POVERTY, ENVIRONMENT AND DEVELOPMENT

Proposals for action

(32)

POVERTY, ENVIRONMENT AND DEVELOPMENT

Proposals for action

Paper prepared for the secretariat of the 1992
United Nations Conference on Environment and Development

Written for the Swedish International Development Authority
by Johan Holmberg, IIED, London, in May 1991

Cover: Coffeeharvest
painted by Francisco D. Van-Dúnem, Angola

Layout: Press Art
ISBN: 91 586 7133 1
Printed by Ljunglofs Offset
Stockholm, July 1991

The paper is manufactured using methods
that are kind on the environment

Table of Contents

Foreword

Poverty and development are often so closely linked that they are commonly referred to as two sides of the same coin.

Over the last decade it has become obvious that there are also close links between poverty and environment. The Brundtland Commission stated in 1987: "Poverty is a major cause and effect of global environmental problems". To combat poverty it is thus necessary to address environmental issues efficiently. The interrelationships between the two are complex however, and have not been studied sufficiently. The World Bank, in its First Annual Environment Report 1990, states: "The links between environmental degradation and poverty are as yet poorly understood".

The Swedish International Development Authority (SIDA) in 1990 initiated in-house work to improve our understanding of the poverty–environment links as a basis for formulating strategies for our future cooperation programmes. The UNCED Secretariat learnt about our work and asked Sweden to produce a paper on the subject. To this end SIDA engaged Mr Johan Holmberg of IIED, London. Mr Holmberg is an assistant director general at SIDA on leave. The paper, which is based on the findings of our in-house study, was finalized in May 1991 and has been submitted to the UNCED Secretariat.

As a contribution to international discussions we have decided to make the paper available to a wider audience.

Carl Tham

Director General
Swedish International Development Authority

Abstract

THIS PAPER arises out of an in-house study carried out by SIDA analysing conclusions from SIDA's own work with poverty and environment. The point of departure of the paper is the dictum of the Brundtland Report that poverty is a major cause and effect of global environmental problems.

There is some evidence that there is a connection between poor countries and resource poor and fragile environments. Within countries the poor often tend to be found in environmentally sensitive low-potential areas. The poor typically lack access to land and to the social services and amenities that potentially could improve their livelihoods. Internal distortions in developing countries, land distribution being one of them, are probably the greatest immediate impediments to poverty alleviation.

Generally, degradation of the environment in poor countries is characterized by a reduction in the productivity of natural resources, principally because of overuse. While there is a shortage of data to accurately measure environmental trends, all indications are that they are accelerating in a negative direction, and that this is hurting the poor the most. In many countries degradation of the environment is fuelled by dependence on natural resources for growth and exports.

Population growth is closely associated with poverty and leading to increasing environmental stress in poor countries. In the literature on poverty and environment may authors underline the role of poverty as an underlying cause of environmental degradation, while other authors prefer to stress the role of 'misdirected public policies'. Closer examination of the poverty/environment linkage yields the conclusion that the causality is more difficult to define than it appears to be at first sight. In many situations poverty may be an underlying cause, while in others poverty is only a proximate cause with policies and other factors seen as underlying causes.

Policies to address poverty and environment should be conducive to approaches here summarized under the rubric of primary environmental care. Sound macro-economic management and improved environmental management on a national level are two prerequisites for sustainable success of projects in this area. The role of NGOs in implementing projects relevant to poverty and environment is emphasized. More attention needs to be given to degraded urban environments, an area much neglected by governments and aid donors.

1. Background and Purpose of the Paper

As we proceed through the 1990s, two problems continue to be pervasive in world development. One is consistent poverty and destitution affecting about one-third of the population in developing countries despite impressive gains made by many of these countries during the past decades. The other is increasing natural resource destruction in the same countries which, in combination with global environmental threats like climate change, have led to growing international recognition of the need to address degradation of the environment as a major impediment to development.

Poverty, environment and development will therefore feature high on the agenda for the deliberations at the 1992 United Nations Conference on Environment and Development (UNCED). The subject was debated at the second meeting in March 1991 of the UNCED Preparatory Committee. The intention of the UNCED secretariat is to submit to the third meeting of the Committee in August 1991 a set of programmatic proposals designed to address poverty, environment and development.

To that end the UNCED secretariat has commissioned papers on this subject from eight different UN agencies. In addition, the Swedish International Development Authority (SIDA) was requested to submit a paper based on an earlier version prepared in December 1990 for the secretariat. That paper in turn was based on an in-house study carried out by SIDA in 1990/91 and only available in Swedish. To assist the preparation of the present paper SIDA organized in April 1991 a seminar with participation of international experts, representatives of some aid agencies and SIDA staff.

Poverty and environmental degradation are often seen as interrelated, at the same time the cause and the effect of each other. The 'conventional wisdom' on poverty and environment is that of the Brundtland Commission which in its 1987 report stated that

> *"Poverty is a major cause and effect of global environmental problems. It is therefore futile to attempt to deal with environmental problems without a broader perspective that encompasses the factors underlying world poverty and international equality"*[1]

However, the relationship may not be quite that straightforward. Authors on the subject have tended to use a set of suppositions as their point of departure for reasoning that often is poorly substantiated by empirical findings, although there is a growing body of intuitive and field-related experience which has yet to command serious attention. The causal effects between poverty and environment are often more complex than believed at first sight. Further, there is the potential for conflict in policies and programmes between the goals of poverty alleviation and environmental protection.

The academic debate on the poverty/environment linkage is inconclusive. The World Bank has stated that "the links between environmental degradation and poverty are as yet poorly understood" and that "improved understanding of the links between poverty and environment remains a priority"[2].

Some of the most serious environmental problems today facing the planet originate in the rich countries, and there is clearly a relationship between high levels of consumption caused by wealth and environmental degradation. It is also argued by some that profligate northern consumption in combination with the unequal North-South political and economic power relations are underlying causes of poverty and environmental degradation in developing countries. Further, there are evidently many poor in the rich countries.

All of these aspects are relevant and important. However, they are **not** dealt with in this paper. North-South relations and their linkage to environment and development will be exhaustively covered elsewhere in the UNCED preparatory process. This paper therefore limits itself to a discussion of poverty, environment and development in developing countries.

The paper starts with a brief overview of poverty and impoverished environments. Poverty is analyzed in the context of the broader concept of deprivation, and a review is made of environmental trends in developing countries and how they affect the poor. A summary is made of the natural resource dependence and foreign trade implications on the environment in developing countries and of the relationship between population growth and poverty. The debate in the literature on the poverty/environment linkage is summarized, and in a subsequent section an attempt is made the disentangle the causality of that relationship. A review is made of the policy and action agenda relevant to poverty and environment, and in a concluding section some specific areas for action are suggested. Several case study illustrations are provided of major problem areas and of successful project approaches.

The focus of the paper is on policies and action programmes to address issues related to poverty and environment in developing countries. Sections 1–5 should be read as descriptive background, sections 6–8 probe the linkages between poverty and environment, while sections 9–10 provide suggestions for policy and future action by governments and aid donors.

2. Poverty and Impoverished Environments

ABSOLUTE POVERTY IS THE most commonly used concept in quantifying the extent and trends in poverty worldwide. Levels of absolute poverty represent income thresholds established by countries or regions, below which a minimum nutritionally adequate diet plus essential non-food requirements are not deemed affordable. Those thresholds vary by country or region in broad accordance with the general level of development. They may also vary within countries and between rural and urban areas[3].

Recent estimates by the World Bank, UNDP, the Worldwatch Institute and, most recently, the United Nations all place the number of people living in absolute poverty in developing countries at 1,1–1,2 billion people.[4] However, these estimates may underestimate the extent of urban poverty. United Nations data indicate that in 1985 there were some 300 million urban residents, about one-fourth of the total number of poor, living in absolute poverty.[5]

However, other estimates indicate that some 600 million urban residents in developing countries live in "life and health threatening homes and neighbourhoods",i.e. where provision of water supply, sanitation, drainage and removal of household waste presents serious health risks[6]. The total number of people considered absolutely poor in the developing countries would then be 1,4 – 1,5 billion, equivalent to 35 percent of the total population in these countries.

Between 1970 and 1985 the proportion of poor in developing countries decreased by 8 percent, but because the population grew so rapidly the number of poor increased by 22 percent. Over the same period the incidence of poverty decreased by 13 percent in Asia and by 4 percent in Latin America, while it increased by 3 percent in Africa.

The nature of poverty varies considerably between countries and regions. In Africa and Asia poverty remains an overwhelmingly rural phenomenon, while in Latin America most of the poor are concentrated in urban areas. In Sub-Saharan Africa about two-thirds of the population is affected by absolute poverty which is persistent among subsistence farmers, mainly as a consequence of rapid population growth and low agricultural productivity. In Asia poverty is caused primarily by high population densities in combination with landlessness and fragmented holdings, but the numbers of urban poor

are increasing much faster than the rural poor. In Latin America poverty continues to be widespread, despite generally higher income levels than in the other regions, due to the unequitable distribution of resources, mainly land, and of income[7].

There is some evidence that there is a connection between poor countries and resource poor environments. While emphasizing that "the relationship of environment and poverty between nations is understudied, partly because of various ideological pressures and fears of environmental determinism" Kates suggests that the least developed nations are found in marginal environments and locations, primarily semi-arid grasslands and hill lands that are "peripheral even within the developing world"[8]. An African map of absolute poverty has been said to coincide with the areas deforested on the continent, and there have been references to a "hunger crescent" across Africa stretching from Senegal in the west to Somalia in the east. A 1984 FAO report indicated a disturbing degree of correspondence between the areas at risk of desertification and deficient in fuelwood and those areas having inadequate land resources to feed their population.

Examples of areas where severe environmental degradation coincides with high incidence of poverty include the Sahelian countries with the Horn of Africa, parts of India and especially areas populated by 'scheduled tribes', Java, northeastern Brazil, parts of Central America, Haiti, the Andes. In many of these areas ethnic factors contribute to deepening poverty, for example in Latin America the native Indians is the most impoverished group living on the most degraded land, in India it is the 'scheduled tribes'.

One study estimates that the poorest 20 percent, the 'poorest of the poor', are frequently found in ecologically vulnerable areas. About 80 percent of the poorest in Latin America, 60 percent of those in Asia, and 51 percent of the poorest in Africa were thought to live in marginal lands with low productivity and high susceptibility to environmental degradation[9]. While these estimates must be regarded more as a statement of a hypothesis than an answer to the question of the correlation of poverty and threatened environments[10], there appears to be good reason for assuming that the poor generally live in degraded and marginal areas.

3. The Deprivation Trap and Development

USING THE BROADER CONCEPT of deprivation, Chambers has described what he calls the "deprivation trap" where five sets of factors interlink like a web to trap people in deprivation from which they have great difficulty to break out[11]. He calls the sets

- poverty,
- physical weakness,
- isolation,
- vulnerability, and
- powerlessness.

Poverty refers to lack of income (flows of food and cash) and of wealth (stocks of assets) and is a strong determinant of the other sets. Physical weakness refers to the lack of strength, malnutrition, poor health, physical disability and high ratio of dependents of active adults and is often directly related to poverty. Isolation includes the physical remoteness, lack of education and ignorance, lack of access to services and information. Vulnerability relates to external and internal stress and the danger of becoming poorer and more deprived, while powerlessness means inability to adapt and to cope and weakness in the face of exploitation and demands by the powerful.

Many of the links between these sets of factors work in both directions, and the causality is not always clear: people may be unhealthy because they are poor, and they may be poor because they are unhealthy. From the point of view of the environment some aspects of deprivation may be singled out as particularly relevant.

Perhaps powerlessness, in rich and poor countries alike, is one of the most dominant characteristics of deprivation. The poor lack access to influence and power and are ill represented at the seat of government. Many Third World countries are governed by interests representing western middle-class values and more concerned with raising their own welfare than that of the poor. Many developing countries therefore lack appropriate institutions for mobilizing the influence of the poor, be they political parties or NGOs. An illustration of the powerlessness of the rural poor is the agricultural price

policy favoured by many countries, for example in Africa during much of the 1980s, that keeps produce prices low in favour of the politically powerful urban consumers to the detriment of the politically powerless farmers, most of whom are poor. The consequence of powerlessness is the inability of the poor to take initiatives without outside support to improve their welfare, even though the required support may be very modest in many situations, as will be further discussed below.

The most important asset that the poor lack is land, many are landless. FAO has estimated that about 30 million rural households have no land at all, while some 138 million are almost landless, two-thirds of them in Asia[12]. In many Third World countries land distribution is very skewed and inequitable: for example, in several Latin American countries one percent of landowners own about half of all arable land[13].

Development efforts are usually concentrated to high potential areas causing land values to increase and often forcing poor smallholders off the land, leaving them with the options of staying on as landless labourers, migrating to areas with lower potential or moving to the cities. Security of tenure is clearly a prerequisite for poor farmers to be willing to make long-term improvements on their land.

Deprivation will include lack of access to credit: only 5 percent of farmers in Africa and 15 percent in Asia and in Latin America have had access to institutional credit. In the absence of credit, poor farmers will be reluctant to make near term sacrifices for future gains.

Physical isolation means lack of access to infrastructure, markets and the social services and amenities resulting from development. With development typically concentrated to urban and rural high-potential areas the poor living in remote, low potential areas lack access to improved technology to sustain their livelihood. Agricultural research has been persistently biased against marginal lands, and the failure of research to generate significant findings for the low-yield risk-averse peasant farming that characterizes much of Sub-Saharan Africa is often cited as an underlying cause of the African food crisis.

The lack of access to social services, another aspect of isolation, cause the poor to have lower life expectancy, higher child mortality, higher fertility and lower rates of literacy than the non-poor. In the Third World nearly 900 million adults remain illiterate, 1,5 billion people lack access to primary health care, 1,75 billion have no access to safe water[14]. In rural Punjab in India child mortality among the landless was 36 percent higher than among landowners, in Mexico life expectancy was in the early 1980s 20 years less in the lowest income decile and in the highest income decile.

The worst deprivation is often suffered by women and children. In many ethnic cultures the men eat first, the children last; if food is short the children suffer most. While the division of agricultural and other tasks between men and women differ from one region to another, in general men tend to have greater access to the cash economy and public life while women's work

revolves around the subsistence economy, the family and the household. In developing countries overall women are thought to account for half the production of food, in parts of Africa they devote probably as much as 90 percent of all the time required producing, processing and preparing it[15].

A study by ILO emphasized the triple burden of women in poor households of household maintenance including collection of fuel and water and child rearing, income-earning from crafts and trade, and work in agriculture[16]. The study estimated that women in the five sample countries worked 11-14 hours daily compared to 8-10 hours for the men. When it principally is the women who work the land innovations that reduce the time of their chores become of importance, for their ability to do additional work on conservation. Further, the female-headed households are often those most deprived in all respects. Case study 1 in the Annex illustrates the difficulties of female-headed households in Malawi to raise their income and make long-term improvements on their land.

Many developing countries still suffer from a colonial legacy that has left them with fundamentally distorted political, economic and social structures. In particular, that legacy has created the structure of land ownership referred to above and a related economic system, the dual economy, which leaves the majority of the population in the so-called traditional sector largely outside the mainstream of development. It has also contributed to a world economic system with profoundly unequal relationships between rich and poor countries which systematically prejudices the efforts of developing countries to grow out of their poverty.

For deprivation and poverty in developing countries to be reduced in any major way, those relationships must change. That said, internal distortions in the developing countries, land distribution being one of them, are probably the greatest immediate impediments to development and the removal of deprivation. In the short term governments must address those aspect of policy that contribute to income disparities and poverty, if they are serious about improving the welfare of the poor.

4. Environmental Trends and the Poor

GENERALLY, DEGRADATION of the environment in poor countries is characterized by a reduction in the productivity of natural resources, principally because of overuse. A shortage of environmental statistics makes it difficult to measure trends in the environment in these countries. However, all indications are that these trends are accelerating in a negative direction.

The three major environments of usual concern in the Third World are the hill lands, arid and semi-arid grasslands and tropical rainforests. There are other threatened environments but these are comparatively understudied compared to the big three. These include wetlands of all types and coastal wetlands in particular, the marine coastal zone, high potential agricultural land and irrigated areas in particular, and urban environments[17].

Deforestation is occurring in all the three major environments of concern of unprecedented proportions and over an exceptionally short period of time. In many developing countries the tropical forest is fast disappearing as an economic resource. Tropical forests that could have sustained a timber industry in, for instance, the Ivory Coast, Nigeria and Thailand, have already disappeared. Only 10 of today's 33 tropical timber exporting countries will have any timber left to export by the year 2000. The ratio of afforestation to deforestation is very low, in the early 1980s it was 1:29 in Africa and 1:10,5 in Latin America. Deforestation is a particular threat to the approximately 200 million people, often referred to somewhat inaccurately as the indigenous people, who live in or near the moist forests, who are among the poorest of the poor, and who risk losing their livelihood as a result of logging and deforestation.

Deforestation, collection of fuelwood, often biomass in the form of tree branches and twigs, cattle grazing and inappropriate agricultural practices all contribute to denuding the land of its vegetative cover and hence to **desertification**. This process is common for example in Sub-Saharan Africa, where biomass is estimated to account for 60-95 percent of total energy use, where soils are often light and easily erodible, and where the pressure on the land from people and their livestock is increasing rapidly.

Soil erosion ensues from overuse of land that has been stripped of its vegetative cover for purposes of settled agriculture, as the topsoil is washed away by rainwater or by wind and the productivity of the land is progressively

reduced. This is common both in the hill lands and in the arid or semi-arid agricultural areas, both in rich and poor countries. But it is particularly debilitating in countries or regions where the pressure on arable land is high, there are few opportunities for alternative employment, and the resources to address the problem are limited. FAO has estimated that 40 percent of India's cropland is subject to soil erosion, and that agricultural production would fall by one-fourth between 1975 and 2000 in the absence of forceful soil conservation. Case study 2 illustrates the problems arising out of soil erosion in Ethiopia, a country in the 'hill lands environment' where soil erosion has caused acute threats to food security and to the livelihoods of large numbers of rural poor.

In the wake of deforestation and soil erosion there follows a rapidly increasing **threat to the world's biodiversity**, due mainly to the exceedingly rich flora and fauna in the tropical forests. As a result, a quarter of all currently existing species may be extinct by 2025. The main cost is the loss of ecological resilience, biological information and the capacity of adapting agricultural and health systems, as well as an important part of man's biological and cultural heritage. For the poor living in or near the forests it is the breakdown of biological diversity that is destroying their livelihood.

Throughout history poor people have depended on a resource base far larger than their own, the so-called commons, to gather fruit, firewood, fish, game and other resources. It is useful to distinguish between open access resources, like air or water of the sea, and common property resources like a parcel of land managed jointly by a community. For example, in the dryland regions of India, the poor are said to gather one-fifth of their annual income, along with numerous non-marketed goods, from the harvest of natural products from land that had been protected from overuse by traditional management regimes controlled by local communities. In recent years the destruction of such communal lands through privatization, often sponsored by the government, and overuse caused by population pressure have increased and encroached on the income-earning possibilities of the poor.

It is the open access resources that are now under various global threats, for example the risk of the greenhouse effect. Some large and rapidly industrializing developing countries are not only contributing increasingly to greenhouse gas emissions but also causing considerable **air pollution and acid rain** within their own borders, China being one example. Several examples from large Third World cities illustrate how the health effects of air pollution are worst for the poorest[18].

Another open access resource increasingly under threat is the **tropical coastal zone.** The highest density of people and the highest rate of population growth occur in the coastal zone, by the year 2000 it is estimated that 75 percent of the world's population will live within 60 km of the shores of the continents[19]. In Asia alone over 1 billion people depend totally on fish, mostly from the nearshore marine environment, for their high quality protein.

However, this environment is being destroyed in many parts of the zone by sediment from soil erosion washed downstream by runoff and rivers, by deterioration of coral reefs through the use of explosives and poison in fishing and through tourism, by discharge of untreated sewage, and by overfishing using inappropriate techniques. Again, it is the livelihoods of the poor coastal fishing communities that are threatened as a result. Case study 3 describes the consequences of overfishing off the coast of Kerala, India.

In parts of the Third World availability of **freshwater** can no longer be taken for granted. About 63 percent of total freshwater use is for irrigation that accounts for 17 percent of all cropland but one-third of the global harvest. In many developing countries, for example parts of India, government subsidies of tube wells and subsequent over pumping have caused ground water tables to drop and saltwater to invade aquifers. Many African countries will in coming years face increasing water shortages, as growing populations conflict with water resources. Deforestation and overgrazing contribute to water shortages in these countries. Water shortage will typically affect the poor more than the non-poor and may force them to migrate in search for livelihoods based on better water supplies.

Urbanization is one of the dominant demographic trends of the late 20th century. United Nations forecasts suggest that the urban population of developing countries will increase from 37 to 61 percent of the total population in developing countries over the period 1990-2025. An increasing number of the world's urban residents will live in large agglomerations of 5 million people or more: in 1990 there were 33 cities of this size of which 22 were located in developing countries, in 2000 there will be 44 such cities of which 33 will be in developing countries[20]. The cities are already today unable to provide infrastructure and social services to their growing populations, let alone mitigate the air pollution problems mentioned above. The **urban environmental quality problems** are therefore rapidly worsening: for example, in Latin America less than 2 percent of total urban sewage flows receive treatment.

The urban poor usually live in overcrowded shantytowns in areas eschewed by the non-poor: on steep slopes, near garbage dumps or industrial zones. There they suffer the health problems caused by pollution from burgeoning industry or incessant traffic: it was no coincidence that the victims of the 1984 Bhopal disaster in India overwhelmingly were poor. Case study 4 illustrates the health problems of the poor in some large cities.

5. Natural Resource Dependence and Foreign Trade

HISTORICALLY, DEVELOPMENT can be seen as a process of gradual reduction of direct use of natural resources for purposes of economic growth and increasing indirect use, while continuously attempting to improve efficiency of resource use. In the industrialized countries the environment tends to be degraded mainly by the pollutants resulting from profligate consumption, in the developing countries environmental degradation arises mostly out of overuse of natural resources.

The link between natural resource dependence and income is illustrated by the following table (most data from 1988):

	Low Income Countries	**Middle Income Countries**	**High Income Countries**
GNP per capita, USD	320	1,930	17,080
Agriculture as % of GDP	33	12	4
Employment in agriculture as % of total employment	65	60	13
Exports of primary commodities as % of total exports	48	42	21

Many of the poorest countries depend heavily on natural resources for employment and economic growth, frequently this dependence is extreme: in Tanzania agriculture contributes 66 percent of GDP, Nepal has 93 percent of its labour force in agriculture, Uganda derives 96 percent of its export revenue from coffee, 95 percent of Zambia's exports is copper ore. Typically

the poor countries supply primary commodities for processing in middle or high income countries.

Real prices for primary commodities have declined since the 1950s, while the prices for the manufactured goods imported by developing countries have increased over the same period. An index of the purchasing power of primary commodities exported by developing countries was 153 in 1951, 100 in 1961, 92 in 1971, 91 in 1981 and 73 in 1985. This deterioration in the terms of trade, when combined with the increase in real interest rates during the 1980s, has been severe for developing countries as a group, particularly serious for several of the poorest countries. The World Bank has estimated that this combined effect for the countries in Sub-Saharan Africa is equivalent to a cost of 14,4 percent of GDP, if changes during 1985-88 are compared to the average for the 1970s[21].

Foreign debt exacerbates the situation still further and particularly for the 26 countries classified as both severely indebted and low income[22]. Many of these countries are subject to structural adjustment programmes, under which they are encouraged to expand their exports to foster economic growth.

The combined effect of dependence on primary commodities, mainly from agriculture, and the added impetus arising out of indebtedness and the need to raise exports places a heavy strain on the natural resource base of many poor countries. Land under export crops will be under pressure to expand. The temptation to 'mine' available resources for short term gain, setting aside considerations of sustainability, will be considerable.

Whether pressure to raise agricultural exports will, in fact, have deleterious environmental effects would partly depend on the crops involved. Perennial tree crops like coffee and cocoa would be expected to have more benign effects on the environment than annual crops that tend to be soil erosive, for example groundnuts. Farming practices would also play a role, for example the large mechanized farms established in the Sudan with external support to boost exports have added considerably to wind erosion of the soil. Cash crops for export and import substitution are often grown on irrigated land, where scarce water resources are used wastefully due to inefficient irrigation systems; in many large Asian systems no more than 30 percent of the water is said to actually benefit crops[23].

While the pressure to increase exports often accelerates environmental degradation, the poor loose out as well in the short term. Development efforts, including agricultural research, remain focused on the high potential areas where pay-off is highest. With governments' attention concentrated on raising export revenue, resources allocated to social services tend to suffer to the detriment of the poor.

This has led to calls for an alternative to the export led development model. Development must, it is said, first satisfy domestic needs for food and be more sensitive to the needs of the poor. Besides being at time

environmentally deleterious a shift to marketed crops has in some countries been found to be accompanied by a deterioration of the nutritional status of women and children, as traditional non-marketed food crops are neglected.

But there is little alternative to raising exports as a means to propel development. For all the talk about alternative development models, there is no example of a country that has successfully improved the welfare of its citizens by pursuing inward looking development strategies. However, there are plenty of cases, for example the East Asian countries, to show that international trade allows countries to develop their comparative advantage which results in gains in economic efficiency and incomes among all trading partners.

The issue for purposes of this paper is how increasing exports can be reconciled with safeguarding the natural resource base while raising the incomes of the poor. Eliminating barriers to trade in export commodities from the Third World would be one such step. Policies that redistribute the gains from exports more equitably within the exporting country would be another. Increased attention to the effects on the environment of certain export crops and farming practices would be yet another, as would diversification of export crops. The answer cannot be to reduce exports, even for countries which are heavily natural resource dependent but to design policies that mitigate against negative effects on poverty and on the environment.

6. Poverty and Population Growth

CARRYING CAPACITY is a term frequently used to indicate the maximum number of people that can be sustained by the resources on a given area at a given level of technology. It is evident that with current population growth rates in most developing countries of 2 – 4 percent per year, that is doubling every 20 years or so, many countries are fast approaching the limits of their carrying capacity.

The relative weight of the different forces that contribute to population growth has been the subject of much research but are not fully understood. In a recent report UNICEF raises four consistent elements in that process as particularly important[24]:

- economic progress,
- improvements for women,
- availability of family planning programmes, and
- reduced child mortality.

The report notes that rising living standards – reduction in poverty, modernization and urbanization - are usually accompanied by falling birth rates. Economic progress tends to erode the advantages of large families. For poor families dependent on agriculture for their sustenance the marginal benefits of the additional child will tend to be positive, as children supply on-farm labour and larger families provide necessary social security[25].

There are several important examples, notably China, Sri Lanka and the Indian state of Kerala, where birth rates have been brought down without any accompanying significant rise in incomes. The common feature of all these cases is **social progress**, especially in education and health[26]. In particular, the education and status of women seems to be one of the most consistently powerful factors in reducing birth rates. Falling birth rates are also closely correlated with the availability of family planning services.

High infant mortality is consistently associated with high fertility. When child death rates are high many parents compensate for the anticipated loss of one or more of their children by giving birth to more children than they actually want. Further, an infant death ends the suppression of ovulation caused by breast-feeding, making a new pregnancy more likely. The infant

mortality rate would appear to be closely related to income, as illustrated by the following summary (infant deaths per 1 000 live births)[27]:

- All low income countries 86
- Low income countries, excl. China and India 107
- Middle income countries 52
- High income countries 12

Data on the under-five mortality rate for children show a similar pattern.

It is evident that the four broad factors listed by UNICEF, as its reports points out, are synergistically related. Women's advancement is often (not necessarily always) promoted by economic progress. Such progress will create not only demand for but also resources necessary for the social programmes, including family planning, that contribute to reducing birth rates. Conversely, slower population growth will contribute to increasing economic progress.

We can also note that poverty is closely associated with all the four mentioned sets of factors. With some exceptions population growth tends to be faster the poorer a given country. Poverty can often be used to explain, albeit incompletely in some instances, low status of women, the absence of mother and child care programmes, and the lack of family planning services. In particular, poverty is linked to child mortality, a determinant of high birth rates. The link between poverty and high rates of population growth would appear fairly well established.

7. Poverty and Environment: the Debate

Poor countries tend to be highly natural resource dependent and therefore need to protect their environment as a basis for future growth and poverty reduction. Poor countries also tend to have higher rates of population growth than the not-so-poor. But does poverty itself degrade the environment, as postulated by the Brundtland Commission?

If we accept that hypothesis, a number of questions arise. Does that not mean that degradation of the environment would decline with reduced poverty or rising income? What is the relationship between income and environmental degradation? And is it not a fact that some of the most pressing environmental problems today facing the planet, like climate change or the hole in the ozone layer, originate in the wealthy countries?

To examine what we may call the Brundtland hypothesis a review of the literature may provide some answer. As stated early on in this paper, research in this area is yet limited. Available writings can broadly be divided into two camps, those that unequivocally support the hypothesis and those that adopt a more guarded attitude[28].

The majority of the authors are in the first camp. They emphasize the interrelationship between poverty and environmental degradation, what some refer to as the process of 'cumulative causation'. The poor are forced to adopt short planning horizons to satisfy the urgent needs of the present, they are unable to protect the resources on which they depend for future needs, in so doing they degrade the environment, this reinforces their poverty, and the process continues.

In this view, environmental problems and poverty are inseparable in developing countries. Social, economic, demographic and even climatic factors interact to push poor groups onto low-productivity marginal lands. This interaction sets off a downward spiral of ecological deterioration that threatens the physical security, economic well-being and health of many of the world's poorest people. The pressures of wood gathering, inappropriate farming techniques, population growth and overgrazing all contribute to the spread of desert-like conditions that further decrease the productivity of marginal lands and make the rural poor even more susceptible to drought and other natural disasters.

There is a strong temptation to point at unchecked population pressure as the direct cause of degradation of marginal lands through overuse and

misuse. Indeed, some will call for population policies, including family planning, as the major course of action to arrest environmental degradation. It is clear that population density often is a major factor and that family planning programmes have an important role to play. However, as Murdoch pointed out 1980 in a major study, the same forces that are important in maintaining high birth rates and constraining food production and economic development are dominant: the suppression of the welfare of the rural population, inequality within the rural society, the impoverishment of peasants. Even if environmental degradation were the result only of population pressure, he says, this in its turn has its origins in the structural poverty of the rural population.

Other authors see poverty more as a 'disabling factor' rather than an underlying cause. They conclude that the poverty/environment relationship postulated by the Brundtland Report is not that straightforward and prefer to stress 'misdirected public policies'. Barraclough and Ghimire are of the view that "poverty, profligate consumption by the better-off and rapid population growth are all symptoms of unequal exploitive development, as is indiscriminate deforestation itself... To blame poor migrants for destroying the forest is like blaming poor conscripts for the ravages of war"[29].

One illustration of 'misdirected policies' would certainly be Brazil where deforestation in the Amazon until recently has been accelerated by the general tax policies, special tax incentives, rules of land allocation and the agricultural credit system. Such policies increased the size of land holdings and reduced the chances of the poor to become farmers. The Asian Development Bank in a recent report stresses that poverty and environmental degradation are closely associated and virtually two sides to the same coin. However, the report goes on to say, "low levels of income by themselves do not lead inexorably to degradation of the environment" and places responsibility for the downward spiral on "the failure of policies to adapt to new circumstances", citing inequitable land distribution as an example[30].

Others emphasize the influence of economic and institutional policies that shape incentive structures, physical and social infrastructure and hence affect natural resource usage. They stress that due to the paucity of empirical research data little is known about the dynamics between poverty and environmental degradation, and that much of the literature on the subject tends to work forward from what appears to be a plausible but yet untested hypothesis.

There are clearly different perceptions of the poverty/environment linkage in the academic debate. One camp emphasizes the process of 'cumulative causation' in keeping with the Brundtland Report, while the other maintains a certain distance to this process and prefers to stress the role of government policies and their effect on the process. While the differences may be more apparent than real, it is clear that what many authors adopt as an obvious causal relationship is treated with great scepticism by others.

8. Poverty and Environment: an Appraisal of the Causality

In pre-historic times man lived in perfect harmony with nature as hunter-gatherer, in some parts of the world man still lives in this fashion. In this primal state there is utter poverty, at least in monetary terms, but no degradation of the environment. With development mortality rates fall as a consequence of improved communications and social services, and pressure on the environment increases. But with development incomes also increase.

Man has always changed his environment as part of the process of development. In ancient times the Greeks cut down the trees on their islands to get wood for their ships, the Romans deforested the Appenine peninsula to provide farmland for demobilized soldiers. European forests were largely cleared between the 11th and 13th centuries, and much of North America was deforested in the 18th and 19th centuries. Some developing countries will today argue that the deforestation of their lands is part of a natural process of growth and a response to demand for cropland that yields higher returns and more employment than closed forests.

What is the cause of environmental degradation is, to a degree, in the eyes of the beholder, a matter of perspective. Worldwide, 50-60 percent of deforestation in the Third World is estimated to be caused by clearing of forests for purposes of agriculture. Much of this is the result of shifting cultivation, the poor farmer's way of maintaining the productivity of his soil, in combination with population pressure. The proximate cause of this environmental degradation would then be poverty. But often the forest has been opened up for poor farmers by not-so-poor loggers who build roads into the forest. The underlying cause may then be the market forces that drive demand for tropical timber and the economic needs that poor countries have to exploit their timber resources.

The explanations for environmental destruction can be analyzed as a chain of related causes that successively grow out of each other, rather like the Russian *babushka* dolls. Poor settlers in Brazil burn forest to clear land for agriculture. But a underlying reason why the settlers encroach on the forest is the grossly inequitable land distribution in Brazil that forces the poor to migrate in search of land. The reason underlying the land distribution is the political power structure in the country that, apparently, makes equitable land reform highly unlikely and that enacts legislation that favours, indeed

subsidizes, large-scale agriculture. That power structure in turn is the result of historical and cultural factors.

In the Brazilian example poverty would be a proximate cause, the settlers would not behave as they do if they were not poor. However, the major underlying cause would appear to be legislation that in a variety of ways favours the large landowning interests or, in the terminology of some authors, 'misdirected public policies'. It would appear that this would apply particularly to a country like Brazil, where average income is relatively high and the means to reduce the extent of poverty would seem to be at hand, given different policies.

It is evident that the poor suffering health problems in urban slums, as illustrated by case study 4, did not themselves primarily cause the environmental problems they suffer from. Those problems were caused, in most cases, by industry and vehicle traffic and exacerbated by governments unwilling or unable to abate pollution and provide services, like garbage collection. This would seem to be a situation of the poor suffering as a result of production, or of negligence, by the rich. The poor fishermen off the coast of Kerala suffering declining catches as a result of overfishing by trawlers, described in case study 3, would be another example of rich producers causing environmental degradation and contributing to increasing poverty. In these situations poverty could barely be seen even as a proximate cause of environmental degradation, and it might be more appropriate to talk of the poor as victims of degradation caused by others.

Then there are situations where it would be difficult to argue with the view that there is a process of 'cumulative causation' linking poverty and environmental degradation, where poverty is so pervasive that it dominates all parameters, and poverty is associated with lack of access to productive resources, with high rates of population growth and with simple low-yield technology. The poor often have no alternative but to cultivate marginal, easily erodible lands and to degrade the common lands. There is a social dynamic in this process that leads to deeper poverty and continued environmental degradation. Since many of the countries involved have economies based on agriculture, the process contributes to reducing overall growth and hence to deepened poverty. Chart 1 describes this vicious circle.

This is the process of 'cumulative causation', or the downward spiral of environmental degradation, referred to in the previous section and illustrated by case study 2 on the Ethiopian highlands. Here poverty is the factor underlying population growth, the level of technology used in agriculture, and to a large extent the level of knowledge of officials and farmers. Another major field study carried out on Nepal with support from British aid and referred to in the recent report from the Asian Development Bank has similar findings[51].

It would then seem that we may separate out three cases of poverty/environment relationships, namely

1. where **poverty is the major underlying factor** in what is essentially a two way causal relationship between poverty and environment,
2. where **poverty is a proximate cause** of environmental degradation, but where **failure of policies, markets and institutions** is the underlying cause, and
3. where environmental degradation is caused primarily by **the opposite of poverty, namely wealth**, often reinforced by policy failure, where poverty is exacerbated as a result, and where it would hardly be appropriate to talk about poverty even as a major proximate cause.

Stretching this analysis further two additional, albeit possibly less significant, cases may be distinguished, namely

4. where poverty causes **no or even reduced environmental degradation** (tribal 'indigenous' people living in harmony with their environment or poor people organizing themselves to protect their environment, such as the Chipko movement in India), and
5. where there are **knock-on effects caused by poverty affecting the poor in another area** (floods in Bangladesh and caused by deforestation in the Ganges river valley); this is really a subset to case 3 above, where environmental degradation is caused by outsiders and not by the poor themselves.

It would probably be possible to distinguish some further cases, but for purposes of the following we shall confine ourselves to the first three.

It is clear that it is difficult to generalize about the poverty/environment relationship. Two caveats need to be made. One is that the cause/effect relationship will often be specific to a particular situation or mix of ecological, economic and social factors. That mix may differ within a country or within a region; it will be different in rural and in urban areas. Pervasive poverty may in one region be a principal underlying cause of environmental degradation, (case 1) while in another region the poor may suffer from, say, poisoning of ground water caused by excessive use by pesticides on large-scale farms, (case 2).

The other is that the cases listed above are not clear-cut, in practice they often overlap. For example, in the case illustrated by the example of the Ethiopian highlands, where poverty is a major explanatory factor, there certainly also is present as an underlying cause the policy failure of the government to address land tenure. In the Brazilian example poverty would explain wasteful approaches used by settlers to cultivate the land. And in the Kerala example artisanal fishermen could have contributed to exhaustion of fish stocks by, for example, overfishing certain species close to the shore.

We then have three principal cases of causal poverty/environment relationships: where poverty is the main underlying cause, where poverty is only a proximate cause, and where poverty cannot be said to be even a major proximate cause. However, the cases overlap and generalizations are difficult.

Is it then possible to say whether poverty causes environmental degradation? The answer would seem to depend on the focus of analysis. At an immediate, proximate level it is suggested that the process illustrated by chart 1 obtains in many cases, where poverty underlying population growth is a powerful explanation of increasing environmental stress and reduced carrying capacity. However, at a higher level it is necessary to look further afield and at the policies and other factors that explain poverty (chart 1 again). Here it would be more relevant to ask, for example, to what extent poverty can be alleviated by different economic and social policies or by better terms of trade, debt reduction etc. But at a still higher level of abstraction it becomes difficult to sort out what is cause and effect of poverty: do countries have inefficient policies because they are poor, or are they poor because of them? Besides, we have noted above (page 3) that poor countries tend to be located in poor and fragile environments, and at this level the two-way causality would seem to be valid.

It is evident that the poverty/environment relationship is much less clear than the hypothesis stated by the Brundtland Commission. What we can say with some certainty is that poverty in many Third World situations is closely associated with environmental degradation, often directly and sometimes indirectly, and that abatement of poverty is an essential but insufficient step toward creating a better protected environment.

The purpose of analysis of development problems is to design policy remedies. To improve the design of policies relating to the poverty/environment linkage it would be useful to explore also the relationship between rising income and environmental degradation.

As developing countries industrialize and their economies grow, they will first adopt the 'cheap and dirty', badly polluting technology, accelerate deforestation and degrade their environment in other ways. Weak institutions and regulating mechanisms, or weak governance, in combination with such technology and economic growth will cause environmental degradation. A useful illustration is China where "the dependence on coal to power factories and heat homes is choking cities in toxic fumes, showering wide swaths of countryside with acid rain and swelling the ranks of lung-cancer victims"[32].

In rural areas growth may degrade the environment as roads are built, chemical farm inputs are introduced, cropland expands and forests are cleared. All environmental degradation, whether rural or urban, has associated economic costs. Failure to internalize environmental costs will mean that the polluters are not paying for the damage they are causing. In other words, it is very profitable to go on degrading the environment, like destroying tropical forests, because the environmental costs are being charged to society at large and not to those directly responsible. This will cause economic rents and profits to increase and go on fuelling an unsustainable economic growth. This process is illustrated by chart 2.

9. The Policy Agenda

THE POLICY AGENDA arising out of the poverty/environment linkage is discussed below starting with three basic assumptions continuing with key macro-level policy requirements, providing a discussion of the meaning of empowerment for sustainable development, discussing primary environmental care and finally the role of supportive services and institutions. By examining charts 1 and 2 some of the main elements of this agenda may be identified.

When discussing the policy and action agenda relevant to the poverty/environment linkage it is easy to lead on to a variety of issues of importance either to the elimination of poverty or to protection of the environment, not necessarily both. An effort has been made in the following not to raise the entire gamut of development issues of governments and donor agencies but to focus on the linkage at hand. What is at issue is either **how to reduce poverty without degrading the environment further** or **how to protect or improve the environment without worsening poverty**.

9.1 Some Basic Assumptions

THREE BASIC ASSUMPTIONS, or points of departure, underlie the reasoning that follows. The first is that governments accept responsibility for addressing issues relating to poverty and environment within the confines of their country borders. There has been a train of thought that poverty and environmental degradation in the Third World is, to all intents and purposes, the responsibility of the First World to set straight[33]. The defoliation of tropical rain forest in parts of Latin America brought about by the fight against producers of the coca plant has been cited as an example of environmental degradation caused by rich countries but affecting the poor in developing countries. Those environmental (and related poverty) problems should be addressed by the rich countries that are the markets for cocaine, this argument goes.

Those rich countries may well support and assist, indeed should do so. But the responsibility for designing the appropriate policy framework, that would put such support to good use, must rest with the developing country government concerned. Protection of the environment cannot be seen as a luxury issue, something to be attended to later in the development process,

'when resources permit'. The natural resource dependence of many developing countries requires priority attention to conservation of the very environment on which future growth depends.

The international environment debate has largely been led by First World representatives which has caused suspicion in developing countries and caused concerns for the environment to be associated with wealth. But as the foregoing analysis has tried to show, neglect of the environment by governments in poor countries, or waiting for initiatives from rich countries to provide resources, will only contribute to deepening poverty.

The need for governments to take more forceful change of their own development with regard to poverty and the environment is related to the second key assumption, namely that foreign aid is unlikely to increase significantly in real terms in future years. A quick review of the political support for foreign aid programmes in the major donor countries would tend to support this assumption. Much can be done to improve the performance of aid itself, and a good case can be made to increase the proportion of aid that is allocated to combat poverty and environmental degradation. But the role of aid can only be catalytic, to contribute to identifying problems and to show what can be done. Foreign aid can never solve the problems. Again, governments must create the policy framework that is conducive to disseminating widely the findings of aid programmes.

The third basic assumption is that the large, centralized, top-down action programmes, that became common in the 1970s to address poverty and related issues, on the whole did not work. The 'blue-print' approach prescribing standardized solutions to what, in effect, were complex problems of considerable diversity has been tested and found to be unsatisfactory. The new approaches tend to focus on smaller, location specific solutions in addressing poverty and environment issues, as will be further elaborated below. It will suffice here to note that the experiences from the past two decades of development point at a need for a change of paradigm, a need to depart from the previous emphasis on central planning and big solutions, to begin to think in terms of solving big problems by thinking small. The big programmes will have to be built from the bottom and up and not, as in the past, the other way around.

9.2 The Macro-economic Framework

A CONCLUSION FROM THE discussion in previous sections is that there need not be any contradiction between policies and programmes that promote growth and that protect the environment respectively. In many developing countries environmental degradation is a growing threat to the ability of the poor to feed themselves. There will always be a trade-off between programmes to feed to hungry today and to conserve the environment to prevent famines in the future, but that trade-off is intrinsic to development itself.

Another conclusion is that **macro-economic management must be sound** as a prerequisite to reduction of poverty and environmental degradation. Growth is necessary to eliminate poverty, and growth in agrarian societies must be based on positive returns to farming in general and small-scale farming in particular. Low-price agricultural policy and overvalued exchange rates have deleterious effects on the returns to subsistence agriculture and hence on poverty as well as on the willingness of farmers to conserve their soils, plant trees etc. The ultimate objective of policy must be to provide the incentives for individuals to protect the environment and that, at the same time, are conducive to growth.

In countries where there are manifest imbalances in the economy and where the requisite incentives for growth and for environmental protection are not present, it will therefore be necessary to embark on programmes for macro-economic adjustment. While this is not the place for a dissertation on the arguments for and against structural adjustment, it may suffice to refer to the fairly comprehensive body of past development experience that indicates that poverty cannot be eliminated in the absence of growth, that growth will not happen without the appropriate economic incentives, and that those incentives will be not be present in economies with structural imbalances.

There are many signs that economic progress to date has been measured with misleading indicators, leading to what some call a 'schizophrenic perspective'. During the 1980s the world economy grew by some 3 percent per year adding USD 4,5 trillion to the gross world product, a remarkable performance. At the same time virtually all measures of global environmental change are distressing[34]. Evidently conventional indicators of economic growth are misleading in so far as they treat changes in the environment as 'externalities', something left out of the analysis. For example, an effort was made to adjust GNP for Indonesia to include the cost of depreciation of critical natural resource stocks over the period 1971-1984, when the country had enjoyed an average rate of growth of 7,1 percent. The adjusted rate was found to be 4 percent, almost half the annual growth rate had been unsustainable (chart 2).

To raise concerns for the environment in the determination of priorities and resource allocation it is necessary to begin to **include environmental costs in government decision making processes**. Hard-pressed finance ministers will not pay attention to calls for caution by environmental protection agencies, unless such calls can be substantiated by estimates of the costs to the economy and to the exchequer of environmental degradation. These costs can only begin to be assessed if environmental change is regularly monitored and data bases are established. This is a first necessary step toward a macro-economic policy framework that takes into account degradation of the environment.

One element in the macro-economic, or perhaps socio-economic, framework that is an essential but insufficient condition for both poverty

alleviation and environmental protection is **equitable land distribution**. Policy failure in this area is, as has been stated earlier in this paper, often an underlying cause of the marginalization of the poor onto degraded lands and urban squatter settlements. Yet this is one of the most difficult policy areas to change, since entrenched political interests basing their wealth on land and often reaching the very top of governments will resist land redistribution. Here there may well be cases where gradualism will be insufficient and where more comprehensive change will be called for, if poverty and resultant environmental degradation is to be reduced. In this area many governments both bear full responsibility for policy change but at the same time are most recalcitrant to such change.

9.3 Empowerment and the Role of Governments

MANY RECENT REPORTS stress the need for sensitivity to local conditions in the design of solutions to poverty and environmental degradation. Poverty eradication and resource conservation are location-specific activities. Pressures on natural resources are strongly interlinked with local production systems. Eradication of poverty requires a clear understanding of local environmental and socio-economic characteristics and of local opportunities and constraints. What is needed is an approach that empowers local people to organize their own resource management[35].

The last two decades of development work in the South (and the last two centuries of development worldwide) provide conclusive evidence that development will never be sustainable unless the people meant to benefit also participate actively in the design and implementation of the various ventures intended to improve their welfare. Development will not happen from the top down, one of the basic assumptions listed above. In short, people cannot develop without gaining power over their own futures[36].

Empowerment requires devolution of power by governments, decentralizing authority to local administrations and municipalities, bringing government closer to the people. It means representative government, better government at the local level. It challenges governments to be less interventionist and more supportive of private entrepreneurs, local communities and NGOs. It is consistent with the World Bank's call upon governments in its 1989 report on Africa to provide their people with an 'enabling framework for growth'[37].

In its study of seven Asian countries the Asian Development Bank underlines 'the unanimous and very powerful call for more political and financial autonomy to manage environmental problems locally'[38]. Yet in most instances local governance was found to be too weak to take on any added responsibilities, a common situation in developing countries. Clearly devolution of government will have little meaning, unless capabilities at district and municipality levels are at hand to effectively use devolved

authority. There will therefore be a strong need to focus increasingly on providing managerial competence and other resources to foster better local government. This will, again, require political decisions by governments who may be willing to pay lip service to the need for decentralization but reluctant to delegate real authority.

Again, this is an area for policy decisions by governments. All experience indicates that tackling poverty and environmental degradation on the ground, where the people live and are directly concerned, will require the active involvement or empowerment by these people. That in turn will depend on the structure and role of government and on effective support by that government at local levels. Often this will require fundamental rethinking at central government level.

9.4 Primary Environmental Care

The concept of primary environment care (PEC) builds directly on the debate on rural development that originated in the 1970s with which it has in common the objective of raising the productivity and welfare of the poor but with an added concern for protection of the environment. It includes processes by which local groups or communities, not necessarily only in rural areas, organise themselves with varying degrees of outside support to apply their skills and knowledge for the care of their environment whilst satisfying livelihood needs. PEC has three integral elements, namely

- the meeting and satisfying of basic needs,
- the protection and optimal utilisation of the environment, and
- the empowering of groups and communities.

The basic ideas behind PEC are not new and have been endorsed by governments, NGOs and donor agencies for years. What is new is that an increasing consensus is emerging that success of PEC will depend on the degree to which

- local groups and communities are permitted to organise, participate and influence development priorities,
- local groups and communities are permitted access to natural and financial resources,
- local groups and communities participate in the generation and extension of productive and environmentally sensitive technologies,
- outside institutions give political support and open access to information, and
- planning and implementing agencies take an adaptive and flexible approach.

A review of 80 bilateral and multilateral projects carried out by IIED

suggests that there are common elements essential to success of PEC[39]. One such element is **building on local knowledge, including management systems and technical solutions**. The livelihoods of poor households are usually diverse, in rural areas depending on a mix of agricultural produce, wild plants and animals, remittances and trading. Decision making is complex, and it is impossible for outsiders to predict needs and preferences. Local management systems developed over generations are tuned to the needs of local people and the characteristics of available resources. PEC therefore requires taking detailed stock of local knowledge as a starting point and then building on it.

PEC approaches are also most successful when they manage to **build on existing social organisation**, preferably when dealing with homogenous groups. Local organisations, in which members have decision-making inputs and a measure of control over management,

become efficient mechanisms to mobilize local energies and initiatives. PEC gives preference to **locally available resources and technologies** by emphasizing the opportunities available for intensification of resource use. The complete involvement of local people in the design, implementation and maintenance of infrastructural development and services in urban areas produces more sustainable and effective results than solutions imposed from the outside.

PEC projects typically **begin small and do not over-innovate**. Successfully introduced technologies are commonly low risk, easy to teach and demonstrate, tested locally, and offer prospects of clear, on-site benefits in the coming season or year. These projects are **flexible** in their design and of **medium to long term duration** (5-10 or more years). Outsiders play the role of bringing interested groups together and facilitating the process of information exchange. **External inputs are small** and focus on catalytic functions. PEC approaches apply in all situations where local groups wish to improve or protect their own immediate environment. They are **multi-sectoral** and may include forestry, agro-forestry, soil and water conservation, livestock husbandry, crop husbandry etc. They have often been successful in involving **women in their role as resource managers** by building from the outset on women's knowledge and participation.

PEC approaches are illustrated with three appended case studies. Case study 5 describes a soil conservation project in Honduras where yields were tripled on marginal lands without use of external inputs. Case study 6 documents experiences from an agro-forestry and soil conservation project in Burkina Faso which has restored the productivity of land threatened with desertification. Case study 7 illustrates how the problem of solid waste management was solved in urban squatter areas in Recife, Brazil.

All these three projects used simple, locally developed technology, a minimum of external inputs, engaged existing groups of beneficiaries to evolve solutions, and were based on active participation by these groups in

all stages of implementation[10].

Clearly PEC is no panacea and several problems exist. One relates to scaling up the process which led to success of a small-scale project to have an impact on a regional or national level. This usually requires close collaboration with a government extension service attuned to the flexible, beneficiary-steered approach that characterizes PEC. Case Study 8 documents experiences from a national soil conservation programme in Kenya that, while being centrally designed in the 1970s, over the years has succeeded in adapting to local priorities and needs.

Other problems relate to the heterogeneous composition of many communities, even at local or village level. Unity within a community is the primary requirement for good natural resource management, since the more powerful elements of the community will always tend to marginalise resource use, like grazing rights, by the poor. A report from India has described how two strategies are being adopted to tackle this problem. In areas where levels of inequality and social stratification are not very high, universal election of a village committee is practised, while in areas where levels of inequality are high, efforts have been made with outside support to form institutions bringing together only poor households[11]. In these latter areas open public forums allowing all villagers to participate in decision-making work much better than elected committees.

A third problem with PEC relates to the level and quality of outside support. Collecting and analyzing the views of villagers or squatter citizens in an interactive process that is difficult and requires training. It is not necessarily something expatriate outsiders are good at doing and therefore usually requires special training of local specialists familiar with the local vernacular. In particular, familiarity with techniques like rapid (or participatory) rural appraisal will be valuable[12].

9.5 Supportive Services and Institutions

PEC WILL NOT HAPPEN by itself. The need for a sound macro-economic framework has already been mentioned, as has the necessity for an approach to governance that encourages devolution of authority and empowerment of the poor. However, there are also some more specific requirements.

Some of these can be identified in charts 1 and 2. In the downward spiral of 'cumulative causation' (chart 1) the pressure on the land can be reduced by the introduction of better farming technology or by reducing the rate of population growth. Both usually require some form of empowerment of the beneficiaries involved. PEC approaches may be used to introduce yield-raising farm innovations and arrest degradation of the land. A policy of out migration may also relieve the pressure on the land. In the case of growth and environmental degradation (chart 2) strengthened institutions and less polluting technology would contribute to reducing degradation of the

environment. Internalising environmental costs, something often difficult to achieve in developing countries, would give a more correct measure of economic activity.

The report of the Brundtland Commission emphasized that the environment cannot be seen as a sector apart, and that concerns for the environment must be built into all economic sectors. However, tackling poverty and environment successfully will also require better management of the environment. There must be strategies for doing this. There must be within governments some unit with responsibility for such strategies, a unit with a lead role in analyzing the environment issues and with an advocacy role in placing these issues high on the government agenda.

Such duties are usually vested in **environment protection agencies** or similar organisations.

These agencies are typically weak, often low in the government pecking order, and yet rather cynically expected to assume responsibility for problems caused by the bigger and more powerful ministries: industry, agriculture, finance, energy, and so on. They often have large shortcomings in their capacity to plan and manage development of a society in a more environmentally sound direction, a complex and difficult task under the best of circumstances. Stronger political support, more and better trained personnel, and an improved data base would be important steps toward that end.

There will be a need for expanded **research, particularly agricultural research**. The pressure on marginal lands will be relieved by the introduction of yield-increasing agricultural innovations, like fertilizers and improved seeds, for peasant farmers in areas thought to respond to such inputs, one important issue for research. However, research needs to take a fresh and holistic view of livelihoods in marginal areas, focusing not only on the cash crops (as in the past) but increasingly also on food crops and other sources of sustenance. More work needs to be done on improving the traditional techniques used by small farmers and adjusting and improving them in close collaboration with PEC projects. More work is also needed in techniques for soil and water conservation.

Credit will be important to enable the poor to accumulate assets and support consumption in hard times. In urban and rural areas alike, availability of credit may provide the requisite means for the poor to undertake measures to protect their environment. However, providing credit in small amounts to each of large numbers of poor tends to be expensive. To protect the poor against the cost of administering large, formal credit schemes governments and donor agencies have experimented with subsidizing credit. However, as mentioned above (page 5), these programmes have generally not been successful in extending credit to significant numbers of poor, repayment rates have been low, and cheap credit has become a bonus for the not-so-poor.

The World Bank is therefore suggesting that more attention be devoted to learning from the informal finance systems that exist in many countries[33].

This would be consistent with the PEC approach in building on traditional institutions: saving and loan associations, rotating funds, mobile bankers, financial dealings among family and friends, and so on. Examples are cited of African countries where such arrangements have grown into relatively large financial organizations linked to the formal credit system.

Another approach found successful is the closely supervised group credit approach devised by the Grameen Bank in Bangladesh. Similar schemes have been designed by MYRADA in southern India and AKRSP in northern Pakistan[14].

In rural and urban areas alike more effective policies and programmes for **family planning** will be necessary to reduce population pressures on environmentally fragile areas. Such programmes can often be linked to primary health services with a focus on mother and child care and be useful areas for increased foreign support. However, the cited report of the Asian Development Bank states that it is "the unanimous finding of the seven country reports that the hoped for demographic transition to lower population growth rates ... will not occur without active and explicit government support"[15]. Providing targeted family planning services to rural and urban poor merits increasing attention by many governments that almost by default make such services available only to the urban middle and upper classes.

As stated previously and illustrated by chart 1, family planning programmes become more effective if accompanied by improved **education** of women and girls. Raising educational levels for the poor will also impact on environmental degradation in other ways than contributing to lower population growth. Some environmental destruction takes place because people do not understand the harm they are doing, for example by ploughing sloping fields in the direction of run-off rather than on the contour[16]. Besides, education will increase income. The World Bank has estimated private returns to primary education to be as high as 31-42 percent in Africa, Asia and Latin America. For developing countries as a whole, average social returns for every level of education lie in the 10-15 percent range[17].

The Asian Development Bank emphasizes **employment creation** as one of the most important areas where an impact may be made on poverty and environmental degradation at the same time. Landlessness is widespread among the rural poor, particularly in Asia. At issue is how to adopt policies that result in creation of jobs at rates high enough to absorb adults from the age group which is growing more rapidly than the population as a whole and in which there is a backlog of unemployment. Policies to promote rural employment should consider the concept of livelihood, including income sources off-farm: in construction, labour intensive rural works, trading, cottage industries, and so on.

By creating job opportunities consistent with sustainability pressures to encroach on fragile lands may be reduced, and people may begin to afford to pay for public amenities and an improved environment, for example in the

dwelling[18]. It is important to recognize, as does the Bank, that governments themselves do not create jobs in large numbers, that those that are created are not always productive, and that most jobs are created by people for themselves, if provided with the right incentives.

10. Some Specific Areas for Action

ABOVE THE POINT HAS been made that developing country governments must be assumed to be responsible for creating the policy framework that is conducive to alleviation of poverty and environmental degradation. The point was also made that foreign aid resources are unlikely to increase at a rate that is commensurate to increasing needs in poor countries. It then becomes incumbent on donors and recipients of aid alike to use available aid resources as efficiently as possible and to target them strategically where their 'ripple' effects can be maximized.

Going beyond the policies some specific and strategically important areas for action relating to poverty **and** environment have been listed in the following. Inevitably, what to include is a matter of judgement as these two areas taken together could easily be interpreted to include most of the development agenda in many countries.

1. Primary environmental care. The foregoing discussion has placed much stress on PEC as an approach to addressing poverty and environmental degradation. In the light of increasing demand for available aid resources PEC is welcome, since it does not necessarily imply any need for large external resources. The most successful PEC projects, including those documented in case studied 5-7, were supported by donors who encouraged starting on a modest scale. For example, the project in Honduras (case study 5) is tripling farmers' yields at a total project cost of about USD300 per farmer; other similarly designed projects in Honduras and Guatemala achieve the same result at a cost of USD200 per farmer.

At issue for project planners is how to design the appropriate mix of inputs at a suitable level that will not unduly tamper with the incentives of beneficiaries to participate actively. Ambitions to quickly raise spending levels, not uncommon in the donor community, could easily contribute to distortions that would render the projects unsustainable. The widely held belief that there are economies of scale in project size do not necessarily apply to PEC approaches.

Present definitions of PEC assign no special role to women. Yet, in many areas, they are the most import, often unpaid, agents of PEC sustaining the resource base for development. Women fare worst on the deprivation trap

and have the least access to land, credit, extension services etc. and yet have a great deal of environmental knowledge. The role of women as resource managers needs often to be more explicitly recognized in the design of projects. Many of the more successful projects, like those described in case studies 6 and 8, have been successful also in this regard.

2. The role of NGOs. It is necessary for governments and donor agencies to take a close look at what their comparative advantage is relative to that of NGOs. There is evidence to suggest that PEC approaches often work best if carried out by NGOs, and that NGOs often are better placed than public agencies to stimulate a process of change involving the poor. Once that impetus has been provided a collaboration between NGOs and public agencies is often fruitful.

A strategy increasingly adopting PEC approaches would therefore also imply channelling more development resources through NGOs, a need now recognized by many donor agencies. This in turn has several implications. Many Third World governments do not share the enthusiasm of western donors for involving NGOs in the process of development, in many countries NGOs are viewed with considerable suspicion. Donor agencies will have to be supportive of NGOs in a variety of ways, even in situations where this may place NGOs in conflict with their governments. For example, local NGOs are often the last to benefit from training opportunities provided under bilateral or multilateral aid channelled through governments. Through their current dialogue with governments, in some cases perhaps going so far as to impose conditionality, donors should assist and strengthen NGOs in their ability to reach the poor.

That said, it is obvious that some NGOs suffer from problems of bureaucracy and corruption, as do governments. In some countries NGOs are being established wholesale to capitalize on the growing donor interest. Not all NGOs are innovative and not all NGOs do well in reaching the poor. At the same time the very nature of NGOs, their independence and right to self-determination, at times make them difficult partners for the donors. Many southern NGOs complain about heavy-handed, know-all attitudes from their northern partners and clearly have a somewhat schizophrenic relationship to them[9]. Broadening the agenda of collaboration with NGOs will place new demands on some donor agencies and governments, forcing them to adjust their working procedures and be more receptive to the motley views and approaches of a burgeoning NGO community.

3. Strengthening local government. To bring about the type of government that creates an environment propitious to the PEC approaches advocated above requires, as has been said, strengthening of local government institutions at district or municipality level to enable them better plan and implement provision of government services at that level and, mainly, to be more attuned to the wishes of people in need of such services.

This will require both quantitative and qualitative improvements. More development resources should be placed a the disposal of local authorities. This in turn will need strengthening of local institutions in a variety of ways, including staff training programmes, provision of better housing and office facilities, computerized accounting and planning tools, and so on. In many countries service in local government is seen as a place of exile for staff and therefore does not attract the most competent manpower, and it is necessary to make local government service more attractive.

In many countries much additional financial resources may not be forthcoming from the centre to the periphery, and it will be necessary to look for ways to strengthen local tax revenue collection. One specific area for action in that context is the creation of land registers and cadastral surveys to that end. In squatter settlements in urban areas land demarcation is often the first step towards gaining acceptance for poor citizens of their rights to municipal services and improvements of their housing.

4. Institution building. There are a variety of actions relating to the broad field of institutional building that will need to be taken in support of PEC projects, only a few will be mentioned here. The point was made above that tackling successfully poverty and environment requires sound management of the macro-economy; this has attendant institutional implications that need not be elaborated in this context. Another basic requirement, that also the environment needs to be well managed on a macro-level, deserves a few further comments.

Strengthening the analytical capability within governments to design policies relating to the environment will include support to the central agencies that formulate such policies, possibly through twinning arrangements with similar institutions in donor countries. It will also include monitoring the environment and building up a data base on environmental change as a first step towards linking such change to economic growth and gradually creating measures of national income that are adjusted for 'consumption' of the environment. With time it will then be possible to build into the government decision-making process an attention to the costs of this 'consumption' and initiate training in environmental economics of centrally placed staff in ministries of finance, planning and other agencies concerned with economic resource allocation.

The need for strengthening institutions working on research was also mentioned above, particularly research relevant to the livelihoods of the poor. But research will be of little value, unless its findings can be disseminated and translated into practical use for the poor. This will call for support to extension services that are not only collaborating closely with research institutes but also flexible and attuned to PEC approaches in the field. The project in Kenya illustrated by case study 8 has a good record in that regard.

In the general area of institution building foreign aid could play a very useful catalytic role by improving governance and enabling governments to multiply successful but isolated project experiences. By using aid to build absorptive capacity through strengthening key institutions relatively limited aid resources can have important multiplier effects.

5. Basic infrastructure. The poor are often isolated, both literally and figuratively, lacking access to the services and amenities that potentially could improve their livelihoods. Breaking their physical isolation by construction of rural roads would give them better access to markets and to public services, besides providing them with some employment as roads are built and later maintained. They would not only become more involved with the cash economy and gain more income from their produce but they could also gain more from trading and employment in nearby towns. With increases in income resulting from better access to markets their propensity to undertake conservation measures would also likely increase.

A particularly important element of basic infrastructure investments is the provision of water resources. Experience indicates that viable water projects must be based on local socio-cultural traditions, called for PEC-type project approaches. However, the increasing need to treat water as a finite and fragile resource also calls for strengthening those government agencies that are responsible, centrally and locally, to plan and manage the use of water, another important area for institution building.

6. Family planning services. The availability of family planning services is, as we have shown above, one of the determinants of population growth and hence of pressure on the environment. Such services are often unavailable to the poor. Yet they are much in demand: UNICEF has found that an estimated 300 million couples in the developing world do not want any more children but are not using any effective means of avoiding another pregnancy[50].

At present no more than 1,3 percent of total official development assistance is used for family planning, a figure that SIDA has estimated should be raised to 3 - 4 percent. However, to be successful increased attention to family planning programmes should be accompanied by efforts to address the social conditions leading to high birth rates, including raising the education and status of women and girls in general and among the poor in particular.

7. Degraded urban environments. One area deserving much more support by governments and foreign aid donors is the problem of environmental degradation in urban squatter areas and, in general, policies and issues related to urbanization and human settlements. Third World cities have been straining under the weight of population increases since the 1950s, but the

worst is yet to come and already today provision of basic services in urban areas is totally inadequate. Governments are not expected to be able to boost significantly their spending on such services in the 1990s.

There will therefore be a need for new, low-cost solutions to the problems of housing, water, sanitation, garbage removal in urban environments and for such solutions to be largely self-financing. Promising approaches exist, as illustrated by case study 7, but they need to be much more widely disseminated. Pollution abatement in industry, transport and energy also requires more attention. Foreign aid to urban areas at present is only a few percent of the total, an amount that would need to increase to perhaps 8 - 10 percent to better correspond to the severity of the urban crisis in developing countries.

Will it be difficult to accommodate action in all the fields listed above within heavily constrained government development budgets and stagnating foreign aid programmes? There are, of course, many other areas than these that are also, rightly, calling for more resources, humanitarian emergency support being one of them. But it should be recalled that in a macro-economic climate that places increasing emphasis on a less interventionist and more decentralized government, on policies conducive to growth with equity, and on market-based solutions, some resources would be freed and others mobilized. Direct state interventions in productive sectors, like industry and agriculture, would be reduced. Many of the approaches advocated above, like PEC and various forms of institution building, are not particularly costly.

If scarce aid resources are better targeted on projects of that kind they should in many instances be adequate to make important contributions to the overall goal of securing sustainable livelihoods for the poor in environmentally degraded areas, provided that they are accompanied by the appropriate government policy framework.

Notes

1. World Commission on Environment and Development: Our Common Future. Oxford University Press, Oxford, 1987, page 3.
2. World Bank: The World Bank and the Environment, First Annual Report, Fiscal 1990. The World Bank, Washington DC, 1990, pages 45 and 85.
3. United Nations: World Population Monitoring, 1991 (draft). Department of International Economic and Social Affairs, United Nations, New York, 1991, page 489.
4. See World Bank: World Development Report 1990. Oxford University Press, New York and London, 1990, page 28; United Nations Development Programme: Human Development Report 1990. New York and London, page 172; Durning, Alan B.: Poverty and Environment: Reversing the Downward Spiral. Worldwatch Paper 92, Worldwatch Institute, Washington DC, November 1989, page 20;

United Nations, op. cit., page 490.

5. United Nations, op. cit., page 490.
6. Hardoy, Jorge E., Cairncross, Sandy and Satterthwaite, David, eds: The Poor Die Young: Housing and Health in Third World Cities. Earthscan Publications Ltd, London, 1990, page 4.
7. United Nations, op. cit., pages 489-491.
8. Kates, Robert W: Hunger, Poverty and the Human Environment. Michigan State University, Center for Advance Study of International Development, Distinguished Speaker Series, May 6th 1990 (mimeo), page 3.
9. Leonard, H. Jeffrey and contributors: Environment and the Poor: Development Strategies for a common Agenda. Overseas Development Council, Washington DC, 1989, pages 16-22.
10. Kates, ibid.
11. Chambers, Robert: Rural Development, Putting the Last First. Longmans, New York, 1983, page 112.
12. Food and Agriculture Organisation of the United Nations: The Dynamics of Rural Poverty. FAO, Rome, 1986.
13. Durning, Alan B.: Poverty and the Environment: Reversing the Downward Spiral. Worldwatch Paper 92, Worldwatch Institute, Washington DC, November 1989, page 26.
14. UNDP, op. cit., page 27.
15. Leonard, H. Jeffrey, op. cit., page 12.
16. Cecelski, Elisabeth: "Energy and Rural Women's Work: Crisis, Response and Policy Alternatives", in International Labour Review, ILO, Geneva, Vol. 126, No. 1, January-February 1987. The study drew from ILO country studies from Indonesia, India, Ghana, Mozambique and Peru.
17. Kates, Robert W., op. cit., page 5.
18. Hardoy, Jorge E., Cairncross, Sandy and Satterthwaite, David eds, op. cit., passim.
19. Linden, Olle: "Human Impact on Tropical Coastal Zones", in Nature & Resources, UNESCO, Parthenon Publishing, Volume 26, Number 4, 1990.
20. United Nations, op. cit., page 311-312.
21. World Bank: Commodity Trade and Price Trends, 1986 edition. John Hopkins University Press, Baltimore, 1986, table 21, and also the World Bank, World Development Report 1990, op. cit., page 107.
22. The World Bank: World Debt Tables 1989-90. World Bank, Washington DC, 1989, volume 1, page xix.
23. Postel, Sandra: Water for Agriculture: Facing the Limits. Worldwatch Paper 93, Worldwatch Institute, Washington DC, December 1989.
24. United Nations Children's Fund: the State of the World's Children 1991. Oxford University Press, Oxford and New York, 1991, chapter 5.
25. Pearce, David: "Population Growth", in Pearce, David editor: Blueprint 2: Greening the World Economy. Earthscan Publications Ltd, London, 1991.
26. UNICEF, op. cit.
27. United Nations Development Programme, op. cit., page 177.
28. Some, by no means all, of the literature on the poverty/environment linkage is listed below for those interested to probe the subject further:

- Leonard et al., op. cit.

- Durning, Alan B., op. cit.
  Mellor, John M: "The Intertwining of Environmental Problems and Poverty", in Environment, November 1988.
- Barbier, Edward B: Sustainable Agriculture and the Resource Poor: Policy Issues and Options. LEEC Paper 88-02, London Environmental Economics Centre, IIED, London, 1988.
- Asian Development Bank: Economic Policies for Sustainable Development. Asian Development Bank, Manila, 1990.
- Foy, George and Daly, Herman: Allocation, Distribution and Scale as Determinants of Environmental Degradation: Case Studies of Haiti, El Salvador and Costa Rica. Environment Department Working Paper No. 19, World Bank, Washington DC, September 1989.
- Murdoch, William: The Poverty of Nations: The Political Economy of Hunger and Population. John Hopkins, Baltimore and London, 1980.
- Binswanger, Hans P: Brazilian Policies that Encourage Deforestation in the Amazon. Environmental Department Working Paper No. 16, World Bank, Washington DC, April 1989.
- Jagannathan, N. Vijay: Poverty, Public Policies and the Environment. Environment Department Working Paper No. 24, World Bank, Washington DC, December 1989.
- Pearce, David and Warford, Jeremy: Environment and Economic Development. Unpublished manuscript, forthcoming 1991.
- Gammage, S: "Poverty and the Environment", in Environmental Economics in the Development World: Report to the United States Agency for International Development. London Environmental Economics Centre, IIED, London, May 1990.

29. Barraclough, Solon and Ghimire, Krishna: The Social Dynamics of Deforestation in Developing Countries: Principal Issues and Research Priorities. UNRISD Discussion Paper 16, UNRISD, Geneva, November 1990, page 13.
30. Asian Development Bank, op. cit., pages 52-54.
31. Environmental Resources Ltd: Population Pressure and Natural Resource Management: An Assessment of Key Issues and Possible Actions by the ADB. Asian Development Bank, Manila, February 1990.
32. Time Magazine, April 29 1991, No. 17, page 54.
33. For example, this view was widely expressed at a seminar with representatives of NGOs discussing poverty and environment that the author attended in March 1991.
34. Brown, Lester R., "The New World Order", in State of the World 1991. Worldwatch Institute, Washington DC, 1991, page 6-7.
35. Asian Development Bank, op. cit., page 69. and Pretty, Jules and Sandbrook, Richard: The Primary Environmental Care Approaches: Building on Best Practice. IIED, April 1991 (mimeo, draft of paper for DAC).
36. Holmberg, Johan; Bass, Stephen; Timberlake, Lloyd: Defending the Future: A Guide to Sustainable Development. Earthscan Publications Ltd., London, 1991, page 36.
37. World Bank: Sub-Saharan Africa: From Crisis to Sustainable Growth. World Bank, Washington DC, 1989, passim.

38. Asian Development Bank, ibid.
39. Pretty and Sandbrook, op. cit.
40. For a fuller documentation of case studies of six PEC soil conservation in Mali, Burikina Faso and Kenya, see Critchley, Will and Graham, Olivia: Looking after our Land: Soil and Water Conservation in Dryland Africa. Oxfam in collaboration with IIED and ALIN/RITA, Oxford, 1991.
41. Agarwal, Anil and Narain, Sunita: Towards Green Villages: A Strategy for Environmentally Sound and Participatory Rural Development. Centre for Science and Environment, New Dehli, 1989, page 24.
42. McCracken, Jennifer; Pretty, Jules; Conway Gordon: An Introduction to Rapid Rural Appraisal for Agricultural Development. IIED Sustainable Agriculture Programme, IIED, London, 1988.
43. World Bank: World Development Report 1990, page 67.
44. Pretty and Sandbrook, op. cit., page 15.
45. Asian Development Bank, op. cit., page 55.
46. Mellor, op. cit.
47. UNDP, op. cit., page 26.
48. Asian Development Bank, op. cit., page 74-75.
49. Again, this view was expressed at the seminar in March 1991 referred to in note 33.
50. UNICEF, op. cit.

Annex: Illustrations and Case Studies

Chart 1:

Poverty/environment: the process of cumulative causation

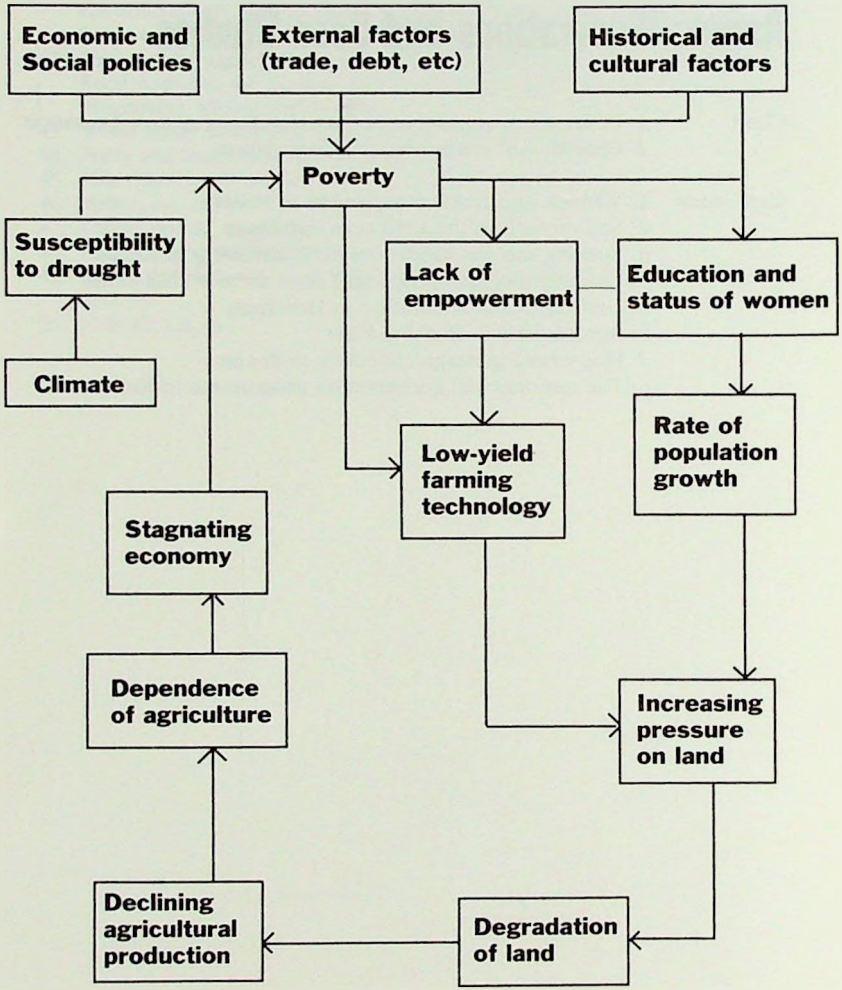
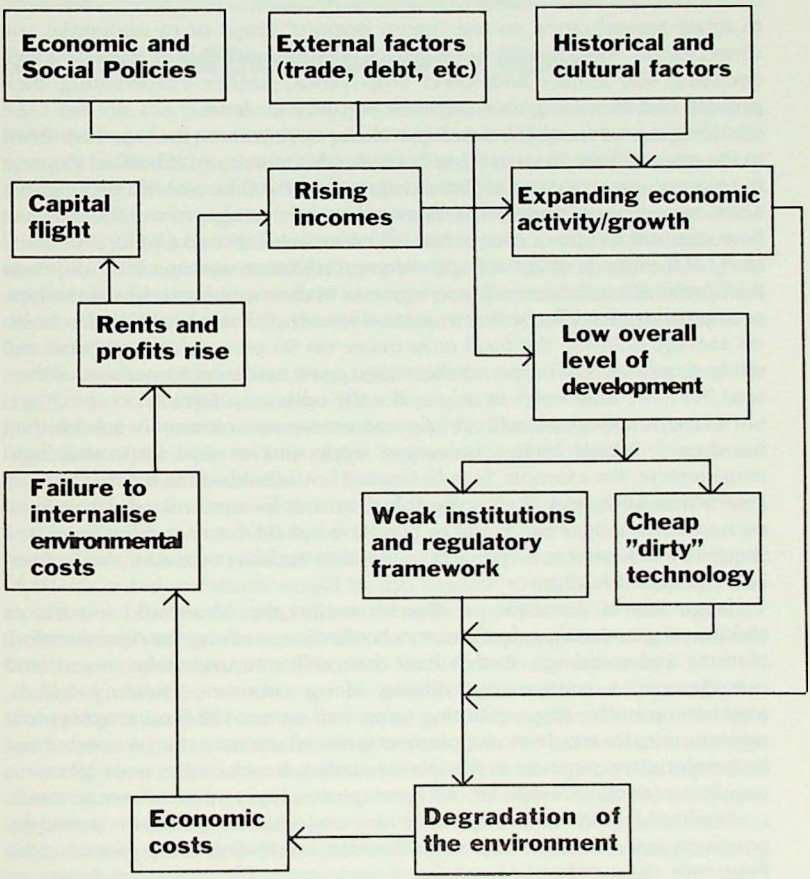


Chart 2:

Growth and environmental degradation



CASE STUDY 1: Women and Land Management in Malawi

In the agriculturally based economy of Malawi, declining soil fertility and soil erosion constitute a serious problem. The direct linkage between women, poverty and the environment is very strong. Female-headed households make up a large percentage (42 percent) of the "core-poor" households. They typically cultivate very small plots of land (less than 0.5 ha) and are often marginalized on to the less fertile soils and slopes as steep as 12 percent or more. They are often unable to finance agricultural inputs such as fertilizer, to rotate annual crops, to use "green manure" crops or to undertake soil conservation. As a result, poorer female-headed households generally face declining soil fertility and lower crop yields, further exacerbating their poverty and increasing their dependence on their land.

However, women's relationship with the environment is not just confined to the poverty link. Even in those households that are not classified as poor, the women are active participants in agricultural and household production. Thus, women's use, perception, knowledge and management of the land can be contrasted to that of men across all households. For example, a detailed study of the effects of agricultural commercialization among smallholders in the Zomba district of the southern region of Malawi emphasizes how the type of crops cultivated differ between men and women. Female-headed households on average cultivate the food crop maize on 90 percent of their land and rarely grow any cash crops, whereas men grow maize on 81 percent of their land, with the remainder mostly under the cash crop tobacco.

Women confront a multitude of constraints – non-existent or less binding for men – which hinder economic opportunities and improved land management. For example, female-headed households often have extremely low income and are unlikely to be able to raise sufficient financing from their own sources or to obtain credit to purchase hybrid maize and fertilizer: in a sample of 883 farmers 37 percent of the men and 28 percent of the women had purchased fertilizer.

Large labour demands on women within the household – such as childbearing and rearing, fuel and water collection, cooking, land preparation, planting and weeding – further limit their ability to undertake sound land management – constructing ridging along contours, building bunds, maintaining buffer strips, planting trees, and so on. Off-farm employment opportunities for women to supplement farm income may also be constrained by gender discrimination in the labour market; for example, male labour is usually preferred to female labour for wage employment on tobacco estates.

Smallholders in Malawi appear to be aware of the problems posed by persistent soil erosion – especially farmers cultivating steep slopes, who frequently cite problems of runoff and declining yields. Extension advice on how to deal with the problems posed by soil erosion is generally reaching only larger, male farmers who are credit club members. Extension messages

tend to be very general and are not customized to the needs and requirements of women, particularly the labour and other economic constraints they face. This is indicated in the relatively poor adoption of soil conservation measures by female as opposed to male farmers.

Source: Barbier, Ed: "Environmental Degradation in the Third World", in Pearce, David, editor: **Blueprint 2 – Greening the World Economy.** Earthscan Publication Ltd, London, 1991.

CASE STUDY 2: Soil Erosion in the Ethiopian Highlands

FAO AND THE GOVERNMENT of Ethiopia with finance from the World Bank in 1983-1985 carried out a study to present a rural development strategy for the severely eroded Ethiopian highlands. The study was a major effort absorbing a total of 292 man-months of professional staff resources. It was an attempt to address the vulnerability to drought and the severity of consequent famine which in 1972-73 had claimed some 250 000 lives in northeast Ethiopia and, again, in 1984 a similar number. It is possibly one of the most detailed field studies of land degradation, its causes and possible remedies. The study was never officially accepted by the Government of Ethiopia and is available in the archives of FAO.

The study estimated that over 1 900 million tons of soil are lost from the Highlands of Ethiopia annually. These losses are of productive top soil, and they are for all practical purposes irreversible. The study characterizes the highlands of Ethiopia as 'one of the largest areas of ecological degradation in Africa, if not in the world'.

One of the findings of the study (chapter 7) is that, if present trends continue, by the year 2010 some 38 000 sq.km of the highlands would be eroded down to bare rock, a further 60 000 sq.km would have a soil depth of 10 cm or below which would be too shallow to support cropping. This would mean that in that year almost 10 million people would have to derive their food and income from sources other than cropping their own lands, and that they would have to be absorbed elsewhere in the economy.

About half of this number would come from the regions of Eritrea, Tigray, Welo and northern Shoa, areas that today in 1991 are subject to major drought and famine. A paper written for the government in 1984, drawing on analyses covering recent decades, concluded that severe drought in Ethiopia has 'about seven to ten years recurrence'. The resultant famines, the paper suggested, would gradually become more severe as the process of soil degradation proceeded. With serious drought and famine resulting in many thousand deaths having hit the Ethiopian highlands in 1972-1973, 1984-1985 and again in 1990-1991 this forecast would not seem to be too widely off the mark.

The study notes the simple farming techniques practised by the Ethiopian peasants (chapter 5). A simple plough has been used in the highlands 'for probably 2 000 years, and the implement is still basically unchanged'. Most peasants keep their own seed from season to season, the use of improved seeds is negligible. Use of fertilizer is also very low, confined to 2,5 percent of land cultivated by peasants. Once seeds have been sown, little effort is generally spent in weeding.

Discussing the causes of land degradation in Ethiopia, the study (chapter 6) notes that the original natural vegetation over most of the highlands was forest or woodland. 'The growth of population has resulted in accelerating deforestation and the spread of cultivation and grazing to newer and frequently more marginal areas. ... Fundamentally, accelerated erosion may be regarded as the result of incorrect use of land, and the principle abuse is failure to recognize the protective role of vegetative cover'.

The study then goes on to discuss 'the many socio-economic conditions which contribute to degradation through inappropriate land use' and lists them under four headings: knowledge; resources; motivation; and organizational and policy arrangements:

Lack of knowledge. 'In much of the highlands there is, among both peasants and local officials, an awareness of the degradation problem but not of the underlying causes. Similarly, at the level of national government the problem is recognized, but understanding of the basic causes appears to be too limited – except possibly among those in the Ministry of Agriculture most directly concerned. Even here, awareness of solutions seems to be more or less confined to structural methods of conservation and reafforestation ... There appears to be little awareness at any level that land abuse is the major cause of the problem and that long-lasting and nationwide solutions have to be achieved through improved land use. Thus, for example, the Ministry of Agriculture has recently commissioned the preparation of a large animal health project which, if approved and successfully implemented, would increase the number of livestock ... and so put even more pressure on the overgrazed grasslands of the highlands'.

Lack of resources. 'The lack of land resources results in excessive population pressure, increasing cultivation intensities, deforestation and overgrazing, which puts the eco-system at, or well beyond, its carrying capacity at the level of inputs and technology currently being practised. The lack of inputs and financial and/or management resources prevents indivudual peasants, farmers' groups or the government from carrying out work or practising methods which would solve or prevent the problem on the scale and intensity now required.'

Lack of motivation. 'If the farmer has complete security of tenure and therefore thinks of his land as a personal asset, to be preserved, improved, and passed on to his descendants, he has a strong incentive to improve the soil, drain, plant trees, terrace the hillsides, etc. But if his tenure is temporary,

partial, circumscribed, or at risk, then his incentive is reduced, or may often become a disincentive (or an incentive to "mine" the land). In the highlands today the peasants do not have sufficient incentive to improve and conserve their land.'

Lack of appropriate planning, policy and organizational arrangements. 'The inappropriate use of land is being prolonged and in some cases even encouraged by inappropriate and occasionally conflicting policies (e.g. animal health, agricultural research) and inefficient organizational arrangements'.

Source: FAO: **Ethiopia – Highlands Reclamation Study, Final Report.** Report AG:UTF/ETH/037/ETH, FAO, Rome, 1986.

CASE STUDY 3: Ruining the Commons: Coastal Overfishing in Kerala

THE SEA OFF THE South-West coast of India, comprising the maritime states of Goa, Karnataka and Kerala, forms a relatively homogeneous aquatic eco-zone. The average fishery productivity potential in these waters works out to 30 tonnes per square kilometre making it the most productive fishing zone in India. The fishery resources off Kerala state are marked by a multitude of species attaining varying sizes at age of maturity. They are widely dispersed in the coastal commons. Each species is available in relatively small quantities, and there are complex prey-predator relationships between them as well as competition for food.

Kerala state has been the leading maritime state in India contributing 20-35 percent of the total fish harvest during 1956-1985. Fish catches increased steadily until 1973 and declined 1973-1985. In the main landing centre in Kerala the catch per unit effort declined from 83 kg/hour of fishing effort in 1973 to 20 kg/hour in 1984. The total demersal fish harvest in Kerala declined from 148 000 tonnes per year in 1971-1975 to 94 000 tonnes in 1981-1985.

When traditional technologies predominated the fish economy, the common property nature of the marine resource did not pose a major problem. Technical barriers, such as the need to have fishery specific skills, and social barriers, like fishing being the occupation of a lower caste, prevented free entry of capital and persons from outside the traditional fishing community into the fishery.

The introduction of mechanized boats and the perceived profit opportunities from prawn exports changed this scenario considerably. The merchant class of Kerala took the first initiatives to break the barriers, investing in the fishing, processing and exporting of prawns. With support from foreign aid (the Indo-Norwegian project) and state subsidies, the fishing industry was mechanized and the number of trawlers increased from a few hundred 1966 to around 2 800 1985. Meanwhile, the international market for prawns caused prices to

rise rapidly: the landed price of prawns increased seven-fold between 1971/72 and 1984/85, while prices for oil sardines and mackerel doubled.

The traditional fishing technologies were in general evolved to suit the particular ecological context of the seas off the coast of Kerala. However, the new technologies introduced were based on temperate waters and used trawling (the method of scraping the sea bottom with a bell-shaped net to catch demersal fish) or purse-seining (quickly encircling whole shoals of pelagic fish). Extensive and indiscriminate use of these techniques contributed very significantly to overfishing.

The impact of overfishing dampened the growth of the fisheries sector and widened the gap between it and the rest of the state's economy. The major economic brunt of this was taken by the fishermen and their families. Per capita income of artisanal fishermen fell by about 50 percent between 1974 and 1982. The availability and quality of fish sold in the local markets deteriorated while prices increased. While higher income households shifted to other and cheaper sources of protein, such options were not available to poorer households who had to bear the adverse nutritional impact.

Source: Kurien, John: **Ruining the Commons and Responses of the Commoners: Coastal Overfishing and Fishermen's Actions in Kerala State, India**. Research paper for UNRISD, undated (mimeo).

CASE STUDY 4: Health Problems in Rich and Poor Areas within Cities

Bombay and Delhi, India: In some low-income settlements **(bustees)** in Delhi, the child mortality rate was 221 per 1 000 but reached nearly twice this rate among poorer castes within these settlements. In Bombay, the crude death rate on Bombay island (the central city area) was twice as high as that of the suburbs and three times that of the extended suburbs.

Bangladesh: In 1978, the infant mortality rate in 'urban slums' was 208,5 per 1 000 live births, more than twice the rate for 'non-slum' urban areas.

Urban areas in Guatemala: Infant mortality rates for different population groups in urban areas vary from 113 per 1 000 for the children of illiterate women in the poorest socio-economic group to 33 per 1 000.

Karachi, Pakistan: In three low-income areas, between 95 and 152 infants per 1 000 live births died before the age of one; in a middle class area, only 32 per 1 000 died.

Manila, Philippines: A series of surveys in the mid-1970s revealed the disparities between health problems in a large squatter settlement (Tondo) and other non-squatter areas of the city. In Tondo, the level of severe malnutrition among infants and young children was three times the level for non-squatter areas. Tondo's infant mortality rate was 210 per 1 000 live births compared to 76 for non-squatter areas in Manila. The proportion of people

with tuberculosis in Tondo was nine times the average for non-squatter areas, while diarrhoea was twice as common. In Tondo, anaemia was twice as common and typhoid four times as common.

Panama City, Panama: A study in 1979 found that of 1 819 infants with diarrhoeal diseases, 68 percent came from those living in slums or shanties with zero infection rates observed among children in better quality housing.

Sao Paulo, Brazil: Infant mortality rates can vary by a factor of four, depending on the district. In the core area, 42 infants die before the age of one for every 1 000 born alive, while in one of the predominantly poor peri-urban municipalities the rate was 175 per 1 000 live births. Infant death rates from enteritis, diarrhoea and pneumonia on the city's periphery were twice as high as in the core area.

Source: Hardoy, Jorge E., Cairncross, Sandy and Satterthwaite, David editors: **The Poor Die Young: Housing and Health in Third World Cities.** Earthscan Publications Ltd, London, 1990, pages 15-16.

CASE STUDY 5: Low Input Soil Restoration in Honduras

In 1983 NGOs working in Honduras began experimenting with green manure crops that could be grown while incurring no cash costs, using no land that has an opportunity cost, and requiring a minimum of additional labour. The objective was to restore soil quality in areas where it had deteriorated badly due to increasingly intensive farming of marginal, poor lands. The systems tried could include growing green manure crops during the dry season, or intercropping them with traditional maize crops. By 1987 it was obvious that farmers preferred intercropping of velvetbean *(Mucuna pruriens)* which had proved to be the best adapted species for most of Honduras. However, management practices for intercropped velvetbean still had to be developed and tested.

In early 1987 the Cantarranas Integrated Development Programme was launched by the same NGOs. The programme identified soil restoration as its most important challenge and adopted a goal of tripling farmers' traditional basic grain yields through the use of entirely on-farm sources of fertility. Traditional yields of maize, found to average 850 kg/ha, would be tripled using neither chemical nor organic fertilizers originating outside the villagers' farms.

Farmers were shown velvetbean experiments and told that no ready-made management solutions existed to management of intercropping with maize. However, several alternative options were available. After scores of experiments and the cross-fertilisation of ideas between farmers, the most common practice became to plant vetvetbean and maize simultaneously

(thereby saving labour) and prune back the vetvetbean twice to about knee level.

The results have been very promising. Soil colour, tilth, and drought resistance of crops have visibly improved where velvetbean has been used. The vetvetbean can fix as much as 150 kg nitrogen/ha, and the increased organic matter has made it unnecessary to apply any additional fertilizer. No subsidies or give-aways are provided to farmers, and all the village teaching is done by villager farmers who have themselves already succeeded in improving their yields. The programme believes that no one from the outside can understand what will motivate a farmer to change better than a neighbouring farmer who has just made some major changes.

The Cantarranas Programme, already after three and a half years, was working with over 600 families. Nearly all of these had made contour rock walls or ditches to stop erosion, most had experimented with in-row tillage, some 90 farmers had already tripled their previous average yields, another 200 were expected to reach that goal within another few months, at least 50 farmers had multiplied their incomes from horticultural crops by more than five times. Now at its halfway point the Programme expects to have spent about USD 400 000 at the end of seven years of work and to have reached some 1 300 farmers by that time. If the rains permit, it should by then have helped some 1 000 farmers to triple their basic grain yield, another 350 or so would have tripled their yield through spontaneous spread of the programme technology.

Source: Bunch, Roland: **Low Input Soil Restoration in Honduras: The Cantarranas Farmer-to-Farmer Extension Programme.** IIED Gatekeeper Series No. 23, IIED, London 1990.

CASE STUDY 6: Agroforestry in Burkina Faso

The Agroforestry Project (PAF) of Yatenga Province in Burkina Faso has built up a reputation of being one of the most successful soil and water conservation projects in sub-Saharan Africa. The project has been carried out with Oxfam support since 1979.

It is located on the central plateau of the country, where rainfall has decreased significantly from the long-term average of 720 mm/year to 440 mm/year within the last 20 years. Not only is rainfall low, but it is also very unreliable. The project area has the double problem of high population density and severely degraded land. Over half of the land is now under cultivation and little or no fallowing is practiced. Much of the remaining land is eroded, encrusted with a hard cap and cannot be cultivated without improvement. Overgrazing adds to the problem.

Early efforts to improve land and increase cereal production were generally unsuccessful. In the 1960s under a large scale, internationally funded project heavy machinery was used to construct earth bunds over entire catchments, whether the land was used for agriculture or not. The work was carried out without any active participation by the local people, who did not bother to maintain the bunds which quickly lost their effectiveness.

PAF first aimed to improve tree planting using "micro-catchment" techniques which collect rainfall runoff and concentrate it around tree seedlings. However, gradually an increased attention was devoted to the restoration of degraded land. Traditionally simple stone lines had been used to help reduce erosion in fields, but this practice had largely been forgotten. Through discussions with the people PAF resurrected the technique and improved it by building the stone lines along the contour. Contour stone bunds became the focus of the project's attention from 1982. In combination with stone bunds, another traditional technique was reintroduced. It involved preparation of wide and deep planting holes to collect and concentrate runoff water for improved plant growth, placing manure or compost in each hole.

The combination of contour stone bunding and deep planting holes lead to rapid benefits for farmers. Yields were often improved by 40-60 percent in the first season after the land had been treated, and even in very dry years these techniques ensure some yield. They have therefore proved very popular, and by 1989 some 8 000 ha in over 400 villages had been treated with stone bunds.

PAF's training and extension system is the cornerstone of the success. The project collaborates closely with the national extension service. A very effective farmer training programme has enabled thousands of farmers to use simple surveying equipment to lay out contours in the fields and build improved bunds.

Planning and coordination of conservation activities is carried out through village committees, and the local people participate in all stages of planning and implementation. Conservation work is normally carried out by groups on a voluntary basis in fields belonging to members of the group with the owner of each field paying for the work with food. A minimum of incentives is provided by the project and then only in response to a specific need, for example a shortage of work tools. However, there is some concern that project benefits do not reach the very poorest farmers who have difficulties to provide food for group labour. To address this problem PAF has made food available to village committees to loan to the poorest farmers to enable them feed groups working on their fields.

Source: Critchley, Will and Graham, Olivia: **Looking after our Land: New Approaches to Soil and Water Conservation in Dryland Africa**. Oxfam in collaboration with IIED and ALIN/RITA, Oxford, 1991.

CASE STUDY 7: Household Garbage Collection in Recife

MOST DEVELOPING COUNTRY governments perform poorly in collecting and disposing of urban household waste. An estimated 30-50 percent of solid waste generated within urban centres is left uncollected, in some cities the proportion is higher.

Poorer households suffer most from the health hazards resulting from uncollected garbage. Many live in settlements regarded as illegal by the public authorities, and there is no recognition of their need to public services. Often most poor households are in the poorest municipalities which have the least resources to pay for public services. In addition, many poor settlements are located on difficult terrain, for example steep hills, where houses are built close together with access to them only by pathways. Conventional garbage collection trucks therefore cannot get close to them.

Meanwhile, most engineers and public officials see the solution to the problem as an increased use of large, sophisticated collection trucks and solid-waste treatments plants whose cost is far beyond the means of local governments.

The municipality of Recife in northeastern Brazil has grown rapdily in recent years, its present population is 1,3 million inhabitants. It suffers increasingly serious problems of declining financial resources, growing population, worsening pollution, low efficiency in service provision and growing demands from local inhabitants. Within the boundaries of the municipality there were in 1985/86 195 neighbourhoods classified as **favelas** covering an estimated 15 percent of the city's inhabitable area but housing about half of its population. Some 75 percent of the households in the **favelas** earned less than USD150 per month. Since the inhabitants were too poor to pay for garbage collection, rubbish was usually left uncollected.

Drawing on experiences from a neighbouring municipality a pilot project was started in one **favela** with a population of 15 000 to ensure effective collection of refuse from every house. The first stage involved development of a piece of equipment appropriate for rubbish collection in the particular conditions of the terrain. This was a simple device consisting of a basket hanging from two poles held at either side by one person. Local workers were hired and trained to collect the rubbish with the help of the basket. Collection routes were designed in such a way that the two-person team would always carry the basket full downhill. In strategic points small containers were placed from where the garbage was collected by lorry and brought to a composting and recycling plant built with simple techniques and locally available materials. There re-cyclable matter (glass, paper, plastic, etc.) was removed by hand, classified and finally sold. The compost was eventually used as organic fertilizer and sold for use within the municipality.

The system is very labour intensive and has proven effective for adequate collection of refuse in the rough topographical conditions of the **favela**. The

volume of garbage collection increased from three tonnes a day under the old mechanized system to six tonnes. The higher collection rate has considerably reduced health hazards for the local inhabitants, particularly children, as people have ceased disposing of their refuse in the open spaces. In addition, the system has generated employment among local residents.

With the positive results from the pilot project in this **favela** the municipality decided to expand the collection system to cover similar poor and hilly settlements throughout the city, with a potential coverage of some 200 000 of Recife's poorest inhabitants. It is hoped that this expansion of the system will combine the goals of generating employment, eliminating (or at least reducing) garbage transport costs, cost recovery through the sale of recycled materials and organic compost and, in general terms, reaching a more appropriate solution from a sanitary, environmental and cultural point of view.

Source: Stenio de Coura Cuentro and Dji Malla Gadji: "The Collection and Management of Household Garbage" in Jorge E. Hardoy, Sandy Cairncross and David Satterthwaite, eds: **The Poor Die Young: Housing and Health in Third World Cities**. Earthscan Publications Ltd, London, 1990.

CASE STUDY 8: The National Soil Conservation Programme in Kenya

THE NATIONAL SOIL conservation programme in Kenya started in 1974 on a small scale and has gradually expanded into a national wide programme. Supported since its inception by SIDA, it has so far been mainly concentrated to the high and medium potential areas of the Kenyan highlands.

These areas cover some 20 percent of the country but include over 85 percent of the rural population which is growing at one of the world's highest rates (about 4 percent per year). The pressure on arable land is intense and will increase further in future years. Potential arable land per capita in Kenya was estimated at 0,4 ha in 1980, the projected figure for the year 2010 is 0,12 ha.

The main project concept was to improve farmers' cropping practices to avoid a need to revert to legislation banning areas susceptible to erosion. An educational approach was adopted to convince farmers that conservation would not only maintain but also improve their yields, and a broad education and training programme was launched through the extension service of the Ministry of Agriculture. One component of this programme was long term training of extension officers, government officials and primary school teachers.

The technical components of the programme were kept simple and adjusted to the means of poor farmers. Farmers were given advice through the extension service on how to control erosion by growing grass in strips

on the contour or, in more erosion prone areas, digging terraces. Suitable grass and tree crops were provided for planting on terrace edges to enhance stability.

The practical work was carried out by individual farmers with advice from extension agents. Heavy work like digging terraces was done by local farmers' groups, often with women in large majority. The programme provided limited material support in the form of handtools, planting materials and seedlings.

After a modest beginning the programme gained momentum during the early 1980s. By 1990 some 800 000 small farmers had carried out soil conservation measures on their land, and it is now difficult to travel on the highways in the Kenyan highlands without seeing these measures on either side of the road.

Some of the factors contributing to success include

- start on a small scale and slow expansion into a national programme;
- the programme has throughout been implemented by existing government institutions at central and local levels;
- education has been the main tool to achieve programme objectives, and the education messages have been kept simple and easily understood;
- a flexible technical package was devised that allowed adaptation to local conditions and income levels of poor farmers;
- the programme has throughout enjoyed strong political support from the government of Kenya;
- long term commitment by the government of Kenya and by SIDA.

Source: SIDA records

This publication arises out of an in-house analysis of SIDA´s own work with poverty and environment. It was prepared for the secretariat of the 1992 United Nations Conference on Environment and Development. The point of departure is the dictum of the Brundtland Report that poverty is a major cause and effect of global environmental problems.