, securing our future, UNEP, US NASA, World Bank, November 1998.

²The dictionary definition of the "mainstream" is the "prevailing trend of opinion, fashion". It is used throughout this paper as a proxy for the attributes of integration, awareness and promotion.

³Our common future, World Commission on Environment and Development 1987.

⁴Improving the quality of our life, DETR, May 1999.

⁵Shaping the 21st century, the contribution of development co-operation, OECD 1996.

limited data available to measure progress. In addition, the environmental resources of each country will differ, so there is no international blueprint for the best indicators.

1.8 Sustainable development strategies are an important input to achieve the target of reversing the loss of environmental resources. But many other actions are also clearly required. These include private sector initiatives, changes in technology and adherence to obligations set out in multilateral environmental agreements. In addition, sustainable development strategies, given their broader remit, should address more than environmental resources.

National strategies for sustainable development

1.9 The DAC definition⁶ of national strategies for sustainable development is that they are “*a strategic and participatory process of analysis, debate, capacity strengthening, planning and action towards sustainable development*”. The key words are process and sustainable. The UK White Paper⁷ defines them as “*the main vehicle for integrating pro-poor economic growth with social improvement and a responsible approach to environmental management*”.

1.10 A national strategy for sustainable development represents the policies, plans, processes and actions that a country is taking to move towards sustainable development. This could be a single umbrella strategy (drawing together initiatives in different areas) or the aggregate of a range of co-ordinated, existing strategic planning approaches. It is neither an environmental action plan, nor is it a separate, stand-alone strategy.

Strategic planning for sustainable development: emerging consensus

1.11 Each country will need to decide how to develop its own strategic processes for sustainable development. But there is growing international consensus on some of the key principles. They include:

- putting people at the centre, particularly the poor;
- securing high-level political commitment and an influential lead institution;

- orienting the strategy to focus on process and outcome;
- building country/local ownership;
- building on existing processes and strategies;
- adopting a comprehensive approach which integrates economic, social and environmental dimensions;
- ensuring effective monitoring, learning and improvement;
- setting targets and priorities; and
- strengthening capacity.

1.12 These principles describe a set of desirable processes and outcomes, yet allow for local differences. They do not represent a checklist of criteria to be met. There is nothing new in them – many are entirely consistent with basic good strategic planning. But experience shows that they are seldom delivered in practice. The challenge is strengthening incentives and securing commitment to change.

1.13 New country-level planning frameworks offer a significant opportunity to put these principles into practice. The Comprehensive Development Framework and Poverty Reduction Strategies, and the National Visions developed by some countries encompass a number of them and demonstrate a significant convergence of approach between the country-led frameworks and the criteria for sustainable development strategies.

1.14 The Comprehensive Development Framework – the attempt to integrate all development efforts being piloted by the World Bank – seeks a better balance in policy-making by highlighting the interdependence of all elements of development – social, structural, human, governance, environmental, economic, and financial. It emphasises partnerships among governments, donors, civil society, the private sector, and other development actors. It also stresses country ownership of the process.

1.15 Poverty Reduction Strategies⁸ (which need to be developed to gain access to multilateral debt relief and concessional lending) also incorporate a number of the above principles. The strategies “... *should be country-driven, be developed transparently with broad participation of elected institutions, stakeholders including civil society, key donors and regional development banks, and have a clear link with the agreed international development goals (targets).*”

⁶Assisting developing countries with the formulation and implementation of national strategies for sustainable development: the need to clarify DAC targets and strategies. DCD/DAC(99)11, March 1999.

⁷Eliminating world poverty, a challenge for the 21st century, DFID, November 1997.

⁸“Development Committee Communiqué”, April 17, 2000.

1.16 In order to integrate sustainability into these frameworks, particular attention will need to be devoted to those principles where commitment in the past has been weak or non-existent. The challenges include ensuring that frameworks address the structural causes of poverty, including where these are environmental in origin; balance short-term priorities with long-term sustainability; and are truly country-led.

1.17 Country examples for Ghana, Bolivia, Uganda and the United Kingdom are set out in more detail in Annex I. They show the diversity of approaches consistent with sustainable development strategies. Apart from the UK, none of the other country examples is labelled as a strategy for sustainable development. This is not important. The critical issue is the strengthening of a country's strategic

Box 1: Poverty and the environment – some misconceptions⁹

New evidence challenges a number of entrenched assumptions about poverty–environment interactions.

Most environmental degradation is caused by the poor.

Globally, most environmental degradation is caused by the non-poor as the consumption levels of the poor are still low relative to the rich.

Poverty reduction necessarily leads to environmental degradation.

Studies have failed to show a common pattern in the relationship between poverty and resource use. The linkages between poverty and the environment are complex and require context specific analysis – there is no simple causal relationship. There is sufficient evidence to show that the generalisation that poverty reduction and concern for the environment are incompatible does not hold true.

The poor are too poor to invest in the environment.

The conventional wisdom has been that poor people are too impoverished to mobilise resources for enhancing the environment. In some cases this is true. However, numerous experiences now demonstrate that when incentives are favourable, even the poor can mobilise enormous resources, particularly labour.

The poor don't care about the environment.

There are numerous examples to show poor people often value the environment strongly, both as a resource base, and for cultural, aesthetic and religious reasons.

Poor people lack the technical knowledge for resource management.

It is often assumed that a lack of technical knowledge is a key constraint to poor people's management of natural resources. Indeed, when poor people move to areas with new ecological regimes, or when something happens to change the balance under which their old technology developed, a period of adjustment is required. However, poor people are often blamed for things that are not their fault. For example, shifting cultivation has been blamed for destroying the environment, yet in some circumstances it is the most sustainable agricultural practice. Also, evidence is increasingly showing that poor people have an enormous store of what is sometimes termed indigenous technical knowledge, such as the use of medicinal plants, water harvesting structures, fishing sites and so on, but this knowledge is often undervalued or completely ignored. More research is needed to fully appreciate the logic of poor people's management practices.

planning process to draw together existing plans and policies and ensure the commitment to the principles of sustainable development.

The international development target and the elimination of poverty

The linkages

1.18 The achievement of both the interim and final target would make significant contributions to poverty elimination. Effective sustainable development processes should help poor people pursue sustainable livelihoods. They create opportunities for marginalised and vulnerable groups to participate in decision-making affecting their livelihoods and promote pro-poor economic growth and sound environmental management. They also encourage transparency, accountability of governance structures and institutions which are more responsive and accountable to the needs and priorities of poor people.

⁹ *Attacking poverty while protecting the environment: towards win-win policy options*, John Ambler, July 1999. Background technical note produced for the United Nations Development Programme/European Commission poverty and environment initiative.

1.19 Reversing the losses of environmental resources has a direct impact on poverty elimination. The vast majority of poor people in developing countries, particularly those living in rural areas, rely on natural resources for their livelihoods. The state of the environment, therefore, has important implications for them. The existence of more productively and sustainably managed natural resources from which poor people can derive sustenance and income is an important element in reducing rural poverty.

1.20 Reducing environmental hazards due to unsafe water, air pollution, inadequate sanitation and waste disposal is also central to poverty reduction, particularly in urban areas. Poor people, especially women and children, are disproportionately affected by the health problems caused by these hazards. They are affected directly through ill-health, accidents, injury and premature death and indirectly through the consequent loss of income or their livelihood.

1.21 A clear distinction should be made between environmental change and environmental degradation. The latter is defined in this paper as processes likely to cause long-term or irreversible damage to livelihoods, especially those of poor people. There will always be an element of subjectivity in assessing when change deteriorates to degradation, or indeed where the thresholds are for irreversible damage. But concern for the environment is not incompatible with development. The key is effective planning and management of environmental change.

1.22 The poor have identified security as one of their key concerns. Poor people are particularly exposed to sudden natural shocks (for example, floods) and longer term trends of environmental degradation (for example, declining soil fertility). The resulting vulnerability translates into declining and insecure incomes and the sudden loss or gradual erosion of the asset base of the poor. Enhancing the security of the poor, therefore, has a key role to play in eliminating poverty. The consideration of environmental issues in development processes and interventions can help address current trends of environmental degradation and prevent new adverse trends to which the poor are vulnerable. It can also mitigate against and reduce the impact of extreme and sudden natural shocks.

1.23 In developing their own environment strategy, the World Bank have come to similar conclusions.¹⁰ The links they establish between poverty reduction and improved environmental outcomes relate to improvement in the health of poor peoples; enhancing the livelihoods of poor people who depend on natural resources; and reducing the vulnerability of poor people to environmental risks, such as natural disasters.

Policy implications

1.24 The poor are inherently more vulnerable to general environmental problems, and a number of specific environmental problems (for example, indoor air pollution, soil degradation) affect the poor disproportionately. Two major conclusions flow from this:

- general environmental improvements are likely to benefit the poor;
- policies which address those environmental problems which affect the poor disproportionately will have a strong pro-poor impact.

Scope for achieving the international development target

1.25 National strategies for sustainable development should be in implementation by 2005 and in place as early as 2002. The UN conference scheduled for 2002, 10 years after the Rio conference, should be used to encourage all countries to focus on the target. However, it is not yet agreed what criteria will be used to assess whether an effective strategy is in place. The UK and the European Commission are jointly leading a DAC task force which will, in co-operation with representative developing countries, assist in formulating such criteria. Results from the task force will be available in early 2001. It may be sensible to formally review the interim target towards the end of 2001, immediately prior to the Rio+10 conference. Given that most developing countries will have formulated Poverty Reduction Strategies by this stage, it is important that they reflect sustainability principles.

1.26 The target is complex. Although they will not be applicable to all countries, the indicators to measure trends in environmental degradation have been agreed (see section 6). There is some uncertainty as to whether the target means adding to environmental resources by 2015 or simply slowing the rate at which such resources are

¹⁰*Towards an environment strategy for the World Bank Group: a progress report and discussion draft*, May 2000.

depleted. Environmental indicators are often difficult and costly to identify and collect. National trends are generally more important to countries than global trends.

Aggregation of environmental indicators is very difficult. But the trends in most individual indicators are negative, and have been deteriorating for some years. Without radical changes in the choices that people make, whether brought about by changes in technology, governance or other means, current trends in losses will not be reversed by 2015. Some of the more important changes that could be made are outlined in this paper.

1.27 Appropriate national and local indicators and criteria should be developed as part of the process. This is the approach taken in the UK in our own sustainable development strategy. Ten 'headline' indicators¹¹ have been developed which give a broad overview of trends. A further 150 indicators focus on specific issues and identify areas for action.

Links with other targets

1.28 Environmental concerns and issues must be integrated into development policies and programmes. It follows that there are close links with the strategies for meeting other International Development Targets. There are obvious synergies between the environment and economic targets, particularly with respect to the potential opportunities that sound environmental management presents for sustainable growth. These must be explicitly taken into account when forecasting over a 15–20 year time horizon.

1.29 This paper also highlights the importance of appropriate institutional and governance frameworks which emphasise transparent and accountable decision-making, coupled with secure property rights, linking to strategies on gender equality, effective governance and human rights. Effective environmental management is crucial to targets for water and sanitation. A healthier and safer physical and social environment is one of the key requirements if developing countries are to attain the international health targets. Universal primary education will broaden opportunities for raising environmental awareness and respect for others.

¹¹The headline indicators relate to the components of sustainable development, i.e. maintaining high and stable levels of economic growth and employment; social progress which recognises the needs of everyone; effective protection of the environment; and prudent use of natural resources.

2. Present position: the challenge

Introduction

2.1 The environment is under threat. The demands placed on it to provide resources for human activity and to absorb wastes have grown rapidly with rising population and increasing per capita consumption. Attempts to address environmental problems have achieved mixed results: Box 2 sets out some of the environmental successes and failures of the last 30 years. Annex 2 gives brief details of the main multilateral environment agreements.

Box 2: Some environmental successes and failures¹²

Successes

- ❑ The first international steps – the United Nations Framework Convention on Climate Change and its Kyoto Protocol – have been taken on global climate change.
- ❑ The public is now much more concerned about environmental issues. Popular movements in many countries are forcing authorities to make changes.
- ❑ Voluntary action taken by many of the world's major industries is reducing resource use and eliminating waste. Increasingly, it is recognised that what is good for the environment can also be good for business. This may do much to reverse trends for which industry itself was originally largely responsible.
- ❑ Governments in developed regions have been markedly successful in reducing air pollution in many major cities.
- ❑ Deforestation has been halted and reversed in parts of both Europe and North America.
- ❑ Local Agenda 21 initiatives have proved effective in developing and implementing sustainable policies that involve both communities and political agencies.
- ❑ The ozone layer is expected to have largely recovered within half a century as a result of the Montreal Protocol.

Failures

- ❑ Global emissions of CO₂ reached a new high of nearly 23,900 million tonnes in 1996 – nearly four times the 1950 total.
- ❑ Some 20% of tropical forests was lost from 1960 to 1990.
- ❑ Losses to biodiversity have always occurred as a result of human activity but the process is accelerating more than ever before.
- ❑ Studies suggest that if present consumption patterns continue, two out of every three persons on Earth will live in places or countries without adequate water by 2025.
- ❑ More than half the world's coral reefs are potentially threatened by human activities, with up to 80% at risk in the most populated areas.
- ❑ Exposure to hazardous chemicals has been implicated in numerous adverse effects on humans from birth defects to cancer. Global pesticide use results in 3.5–5 million acute poisonings a year.
- Some 20% of the world's susceptible drylands are affected by soil degradation, putting the livelihoods of more than one billion people at risk.

2.2 Inadequate protection and conservation of the environment has led to substantial direct and indirect impacts on health and livelihoods and increased the vulnerability of poor people throughout the world. The most pressing environmental problems experienced vary greatly from region to region, and country to country, and defy single global solutions. Many environmental problems are causing damage far beyond their local sites of origin; others, such as climate change, constitute a global threat. In addition, new environmental problems are emerging. This section considers these problems and highlights dominant trends and challenges that need to be tackled in aiming to meet the International Development Target.

¹²Global Environmental Outlook, 2000, UNEP, September 1999.

Environment and health

2.3 Environmental factors are responsible for almost a quarter of all disease in developing countries. The poor, particularly women and children, are most affected by environmental health problems. The most important hazard, particularly for urban populations in developing countries, is faecal contamination of water and food due to poor or non-existent excreta disposal systems and inadequate hygiene, compounded by unreliable and unsafe domestic water supply¹³. As indicated in Table 1, approximately 90% of the burden of diarrhoeal disease is attributable to environmental factors. Improving access to clean water and sanitation is the most significant environmental priority for the poor in developing countries.

Table 1. Environment and the burden of disease¹⁴

Disease	Global disability-adjusted life years (000s) ¹⁵	Fraction attributed to environmental causes (%)
Acute respiratory infections	116,696	60
Diarrhoeal diseases	99,633	90
Vaccine preventable diseases	71,173	10
Tuberculosis	38,426	10
Malaria	31,706	90
Unintentional injuries	152,188	30
Intentional injuries	56,459	n.e.
Mental health	144,950	10
Cardio-vascular disease	133,236	10
Cancer	70,513	25
Chronic respiratory diseases	60,370	50
Total diseases	975,350	33
Other diseases	403,888	n.e.
Total all diseases	1,379,238	23

*This equates to the full years of life lost as a result of disease, including an adjustment for the effects of disability.

n.e. = not estimated

2.4 There are other significant hazards. Ninety per cent of the global burden of malaria, which is estimated to kill one in twenty children under five years of age in sub-Saharan Africa, is attributable to environmental factors. The spread of diseases such as malaria will also be exacerbated

by climate change. Around one billion people are affected by problems caused by the use of traditional biomass fuels (for example, dung, charcoal, crop residues, wood) for cooking and heating. They are exposed to high levels of indoor pollution from cooking and heating with inefficient fuels in poorly ventilated areas. Estimates¹⁵ suggest that indoor air pollution contributes to acute respiratory infections that kill some four million infants and children a year and decreases the overall health and life expectancy of millions more women and children. The World Health Organisation (WHO) has declared indoor air pollution one of the four main risk factors for ill-health globally, and a major maternal and child health problem in the developing world.

2.5 In many newly and rapidly industrialising regions of the world, urban populations are in double jeopardy, facing traditional environmental health problems as well as emerging problems associated with industrial pollution and economic growth. In Bangkok alone, the annual cost of air and water pollution is estimated at \$2 billion¹⁶. Inefficient collection, storage and disposal of municipal and hazardous wastes results in the spread of disease and localised pollution. Rural populations also suffer exposure to hazardous chemicals. Poor farmers and farm workers often use pesticides without training or protective clothing and are often unable to read instructions. As many as 25 million agricultural workers may be poisoned each year, and hundreds of thousands die¹⁷.

Environment and livelihoods

2.6 One of the main environmental threats to the livelihoods of the rural poor in developing countries is soil degradation, estimated to affect some 1.9 billion hectares of land globally and the livelihoods of more than one billion people. Many of the areas in which the rural poor live are fragile and can easily be rendered non-viable by small changes in their ecology.

2.7 Deforestation continues at high rates in certain developing countries. As a result, communities are often deprived of valuable forest resources such as wood products, food and medicine. This is in addition to the serious impact on nutrient recycling, soil stabilisation and

¹³Proposals for dealing with this issue are set out in the companion DFID paper on *Addressing the water crisis: healthier and more productive lives for poor people*.

¹⁴*The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020*, Harvard School of Public Health, Murray CJL & Lopez AD, eds, 1996.

¹⁵*Rural energy and development: improving energy supplies for 2 billion people*, World Bank, 1996.

¹⁶*The environment in times of crisis: Asia and donors after the 1997 financial crisis*, Peter Dauvergne, AusAID.

¹⁷*Human Development Report, 1998*, UNDP.

local and global climate change. Degradation of coastal areas is leading to the destruction of ecosystems, such as mangroves and coral reefs, which are important for the sustainability of fish stocks and coastal protection. One of the world's greatest ecological disasters is the drying up of the Aral Sea in Central Asia as a result of centrally planned, poorly conceived irrigation schemes.

2.8 Biodiversity losses are increasing as a result of both natural and human phenomena. Some of the highest rates of change are in developing countries. Rapidly growing populations are placing ever greater demands on ecosystems as are increases in natural, resource-based exports.

2.9 Almost all population growth in the world is currently taking place in areas where freshwater is in short supply. Increasing demand threatens the quantity, reliability and quality of water supplies. Over-abstraction of surface waters and groundwater is common, river flows are often drastically reduced. Problems include falling water tables, vegetation and habitat loss, siltation, subsidence and salt-water intrusion in coastal aquifers. The problems are compounded by pollution of groundwater and surface waters. This further constrains water use options, can create or worsen health problems and leads to additional degradation of river and lake ecosystems.

Environment and vulnerability

2.10 Poor people are vulnerable to the effects of natural disasters and the impact of conflict on their lives. The number of major natural catastrophes over the past decade

has tripled when compared with the 1960s, while the rate of economic losses associated with them has increased by a factor of almost nine during the same period¹⁸. The frequency and severity of extreme weather events is likely to increase as a result of climate change. Natural disasters now have a far greater and disproportionate impact upon the poor, because a growing proportion of them live and work in places that are more vulnerable to disasters.

In its annual report, the Red Cross estimates that 1998 was the first year in which the number of refugees from natural disasters exceeded those displaced as a result of war. Environmental stress alone rarely leads directly to conflict. It usually contributes indirectly to conditions – political, social or economic – in society which result in, or exacerbate, conflict. However, environmental degradation can escalate into violence. Examples include severe water shortages, widespread desertification, health-threatening toxic contamination, and refugee flight from environmental wastelands.

Regional environmental problems

2.11 The wide range of environmental problems occurring throughout the world is testament to the complexity of the interactions taking place between human populations and their environment. Although there are many recurring themes, experience has shown that there are few, if any, solutions that will work everywhere. Solutions need to be carefully tailored to the specific circumstances of the country or region if they are to be sustainable.

Box 3: Regional environmental problems

Africa

Major environmental problems include deforestation, soil degradation and desertification, declining biodiversity and marine resources, and deteriorating water and air quality. Land degradation is a key factor in constraining food production to levels below the current average rate of population increase. Sixty-five per cent of agricultural land in Africa has been affected by soil degradation since 1950. Crop yields in Africa could be halved within 40 years if degradation of cultivated land continues at present rates. Fourteen countries are subject to water stress or water scarcity, and a further eleven countries will join them by 2025. Urbanisation is an emerging issue in Africa, and is associated with various environmental health threats.

Asia

High population densities, economic growth and industrialisation are serious environmental challenges. Land degradation is, again, a key issue. In India, for example, 27% of the soil has been affected by severe erosion. In Pakistan, salinisation from irrigation has reduced crop yields by 30%. Increasing habitat fragmentation has depleted the wide variety of forest products used as an important source of food, medicine and income for indigenous people. The forest fires in South-East Asia in 1997-98 caused extensive environmental damage, and an estimated health cost of \$1.4 billion. Water supply is a serious

¹⁸Emerging environmental issues, paper presented to the UNEP Ministerial Special Session, Malmo, 29-31 May 2000.

problem, and freshwater availability will become a significant constraint. Many rural fishing communities are threatened by the degradation of coastal habitats and the spread of unsustainable aquaculture practices.

Latin America

There are two major environmental problems. The first is the lack of effective environmental planning in urban areas, where 75% of the population now live. This has led to poor environmental health, ineffective solid waste management, disposal and air pollution, exacerbated by overcrowding and insanitary conditions. The second is the depletion and destruction of forests in the Amazon basin, and biodiversity held within them. Latin America contains almost 70% of the world's tropical rain forests. Natural forest cover is decreasing at over 1% a year. This is a major threat to biodiversity and also contributes to global warming. The region is also prone to natural disasters, most recently Hurricane Mitch in Honduras in 1998 and the flooding in Venezuela at the end of 1999.

Central and Eastern Europe and Central Asia

This region has an enormously costly environmental legacy, and is home to many of the world's biggest environmental disasters. Many of these problems are of national significance and affect both the health and livelihoods of the poor, as well as impeding future economic growth and foreign investment. The Chernobyl disaster in Ukraine in 1986 led to an estimated 500,000 people being exposed to health threatening levels of radiation. Numerous other incidents and nuclear trials have also led to large numbers of people being exposed to unacceptable radiation levels. Industrial pollution, although decreasing as a result of industrial decline, remains widespread, and in many cases threatens public health. Public environmental infrastructure is often inefficiently managed. At the same time, new problems are emerging – growing solid waste problems due to changing consumption patterns, rapid increases in urban transport leading to increased urban air pollution and uncontrolled development in urban areas without proper environmental infrastructure. As a result, levels of air, soil and water pollution in many urban areas are above levels recognised to be safe.

Small island states

The economies of small island states are highly dependent on the natural and physical environment. They are vulnerable to natural and environmental disasters and have limited capacity to respond and recover. Low-lying islands (for example, Tuvalu, Maldives) are at risk from sea-level rise as a result of climate change. Mountainous islands are susceptible to inappropriate conversion of steep slope forests for agriculture with consequent soil erosion, landslides, damage to infrastructure, flooding of coastal areas, sedimentation of coral reefs and general degradation of fragile coastal environmental resources on which some of the poorest communities depend for their livelihoods. The widespread use of agricultural chemicals particularly in mono-crop production systems (for example, bananas, sugar) is a significant source of pollution with measurable impacts on water quality for human consumption and recreation, as well as on coral reefs and fisheries. Tourism depends on healthy coastal environmental resources and marine biodiversity, but itself contributes to environmental degradation.

Western Europe and North America

Until very recently, this region suffered many environmental threats associated with industrialisation and the unsustainable use of natural resources. While many of these threats have now been reduced, new environmental threats are emerging. Road transport is now the main source of urban air pollution, while emissions of other pollutants are still rising. Per capita energy use is among the highest in the world. Stocks of some commercial fish have declined or collapsed. There are concerns about exposure to pesticides and other toxic chemicals, food hygiene and the use of genetically modified organisms. Important decisions need to be made that will determine whether the economic activity and patterns of production and consumption of the region will become more sustainable.

Trans-boundary and emerging environmental problems in the 21st century

2.12 Environmental problems do not respect national boundaries. Conflict over access to shared water resources is growing in many regions of the world. Air pollution from one country can lead to environmental health impacts in another. Persistent organic pollutants used in one country can have effects in countries thousands of miles away.

2.13 The emission of substances that cause stratospheric ozone depletion is another important example of a trans-boundary environmental problem. The production and release of ozone depleting substances from China can cause skin cancer in Latin America and Australasia. Action to address damage to the ozone layer through the Montreal Protocol was one of the first concerted international efforts to protect the environment and is seen as a model for other global environmental problems. Gradual phasing out of technology which produces or uses ozone depleting substances has led to some improvement in the condition of the ozone layer, but continued enforcement of the Protocol is vital for the problem to be controlled.

2.14 Climate change is the quintessential global environmental problem. It is immaterial from where a ton of CO₂ is released into the atmosphere. Its effect on global warming will be the same. Consequently, changes in climate can only be dealt with by global agreement. The objective of the Kyoto Protocol to the UN Framework Convention on Climate Change is that developed countries and countries in transition should collectively reduce their greenhouse gas emissions by 5% below 1990 levels by 2008–2012.

2.15 The impact of climate change is likely to constitute one of the biggest global environmental problems for the 21st century. Despite the progress made so far through international negotiations much more action is needed if atmospheric concentrations of greenhouse gases are to be stabilised at an acceptable level. The effects of climate change are uncertain and are likely to vary greatly between regions. Rainfall is likely to become less predictable and extreme weather patterns more common. Rising sea levels could threaten the lives of millions, with Bangladesh estimated to lose 17% of its land area and

Egypt 12% from a one metre rise in sea level¹⁹. The overall impact of a doubling of CO₂ in the atmosphere would be to reduce the GDP of developing countries by an estimated 2–9%, compared with 1–1.5% for industrial economies²⁰.

2.16 Genetic modification technologies demonstrate how the latest technology can offer potentially very important benefits for the poor and yet also pose environmental risks which require careful appraisal and control. Potential benefits for people and the environment include increased food security and employment; less use of pesticides; and improved yields and nutrition. The Food and Agriculture Organisation of the United Nations (FAO) estimates that to meet the needs of a projected world population of eight billion or more in 2020, food production will have to double. Whether that can be achieved with conventional agricultural technologies is uncertain.

2.17 There is not much understanding of the possible environmental consequences of widespread release and use of genetically modified organisms (GMOs). An agreement on biosafety was negotiated in Montreal in January 2000. It will give developing countries the legal ability to take decisions about whether to import GMOs that may affect their biodiversity. In working through its implications, it will be essential to support developing countries in building their practical capacity to take such decisions.

2.18 World trade flows are growing rapidly and global production patterns are shifting as countries develop sectors in which they have a comparative advantage. Increased economic growth is often necessary to provide the resources for improved environmental management. There are reasonable concerns that without the implementation of appropriate environmental policies in all countries, trade liberalisation could lead to environmental damage. This is likely to be a problem in countries where environmental legislation and policy is not a priority or well enforced. Several countries are undertaking sustainability and environmental impact assessments of trade liberalisation in order to inform future discussions and negotiations. There is no strong evidence that environmental standards are being reduced to attract foreign investment, but there is a good deal of evidence that local capacities to monitor and manage the environment are often inadequate.

¹⁹Human development report, UNDP, 1998.

²⁰Pearce, D., and others. 1996. The social costs of climate change. In *Climate Change, 1995, Economic and Social dimensions of Climate Change. Contribution of Working Group III to the Second assessment Report of the Intergovernmental Panel on Climate Change*.

2.19 In most cases, the environmental impacts of trade liberalisation are best dealt with by environmental policies. With some important exceptions, particularly the few multilateral environment agreements which provide for trade sanctions to secure enforcement, there is no provision for, and it is not desirable to use, trade measures to protect the environment. Equally, it is a mistake to argue against further liberalisation on environmental grounds.

Marginalising poor countries from the benefits of global trade and investment will not prevent environmental degradation and will alienate developing countries from negotiations on global environmental issues. Rather, the challenge of globalisation is that it intensifies the need for better enforcement of appropriate environmental policies at the national level. Developing countries need to be able to harness the gains from increased trade at the same time as ensuring sound management of their environmental resources.

The causes of environmental degradation

2.20 For more than a decade, high priority has been accorded to the environment by countries for domestic policy and development assistance. But actual practice has fallen short of aspirations – opportunities for improved environmental management continue to be missed, and environmental degradation continues. Major environmental problems are rarely the result of a few large, bad projects, but rather the cumulative effects of many small decisions taken separately by millions of individuals. It is important to understand both immediate and underlying causes. The immediate cause – pollution by an inefficient factory, reduced tree cover leading to soil degradation – is generally evident and measurable. But the underlying reasons are usually a complex of social, economic and political factors. They can be categorised as market failure, unsustainable consumption, or poor and ineffective governance.

Market failure

2.21 Some of the most obvious market failures are as follows²¹:

- insecure ownership and open access to resources: this makes it unclear who has the right to benefit from a resource or who has the right to protect or pollute it. It may also lead to inadequate investment in maintaining the quality of the resource;

- externalities: when a producer can shift the effects of pollution to others, there is little incentive to limit pollution;
- uncertainty: our knowledge of many ecological processes and our effect on them is very poor and may never be reliable;
- myopia: individuals have shorter time spans than society and pursue activities whose returns are higher in the short run, but lower in the long run, than more sustainable alternatives;
- irreversibility: some kinds of ecological damage are irreversible, but many decision-making processes undervalue this loss of options.

2.22 Some environmental problems are essentially national or local in scope and solution, but their complexity still poses major challenges. For example, soil erosion has causes and effects across space, time and people. It links to water management. The actions of those upstream impose soil problems on those downstream, who cannot charge or sue those upstream for damage due to lack of property rights and clarity over fault and causality.

2.23 While many local or national problems are theoretically soluble, global environmental problems are more intractable. Individual countries lack incentives to act on global problems because they cannot capture all the rewards. Neither markets nor national laws fully reflect the value of global public goods. Only international agreements can fully protect them. But such agreements are hard to negotiate and implement for several reasons. It has to be generally accepted that inaction risks high costs and that the technology and institutional ability to find cost-effective and environmentally benign solutions to the problem exist. All parties with significant roles to play in the solution or who bear the costs of the solution must be engaged in the attempt.

The effect of patterns of consumption on the environment

2.24 On a global and national level, the poor are not usually the major cause of environmental degradation. They consume too little, contribute little to pollution and waste, and have too little access to soils, forests, fisheries and freshwater to be a major source of degradation. In some instances, however, they contribute to environmental degradation, for example, the cutting down of forests in north-western Brazil. This is generally due to a

²¹Panayotou, T. *The economics of environmental degradation: problems, causes and responses*, IHD Discussion Paper no. 355, Boston, April 1990.

combination of lack of access to land in less fragile environments, open access to these environments, population pressure and poorly designed property rights which requires land clearance to establish ownership. The solution involves tackling these issues directly.

2.25 Production for, and consumption by, the non-poor is responsible for the bulk of environmental degradation. Their consumption is not a bad thing in itself. A higher level of personal consumption is one of the main objectives of economic development. But high levels of consumption of goods and services made in ways which place intensive pressure on environmental resources can give rise to irreversible damage. The key issue is to separate consumption from the resources it requires and the pollution it generates. This can be achieved in part by technical progress. For example the amount of energy used per unit of GDP has fallen dramatically in the last 20 years.

2.30 One way to encourage both technical progress and switching by consumers to more environmentally benign products is to use correct prices, i.e. if the market failures identified in the preceding section can be remedied so that the prices of goods reflect their full economic costs of production together with their social and environmental costs²². Consumers generally reduce their consumption of goods and services whose prices increase.

2.31 While technical progress can achieve much, there still may be a volume effect if technical progress is not fast enough to keep pace with increasing demand. Thus the energy efficiency of motor vehicles may have increased significantly, but the number of vehicles owned and kilometres driven has also increased enormously. Thus the UK continues to emit almost five times as much CO₂ per capita than the developing country average – despite the UK's much higher energy efficiency.

Poor and ineffective governance

2.32 Future generations are key stakeholders in the environment, but have no voice in today's decisions. Similarly poor people often suffer from the worst environments, and also have little or no voice in decisions which affect them. The real difficulty in harnessing and protecting the environment has been to reconcile the diverse interests and demands of people alive today as well

as the next generation. Poor people's aspirations are rarely expressed as being 'environmental', but many of their problems have underlying environmental causes. Full participation in decision-making of all affected interests is generally seen as the necessary response to this dilemma. However, it is necessary but not sufficient. Stakeholder consultation can often generate tension and disagreement. It needs to be buttressed by transparent mechanisms to resolve disputes and consequently often needs to be accompanied by institutional reform.²³

2.33 Good governance can improve the lives of the world's peoples, but much government policy has been neither economically nor environmentally efficient. Where corruption subverts the public interest, both livelihoods and the environment suffer. Reforms of the last two decades around the world have brought markets back into many areas of policy and public provision, reducing subsidies and bringing prices closer to their true economic (including environmental) cost. But removal of subsidies faces stiff opposition from vested interests, often with strong political influence. The effects may also hurt the poor before improvements are seen.

2.34 Some environmental problems have been inadequately identified – so the situation has become difficult to resolve even before they have been noticed. In some cases scientific progress has allowed detection of the problem. But even then, the lack of systematic monitoring of clearly defined environmental indicators means that linkages between policies and environmental impact are not recognised. The consequences of environmental degradation are often dealt with, but with little consideration of the underlying causes. As a result, people systematically under-value the environment.

2.35 There is usually no institutional home in governments for cross-sectoral environmental concerns. It is not sufficient to establish dedicated environmental institutions or programmes. Successful action requires awareness and mainstreaming throughout government. This is very difficult to achieve and progress is slow. Most environmental ministries in developing countries have low status in the administration, are under-funded and need more skilled staff and facilities. They lack the political weight, authority and legal power to

²²It is possible. For example, Singapore has dealt decisively with the issue of traffic congestion. It can easily cost around £11,000 to obtain a permit which allows the purchase of a car. In addition, a tax is levied electronically on drivers travelling on busy roads at rush hours. The result is a rapid flow of traffic – around 60 km per hour even during rush hours.

²³For example, in relation to issues dealing with land ownership and tenancy reforms, many politicians are land owners and are reluctant to promote reform.

enforce compliance with environmental regulations or to influence other ministries. Environmental policies have often been developed in response to pressure from donors or international agreements. They have failed to capture the complexities of the pressures on environmental resources. Governments in some developing countries tend to see environmental issues, especially at the global level, as an agenda dominated by the North, and as a hindrance to economic growth.

2.36 Mainstreaming the environment into national development planning processes faces a number of other challenges including the need for transparent government frameworks; addressing the power of vested interests; developing the capacity of planning systems to incorporate environmental priorities and concerns; developing the capacity of statistical departments and economic planners to value the environment to be able to measure impacts, change and internalise environmental costs and benefits.

3. Experience to date

Experience within poor countries

Experience of the poor in achieving sustainable livelihoods

3.1 While the poor are not usually a major cause of environmental degradation, they are usually the most vulnerable to such changes. Much can therefore be learned from the way they address these problems.

A. The poor need security of access to natural resources

3.2 Weak and ill-defined security of tenure typically results in the poor being denied access to resources. This increases their vulnerability. For example, poor rural women are often more vulnerable to environmental degradation because of existing gender inequalities in access to land, and to natural and productive resources. When the poor have no ownership of a resource, there is little or no incentive for them to use it in a sustainable manner. Top-down approaches directed towards the protection and preservation of natural and physical resources, which have regarded people as part of the problem rather than part of the solution, have usually failed.

3.3 A more people-centred approach is required. Efforts have been made to promote the active involvement of local communities in the management of natural resources, with many successes. One example of combining poverty elimination and reducing environmental degradation is community forestry in Nepal.

Box 4: Access and control: Nepal-UK Community Forestry Project (NUKCFP)²⁴

The 1993 Nepal Forest Act gave legal authority to forest user groups (FUGs) to manage forest areas in the hills of Nepal. Land ownership remains vested with government but FUGs legally own the trees, develop their own management plans, set prices for forest outputs and determine how surplus income is spent. NUKCFP, covering a sixth of all hill districts, has supported capacity-building to implement this legislation within the Forestry Department, non-governmental organisations (NGOs) and FUGs. Surveys show that forest quality is improving in nearly all forest areas under FUG management, although it is still deteriorating in all other forest areas as pressure transfers from the protected to the unprotected forest. Gains for the poorest include greater access to forest resources, although if the FUG is dominated by local elites, the poor can still lose out.

3.4 Experience has not always been positive. Not all stakeholders have compatible objectives and there are different degrees of power and influence. This can lead to conflicts over the use of shared resources or when certain groups are left out of the decision-making process. Inward migration also brings problems for community management as outsiders contest access to resources. Much remains to be learned about the key issues which underpin the effectiveness and equity of community-based management structures. In many instances, it has proved difficult for communities to self-regulate resources, without the involvement of other independent stakeholders, such as non-governmental organisations or government authorities.

²⁴Community forestry in Nepal: impacts on common property resource management, Springate-Baginski O et al, 1998; Changes in community forestry conditions and management 1994-98: analysis of information for the forest resource assessment study and socio-economic study of the Koshi hills, Branney P and Yadav K (1998).

Box 5: Community-managed wells in Mali²⁵

The Macina wells project was a response to the Sahelian drought of 1984–1985. Its aim was to improve and extend water and sanitation provision through construction of wells and public health education. A community management approach was adopted, involving the allocation of tasks to water management teams. The gender division of responsibilities within the project was such that older men with authority were appointed as well caretakers and women as cleaners. Women were also given minimal influence over project planning and excluded from technical aspects of the project and decision-making responsibilities.

The result was that both men's and women's work was substandard. The caretakers were seldom on site and well maintenance was poor. Women tried to avoid well cleaning which they saw as an added burden. They were also unwilling to co-operate with the rules set by the men, which they thought impractical and illogical. Men lacked any incentive to undertake their work since water provisioning and sanitation were viewed as 'women's work'.

B. The poor are readier than might be expected to contribute to environmental services

3.5 The success or failure of programmes to improve the provision of environmental services (such as water supply, sanitation and waste management) depends on consumer demand. In some cases, this means seeing what the poor are doing already and then supporting them. The poor are willing and able to pay for a service they value and need.

Box 6: Improving waste management services in Egypt²⁶

In many rural and urban areas of Egypt there is little effective waste management, and refuse piles up in streets causing health hazards and impeding access. The poor in Egypt consistently identify waste management as one of their major environmental priorities.

Discussions with the urban poor living in Sohag in southern Egypt revealed the price they would be willing to pay for improved waste services. Through working with existing community-based organisations and groups, low-cost waste collection, transfer and disposal services were developed in a pilot district in Sohag. The provision of these services significantly improved waste collection, with benefits for over 100,000 people. Due to popular demand, the improved waste collection services were extended to other districts on a cost recovery basis.

3.6 However, consumers are often unwilling or unable to meet the full cost of a service. For example, while people are willing to pay a market price for the provision of drinking water, they are often unwilling to pay for wastewater treatment. Private companies are therefore willing to extend piped water supplies because the costs can be recovered, but will not provide sanitation. Yet increasing water supply without treating and disposing of wastewater can exacerbate environmental health problems. Part of the answer lies in better health education. It is usually important to ensure that the poor pay for at least the operating cost of the service, to ensure financial sustainability. However, there may be a case for subsidising part of the capital investment consistent with other calls on the government's budget.

C. The poor should be helped to improve existing livelihoods

3.7 It is important to help the poor improve the sustainability of their existing livelihoods, rather than encouraging them to adopt completely new practices, unless this is the only practicable alternative. Sustainable poverty reduction is achievable only if external support focuses on what matters to people's lives, understands the differences between people and works with them in a way that is consistent with their current livelihood strategies,

²⁵Integrating gender into environment research and policy, Joekes et al, IDS Working Paper 27, Brighton, 1996.

²⁶Support to environmental assessment and management – Phase II, DFID.

social environments and their own ability to adapt. Box 7 shows an approach that has been successful, while Box 8 illustrates some of the difficulties.

Box 7: Prunus harvesting on Mount Cameroon²⁷

People living on Mount Cameroon depend for their livelihoods on the use of forest resources. The forests on Mount Cameroon are some of the most biologically rich in Africa. One of the key environmental threats on Mount Cameroon was the unsustainable exploitation of the tree *Prunus Africana*, (the bark of which is used as the source of products to treat prostate gland disorders). The high level of extraction by several hundred harvesters threatened to destroy the trees and reduced the price for which the bark could be sold to an international pharmaceuticals firm. Initially the project tried to identify alternative livelihoods for the harvesters, but this approach failed. The project then assisted the local community to establish a Prunus Harvesters' Union. In its first year of operation, the union tripled annual revenues to US\$40,000 from the collection of Prunus bark sold to the pharmaceutical company Plantecam. Of this, about US\$36,000 was distributed among the 60 involved harvesters on a pro-rata basis according to the amount they individually harvested, and US\$2,500 was used to install the community's first pipe-borne water supply. The pharmaceutical company now purchases bark directly from the Union, which has an incentive to harvest the bark sustainably.

Box 8: Livelihoods and sustainability in coastal Kerala²⁸

Fluctuations in fish stocks, intensification of fishing as well as changes in fishing methods have led to concerns about the sustainability of the coastal environment and the livelihoods of fishing communities in Kerala, India. Environmental health issues are also a major problem in the densely populated villages of coastal fishing communities. Attempts to reform the fisheries sector to strengthen livelihoods have centred on the at-sea activities of men, with loans, extension and new technology aimed at small-scale fishermen. Women's involvement in environmental concerns has largely been viewed in terms of their reproductive activities within the villages. The activities of women fish-traders selling at local markets have gained less attention. Yet the women's incomes are adversely affected by the diminishing quantity and quality of fish available for them to sell as a result of overfishing. The women's interests in environmental sustainability are closely linked with their trading activities, even though they are not directly involved with catching fish.

D. Livelihoods can be improved by linking sustainable use and conservation of biodiversity

3.8 Preventing biodiversity loss helps increase the resilience and productivity of ecosystems over a range of environmental conditions. This underpins the security of livelihoods of poor people who rely on natural resources. However, conservation through the rigid enforcement of protected areas has often proved ineffective in preventing the loss of biodiversity. Poor local communities denied access to such areas have little incentive to support protected area regulations or employ their local knowledge of the conservation and sustainable use of biodiversity. Common problems are illegal harvesting, poaching or encroachment in the conservation area itself and increased degradation of resources in the surrounding areas. The development of community-based management systems, which involve the active participation of local people, has tried to ensure that they benefit more directly from the conservation of biodiversity. Two DFID projects in Tanzania are addressing natural resource management

²⁷ *Participatory biodiversity conservation – rethinking the strategy in low tourist potential areas of tropical Africa*, Brown 1998; *Prunus Africana: striving for sustainable and equitable resource management in Cameroon*, Acworth J and Ewusi. B (1999).

²⁸ *Globalisation and fishing livelihoods in South Asia*, Hodges, N. Unpublished dissertation, 1999, IDS, Brighton.

issues through institutional change to reduce poverty. One at Mbomipa has established an effective wildlife and natural resource management system under community control. The other has developed local capacity to manage the Usangu wetland by reducing conflicts over aquatic resources, improving overall water use efficiency and reducing threats to the bio-diversity upon which livelihoods are dependent.

E. Controls are needed on environmentally damaging activities by the non-poor

3.9 The poor may be powerless to prevent damaging activities by the non-poor. For example, small-scale coastal fisheries are often destroyed by large trawlers, or locally organised forest users may be undermined by illegal commercial loggers. The poor may be forced on to marginal lands if most land is controlled by large farms, as in Central America and some parts of Africa. It is often impossible to help the poor tackle the degradation of their environmental resource base without considering the impacts of the non-poor. Efforts that are focused solely upon assisting the poor may, therefore, fail to improve the management of the environment.

3.10 International efforts can help. The International Code of Conduct for Responsible Fisheries is a voluntary code, developed and promoted by the FAO, which sets out principles and international standards of behaviour to ensure effective and equitable conservation, management and development of aquatic resources. The Code has been agreed by all member states of the FAO and has an important contribution to make to the development of policy for sustainable fisheries. DFID is providing £24 million to a number of West African countries over the next five years in support of the Code.

3.11 Political support to address these inequalities is often necessary. This can be illustrated by the co-operation between government and local communities to stop environmental degradation. However, while governments may introduce new environmental laws and regulations that protect the interests of the poor, implementation and enforcement is variable and frequently low.

Box 9: Stopping environmentally damaging activities by the non-poor in Sri Lanka

The RITICOE project in Sri Lanka sought to protect biodiversity in the important natural sanctuary of Rittigala and increase livelihoods for households near the sanctuary. Collective management initiatives were started by the local Buddhist priest to limit open access to the forest and medicinal plants. However, while these had some success, it soon became clear that most of the illegal logging was being done by non-poor 'outsiders', which the local households were powerless to stop. With donor assistance, links between the neighbouring villages and the Department of Wildlife were developed so that the villagers were able to inform the Department of Wildlife to enable it to take action against illegal logging.

Civil society experience

A. Civil society can be an effective lobby ...

3.12 Civil society has been a powerful voice in the developed world for raising awareness of environmental issues and campaigning for action to address them. Non-governmental organisations (NGOs) in developing countries have taken the lead within civil society on the environment. While there has been a large growth in the number of environmental NGOs in poorer countries, their impact to date has often been localised and their memberships quite small. In the past, many international NGOs regarded the poor as the cause of environmental degradation, rather than an integral part of the solution. However, this is now changing.

3.13 NGOs have other strengths such as the formation of partnerships for cost-effective delivery of services, particularly to the poor; raising awareness through support for effective environmental education programmes in both formal and non-formal education; forming international alliances; and building political will. This last strength is particularly important, since gains from resource extraction often accrue to a few powerful companies or individuals, while the benefits of environmental protection are dispersed among large numbers of people.

3.14 It is important that NGOs show the responsibility to go with their new-found power. They need to pick the right issues, to represent the facts accurately, be responsible to international civil societies and to the real needs of poor countries.

B ... and can raise environmental awareness more generally

3.15 Civil society groups have been particularly effective in raising environmental awareness and holding government and the private sector accountable for environmental improvements. The media in many developing countries (for example, Thailand and the Philippines) have been active in publicising environmental damage, often caused by state institutions. Interest groups have formed to monitor government and corporations and have lobbied for change when performance is below the expected environmental standards. In India, the Supreme Court became involved in monitoring progress towards environmental improvement following protests by public interest groups. In Indonesia, the state environmental agency allocated a mark to large industries based on their environmental performance. Community groups then put pressure on the worst polluters to improve²⁹.

Governmental experience

3.16 Governments in countries throughout the world have taken actions to enhance the quality of the environment in a number of different ways. The following sections summarise the key lessons learned from actions taken by governments in poor countries to address environmental degradation.

A. Clear administrative responsibilities are needed

3.17 Arrangements for managing the environment are often confused, with responsibilities shared between various government ministries or agencies. While there is no clear blueprint for institutional reform, many countries have been improving their institutional and legal framework. One strategy has been to focus on a resource-based approach with a new legal framework created to encourage participation, a holistic view of the resource and clearer property rights. For example, the 1992 National Water Act in Mexico enshrines the principles of decentralisation, user participation, and the introduction of private concessions. New institutions have also been established to manage particular resources. Indonesia has established new river basin authorities to manage watersheds, and a number of other countries are setting up water councils to handle issues of water allocation.

3.18 Many countries have recently created or strengthened environmental ministries or agencies, which

are principally responsible for multilateral environment agreements, for drafting and enforcing national environmental laws and regulations, and for contributing to the development planning process – usually through managing environmental impact assessments. However, the effectiveness of the majority of environmental ministries or agencies remains limited. It is thus important to ensure that older, more powerful ministries are also strengthened to handle environmental concerns.

3.19 Typically, other government authorities have environmental responsibilities within their overall mandate. Often these responsibilities can result in conflicts between their efforts to promote productive activities, and to ensure that such production is sustainable in the longer term. For example, fishery agencies are responsible for both increasing fish production and protecting fish stocks. In those instances where institutions share responsibilities for both production and self-regulation, it is the latter function which is usually weak, under-resourced and often poorly implemented.

3.20 Decentralisation is occurring in a number of developing countries, especially in Africa and Latin America. It has had a varying impact on environmental management. Typically, the transfer of environmental responsibilities to districts and municipalities has occurred without a concurrent transfer in resources or powers. For it to be effective, there is a need for environmental management to be devolved to the lowest appropriate level and for communities to be empowered to manage the resources on which they rely.

B. Environmental policies and plans can be useful but only if certain criteria are met

3.21 The majority of governments in poorer countries have environmental policies and plans. However, their preparation was frequently donor initiated. In the early 1990s, the World Conservation Union promoted the preparation of national conservation strategies in a number of countries. At the same time, the World Bank supported the preparation of national environmental action plans (in many countries (including a number which had, or were preparing conservation strategies). There has been much debate about their effectiveness and impact. While many strategies and plans have not led to different approaches, a number have been influential.

²⁹The PROPER programme began in early 1995 in Indonesia – the acronym standing for Programme for Pollution Control, Evaluation and Rating.

Box 10: Some benefits of national and provincial environmental strategies³⁰

Botswana The National Conservation Strategy (NCS) led to the establishment of a National Conservation Strategy Advisory Board and Co-ordination Agency. Environmental impact assessment procedures were introduced into national planning and development. Application of these procedures had a major impact on development decisions.

Nepal The NCS led to the creation of an inter-sectoral network of senior governmental officials from 20 ministries and departments. This group acted as a catalyst for introducing environmental assessment procedures, and the establishment of environmental units within key government sectors.

Nicaragua A highly participatory process was used to prepare the NCS. This contributed to the national dialogue between antagonists in the recent civil war and launched locally-led efforts to tackle environmental problems affecting the poor.

Azerbaijan The National Environmental Action Plan (NEAP) was the first document to quantify the scale of environmental degradation and to prioritise actions needed. In response to the NEAP, the Government took a loan to fund the Urgent Environmental Improvement Programme, which addressed clean-up actions and institutional strengthening and reform.

3.22 Key lessons to emerge from these strategies and plans are that:

- there needs to be genuine local demand;
- preparation should be led by people with a role in national development (rather than by environmental institutions);
- high-level political support is required;
- active participation by all stakeholder groups is critical (rather than a top-down, or science-based, process);
- consideration is given to the most effective means for integrating economic, social and environmental objectives; and
- stakeholders should monitor the implementation of the strategies.

C. Environmental laws and regulations should be made more relevant and effective

3.23 The introduction of pollution-related environmental laws and regulations is relatively recent, even in many developed countries. Many of the environmental laws and regulations in place in developing countries were based on a 'command-and-control' approach. Often these have not been implemented effectively, as government institutions lacked the powers and resources to enforce them. In addition, they frequently did not take account of the views and rights of other stakeholders, in particular the poor.

3.24 Many poor countries have introduced legislation requiring environmental impact assessments for projects. As in developed countries, this process is of varying effectiveness and impact. Key factors influencing success are that assessments should be conducted at an early stage in project design; those affected must be consulted; the assessment must form part of a wider development planning and decision-making process; they must be available for public scrutiny; and there should be an independent and objective evaluation of the quality of the assessments.

D. Broader economic policies are very important

3.25 Economic policies, such as taxation, public expenditure and trade policy can have a profound effect on the way resources are used. In order to convince economic policy-makers that these issues are worth addressing, there is considerable effort being devoted to quantify the economic costs of environmental damage both at a specific level, such as the cost of air pollution to a city, and at the aggregate level, for example by adjusting estimates of GDP to reflect environmental damage. The results are often stark, suggesting that for many countries the GDP may be significantly over-stated when environmental damage is taken into account. Two examples for China³¹ and Pakistan³² illustrate this point.

- *"The damages of excessive pollution – in the form of premature deaths, sickness and damage to productive resources and urban infrastructure – are estimated to cost the Chinese about 8% of GDP."*
- *"The social cost of environmental degradation in Pakistan is likely to be enormous and will continue to increase."*

³⁰Strategies for national sustainable development: a handbook for their planning and implementation, 1994, J Carew Reid et al.

³¹China 2020: Clear water, blue skies, IBRD, 1997.

³²Pakistan national conservation strategy: review of the commitment to action, Mid-term Review, June 2000.

The direct health and productivity impacts have been conservatively estimated at US\$1.5 – \$3 billion annually, or 2.3%–4.6% GDP, almost half of which are attributable to water pollution. This cost is almost doubled if the impact of indoor air pollution is included".

3.26 Although these figures are significant, they need to be treated with caution. For example, in the case of China, it does not mean that GDP would necessarily be 8% higher if China solved its environmental problems, since China would need to invest substantial sums of money to deal with these problems. But it does suggest that there should, in principle, be a high rate of return for programmes which deal with pollution control and so on. Nevertheless, the figures send an important message to policy-makers and are a good rationale for the use of public expenditures for environmental improvements.

3.27 Given the administrative weaknesses of many environment ministries, it has generally proved more effective to rely on market-based instruments to ameliorate adverse environmental trends. However, there is a perception that some of these instruments, particularly the removal of subsidies, have a negative impact on the poor. This perception is often wrong. In most cases, such subsidies are both harmful to the environment and mainly benefit the non-poor. For example, subsidies that reduce the price of fossil fuels encourage their use and the accompanying emissions of greenhouse gases, and subsidies that keep water prices low for large-scale farms encourage over-irrigation and depletion of freshwater supplies. Most of these subsidies particularly benefit the non-poor. By contrast, the poor often have no access to subsidised systems of water, sewerage and waste collection. Where a genuine case can be made that the poor will be negatively affected, a general subsidy can be replaced by a targeted one which helps the poor with much less environmental damage.

3.28 Many developing countries are now addressing the problems of under-pricing environmental goods. Countries are beginning to revise subsidies for fossil fuels (which cause local air pollution and global warming), fishing gear (over-fishing), diesel (particulate air pollution), pesticides (increased pesticide poisoning and water pollution) and land conversion (leading to forest loss).

Box 11: Energy subsidy reform in China³³

China has made remarkable progress since the 1980s in reducing fossil fuel subsidies. Subsidy rates for coal, which accounts for 73% of China's commercial needs, fell from 61% in 1984 to 11% in 1995. As a result, energy intensity in China – once among the highest in the world – has fallen by about 30 percentage points since 1985. This has also had a major impact on China's greenhouse gas emissions, which by 2020 will have fallen by an amount equivalent to emissions from a year's energy consumption. Efficiency gains in industry, resulting from structural and technical changes, have also played a major part in reducing the energy intensity of the economy. China removed price controls on coal, and encouraged the development of private coal mines, which now produce around 50% of China's coal. Subsidy reform and industrial restructuring has produced multiple benefits: financial savings, energy savings and reduced emissions.

3.29 Many natural resources have a value which can be taxed by the government while still allowing for profitable exploitation. The lower the tax, the greater the incentives for unsustainable exploitation. Many developing countries have low taxes for natural resources such as forestry, fisheries and other mineral deposits. Some are now raising them. For example, the Forum Fishery Agency in the Pacific has significantly increased the charges for entry to their fisheries zones for foreign fleets. Timber concessions have been auctioned to the private sector. Another important resource within developing countries are natural parks. Many countries are raising entrance fees charged to foreign tourists. This can provide funds for biodiversity management and compensation for those who live around the park.

3.30 While most countries have traditionally focused on a regulatory approach to environmental compliance, a growing number are now shifting to environmental taxes and charges. In Malaysia, a tax on wastewater discharge led to major reductions in water pollution. China, Russia and Central and Eastern Europe all have elaborate systems of pollution fees. State ownership of industry previously meant the fines had little impact but with privatisation, a simplified and higher level of fees has led to significant environmental gains. Partial and targeted rewards and incentives can also be an important way to change

³³Wang, X (1996), *China's coal sector: moving to a market economy*, World Bank, China and Mongolia Department, Infrastructure Division.

behaviour. Examples include renewable energy, watershed protection and cleaner production technology.

3.31 While environmental charges have many advantages, they have not always been successful. The lessons learned from past experience are:

- ▣ be realistic and keep implementation of policies within available institutional capacity;
- ▣ be gradual and pilot approaches first;
- ▣ allow for the possibility of low cost revisions when drafting legislation;
- ▣ relevant stakeholders must be involved, particularly to overcome concerns about effects on equity and industrial costs;
- ▣ rely on markets – low cost administration is vital.

E. Research and technology can help but is no panacea

3.32 Land degradation is particularly acute in arid and semi-arid lands, leading to marked decreases in soil fertility. There are many successful examples of resource-conserving technologies increasing or maintaining productivity in marginal lands and reversing degradation. They include soil and water conservation, reduced tillage, trickle irrigation, composting, inter-cropping and improved rotations. In Machakos district in Kenya, soil degradation and erosion were successfully reversed and productivity substantially increased by a combination of bench terracing, tree planting, diversification and the integration of crop and livestock production. Experience indicates that:

- ▣ technology alone is not enough, it needs to be supported by vigorous local institutions and an enabling external environment;
- ▣ some techniques need action and adoption at community level;
- ▣ single technologies are likely to have limited impact while combinations are more successful;
- ▣ farmers need incentives to adopt a long-term perspective – especially secure access to land and other resources.

3.33 An increasing proportion of research into biotechnology is being undertaken by the commercial sector. It can be useful and of high quality but it is largely aimed at bigger farmers and profitable cash crops. There are possibilities for using genetic modification technologies

to benefit poorer farmers, but research is at a very early stage. For example, it can be applied to crops like cassava to produce increased resistance to disease and pests. Half the world's population eats rice daily; yet rice is a poor source of essential nutrients. Using these technologies, a new variety of rice has been produced with a high content of vitamin A³⁴. Such investments may not be commercially attractive to seed companies. There is, therefore, a case for more public funding of research directed towards poor farmers.

3.34 Integrated pest management encourages natural control of pest populations by anticipating problems and preventing them from reaching economically damaging levels. A range of techniques is used such as increasing natural predators, planting pest resistant crops, adapting cultural practices and, as a last resort, using pesticides judiciously and selectively. It has produced good results in Brazil, China, Indonesia and India, reducing pesticide use by up to 90%.

3.35 Successful technology transfer and adoption depends crucially on knowledge and understanding of how best to use it. The way knowledge is spread is a critical factor. Lessons from the agriculture sector indicate that top-down, package approaches are unsuitable and ineffective for poor smallholder farmers, and that the adoption of inappropriate technology can undermine sustainable livelihoods. Approaches which support a learning environment among farmers, providing technology choices and information, encouraging and supporting farmer experimentation and encouraging farmer-to-farmer exchanges and visits, are much more effective than the more prescriptive, old-fashioned extension methods.

Private sector experience

A. Increasing corporate responsibility offers environmental opportunities to business, not just costs

3.36 In recent years, businesses have increasingly recognised that improved environmental performance is a financial opportunity rather than just an extra cost.³⁵ Cleaner production methods were pioneered in the UK. They aim to eliminate pollution at source and conserve raw materials such as energy and water. This proactive, preventative approach contrasts sharply with traditional

³⁴In South-East Asia, 70% of children under the age of five suffer from vitamin A deficiency, leading to blindness and other diseases. UNICEF predicts that improved sources of vitamin A could prevent up to two million deaths a year for children under four years of age.

³⁵The share prices of the top 50% eco-efficiency companies in the global chemicals sector have out-performed the bottom 50% by 20% over the last two years, *Environment Finance*, June 2000.

pollution control or waste management, which aims to mitigate damage after it occurs. Moreover, cleaner production is also often much cheaper. Growing corporate responsibility has led to the introduction of environmental management systems, the setting of clear targets, and the publication of annual environmental audits. However, in the small and medium enterprise sector, progress is much slower.

3.37 In general, foreign direct investment in developing countries has led to an overall improvement in the environmental performance of enterprises. Most multinational companies now promote the application of international environmental standards, and, through investment and management changes, are able to introduce new technology to reduce pollution and emissions. The initial concern that varying environmental standards in different countries would lead to pollution havens has now largely been allayed (although there have been one or two examples identified in research, e.g. the tanning industry in Brazil and phosphate manufacturing in North Africa).³⁶

B. The Clean Development Mechanism offers significant opportunities for the private sector to support sustainable development

3.38 In 1997, the Kyoto Protocol set out commitments for developed countries to reduce their emissions of greenhouse gases. The Protocol also established three mechanisms to help countries meet these targets. Of these, only the Clean Development Mechanism involves developing countries directly. It has two aims: to assist developing countries in achieving sustainable development while simultaneously assisting developed countries in meeting their emission reduction commitments.

3.39 Under the Clean Development Mechanism, a developed country investor would invest in projects in developing countries in return for carbon credits. Such credits could then be used by developed countries towards meeting their Kyoto commitments. It should benefit both developed and developing country partners.³⁷ The developing country gains from the transfer of new environmentally-sound technologies and increased levels of foreign investment. All projects will also need to contribute to sustainable development in the host developing country. A share of the proceeds will help fund adaptation to climate change in the most vulnerable countries. Many countries will also benefit from various capacity-building initiatives, designed to enhance their ability to attract climate-friendly investment.

Box 12: Private sector activity on sustainable development

Many companies are examining how sustainable development approaches can be incorporated into their activities. They recognise the increased transaction costs and public relations damage incurred through poor environmental and social management. This is now coupled with demands for increased corporate responsibility and greater awareness of the business opportunities associated with better environmental and social performance. As a result, the private sector is demonstrating some advanced and leading thinking in the field of sustainable development. Most recently, new rules introduced into the UK in July 2000 require pension funds to declare the extent to which social, environmental or ethical considerations are taken into account in the selection of stocks by fund managers.

Certain companies are now actively attempting to mainstream sustainable development into their corporate policy and thinking. Wider initiatives on issues such as biodiversity, public health, sustainable energy, and climate change are being supported. Emphasis is placed on underpinning all company activity with much greater engagement with public authorities, NGOs and communities. However, discrepancies between corporate intentions on the environment and sustainable development and actual operational activities are recognised as a significant problem. This parallels the problem experienced in many donor organisations of a gap between policy commitments to the environment and what is actually delivered through programme activities.

There is considerable scope for donor institutions and government departments to share experience, and to strengthen collaboration, with the private sector. The opportunity exists to develop coherent and compatible approaches to achieving sustainable development. The World Business Council for Sustainable Development and the World Bank Business Partners for Development are two such examples.

³⁶Mabey, N & McNally, R, *Foreign direct investment and the environment: from pollution havens to sustainable development*, WWF-UK.

³⁷A World Resources Institute assessment of the potential for CDM projects in Brazil, China and India suggests a wide range of sustainable development benefits, including cleaner air and water, reduced deforestation, soil conservation, and biodiversity conservation; and social benefits such as rural development, employment and poverty alleviation.

Experience within bilateral and international institutions

Bilateral institutions

3.40 Virtually all development organisations cover the environment in their normal operations. In the last decade, most have introduced environmental screening and increased the numbers of environmental staff. However, whilst improved screening and appraisal techniques have meant that few projects cause direct environmental harm, development agencies have been less successful at integrating environmental opportunities into their work.

3.41 These shortcomings have been as apparent in DFID's programmes as in those of any other donor. An environment evaluation synthesis report for DFID³⁸ concludes that: *"DFID has accorded high priority to the environment for over a decade ... There is a gap between the high policy priority attached by DFID to environmental issues, the value of projects marked as having environmental objectives, and what has actually been delivered in terms of positive environmental impact. ... Environment as a potential development opportunity – rather than as a risk to be minimised and mitigated – has not been fully mainstreamed across the bilateral programme"*.

3.42 The report identifies four key challenges:

- demonstrate the contribution of environmental improvement to direct poverty reduction;
- fully integrate the environment within bilateral strategies;
- design monitorable performance targets for the environment at country programme and DFID level;
- have a central department with the mandate to promote and support the environment as integral to poverty elimination, and with responsibility for monitoring environmental performance.

3.43 DFID's response to these challenges is set out in section 5. They are common to the international community, including other donors and governments. There is great potential to build on these commonalities through consultation and mutual lesson learning. The World Bank is carrying out a comprehensive evaluation of their environmental activities. A recent history³⁹ states that while the Bank has *"promoted itself as a champion of environmental sustainability ... the integration of these new concerns has been severely constrained by the Bank's established*

organisation, incentives and knowledge". DFID is co-operating closely with the World Bank in this evaluation and in the formulation of its new strategy.

Multilateral institutions

3.44 The UN has played a leading role in the global environmental agenda, not least by organising the 1972 Stockholm Conference on the Environment and the 1992 Rio Earth Summit. Of the UN institutions, the UN Environment Programme (UNEP), based in Nairobi, is designed to be the intellectual and technical leader for global environmental protection. It has in-house expertise and its annual report on the state of the global environment is well regarded. But overall it has very limited funding, variable staff quality and an unfocused mandate, all of which have led to a lack of confidence in UNEP by the international community. Attempts are now being made to address these issues and reform the work of the institution and its governance. Habitat, the operational arm of the UN Centre for Human Settlements is responsible for the implementation of the Habitat Agenda (sustainable human settlements and adequate shelter for all). It needs to take steps to improve the assessment of its real impact and to improve links with civil society, but it has the potential, with UNEP and the UN Development Programme (UNDP), to integrate environmental concerns in the planning and development of human settlements.

3.45 After Rio, the Commission on Sustainable Development was established as the dedicated body to monitor progress in protecting the global environment. It has developed a clear work programme and has successfully involved NGOs and the private sector. But it has faced resistance from vested interests in the UN, it has poor links with the international financial institutions and has no power to impose binding obligations on countries, since its mandate is simply to review progress towards the implementation of Agenda 21. However, it remains an important voice in monitoring the implementation of the follow-up to the Rio conference; and its structure does allow countries to engage in a free and transparent debate if they choose to take the opportunity offered.

3.46 The role of other UN programmes and agencies in support of the environment has been variable, but generally insubstantial, even though many have increasingly

³⁸*Environmental Evaluation Synthesis Study: Environment: mainstreamed or sidelined*, Michael Flint, Paul Balogun, Anne Gordon, Richard Hoare, Ben Voysey, Anthony Ziegler, June 1999.

³⁹*Greening the Bank: The struggle over the environment, 1970-1995*, Robert Wade, in *The World Bank, its first half century*, Kapur, Lewis, Webb (eds) Brookings Institution Press, 1997.

integrated environmental concerns into their strategic objectives. The inefficiencies associated with the UN have hindered a coherent approach to environmental problems, with core agency mandates, rather than cross-sectoral approaches, remaining at the heart of their work. For example, although the UNDP has a very strong field presence, a clear mandate as UN co-ordinator and good relations with many developing countries, it has been unclear about its practical role in support of the environment and, like other agencies, its integration of environmental concerns has been weak. The UNDP is now trying to strengthen its role in support of governance and capacity issues and to take a leadership role in establishing links between the environment and poverty reduction. DFID will seek to support and build on this work.

3.47 The UN's environmental institutions entered the development scene relatively late compared to well-established specialised agencies such as the WHO or the FAO. They have, therefore, had to fit within already established institutional relationships and there has been little real integration of environmental concerns into the broader UN system. However, a start has been made with the establishment by the Secretary General in October 1999 of an Environmental Management Group under the chairmanship of the Executive Director of UNEP. Its purpose will be to enhance inter-agency co-ordination in the field of environment and human settlements within the UN. It is important that there should be greater co-ordination and integration of environmental issues in other international bodies. The Environmental Management Group can help in this effort. Such incremental changes are likely to be more effective than more radical organisational change such as the establishment of a World Environment Organisation.

3.48 The World Bank remains a very significant channel for resources for sustainable development in developing countries. It has shown a strong interest in the global environment debate and has wide experience of environmental issues in developing countries. With its skills in policy analysis and strong links with central ministries, it can wield major influence upstream on the policies of developing countries in support of the environment. Many of the institutional and economic reforms identified earlier in this section are now being addressed with World Bank funding. It has also helped research the link between economic policy and the

environment. It is currently working on a new environmental strategy and sustainable development will form the focus for the 2002 World Development Report. Nevertheless, the environment remains less influential than other sectors and can often lose out to economic and social objectives (for example, in the integration of the environment into Poverty Reduction Strategies). The regional development banks face similar problems, and they probably lag behind the World Bank in integrating the environment into their programmes.

3.49 The EU is committed to integrating the environment into its policies and programmes and investigating the links between poverty and the environment. With its significant funds for development, it is an important partner in pursuing the environment target. Whilst on paper the EC's environmental screening and appraisal systems are excellent, a 1997 evaluation of the effectiveness of environmental integration concluded that much remained to be done⁴⁰. There is now a stronger political momentum behind integration efforts. The importance of integration and plans to strengthen it were endorsed at the Development Council in November 1999. The plans include greater emphasis and increased dialogue with partner countries on environmental issues, enhanced capacity for environmental management in developing countries, the integration of environment and sustainable development considerations in the next trade round, and increasing the ability of partner countries to participate effectively in international environmental negotiations. However, translating these plans into consistent actions remains a major challenge.

3.50 Two other international organisations are also relevant: the International Monetary Fund (IMF) and the World Trade Organisation (WTO). The IMF tries to promote better economic management through its activities in designing stabilisation and structural adjustment programmes. However, whilst there is evidence that some aspects of economic adjustment, such as the removal of subsidies, have been environmentally beneficial, other aspects such as cuts in public expenditure may have been detrimental. The IMF has recently established a small in-house environmental unit. It will act as a liaison point in particular with the International Bank for Reconstruction and Development (IBRD) to ensure co-ordination between the two institutions. The WTO has had to respond to concerns that trade may have adverse effects on the environment (for example, by clarifying its position on

⁴⁰Evaluation of the environmental performance of EC programmes in developing countries: a synthesis report, ERM, 1997.

labelling). It has done so in such way as to resist pressure for eco-protectionism. It should also recognise that multilateral rules on trade and trade measures in environmental agreements are compatible.

Global environmental institutions

3.51 Trans-boundary environmental problems are starting to be addressed through an increasing range of international and global institutions, such as the UN Conventions on climate change, biodiversity and desertification. They help to raise the profile of specific global environmental problems, particularly at a high political level. But this politicisation can make their outputs remote from day-to-day problems in developing countries. In general, developing countries resist binding targets during negotiations, since they see global environmental problems as caused principally by the North and are suspicious that their economic growth might be restricted. Developed countries face major changes to established lifestyles and fear environmental measures will make them less competitive in world markets. At present, this tends to result in 'lowest common denominator' decisions.

3.52 The Montreal Protocol has been successful in slowing down depletion of the ozone layer. It is expected that depletion will soon start to be reversed. This is largely due to the phasing out of CFCs and halons in developed countries and the wide availability of replacement technologies. The Kyoto Protocol to the UN Framework Climate Convention has negotiated legally binding measures on developed countries to protect the environment. A major challenge is to ensure the Protocol is brought into force.

3.53 An example of global approaches has been the establishment of the Global Environment Facility (GEF). It assists developing countries in meeting the additional cost to them of addressing global environmental objectives. Projects addressing climate change, biological diversity, sustainable management of international waters and ozone depletion are implemented by the World Bank, UNDP and UNEP. It has unrivalled experience in practical approaches to global environmental problems and a wide network of scientific advisers. Finance through the GEF has been substantial (about \$3 billion has been committed since 1991) but it is viewed rather suspiciously by developing countries, since disbursement has been slow. Some see it as driven by the North's environmental agenda, and although finance for the GEF was an additional commitment after Rio, it has been overshadowed, from the perspective of developing countries, by more general failures to make progress towards the 0.7% of GNP target for aid. The GEF also promotes the mainstreaming of the global environment into the programmes of other institutions. Negotiations for a third replenishment of it will commence in late 2000, with completion of the process expected in early 2002. A successful outcome to the replenishment is likely to be welcomed by developing countries and encourage more constructive North-South partnerships at Rio+10.

1 The Patancheru Story

"CPCB in consultation with State Pollution Control Boards, has identified critically polluted areas (22) in the country which need attention for control of pollution. PATANCHERU is one of them."

*Industrial Profile of Medak district:

Medak is a backward district with more than 80% of the population dependent on agriculture. There are 4 industrial estates and 8 industrial development areas. The Industrial Area at Patancheru with 5 phases is acclaimed to be a good industrial estate/area.

The district has 372 large and medium scale units with an investment of 4025.79 crores providing employment to 78,253 persons among which are BHEL, Ordnance factory, BDL, Nizam Sugars Ltd., Dr. Reddy's, Aurobindo Pharma, MRF, Mahindra and Mahindra etc.

Under Small scale sector 4536 units are in the district and important products manufactured by these SSI are paints, Granite stone cutting & polishing, welding electrodes/pharmaceuticals, locomotives, mosquito coils etc. The investment for unit in this sector is highest in the state as the small scale units in and around the state capital are intensive.

INDUSTRIES

Industrial Clusters in the district : Bulk Drugs and Pharmaceutical Industry in Patancheru, Bollaram & Khazipally areas, Mechanical industry in R.C.Puram & Patancheru.....

The population of medak district is 2269800 persons out of which 1152079 are Male and 1117721 female. (1991 Census)

According to 2001 Census, population of Patancheru mandal is 117214. Out which 60947 are Male and 56267 female. PROPOSED HEALTH SURVEY

Patancheru industrial development area is about 40 km away from Hyderabad, and is situated on Hyderabad-Bombay highway. About 320 industries manufacturing pesticides, chemicals, pharmaceutical products and steel are located in this area. A common effluent treatment plant (CETP) is installed by about 110 industries that bring the effluent in the tankers for treatment purpose. After treating these effluents, wastewater is discharged in a water stream called peddavagu which meets the main stream Nakkavagu flowing through patancheru area. The Nakkavagu finally meets the river manjira that is one of the main source of drinking water in the area.

Industrialization around Khazipally started around 1989. One of the reasons for establishing chemical and drug industries can be traced to the fact that bulk drug production was banned in United States around 1980. At this point of time most of the bulk drug industries shifted to third world countries.

Climate :

Semi-arid tropics, home to one-sixth of the world's population. Persistent drought, unpredictable weather, limited and erratic rainfall, and nutrient-poor soils are the farmer's challenges.

Impacts of Pollution

Pollution of water resources

Small village tanks are the primary source of irrigation in this district. These are used mostly for irrigation and drinking purposes. They also help in recharging the groundwater, thus maintaining the groundwater table and sustaining wells for livelihood. Predominantly people are dependent on agriculture, the very survival of the population here is dependent on the village tanks. Due to discharge of unregulated industrial effluents, the water quality of many of these tanks is degraded and loaded with toxic chemicals, resulting in acidification, increase in total dissolved solids, decrease in dissolved oxygen and decrease in biological diversity. These tanks have been converted into toxic ponds.

Change in the water quality due to industrial pollution has affected the survival of many sensitive aquatic species resulting in a significant reduction in bio-diversity in these ponds. It would be rather apt to describe the villagers as nothing but moving corpses.

Pollution of groundwater

The groundwater of the area has obviously been contaminated in and around the industrial estates. In addition to the pollution to moving water resources, infiltration from wastes dumped on the ground and seepage in some places has become a cocktail of toxins and is unfit for any use. The National Geological Research Institute (NGRI) conducted a study and found arsenic in abnormally high quantities, close to around 700 times above permissible levels. The toxic metals pollute surface and ground water, with their horizontal and vertical movements. In addition selenium, boron, manganese, chromium, nickel, cadmium and many other metals too were found at unusually high levels.

Contamination of Soil

Before the pollution of the moving water resources, villagers irrigated agricultural lands from these sources. They continued to use this source unknowingly even after alarming levels of pollution. This resulted in deposition of heavy metals in the soil. After getting the crops damaged, they tried to tap the groundwater which was also deposited with heavy metals. In this way a multitude of toxins have entered the food cycle as well. Some of the locals having given up agriculture have taken to sand mining and brick making. This has enhanced the of groundwater carrying heavy metals and increased the concentration of total dissolved solids.

Air Pollution

The industries principally responsible for the omnipresent polluted air over Patancheru are → Pesticide Units, Bulk Drug Industries, Particleboard Industries, Steel Rolling Industries, Common Effluent Treatment Plants & distilleries. Primary pollutants that have been identified in the air include Mercaptans, Particulate Matter, Chlorine and other bulk intermediaries, Hydrogen Sulphide.

Impact on Agriculture

Air and groundwater pollution have had a direct impact on crop yield and food cycle. High total dissolved solids and chemical intermediates degrade the soil characteristics. Yields have suffered due to the increase in salinity, loss of living structure of the soil complex and change of physical and chemical properties of the soil. Soil pollution with heavy metals and other toxins

extends into the food chain and has irreparable impacts on human health. Yields have significantly decreased in terms of quantity as well as quality. Results of socio-economic studies reveal drastic deterioration of economy and health.

Impact on Human Health

Mercaptans, found in the air cause nasal nerve damage, which usually acts as one's first defensive mechanism. Pesticides like organophosphorous compounds are absorbed through the skin and lungs. These reduce acetylcholine enzyme in the blood. Reduction of this in the blood can prove fatal, which in turn ties in with a disturbing trend in Patancheru - sudden unexplained deaths. Skin diseases and respiratory disorders like bronchitis and bronchial asthma, convulsions and brain tumors have been reported from here. Hydrogen sulphide, another common pollutant here causes pneumonitis. Increasing incidence of cancer, leukemia in young children, lung cancers amongst non-smokers and liver cancers amongst non-alcoholics have been reported. Indiscriminate dumping of toxic chemicals like lead, arsenic, nickel, chromium and other heavy metals, and pesticides (both organochlorines as well as organophosphates) has resulted in heavy metal poisoning. A survey conducted in 2001 revealed close to 700 people suffering from symptoms of toxicity from a sample space of around 3000 people. Preliminary Epidemiological studies which have been conducted since 1987 revealed a steep increase in morbidity rate, reaching as high as 88%, while the national morbidity rate hovers at around 10%. Young children have been reported to have extremely brittle bones.

Exposure Pathways include → Inhalation, Ingestion & dermal.

Major Toxins Present

Includes -

- ❖ Heavy Metals like selenium, Boron, Chromium, Nickel, Lead, Arsenic, cadmium and many more
- ❖ Organochlorines / Organophosphates
- ❖ Hydrogen Sulphide
- ❖ Particulate matter - primarily wood and iron.
- ❖ Chlorine and other bulk intermediaries.

Findings: LITERATURE SURVEY

The industries of the Patancheru and Bolaram area generate a cumulative 8×10^6 l/day of effluents which are being directly discharged on to surrounding land, irrigation fields, and surface water bodies which finally enter into the Nakkavagu River a tributary of the Manzira River: Present study on abundance and distribution pattern of toxic trace elements indicates the quantitative aspect of pollution in the Nakkavagu Basin. Migration patterns drawn for TDS, toxic elements indicate that pollutants discharged by the industries are entering the surface and groundwater system (aquifers) and are also migrating towards the Manzira River further deteriorating the entire hydrological setup of the area.

Contamination of soil due to heavy metals in the Patancheru industrial development area, Andhra Pradesh, India

Abstract. Industrialization and urbanization are the two main causes for the increasing contamination of heavy metals in soil. An environmental geochemical investigation was carried out in and around the Patancheru industrial development area of Andhra Pradesh to determine the extent of chemical pollution in the soil. The main objective of the study was to establish the spatial variability in heavy-metal enrichment and to assess the extent of contamination in the study area. The data reveal that soils in the area are significantly contaminated, showing two to three times higher levels of toxic elements than normal. Many heavy metals, such as Cr, V, Fe, As, Cd, Se, Ba, Zn, Sr, Mo and Cu, are present above the normal distribution in the soil. The heavy-metal loads of the soils in the study area are 240 mg/kg for Cr, 235 mg/kg for V, 1,350 mg/kg for Ba, 200 mg/kg for Cd, and 500 mg/kg for Cu. Most of the soils should be removed from agricultural production, and the area needs to be monitored regularly for heavy metal enrichment.

Government Study on Ground Water Pollution: In compliance with Supreme Court order.

Survey conducted on 27-6-1996

From the samples collected it was clearly established in the field that groundwater is not potable in 8 villages. Out of 16 villages in 11 villages groundwater is found to be polluted and pollution is attributed to industrial activity as discharge of Nakkavagu and Pamulavagu is coloured and odoured. The source of pollution to groundwater is industrial effluent which is let into the stream and affects groundwater body during rainy seasons mostly. On the whole the pollution areas fall within 100 to 500 mts either side of Nakkavagu and Pamulavagu streams. There is evidence in the field that the crop yields are reduced highly and some lands are abandoned from irrigation and cultivation.

Conservation and management plans for remediation KHAZIPALLY CHERUVU
Final Technical report , Jawaharlal Nehru technological university, Hyderabad.
January 1999.

Socio economic study due to pollution and damage in and around the water bodies:
According to the census data on population between 1981 and 1991 a growth rate of 1.5% in population is reported. In this period of 10 years the area of the land available for cultivation has come down from 240 acres to 80 acres a reduction of 66% mainly due to introduction and influence of industrial effluents into Khazipally lake.

Water:

The microbiological quality of waters,

Except for one water sample from the bore well, all the other samples showed contamination with fecal bacteria. The habits and practices of people may be the reason for this pollution.

The microbiological quality of soil nitrogen fixers and soil fertility:

The soil around the area is under the influence of pollution.

Analysis of surface and Groundwater samples, sediment and soil samples:

The lake water analysis shows that it is polluted with acidic non biodegradable organics from various chemical and pesticide factories.

Very unpleasant odour pervades the atmosphere and people got affected in different ways. Skin diseases, respiratory diseases and prenatal problems seem to have made their appearance since 1995.

Health :

Some of the general problems are listed below:

! Miscarriage & high mortality of children figure

! Loss of eye sight even at the age of 20+ years. (may be due to air pollutants from the environment)

! skin diseases of various types in all ages

! Pain at joints including weakness of bones in age group of 30+ years

! Indigestion and stomach upset and intestinal disorders etc.

! Vomiting

! Attaining baldness

The prime cause for the present state of alarming status is due to the presence of POPs which are a clan of synthetic toxic chemicals that cause serious and long term effects on livestock, human health & ecosystems. They have also been implicated in certain cancer of the skin, prostate & re-productivity defects viz., Infertility sex linked disorders, foetal malformation, neo behavioural impairment, immune system disfunction.

Ground water around Khazipally village:

Almost all the samples are around neutral pH. Very slight turbidity is present. In most of the samples chlorides are at the taste threshold. Hardness is also high in these water. Organic Pollution is evident bu higher COD values. None of the samples are free from bacterial contamination. The MPN values for all these is higher than 1500 / ml. These waters definitely cannot be used for domestic purposes.

STUDY OF GROUNDWATER POLLUTION IN PATANCHERU AND BOLARAM INDUSTRIAL DEVELOPMENT AREAS, MEDAK DIST. ANDHRA PRADESH

Sponsored by APPCB, Hyderabad

National Geophysical Research Institute, Hyderabad

December, 1998.

The Study area covers about 160 sq km. There are more than 400 big and small pharmaceutical and chemical industries.

Environmental geochemical studies wee carried out in patancheru and bolaram industrial development area.

Some of the observation of the toxic metals are :

1. The result shows that Arsenic concentration is very high in Peddavagu nala samples. High arsenic concentration are noted in some of the groundwater samples specially in the villages like Muthangi, Bandlaguda, patelgudem etc.

Wells in the villages are having arsenic concentration upto 700 ppb while the permissible limit by WHO is only 10 ppb.

The main source of arsenic was found to be CETP.

2. it was observed that Strontium values were as high as 3000 ppb in Bangalguda, Krishnareddypet, and Muthangi villages. High values are observed in surface as well as groundwater areas.
3. High concentrations of Barium are not very common in groundwater but in Patancheru area barium values are found to be in the range of 100-200 ppb which are very high in comparison to normal distribution of barium in water or soil samples.
4. Selenium is one of the most toxic metal and is normally nil in groundwater or surface water until and unless it is added by some industrial effluents. High concentration of selenium are observed in Muthangi, near Voltas chemicals, Krishnareddypet and patelgudem areas. This toxic meta may be released by some of the chemical or pharmaceutical industries in the study area.
5. Boron concentration in ground or surface water is normally found to be around 100 ppb but in the study area this element is present to the extent of 3000 to 4000 ppb in Muthangi, Pocharam area.
6. Manganese normally doesn't exceed 100 ppb in water samples but is found to be very high in Bandalguda area abd the values are in the range of 1500 ppb.
7. High concentration of nickel which is a known carcinogen were found in the range of 200-1000 ppb which is normal concentration should not be more than 50 ppb.
- 8.

- Residual pesticides show very high concentration in Nakkavagu water samples.
- Total BHC was found to be abnormally high i.e. 34869 ng/L in CETP nala, 1620 ng/L in Muthangi well water and 1450 ng/L in the nala originating near Voltas Chemicals.
- Aldrin was found to be 6950 ng/L in Pocharam open well.
- Total endosulphar was found to very high in nala water samples near voltas.
- High concentration of DDT and phenols were also observed in CETP nala water.

9. Studies of Soil samples also reveal high level of contamination due to anthropogenic sources of patancheru and bolaram industrial areas High chromium values of 100-200 ppm were observed in nakkavagu near chitkul village. High cadmium concentration were also observed in Nakkavagu water samples. NVery high cadmium values were found to be in Kazipally industrial area near bollaram.

10. Soil samples in Bolaram IDA show adistribution of arsenic in the range of 1 to 2 ppm which is much more than the normal distribution of less than 0.5 ppm in soil.

11. It is well established that the high concentration of toxic metals are dangerous to human life and causes many diseases which are called geochemical diseases. High concentration of arsenic causes lung cancer, skin cancer and nickel is a well known carcinogen and causes cancer. Lead is known to increase the blood pressure in human beings.

ELEMENT	AVERAGE ABUNDANCE	DISEASES CAUSED
As	0.2 ppm	CARCINOGEN, GASTROENTEERITIS, CARDIO VASCULAR
Cd	0.06 ppm	HYPERTENSION, KIDNEY STONE
Pb	10.00 ppm	ANEMIA, HYPERTENSION,NERVOUS SYSTEM
Ni	40.0 ppm	CARCINOGEN, RESPIRATORY, ASTHMA

Cr	50.0 ppm	CARCINOGEN, DERMATITIS, LUNG CANCER
Cu	20.0 ppm	RENAL DAMAGE, DEPRESSION, DIARRHOEA
Zn	50.0 ppm	ESSENTIAL ELEMENT, VOMITING, MUSCULAR COORDINATION

INVESTIGATION REPORT:

Environment pollution caused by patancheru and Bollaram industrial Estates in nearby villages of medak district in Andhra pradesh.

By : National Environmental Engineering Research Institute, Nagpur. October 1991.

A detailed survey has been carried out by NEERI in patancheru and Bollaram industrial Estates and in surrounding villages affected by pollution including the river quality of Manjeera after the confluence with Nakkavagu which is carrying wastewater from both the estates.

Observations:

- Wastewater is highly polluting and must be treated.
- Samudram an irrigation tank at Kistareddypet has been totally spoiled by industrial discharge into it and now it looks like stabilization pond.
- The analysis of the data reveals that the wells/bore wells and even Manjeera river waters have been contaminated.

HEALTH:

The incidence of disease and death has increased considerably. The data suggests that there is an increased rate of premature deaths.

NEERI Scientists were informed by the farmers of the affected villages that :

- Girls are not attaining puberty at proper age
- Married women are not conceiving
- Pregnant women are delivering still born children
- There is high rate of infant mortality
- Death of cattle wealth takes place after drinking/coming in contact with the high polluted wastewater.

A STUDY ON THE ENVIRONMENTAL POLLUTION AND ITS EFFECTS ON THE HEALTH STATUS OF PEOPLE AT SULTANPUR VILLAGE BY BEPT. OF COMMUNITY MEDICINE, OSMANIA MEDICAL COLLEGE, HYDERABAD. NOV. 2000

Sample: Total population of Sultanpur grampanchayat 382 households.

1/4th of the population available for medical examination. Blood samples from some individuals with suspected heavy metal poisoning were taken.

"2974 people examined and 690 people found to be suffering from symptoms of toxicity. DR. Rao in Hell of Earth".

RESULTS AND RECOMMENDATIONS OF THE STUDY:

1. The religious, demographic low economic low educational, inadequate housing, industrial employment, agricultural works in the fields in Sultanpur village predispose them to the ill health.
2. The morbidity due to heavy metal depositions in the various tissues of the body has manifested in the hairs, skin, nails, nervous system, GIT, Urinary system, cardiovascular and locomotor systems and the visual changes in the eyes and also the physical growth retardation of the children, supported by lab investigations for blood samples for various toxic heavy metals indicates the need to have a surveillance center for industrial pollution and its effects at Rural Health Centre, Patancheru for which WHO can be consulted.
3. There is a need to monitor the health status of the people who are at constant threat of industrial pollution by periodical health surveys and lab investigations to establish the relationship between the pollution and the effects observed.

ASSESSMENT OF ENVIRONMENTAL HEALTH RISK DUE TO INORGANIC ARSENIC IN THE INDUSTRIALLY CONTAMINATED AREAS OF HYDERABAD.

BY Analytical Chemistry and Environment Sciences Division, Indian Institute of Chemical Technology and Yashodhara Hospital, Patancheru

SAMPLES:

Samples were collected from residents if the length of their residence in that locality was more than five years only.

Urine and blood samples were collected from 193 people of various age groups.

Samples of blood, urine, hair and nails from people residing in areas free from industrial pollution and from the authors served as controls.

Environment exposure of inorganic arsenic to humans was assessed by collecting samples from the residents of the industrially contaminated area, Patancheru. Arsenic levels in the clinical samples like blood, urine, hair and nails was measured by means of ICP-MS.

The main source of arsenic exposure is found to be the contaminated waters (ground and surface) and also through the consumption of arsenic contaminated vegetables grown on contaminated soils.

Concentration of arsenic in clinical samples clearly shows that there is a possible association of arsenic in blood, urine, hair and nail with age, sex and with concentration of arsenic in soil, water and vegetables.

STATUS HEALTH REPORT ON HEALTH PROBLEMS AND REMEDIAL MEASURES TAKEN AT PATANCHERU AREA.

FROM Dr. G. Nagaiah
to The additional advocate general, high court
Osmania medical college

Morbidity survey, 1998.

SAMPLE:

The sample study was conducted in 14 villages. The unit of the sampling used was household.

10% of the households in each village were selected by stratified random sampling method.

The study team came out with the report which showed 25.49% of General sickness rate, the report also showed more morbidity was due to orthopedic problems. The cause for diseases was to be established.

Remarks of Chief Investigator.

The report of the sample study in oct 1998 was showing quantitative values of the health problems. The study was lacking specificity of cause effectiveness.

FINDINGS/OBSERVATIONS

- Morbidity rate in this area showing increasing number trend which is evident from past rate of 10.18% in 1991 oct. to present ratio of 25.49%
- In all the types of the diseases, the female population is experiencing higher morbidity.

EUROPE AND INDIA PAST, PRESENT AND FUTURE BY Austrian Research Centre Seibersdorf. March 2001.

Status of water contamination sources

- Effluents of the IDAs are discharged partly untreated into the streams, underground and ponds
- The effluents containing appreciable amounts of inorganic and organic chemicals and their bye-products.

Main Identity

From: "Ruchita Khurana" <ruchita@toxicslink.org>
To: "Jayakumar" <thanal@md4.vsnl.net.in>; <tarumitra@vsnl.com>; <econet@axess.com>; <janvikas@axess.com>; "PSS" <pss@narmada.net.in>; <ics@bnpl.com>; <okaanet@yahoo.co.uk>; <sarangi_rk@rediffmail.com>
Cc: <kannhere@hotmail.com>; <sochara@vsnl.com>; "dudani" <atd@mantraonline.com>; <pravah@ndt.vsnl.net.in>; <waste@operamail.com>; <sctripathi@rediffmail.com>; <callshiv@hotmail.com>; <ceesouth@vsnl.com>
Sent: Monday, October 13, 2003 11:50 AM
Subject: Can Zero Waste Be Delhi's Reality - INVITATION to a panel discussion on October 15, 2003

Toxics Link**Environment and Health Public Lecture Series**

'Zero Waste' is a concept that attempts to initiate action to eliminate waste per se. Seemingly theoretical, it however lays down a sustainable framework for a series of policies and actions, which aim at diverting waste from landfills, recycling and reuse, and better product design which minimizes waste. This needs not only citizen's participation but also taking responsibility by industry, an enabling policy by the government and investment in areas such as recycling. Are we then seeing the emergence of such thinking through the actions of the Delhi Municipality?

Since urban India generates over 38 million tonnes of urban solid waste per year and urban local bodies spend about Rs. 500 to Rs. 1500 per tonne on solid waste for collection, transportation, treatment and disposal, clearly this is a key urban environmental issue. Moreover, landfill sites have been exhausted and newly emerging townships do not even have a plan.

Even the Supreme Court, has joined issue while provisions in the new Municipal Solid Waste (Management & Handling) Rules 2000, need to be implemented by 31st of December, 2003. These rules aim at creating zero waste cities in our country by active participation of Municipality; Community based organizations; NGOs and citizens, however fall short of recommending action upstream such as in recycling and industry responsibility.

To discuss the feasibility of this attempt to create zero waste cities and in an attempt to bring better clarity to the issue from the perspective of a state like Delhi, we invite you to a panel discussion on:

"CAN ZERO WASTE BE DELHI'S REALITY?"**Panellists:**

Mr. Rakesh Mehta, Commissioner, Municipal Corporation Of Delhi.
 Dr. R.C. Trivedi, Additional Director, Central Pollution Control Board, New Delhi.
 Dr. Iqbal Malik, Founder-Director, Vatavaran.

Moderated by Mr. Ravi Agarwal, Director, 'Toxics Link'.

Venue: Conference Room 1, India International Center, Lodhi Road, New Delhi

Date: Wednesday, 15th October 2003, Time: 6:30 p.m.

(In collaboration with India International Center)

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