

REPORT
on
CONSERVATION OF WATER RESOURCES
and
CONTROL OF WATER POLLUTION



COMMITTEE ON PLAN PROJECTS
(BUILDINGS PROJECTS TEAM)
NEW DELHI

June, 1963

COPP/PWB/Ser.18/63

REPORT
ON
CONSERVATION OF WATER RESOURCES
AND
CONTROL OF WATER POLLUTION

COMMITTEE ON PLAN PROJECTS
(Buildings Projects Team)
New Delhi.

(June, 1963)

Composition of the Buildings Projects Team

Leader

Shri S.K. Patil, Minister for Food and Agriculture.

Members

Shri Sarup Singh, I.S.E. (Retd.), formerly Director,
National Buildings Organisation.

Shri N.G. Dewan, I.S.E., Chief Engineer, Central
Public Works Department.

Maj. Genl. Harkirat Singh, Engineer-in-Chief, Army
Head Quarters.

Shri N.V. Modak, Consulting Public Health Engineer,
Bombay.

Shri C.B. Patel, Director, National Buildings
Organisation (ex-officio).

Member Secretary

Shri T.S. Vedagiri, Superintending Engineer.

Deputy Secretary

Shri P.S. Krishnaswamy, Superintending Engineer.

REPORT ON CONSERVATION OF WATER
RESOURCES AND CONTROL OF WATER POLLUTION

.....

CONTENTS

	Page
Introduction	1
1. Conservation of water resources.	7
2. Control of water pollution.	16
Appendix	
I. List of places visited and persons with whom the panel had discussions.	39

INTRODUCTION

O.1 The Panel set up by the Committee on Plan Projects for the study of National Water Supply and Sanitation Schemes pinpointed attention to the need for coordinated action in regard to the conservation of water resources and control of water pollution.

During the discussions the Panel had with the Planning Commission and the Central Ministry of Health, it was decided that this subject could be taken up by the Panel itself for further study and report. To facilitate a detailed study of the problems three more Members, Dr. ^{S.} Seshagiri Rao, Dr. T.R. Bhaskaran and Shri ^{V.} Subramanyam were added to the Panel.

O.2 The composition of the Panel as expanded is given below:

Shri N.V. Modak, Consulting Public Health Engineer, Bombay.	Chairman
---	----------

Shri P.C. Bose, Executive Director and Chief Engineer, Calcutta Metropolitan Planning Organisation, Calcutta.	Member
---	--------

Shri R.D. Varma, Member, Oil and Natural Gas Commission, Dehra Dun.	Member
--	--------

Shri S. Rajagopalan, Asst. Director General, Ministry of Health, New Delhi.	Member
--	--------

Dr. S. Seshagiri Rau, Member
Chief (Health),
Planning Commission,
New Delhi.

Dr. A.R. Bhaskaran, Member
Coordinating Officer, ICMR,
All-India Institute of Hygiene and
Public Health,
Calcutta.

Shri V. Subramanyam, Member
Superintending Geologist,
Geological Survey of India,
Hyderabad.

Shri T.S. Vedagiri, Member-
Buildings Projects Team, Secretary
Committee on Plan Projects,
New Delhi.

0.3 . Any positive programme for conservation of water resources in the country must follow an intelligent field survey for the exploration and examination of all available resources like minor and major river basins, lakes and tanks and under-ground sources and an assessment of the needs of the various interest, such as, irrigation, agriculture, navigation, pisciculture, industrial and domestic water supply, recreation etc. Based on such an overall study of the problem the relative priorities for the different uses could be decided on a realistic basis which alone would ensure the success of the programme. Any piecemeal study of the problem, on the other hand, would not only result in duplication of time and effort but also result in a clash of interest between the different users and an inequitable sharing of the available resources. This would adversely affect the balanced and planned development

of the country's economy.

0.4 Although there is now an increasing awareness of the need for a programme of water resources conservation, a systematic approach to the problem is yet to be made. Water conservation studies hitherto were mostly confined to theoretical assessment of river valley potentials based on topo-sheets. Positive river gaugings have been taken in respect of the major projects so far executed but these have not covered the entire river basins. The Geological Survey of India and the Exploratory Tubewell Organisation have collected useful data on ground water in respect of the areas so far covered by them.

0.5 Very few of the country's rivers are carrying perennial surface flow. All the same, a large volume of water goes into the sea unutilised during the monsoon months. Sub-surface supplies in the river valleys during the dry months are mostly precarious. This variation between the two extremes acts as a great handicap to the prosperous growth of communities or industries in the river valleys at present. Conservation of available supplies in these river basins in order to meet the needs of the industries and communities uniformly throughout the year is a nation wide problem of great magnitude and importance.

0.6 While the country's water resources are yet to be fully harnessed the situation with regard to available supply is aggravated by an increasing degree of pollution in almost all the river courses. With the rapid industrialization, growing urbanization and increase in population in many parts of the country there is an indiscriminate discharge of untreated or inadequately treated community and industrial wastes into the water courses. Communities and industries have to spend more in treating polluted waters to make them fit for their use. Public health is also endangered. Fish and other aquatic life are also affected.

0.7 The problems of water resources conservation and pollution control (both of surface water and ground water) have assumed a disturbing magnitude in the industrially advanced countries because of lack of adequate control in the initial stages. It is necessary for us to benefit by the experience of other countries and start taking preventive and control measures in time.

0.8. The nature and magnitude of the problem calls for an extensive field survey and analytical study of the data on a comprehensive basis before any fruitful programme of action could be formulated for implementation in the coming years. It is encouraging that the Natural Resources Committee of the Planning Commission have already under contemplation the setting up of a working group to study water resources conservation on a country wide basis.

In regard to water pollution control, the Union Ministry of Health had already set up a three man Committee to prepare a draft enactment for water pollution control at the Central and State levels. This Committee has submitted its report recently. In these circumstances, the Panel has confined itself to a critical analysis of the present situation both in regard to water resources conservation and water pollution control so as to indicate the broad lines of action which need to be pursued vigorously to achieve the objectives in view. A questionnaire was issued to local authorities and industries all over India to elicit information in regard to quality and quantity of effluents and the extent of incidence of stream pollution in the concerned areas. Sample studies were made in selected industrial areas in West Bengal, Bihar, Bombay and Delhi. The Panel also visited a few industrial units and held discussions with local officers. A list of places visited and officers with whom discussions were held is given in Appendix I.

0.9 In the accompanying report the Panel has dealt with the more important issues bearing on conservation of water resources and on control of water pollution under two separate sections and hopes that the report would help in initiating

0.6 While the country's water resources are yet to be fully harnessed the situation with regard to available supply is aggravated by an increasing degree of pollution in almost all the river courses. With the rapid industrialization, growing urbanization and increase in population in many parts of the country there is an indiscriminate discharge of untreated or inadequately treated community and industrial wastes into the water courses. Communities and industries have to spend more in treating polluted waters to make them fit for their use. Public health is also endangered. Fish and other aquatic life are also affected.

0.7 The problems of water resources conservation and pollution control (both of surface water and ground water) have assumed a disturbing magnitude in the industrially advanced countries because of lack of adequate control in the initial stages. It is necessary for us to benefit by the experience of other countries and start taking preventive and control measures in time.

0.8. The nature and magnitude of the problem calls for an extensive field survey and analytical study of the data on a comprehensive basis before any fruitful programme of action could be formulated for implementation in the coming years. It is encouraging that the Natural Resources Committee of the Planning Commission have already under contemplation the setting up of a working group to study water resources conservation on a country wide basis.

In regard to water pollution control, the Union Ministry of Health had already set up a three man Committee to prepare a draft enactment for water pollution control at the Central and State levels. This Committee has submitted its report recently. In these circumstances, the Panel has confined itself to a critical analysis of the present situation both in regard to water resources conservation and water pollution control so as to indicate the broad lines of action which need to be pursued vigorously to achieve the objectives in view. A questionnaire was issued to local authorities and industries all over India to elicit information in regard to quality and quantity of effluents and the extent of incidence of stream pollution in the concerned areas. Sample studies were made in selected industrial areas in West Bengal, Bihar, Bombay and Delhi. The Panel also visited a few industrial units and held discussions with local officers. A list of places visited and officers with whom discussions were held is given in Appendix I.

0.9 In the accompanying report the Panel has dealt with the more important issues bearing on conservation of water resources and on control of water pollution under two separate sections and hopes that the report would help in initiating

necessary action by the appropriate agencies to gain the objectives in view.

O.10 The Panel is grateful to the authorities at the Centre and the States and of the Industries who were good enough to furnish the information required and for the facilities offered to the Panel for local visits and discussions.

1. CONSERVATION OF WATER RESOURCES

1.1 As a resource, water is a requirement so basic and indispensable to a country's existence and economy that the use of all other resources is depended upon an adequate and satisfactory supply of water. If this is lacking, the use and development of other resources become difficult.

1.2 A broad survey of the present situation regarding water resources in the country would be of interest. The surface water resources of our country have been estimated at about 1356 million acre feet. Almost the entire quantity is derived from precipitation. There is a considerable variation in the available surface water resources in different parts of the country depending on the varying precipitation from place to place. Of the total 1356 million acre feet of surface water, it has been estimated that only about 1/3rd or roughly 450 million acre feet would be available for beneficial purposes, the other 2/3rd not being available due to various physiographic, geological and climatic factors.

1.3 It has been estimated that only about 27 per cent of the useable flow or 8.9 per cent of the total annual flow has been utilized upto the end of 1961. It is reported that roughly 70 million acres have been brought under irrigation from major, medium

and minor projects so far and it is expected that the overall ultimate irrigation potentialities from further irrigation projects would bring in an additional 100 million acres under irrigation. Even after completing all potential irrigation projects, a large quantity of water out of the computed useable flow would remain unused. There is, therefore, considerable scope for harnessing available water which will remain unutilised. For this to be possible, it may be necessary to make radical innovations in the concept of irrigation projects and to reorient our ideas with regard to conservation of water. Combined utility projects to serve all common interest may have to be thought of transcending the normal barriers of the State, individual river basins and the like. Multiple dams along river basins should also be thought of to suit locations of industries and community groups under a master plan drawn up for this purpose.

1.4 Apart from surface water, ground water constitutes another major sources. The occurrence of ground water in different parts of the country is conditioned not only by the local precipitations of rainfall but also by the geological formations, which show a wide variation between different areas of the country. Adequate ground water can generally

be tapped for irrigation or other large scale uses from the alluvial or sedimentary (Tertiary or Gondwana) terrains through tubewells. Water occurs in limited quantities in the pre-cambrian crystalline or sedimentary or Deccan trap terrains and is developed for industrial and community needs by means of shallow or deep wells. Ground water occurs in varying quantities in the Himalayan terrains as well as where different types of rocks are met with.

1.5 It has to be stated that with regard to the study of ground water resources, we are just at the beginning stages. For the past few years, the geological survey of India has been advising on local ground water problems and carrying out regional ground water surveys in specified areas on request. Large parts of the country have been geologically mapped and general data on the occurrence of ground water in different terrains of the country have been gathered. But the potentialities of our ground water reservoirs are yet to be fully explored. In recent years the Exploratory Tubewell Organisation of the Central Government has helped in exploiting ground water resources in specific areas for minor irrigation.

1.6 Even in regard to areas where we have data on the ground water potentials, sufficient material is always not available to forecast the qualitative aspect of the water available in such areas. Over large tracts of the country particularly in Central India the development of ground water is still a speculative venture. A sustained programme to explore the ground water resources in all parts of the country should therefore be undertaken in order to prepare a comprehensive ground water map of the country indicating the areas of meagre, medium and plentiful ground water resources and the quality of supply so available. Regions of meagre ground water potentials could be exploited to provide the much needed community water supply system, in these areas. Regions of medium potentials could be utilised to serve the dual purpose of community and industrial water supplies as well as minor irrigation works to the extent local resources permit; while the areas of plentiful ground water storage could be exploited so as to supplement surface water resources for irrigation and other major uses. In any case, the exploitation of ground water resources in the country should receive high priority and sustained attention as part of a well planned scheme of conservation of visible and hidden water resources of the country.

1.7 With the progress of industrialization, raising of living standards and increased demand of water by all the users, "water resources" have become a grave concern in the more advanced countries of the world. As a result, they are taking measures to make a complete and correct inventory of available resources and to ensure at the same time economy in water use. Rigorous economy measures for control of water pollution are also being taken.

1.8 We have now reached a stage where advance planning is necessary to avoid the misuse and non-use of available water resources. Not only we suffer from inadequacy of data in this behalf; but there is also a singular lack of coordination amongst the agencies which execute independent projects for irrigation, for industries and for community needs both urban and rural. Most often, the needs of irrigation claim exclusive attention while those of domestic and industrial water supply are relegated to the back ground. The isolated execution of projects for these separate needs by independent agencies most often results in investments out of proportion to the capacity of the constituent bodies particularly in regard to domestic and industrial water supplies. In cases where certain rights are already established,

the diversion of even a small quantity of water from such sources to meet the drinking water needs of nearby communities is often resented. Community water supplies have been delayed for long periods on this score. Likewise, when large scale industries are set up either in the public or private sectors, the provision of water supply is most often restricted to the population related to the industry even if large communities in the neighbourhood are in need of such supplies for a long period.

1.9 The Panel, therefore, feels that a comprehensive programme for conservation of water resources in the country should be formulated on the following lines.

- 1) All existing and potential river basins in the country must be surveyed in detail to find out how best and to what extent they could be developed. River gaugings at crucial points should be arranged over a representative period to draw correct conclusions on the surface water potentiality of such basins.

- 2) An assessment of the water requirement of all existing and prospective uses in the region should also be simultaneously made.

- 3) Information should also be collected on the capacity of surface waters to assimilate discharge of man made waste at different points

and during different seasons of the year.

4) All methods of conserving surface water to the maximum by daming up rivers at suitable points and by forming lakes should be investigated. The possibilities of locating diverse industries in the river basin to effectively utilise the water so conserved should be examined.

1.10 This work could be taken up by a special organisation under the CWPC who will pursue their field activities in close collaboration with the State Departments concerned with water utilisation and urban and industrial development.

The programme of field work may be divided into two broad stages, the first stage to include major and important river basins, where river gaugings and similar data are already available, so that the potentialities of these sources could be evaluated and made use of in preparing projects in the ensuing plan periods. The second stage may include all the minor rivers and other water resources, in respect of which data may have to be collected over a period of years before their potentialities could be gauged on a correct basis. Schemes for utilisation of the resources figuring under the second stage could be taken up under a long term plan.

1.11 The assessment of the groundwater resources of the country should continue to be undertaken by the

Groundwater Divisions of the Geological Survey of India (aided by drilling wherever necessary for which they may be equipped). The engineering, industrial and other departments of the States and the centre should collaborate with the Groundwater Divisions of the Geological Survey of India in the different regions (namely, Calcutta, Lucknow and Hyderabad) so that the interests of all users of groundwater may be kept in view and the appraisal of the groundwater resources in different areas could be based on the total programme for the common benefit of all users in the area. Co-ordinated programmes of research should be carried out by all concerned Departments on soil, evaporation and transpiration, as the data gathered, together with the data gathered by the Groundwater Divisions of the Geological Survey of India, would help evaluate the quantity of groundwater that could be salvaged and conserved.

Special emphasis should be placed on collecting analytical data on the quantity and quality aspects of the ground water available from the areas explored together with details of the geological formations so that the technique of developing a supply from such sources and the treatment measures required could all be designed suitably for each case.

The exploration of ground water resources can also be divided into two stages, as in the case of surface water resources. The first stage will include the alluvial and sedimentary terrains, which are by far the most important from the point of plentiful ground water resources. The other areas can be taken under the second stage.

1.12 Both in the case of ground and surface water exploration, survey, the services of competent engineers, ground watergeologists, meteriologists, soil specialists and water analysts should be utilised so as to make the data collected fully comprehensive, realistic and useful.

1.13 It is desirable that the data pertaining to the first stage of the survey works in regard to surface and ground water resources as well as a preliminary forecast of potentialities of the areas figuring under the second stage is made available by the CWPC and the Geological Survey of India within the course of the next five years. With the data thus collected, a special ~~agency~~ may be set up at the Centre and at the State levels for an integrated study of all the material available and for the formulation of a master plan for the country's water utilization.

2. CONTROL OF WATER POLLUTION

2.1 It has been mentioned in the Introduction that a three man Committee appointed by the Union Health Ministry to prepare a draft enactment for water pollution control has already submitted its report. That Committee was composed of the Chairman of this Panel and two of its other Members, Shri S. Rajagopalan and Dr. T.R. Bhaskaran. The other Members of this Panel have since taken the opportunity to study the report of that Committee.

2.2 The Introduction to the draft enactment as prepared by that Committee deals with the subject of water pollution control in a comprehensive manner. It contains survey of the present situation in regard to water pollution in the country and a comparative analysis of the incidence of water pollution and the control measures pursued by other countries. The existing legal provisions have been examined and the pattern of the suggested enactment has been indicated. The organizational, administrative and financial implications of setting up of the control agencies both at the Central and State levels to implement a country wide programme of water pollution control have been discussed. The second part of the Committee's report deals with the draft enactment suggested for the purpose.

2.3 In view of the close inter-relationship

between the water pollution control and water resources conservation and in the light of what has already been stated in Section I of this report, the Panel feels that it cannot do better than to incorporate in this section the introductory portion of the report as submitted by the three man Committee referred to above. It would facilitate a complete understanding of the subject in the entire field of water resources conservation and a better appreciation of the reforms called for in both the spheres.

2.4 The introductory part of the report by the three man Committee would presumably be utilised by the Union Ministry of Health for preparing a short preamble to the legislation to be brought out to control water pollution in the country. The report the Panel is now presenting has been prepared at the instance of the Union Health Ministry. The reproduction of the introductory part of the report submitted earlier to the Health Ministry as Section II of this report by the Panel would serve a dual purpose; it would serve to disseminate information on the important subject of water pollution and its control to a wider field of the public and also help in gaining public support for the administrative and legal reforms which will necessarily have to be introduced in the coming years. It would in addition present a complete picture of the situation to the Planning Commission. The relevant material in regard to water pollution control is accordingly reproduced below.

2.5 Importance of water resources.

For the developmental plans and National building activities of a country its natural water resources form a primary asset. Their uses are manifold; for developing domestic water supplies for communities, for bathing and recreation, for irrigation and agriculture, for industrial purposes, for fisheries, for navigation and for power development. The same water resources have to receive the waste discharges from communities, industries and agricultural lands to find repeated use for similar purposes all along their courses. In the interests of the country's prosperity, therefore it is essential to maintain its water resources unimpaired.

2.6 Water pollution as a problem.

Community wastes in the shape of sewage or sullage contain putrescible organic matter and pathogenic organisms which cause cholera, typhoid and other gastro-intestinal diseases. Industrial wastes contain both mineral and organic substances including acids, alkalies, salts, oils and grease and a variety of poisonous substances. With the rapid industrialisation of the country such wastes would also include radioactive materials which are highly toxic to human, animal and plant life. In recent years the increasing use of insecticides and pesticides for agricultural

purposes would charge the drainage from such lands with these poisonous materials. When a body of natural water receives such untreated wastes from a community, industry or agricultural land, it adds so much pollutional load to the water causing deterioration in the physical, chemical, biological and bacteriological quality of the entire body of water. When such pollution occurs successively at several points in repeated stretches of the water courses, the cumulative pollution to the body of water renders it less and less useful for any and each of the several purposes for which it is intended to be used. Eventually, such a state of affairs might tend to stifle the country's developmental activities which such natural water resources are intended to help. Water pollution therefore can become a serious problem unless measures are taken to prevent it in time.

2.7 Importance of Water Pollution Control.

The ill effects of the pollution of water courses by wastes are many and far reaching. It endangers the very health of the nation. Water pollution by sewage is largely responsible for the high incidence of gastro-intestinal diseases prevailing in the country. Poisonous substances discharged

through industrial wastes make the water dangerous to human beings, animals and plants. Excessive pollution renders the water unsuitable for reuse as a source for community water supply as the cost of purification of such waters may be prohibitive. Pollution also renders the water environment unsuitable for fish culture. In consequence the much needed commercial supply of fish which is an important factor in maintaining the level of nutrition of the population is adversely affected. The putrescible material present in the waste also creates obnoxious conditions and spoils the aesthetics of the environment in which we live.

Apart from damaging the health of the Nation, water pollution renders the water less useful for irrigation and industrial purposes and for power development. The wastes have a deleterious effect on structures like bridges and dams and on moving boats, and makes navigation unpleasant and irksome. Water pollution also reduces the value of property adjoining polluted water courses.

In recent years the rate of industrialization has been very rapid. The treatment of industrial wastes as and when new industries sprang up has been absent or haphazard. Urbanization of the communities has been equally rapid, but the provision of community water supplies

and sewerage facilities have not kept pace with the needs. As a result, community wastes and industrial wastes have been allowed to flow into the country's natural water resources, increasing the pollutional load on them without any check or control. The reuse of such polluted waters for new community water supplies and new industries is creating more and more problems. This growing deterioration of our natural water resources should be stopped before the problem should overwhelm us by its extent and magnitude. A water pollution control programme for the country can brook no further postponement.

2.8 Experience in other countries.

Due to their failure to take note of this problem in time, many of the advanced countries are now facing avoidable difficulties in regard to the pollution of their water resources. During the early stages of rapid industrialization, these countries developed industries and townships along river valleys and allowed the industrial and community waters into the same water courses without proper treatment. In consequence the waters in these industrial regions became heavily polluted and the cost of 'curing' the pollution is proving to be prohibitive. As a result of such bitter experience those countries have initiated a vigorous programme of

water pollution control, somewhat belatedly. There is no reason why India cannot benefit by the experience of such countries by forestalling the problem.

A review of the recent trends in the water pollution control programmes now in operation in the more important countries would be useful in planning a suitable programme for India.

In the U.S.A. the Federal Water Pollution Control Act of 1948 as amended in 1956 provides for nation wide pollution control activities under the United States Public Health service. The Act recognises State responsibility for control of pollution and envisages Federal action for providing coordination, technical and financial assistance to States, in all activities designed to make the State programme more effective in all phases. The pollution control programme is carried out primarily by the State Water Pollution Control Boards, which are autonomous bodies with adequate statutory powers, having technical organisations to carry out investigations and research on water pollution problems.

In the U.K. the control programme is carried out by a number of river boards set up by Ministerial order under the River Boards Act, England (1948) and covers all the river basins in the country. These river boards have adequate statutory powers for

making bye-laws and standards applicable to the reaches of the rivers in the region and for enforcing them. Proper control of effluents entering into the water courses in the basin is ensured by adopting what is known as the 'consent procedure' whereby the consent of the Board has to be obtained for every outlet and discharge of waste waters. There is also a River Board Association in which matters of common interest to different river boards are discussed.

∠ there are, In Germany, ∠ River Basin Authorities which are somewhat similar to the River Boards of U.K. control Water Pollution. These authorities exercise the dual role of enforcing the pollution control measures and also treating the wastes before they are discharged into the rivers. They also exercise an overall control on the quantity and quality of water flowing through the basin. The Federal Law of Germany provides for a uniform basis in respect of water pollution control activities by different authorities and also in regard to the organisation of the river basin authorities.

In the U.S.S.R. Water pollution control is an integral part of the water utilisation plan and the State lays down the principles of utilisation and protection of the water resources.

In 1960, the State Public Health Inspectorate of the USSR approved instructions regarding the protection of water-courses and lakes into which waste waters containing a combination of harmful substances are discharged. In conformity with these instructions, the maximum permissible amount is determined for each such substance, the approved norm being reduced by whatever amount of harmful substances with their own maximum index is to be discharged with waste waters or is contained in the water of the watercourse or lake.

A special commission of the State Public Health Inspectorate of the USSR, in collaboration with the fishery authorities and with sanitation experts, has prepared new draft rules for the protection of waters against pollution by waste. These rules are a comprehensive document, comprising requirements for the prevention of the pollution of waters used for household and drinking-water supplies, for cultural and welfare amenities and also for the fishing industry. A number of provisions included in the draft rules impose stricter requirements concerning the discharge of waste into waters. This has been made necessary by the unfavourable conditions now prevailing in many waters within the Soviet Union.

With the growth of the national economy, the protection of waters in the USSR is assuming ever greater importance, affecting the economic interests

of the country to a large extent.

The most recent measure of the USSR Government, focusing attention on the need for a serious intensification of efforts to protect the country's water resources from pollution, contamination and depletion, is the decree issued in 1960 by the Council of Ministers of the USSR concerning measures to regulate the use and intensify the protection of water resources.

This decree lays down basic rules for the solution of problems relating to water-pollution control. It sets up special authorities responsible for the use and protection of water resources, with inspectorates for the main river basins; it calls upon economic and Soviet organs and the Soviet public in general to comply with the regulations for the protection of water resources; and it again confirms the obligation of the State health authorities to prepare and publish requirements and rules on the basis of which waste can be discharged into waters without danger to public health.

The organs responsible for the use and protection of water resources, subordinate to the Councils of Ministers of the Union Republics, regulate and coordinate the use and protection of water resources in the republics; they supervise, on behalf of the State, the rational utilization of water resources by enterprises and ensure that

enterprises comply with the water-pollution control regulations. These organs have powers to shut down any enterprise which does not take action to ensure that waste waters are treated and rendered harmless.

The organs responsible for the use and protection of water resources work in consultation with public-health, shipping, fishery, municipal and agricultural organs, always giving priority to the use of water for household purposes and as a source of public drinking-water supply.

In October 1960 the Supreme Soviet of the USSR enacted a law on the protection of natural resources in the RSFSR, in which the protection of water resources, which occupies a prominent place, is made obligatory; it provides basic rules and directives for measures designed for such protection and assigns responsibility for the implementation of these measures.

Similar legislation for the protection of natural resources has been enacted in almost all the Union republics of the USSR.

2.9 A Survey of the present situation in the Country.

Before Independence, the number of community water supplies was limited; sewer systems were far less in number. The industrial growth was at a snails' pace and the few industries which grew up were sparsely distributed. Water pollution was not therefore posing a serious problem then. In the post independence period however there has been a phenomenal growth and concentration of industries, as well as of urban communities.

An increasing number of water supplies are also under implementation. The provision of sewerage systems and sewage treatment plants has not however kept pace with the development of water supplies. So much so an increasing amount of untreated sullage is polluting the water sources. Likewise, while industrial expansion received an impetus, the treatment of industrial wastes invariably went by default, and such wastes found entry into the nearest water-courses. There was also a general lack of awareness of the cause and effect of water pollution and its impact on the country's progress.

As a result, any comprehensive survey of pollution of rivers has not been attempted yet on a nation wide basis. Because of the growing nature of the problem, a beginning was made in this direction during the last decade and individual surveys of crucial reaches of a number of rivers in the U.P., Bihar and West Bengal States were carried out by the All India Institute of Hygiene and Public Health, Calcutta. The data collected serve to pin point the nature, extent and magnitude of the water pollution problem in the country. The results of the survey show that while there is an appreciable pollution in restricted reaches of even the big rivers such as Ganges, Brahmaputra, Godavari, Krishna and Hooghly, many small rivers such as Gomti in Lucknow region, the Eastern Jumna Canal, Kali, Krishna, Hindon, Kitcha, Gon and Suraya in Uttar Pradesh,

Sone, Doha and Damodar in Bihar and West Bengal States are heavily and extensively polluted by domestic sewage and industrial effluents from sugar factories, distilleries, rice mills, tanneries and coal washeries. Paper and board wastes in Madhya Pradesh and Orissa are contributing to large scale water pollution. Sabarmati in Gujrat State is heavily polluted by the discharge of sewage and textile mill effluents from the city of Ahmedabad. Instances of serious river pollution from industrial wastes are on the increase all over the country. The effect of all this is an increasing damage to the country's economy in several directions. Fish supplies from these rivers are suffering gradual diminution. New water treatment plants have to incur increased costs on treating the polluted waters from these rivers. The pollution from the coal washeries and the thermal plant in Bihar State are instances on point. The polluted waters have also become less useful for bathing and recreational purposes. Added to all this is the ever present danger of sporadic outbursts of water borne diseases amongst rural communities who may resort to these polluted river waters for their domestic needs. It is not surprising therefore that there is now a growing popular demand for the systematic abatement of water pollution all over the country.

Existing legal provisions.

2.10 Legislation in regard to water pollution has been of recent origin even in the more advanced

countries. In India no specific legal measures in this respect have so far been initiated. We have only the general provisions contained in the Indian Penal Code, Criminal procedure code and the State and local Acts against 'public nuisance'. Some sections of the Penal Code, Criminal procedure code and State and local public health Acts, particularly in Madras and Bengal, provide police powers against 'Public nuisance' and 'fouling of waters' arising out of community and trade wastes. These provisions have not been helpful in instituting measures against water pollution because it is difficult to define these terms specifically and establish guilt or even default. Moreover, these provisions are primarily of a penal nature and are not useful in preventing pollution.

The Indian Factories Act (Rule 18) confers some legal powers to the State Inspectorates of Factories for ensuring proper treatment of industrial effluents before disposal and thereby preventing pollution of water by industrial wastes. However, such powers have not proved useful in preventing water pollution in the absence of a professional agency to assess, guide and advise on the treatment measures needed in each case.

In 1953, the Government of India appointed a Committee to draw up a comprehensive Model Public Health Act. The draft as prepared by this Committee, includes some measures which local authorities may

adopt for the conservation and protection of water sources and the prevention of pollution of streams and lakes. The Appendix to the draft report, includes details regarding the methods of treatment of different types of industrial wastes and indicates certain broad principles relating to stream pollution which may be incorporated by the local or State Authorities in their Public Health Act. Many of the States are yet to pursue action on this Model Public Health Act. Even so, water pollution control has now assumed an urgency and importance which would justify an exclusive legislation by itself rather than stray provision in the State Public Health Act.

In 1948 the U.P. Government set up an Effluent Enquiry Committee to advise on this question. Based on their recommendations, the U.P. Government established in 1955 an Effluent Board for dealing with this problem. The Board is composed of the Director of Medical and Health Services (as Chairman), the Chief Inspector of Factories (as Member-Secretary) and the Director of State Provincial Hygiene Institute, the Chief Engineer (Public Health), the Chief Engineer (Irrigation), the Director of Agriculture, the Medical Officer-in-Charge of Industrial Health, the Industrial Chemist and two representatives from the Industry, as Members. It is obligatory on all factories in the State to get their proposals for treatment and disposal of wastes approved by the Board. The Board examines each individual case separately and prescribes treatment of

wastes and standards appropriate to that case. This Board has been able to initiate some effective measures for the control of water pollution by industrial wastes, particularly in regard to new factories in the State.

However, in the absence of a comprehensive State and Central legislation to cover water pollution as a common subject, much headway could not be made so far.

2.11 Need for a comprehensive enactment

The urgent need for introducing a comprehensive enactment for effective control of water pollution (surface water and ground water) in the country is thus self evident. The new enactment should not only include preventive and penal measures but also provide for setting up a suitable administrative machinery and a technical organisation for effective implementation. The penal provisions should not, of course, act as deterrent and stifle industrial development. The emphasis should be laid more on persuasion to secure abatement of pollution than on the institution legal proceedings. The enactment should also fit into the frame-work of the Indian Constitution. Health is primarily a State subject under the Constitution. It will be the primary responsibility of the States to implement and enforce the provisions in the Act, while the Centre could provide the necessary coordination, guidance and control in general and take specific part in inter State matters.

Experience in the working of a Water Pollution Control Programme in the more developed countries points

E140 W63

05920

to certain basic factors applicable thereto. They are :
(i) waste disposal and water pollution problems differ from region to region. A successful control programme has, therefore, to be organised on a Regional or State-wise basis, (ii) Norms for treatment methods and receiving waters cannot follow any simple and uniform pattern because of the variety and complexity of the problem. Even a Regional agency may have to consider each case separately and lay down standards appropriate to each case, (iii) adequate fiscal provisions for the construction of treatment works for wastes must be ensured in the budgets of the concerned agencies, if the pollution control programme is to succeed; (iv) Communities and industries should realise their duties and responsibilities and offer effective cooperation for the successful working of a Water Pollution Control Programme.

2.12 Pattern of the Suggested Enactment.

In any new enactment to be made on this behalf, it is thus necessary to establish suitable water pollution control boards at the Central and State levels. The Boards shall be autonomous bodies set up under the Act clothed with adequate statutory powers, and their duties and responsibilities well defined. The membership of the Board should be broad based and include representatives from different water users, members of legislature, local bodies and experts in the field of water pollution control. The Board should be provided with adequate funds for implementing the programme effectively.

2.13 A Central Board.

The Central Water Pollution Control Board should have representatives from the concerned Ministries and executive wings of the Central Government, from Parliament and local bodies, from the Industrial Sector and the State Pollution Control Boards. Its functions should include policy making, laying down of general standards, bye-laws, precedents and procedures and review and revision of such standards from time to time, carrying out of special investigations in regard to international and inter State problems, control guidance and coordination of the activities of the State Boards, surveillance and follow up programmes in respect of field activities, arranging of training programmes, seminars and refresher courses, adjudication on inter-State and international problems, compilation and dissemination of statistical and technical data, and promoting proper public relations in support of the entire programme. A technical wing should be attached to the Central Board for it to carry out all these duties satisfactorily and to keep effective liaison with the State Control Boards.

2.14 State Boards.

The State Pollution Control Boards should likewise be represented by the State Ministries and Executive Organs concerned with the programme, and by the Industrial Sector, by local bodies and the legislature. The State Boards will deal with all the facets of the control programme including field investigations for

analysing problems assessing pollution factors, and advising on the treatment measures, laying down norms and standards to suit an individual or group of cases; surveillance and monitoring work; collection and compilation of data; control, supervision and guidance to the local bodies and industrial agencies on all technical and administrative problems under the programme; keeping proper liaison with sister departments and promoting public relations for the success of the programme; and the exercise of secretariat, administrative and legal functions for the enforcement and implementation of the legal provisions.

For carrying out these functions, the State Board should be assisted by an Executive and Technical wing; the former with the secretariat staff would carry out all the administrative duties and enforcement operations, while the latter will deal with all the technical aspects of the programme implementation. The Technical wing is preferably to be developed as an integral but independent unit under the State Public Health Engineering Department equipped with proper laboratory and other facilities to carry out field surveys, study stream pollution problems and advise on specific treatment methods and remedial measures in respect of all the problems dealt with by the Board.

2.15 The general aim.

The aim of the new enactment will be to bring into force a comprehensive Act which is more or less self contained in regard to its objectives, implementation and enforcement, with adequate fiscal provisions, and penal measures to ensure success for the programme. The existing local measures for abatement of 'public nuisance' etc. will have to be amended to bring them in line with the provisions of the new Act, wherever necessary.

The proposed new Act will connote the first attempt to initiate effective measures for the prevention and control of water pollution (both surface or ground water) as a common policy throughout the country. The measures suggested are based on the experiences of other countries with modifications to suit our conditions, and constitute a beginning in this new but important field. These measures may need further modifications on the basis of experience gained in implementing them, and a periodical review would be necessary for this purpose.

2.16 A vital part of the programme.

When a total Water Pollution Control Programme for the country has been placed on the statute, the constructive part of the Programme would imply the installation of treatment plants to deal with domestic and industrial wastes. A majority of the urban communities are yet to have a satisfactory water supply system. All but a few

of them lack the amenity of sewerage system. Industrial development, however, is growing at a rapid pace, faster than even community water and sewerage systems. It is a healthy sign, however, that the Central and State Governments are keenly alive to the urgent need for expediting urban water supply and sanitation projects within the next 10 or 15 years. The creation of Regional Water and Sewerage Boards in each State recommended in this behalf by several Expert Committees, has found wide acceptance. The early creation of such Regional Water and Sewerage Boards is essential in order to husband all available financial resources, and expedite the implementation of all sanitation projects side by side with water supply projects. The successful functioning of the Regional Water and Sewerage Boards or the local bodies, as the case may be, will depend to a large extent on the financial self-sufficiency of the projects they have to implement and the vigorous support and participation of the State and Central Governments. The success of the Water Pollution Control Programme will, in its turn, depend much on the effective and rapid manner in which the National Water Supply and Sanitation programme is completed in the coming years. The inclusion of adequate treatment works for domestic wastes must form part of any sewerage system and the provision of Water Pollution Control measures as contemplated would be enforceable only when the local bodies all over the country are enabled to treat their wastes properly and thereby conform to the provisions of the

proposed new enactment on water pollution. In regard to the treatment of industrial wastes, the problem may soon become equally intensive and extensive. The enactment of the present statute should enable the State and the Central Governments to take timely control over the problem and enforce a salutary regulation by stages to prevent the pollution of the country's natural water resources.

2.17 Financial Implications.

It may perhaps be argued that as this new piece of legislation may add to the financial burden of the States without any corresponding income, there may be hesitation in sponsoring this legislation. It should be noted however, that the constitution of the Central and State Boards will be such that most of the members are drawn from the officers belonging to the different Departments, and actual expenditure on the Members and their T.A. will not be significant. The only significant expenditure would be on behalf of the secretariat of the Central and State Boards as proposed and the cost of the laboratory facilities and field surveys which may be necessary in order to decide and advise on the method of treatment and disposal suitable to each case. This is an expenditure obligatory on the States in order to enforce salutary regulations and reforms on the industries and to prevent whole-sale pollution of public water courses and thereby safeguard the interests of the several water users. Part of the moneys can be

recovered by way of consultation fees from the industries themselves for professional advice where required and for analysis of samples and similar services for which fees could be levied. The actual construction of treatment plants is, in any case, the responsibility of the local-bodies and the industries concerned, and involves no financial commitment to the Central or State Boards. The primary objective of the Boards is only to advise these outside agencies as to how best the moneys spent on treatment plants could be used to maximum advantage.

The Central Government could with advantage earmark specific sums to be utilised in organising and conducting the training programmes, seminars and refresher courses, and in sponsoring research on any specific problems of special interest. The manifold advantages resulting from a legislation for Water Pollution Control will thus far outweigh the likely expenditure entailed by such legislation even if the question of cost should influence the passing of a legislation which is so vital to the country's economic development and future prosperity.

2.18 The Panel ^{strongly} ~~study~~ recommends that the Union Ministry of Health should take immediate steps to enact this legislation.

List of places visited and the persons
with whom the panel had discussions.

Places visited and date.	Officers with whom the panel had discussions	
New Delhi 4.10.61	Lt.Col.G.S. Godiwala	Medical Officer of the New Delhi Municipal Committee.
5.10.61	Dr. M.L. Passi	Deruty Health Officer of the Delhi Municipal Corporation.
	Shri V.S. Rao	Dy. Director, Central Water and Power Commission.
Bombay 18.12.61 Office of Bombay Municipal Cor- poration.	Shri S.V. Desai	City Engineer of the Bombay Municipal Corporation.
	Shri P.R. Bhide	Executive Engineer (Planning). Bombay Municipal Corporation.
19.12.61 Office of Director of Industries.	Dr. M.R. Mandlekar Shri Ganpule. Dr. V.M. Kale Shri D.S. Gadbole	Director of Industries. Officer on Special Duty (Water Supply to Industries). Deputy Director of Industries. Deputy Director of Engineering
20.12.61 (visit to Industrial Area Khopoli, Bombay State.	Dr. Paranjpe Shri Sawaliwallah Shri Lagate Shri Phirzada	Director of the Rapco. Industries. Alta Laboratories (Pharmaceutical). Incharge of Cellulose pulp industries. Assistant to the Manager of Indian Organic Chemicals.
5.2.62 Calcutta Public Health Engineering Department	Shri S.K. Mazumdar	Chief Engineer, Public Health Engineering Depart- ment of West Bengal.
6.2.62 Howrah Office of Municipal Corporation.	Shri N.K. Mukherjee Shri S.C. Ghosh Shri P.R. Mukerjee Shri B. Mukerjee	Chairman of Howrah Municipality. Vice Chairman of Howrah Municipality. Chief Engineer of Howrah Municipality. City Health Officer of Howrah Municipality.

5.	7.2.62 Calcutta Office of Director of Industries.	Shri P.C. Malik Shri Chatterji	Director of Industries. Secretary to D.I.
6.	8.2.62 Office of Municipal Corporation. Calcutta	Shri P.C. Mazumdar Shri S. Mitra Shri B. Nandi Shri D.N. Ghosh Shri S. Kalhashi Shri K.L. Dey Shri S.L. Sinha	Commissioner of Calcutta Corporation. Chief Engineer -do- Executive Engineer (Design) -do- Project Engineer (Planning) -do- Executive Engineer Projects (Water Supply). -do- Executive Engineer Projects (Drainage). -do- District Engineer-do-
7.	Calcutta	Shri S.B. Ray	Additional Development Commissioner.
8.	4.4.62 Sindri (Fertilizer Corporation)	Shri Biswas Shri J.N. Rao Shri David Shri S.R. Pandey Shri Dutta Shri B.D. Gogate Shri B.K. Chatterji Shri B.C. Aich	Dy. Superintendent (Production) Superintendent, (Main) Asst. Supdt. (Water Services) Plant Manager, Sulphate. Technologist. Superintending Engineer. Project Engineer, P & D. Chief Medical Officer.
9.	5.4.62 Central Washery at Jamdoba,	Shri B.H. Engineer Shri K.Z. George	Chief Project Engineer, Tata Iron & Steel Co. Ltd. Chief Mining Engineer.-do-
10.	6.4.62 Indian Iron Steel Co., Burnmore.	Shri F.W.A. Lahmeyer Shri A.N. Banerjee Shri M.S. Doshi Shri B.B. Ghosal Shri S. Goswami	Deputy General Manager. P.A. to the General Manager. Superintending Technical Economist. Chemical adviser. Technical Assistant.
11.	Raniganj Bengal Paper Mills.	Dr. J.C. Agarwal	Mill Manager.

-
- | | | | |
|-----|---|---|--|
| 12. | H.S.L. Steel
Plant Durgapur | Shri Jagdish Rai
Shri A.C. De
Shri T.A.N. Iyengar
Shri S.S. Banerjee

Shri M.S. Srinivasan
Shri M.K. Sen.

Shri Govindaswamy
Dr. G.P. Chatterjee | Deputy General Manager.
Deputy Chief Engineer.
S.E., Public Health.
Zonal Engineer for
Sewerage Survey.
Public Relations Officer.
Asstt. Superintendent, of
Coke Oven Plant.
General Foreman.
Chief Metallurgist. |
| 13. | Coke Oven
Plant of West
Bengal Govt.
Durgapur; | Shri J.K. Ghosh
Shri Chakravarthi | Plant Manager.
Resident Manager. |
| 14. | 19.7.62
Delhi Canton-
ment Board
Office. | Shri V. Krishnaswamy
Shri Singhal

Shri Yadhav
Shri Y.P. Sood | Executive Officer.
Ministry of Food &
Agriculture.
-do-
Asstt. Health Officer. |
| 15. | Delhi
Hindustan
Insecticides. | Shri T.M. Xavier | Works Manager. |