The Environment and Poverty

June 2001

Thomas Sterner
Mats Segnestam

SWEDISH INTERNATIONAL DEVELOPMENT
COOPERATION AGENCY

Department for Natural Resources
and the Environment

The environment and poverty

Thomas Sterner, Professor in Environmental Economics, University of Gothenburg.
Mats Segnestam, Head of the Environment Policy Division at Sida.

The authors would like to thank Anders Ekbom, AnnaLena Erkén, Inge Gerremo, Iftekhar Hossain, Maria Schultz, Johan Sundberg and Mario Zejan for comments and Anette Almlöf and Katarina Renström for research assistance.

Foreword

Contributing to the reduction of poverty and working for sustainable development that takes the environment into consideration are two essential objectives for Sida and, in all likelihood, for all programmes of development cooperation. However, the relationship between these objectives is far from simple. When Sida (SIDA) published its first paper on the subject some 10 years ago, the theme was regarded as new and many thought there was an inherent conflict between welfare and environmental objectives.

In the Sida paper of 1995, "Poverty and the environment", we wrote, "There are a great many aspects to the environmental and poverty problems in the world. When they are discussed together, simplifications are inevitable... Local and individual perspectives must always be taken into consideration when the relationships between poverty and environmental degradation are analysed in practice.... None the less it is important to try and synthesise some of these relationships and the problems associated with them, since there is a tendency to underestimate the difficulties environmental degradation creates for the long-term struggle against poverty, and therefore there is the lingering myth that economic growth, regardless of what it is based on, solves both environmental and poverty problems at the same time".

These words are still valid, but during the last few years we have learnt a lot. The environment and poverty now constitute a complex host of subjects which are being analysed in many places, including the World Bank and OECD/DAC. In Sweden we have been able to intensify our analysis of the relationships with the aid of our cooperation with the Unit for Environmental Economics at Gothenburg University and Professor Thomas Sterner who has written this paper together with me.

Mats Segnestam

Head of Sida's Environment Policy Division

Table of Contents

Poverty, environment, conflicts – ten important points

1. We live in a unique epoch. Never has the number of people in the world grown at such a fast rate as during the last few decades – people who have legitimate demands on the resources necessary for their survival and welfare. At the same time many of the natural resources on which we all depend have never been depleted at such a rapid pace as today.

2. Poor people are directly dependent on renewable natural resources for their livelihoods to a greater extent than the well-to-do. The very fact that poverty in the world is not decreasing more than it has done but, on the contrary, is in danger of increasing, due to environmental degradation and the depletion of resources.

3. The increasing use of natural resources and energy gives rise to local and global pollution which threatens production and health. Where many substances are concerned, the capacity of nature to take care of pollution has been exceeded. Poor countries and poor people are severely affected by pollution and often lack the resources to take proper care of substances which put a strain on the environment.

4. There are two sides to the challenge – to successfully reduce poverty and to successfully restore the productivity of depleted ecosystems. The two sides of the challenge are also inseparably connected with each other: in order to be sustainable, every strategy to reduce poverty must also take environmental and resource aspects into consideration. Successful environmental work benefits the poor in particular.

5. Poor people and countries are obliged, more often than well-to-do people and countries, to use methods to make a living that deplete natural resources and this thereby has an effect on long-term productivity (which does not mean that poor people are responsible for the most serious environmental effects in total). The underlying causes of this situation must both be understood and handled better.

6. The incomes of poor people must increase in order to eliminate poverty. If economic growth is a prerequisite for this, the conditions for growth must be understood from the perspective of sustainability and must therefore take the content of growth into consideration. In order to be effective and have lasting effects, a poverty programme must also take issues of sustainability into consideration.

7. Poverty is increasingly an urban problem. Since it is impossible to make a living in the rural areas, people move to the towns in the hope of a better life. All the work done to reduce pollution of water, air and food in the cities benefits the poor since they are particularly exposed to the pollution problems resulting from uncontrolled urbanisation and industrialisation.

8. Urbanisation involves the massive transportation of nutrients from the rural soils. These nutrients must be restored so that the ecocycle can be completed. Where rural areas are concerned, the restoration of depleted natural resources should involve active efforts to reduce poverty. If the prospects of making a living in rural areas are improved, by creating job opportunities and by re-establishing production capacity, the pressure to move to the towns will diminish.

9. The understanding that it is necessary to restore depleted natural resources, and to continue to work thereafter to ensure that the natural resources are used sustainably, can prevent conflicts, since it forces groups and individuals to work together towards a common goal on which everyone is dependent. The risk that conflicts may arise due to a lack of resources and the emergence of greater numbers of environmental refugees must be taken very seriously.

10. Today there is a lack of sustainability in the use of natural resources. At the same time there is considerable potential that is not used – the productive capacity of those people who are involuntarily shackled in poverty. Combining the urgent need of poverty reduction with the absolute requirement for the sustainable use of natural resources and the environment is both possible and necessary. It requires considerable national and international interventions in the forms of knowledge, capital and institution development, but is an investment that will benefit both industrial countries and developing countries.

1 Seeking links between two complex issues

There is a close relationship between poverty, the depletion of natural resources and environmental degradation. The poor have few resources and are often forced to live in marginal areas. Here the ecosystems can easily be further depleted due to overexploitation. This, in turn, leads rapidly to deeper poverty. The relationships are complex and are inexorably influenced by the type of environmental degradation in question, the poor groups that are affected, and the definition of poverty.

Poverty interacts intimately with the degradation of the environment and depletion of resources. Poverty is often a result of environmental degradation in developing countries and can sometimes also be one of its causes. When ecosystems such as grazing lands, coastal zones, wetlands or forests are overexploited, the people who usually collect wood, water and medicinal plants in these areas are inevitably affected. Grazing, hunting and fishing are also affected strongly. A very large proportion of the world's population live along the coasts and are totally dependent on coastal fishing and other similar resources which are now being subjected to unreasonably great strains.

There are certain types of environmental problems which are particularly exacerbated or even caused by poverty. In rural areas the problems can be soil erosion, overgrazing, the depletion of vegetation, deforestation (and thereby loss of biological diversity). For communities living by the coast the problems can include the degradation of the marine environment and for urban communities environmental problems associated with urban pressures. Since urban problems and rural problems are fairly different they will be treated separately in this paper. However, it is important to remember that there are many links between urban and rural areas.

Poverty and environmental degradation affect each other and the relationships between them are both direct and indirect. Poverty contributes directly to environmental degradation since very poor people simply do not have, or cannot refrain from using, the resources necessary to protect the environment. Poverty contributes indirectly to environmental degradation since poverty tends to be associated with a number of other problems such as limited knowledge on new ways of making a living, a lack of land, high birth-rates and sometimes a strong tendency to think in terms of short-term survival.

Is it poverty or growth which is the threat to the environment?

It is true that there are links between poverty and the environment but no simple causality. There are debaters who are of the opinion that poverty leads to environmental problems, but there are also many (sometimes the same persons) who are of the opinion that "growth pollutes". Taken together these two claims are of course illogical and illustrate the danger of making simple generalisations. This paper can be read to advantage together with an earlier paper on "Growth and the Environment", published by Sida.

Some people exaggerate poverty as a cause of environmental degradation. At worst it is claimed that environmental degradation is "the fault of the poor", that they destroy natural resources: they are uneducated and think in a short-term perspective, and thereby cause envi-

ronmental degradation which leads to further poverty. A short-term perspective and a lack of technology can naturally exacerbate any situation, but at the same time it should be emphasised that, in general, the poor consume considerably fewer of the resources around them than the rich. Many poor people are forced to live in small, often ecologically sensitive and relatively low productive areas and nevertheless destroy these marginal resources. It is not the fault of the individual that he/she is one person among many who is reduced to being crowded into an area with limited productivity. It is often the case that a small percentage of the population own the best and most productive land whilst others are pushed out to the least suitable lands.

The word "environment" is still associated by many people with problems concerned with luxury or with complicated ecological principles which are esoterically compared with the everyday struggle of poor people for their daily bread. This is partly due to the fact that one thinks of a number of local environmental problems in Sweden. For us environmental problems are often related to our consumption of "environment-related" services or experiences: landscapes, views, forest walks and recreation. Even if these are important to us, there is something to be said for the idea that basic, primary consumption needs (food, clothing and so on) should be met first before recreation values are requested. For many poor people relevant environmental and natural resources should not be seen in the first place as aesthetic consumption but as productive capital goods. Grazing land, water and fuel are productive resources which the poor need in order to make a living. It can also be a question of primary consumption goods such as water. This is the reason why environmental resources are of such vital importance for many poor people.

Environment, nature and poverty

Sometimes there are clear links between poverty and the environment, for example, when poor people collect fuel wood in arid areas. They contribute to the further depletion of the plant cover and this, in turn, diminishes their prospects of making a living. Just over one billion people are considered to live in areas which are threatened by desertification or soil erosion. With global climate change, more drought and higher temperatures can be expected and, as a consequence, water shortages, soil erosion and desertification, which will make environmental refugees of additional millions of people.

Source: Global Water Partnership

The distribution of natural and economic resources must be given close attention. Economic growth has the effect that many people, perhaps the majority, enjoy a better life, but sometimes this is at expense of a few. It is often the case that these few people are among the absolutely poorest. Sometimes they are also marginal groups in both the social and ethnic sense of the term. They often live in ecologically marginal areas with low fertility due to uneven precipitation, steep slopes or other causes. In this context, a further small deterioration in fertility of the land can have serious consequences for the poorest people.

Land in the Lake Victoria basin

The land around Lake Victoria is being eroded, nutrients are being washed away into the lake. The soils are becoming depleted and the size of the harvests is diminishing. Poor people are either forced to make do with smaller harvests, or to move to areas that are even more marginalised. These areas can be steeper slopes converted into cultivable land – which also leads to erosion. The soil is accompanied to the lake by pesticides from the cotton plantations. They pollute the water and are taken up in the food chain.

The use of slash and burn farming in the tropics is a short-term solution for poor people. The biomass is part of the vegetation. If this is burnt, the land will be fertile for a couple of years but thereafter it will be rapidly depleted. A reduction in the size of the harvests forces the farmers to burn the already small forest lands. The needs of coal and wood also have the effect that forest cover is reduced. It is estimated that some 90 per cent of the original forest in areas around Lake Victoria have been felled for housing purposes and for conversion to cultivable land.

Source: Jansen (1997); Sida (2001); Sida (1999); Ehlin Consulting (1997)

Issues pertaining to democracy are also important in view of the relationships between the environment and poverty. Even when poor people are aware of the causes of environmental degradation, they seldom have the opportunity to exert an influence on political decision makers. Poor groups that are most dependent on natural resources are often ethnic minorities or other marginal groups. They have little or no influence over the decisions made by others which concern their existence.

Poverty and the environment are multi-faceted and complex phenomena. It is not possible to make an exhaustive description of the relationships since there is not just one relationship but rather several different relationships in each specific situation. Section 2 and 3 go into greater depth on the content of the concepts of environment and poverty. Section 4 gives a review of a number of fundamental relationships, and sections 5 to 7 are dedicated to concrete types of relationships in rural areas, urban areas, regionally and globally.

2 Environment and natural resources

The word environment is difficult to define. It derives from a French word meaning surroundings or vicinity. The concept can be broken down into, for example, the natural environment, the legal or institutional environment or the cultural environment. It is quite natural to imagine that surroundings are of great significance to how people manage to survive in a community. This applies to both the natural environment and the socio-cultural environment. In a region where the poor have high rates of mortality due to poor nutrition and poor water quality, economic growth and social structure will be permeated by these factors. Inequality in the access to resources such as water, food and a clean, safe environment implies a considerable inequality in opportunity. In a community where everyone has access to health care and education, many more manage to make ends meet and it is reasonable to believe that these factors also contribute to a greater degree of equality in income.

By definition the poor have few resources of their own and are therefore particularly dependent on what is available in the environment around them. Particularly important are the different types of *natural resources.* If, for example, there is clean and safe water, the opportunity to fish, fuel wood or grazing, even those born without property have a better chance of making a living. Environmental factors such as poor air quality, polluted water, harmful insects and diseases constitute a much more dangerous threat to the poor than to those with the means to protect themselves.

Felling of mangrove forests – a great threat to poor, local communities

A large part of the people in the world live in coastal areas or in estuaries. This is the case for 80 per cent of the population in South East Asia. This has the affect that fishing is an extremely important source of food and income. Marine fish species are dependent, at some time in their life cycle, on the mangrove-estuary habitat.

More than 50 per cent of the world's mangrove forests have disappeared. In many countries the main reason for the felling of mangrove forest has been to establish shrimp farms. When the mangrove forests are felled, the fishing for local people disappears, which inevitably leads to a reduction in protein intake and an increase in poverty. Fish is the primary source of protein for one billion people. Mangrove is classified as a key species that also maintains balance in the ecosystem since it constitutes an important source of protection against floods, hurricanes and erosion.

Sources: Rönnbäck (2001); Hinrichsen (1998)

One conclusion that can be drawn is that environmental problems are *more important* in poor countries even though these are somewhat different from those we are accustomed to. The problem may concern access to different services or goods which are provided by different natural resources, as well as local environmental issues which concern the immediate surroundings. Polluted drinking water and poor air are still among the primary causes of death in most poor countries. These are environmental problems that we do not think about in Sweden since the water here is good and, if the quality of water was likely to be of poor for some days, we would be warned of this and would drink bottled water. If we are sick, health care is cheap and efficient. However, if the quality of water deteriorates in Calcutta, this affects the poorest people who cannot afford to drink anything else, see a doctor or buy medicines when they are ill. For further examples, see sections 4 to 6 and Ekbom and Bojö (1999). This paper illustrates how the very poorest, those who benefit most from natural resources, are also those who are most vulnerable to deterioration of the environment.

However "the environment" is a composite concept which does not end in the immediate vicinity. This "local environment" or local ecosystem is dependent in turn on regional and global ecosystems and environmental conditions. Balance in the climate system is being threatened due to the emission of so-called greenhouse gases. The ozone layer is being depleted by CFCs. The diversity and resilience[1] of ecosystems are being threatened by both metals and synthetic poisons. Acidification and eutrophication are still increasing in many places.

Much of what we call cleaning, and even environmental conservation is not really based on removing or avoiding emissions, but moving them. When we wash, clean our homes or wash

[1] In this context resilience means the capacity of nature to resist pollution and other forms of stress.

our clothes, the dirt is not "destroyed" but moved (with a large addition of chemicals and water) to the nearest water course. The production of the energy required for these purposes often results in further strains on the environment. When we eliminate smoke from our homes by going over to cleaner fuels (such as electricity), the environmental problems are moved for example to the vicinity of the power plants. When we build chimneys it is quite obvious how we are moving the smoke further away, and it is the same case with wastewater pipes. This can be positive since, if pollution is sufficiently diluted, natural ecological processes can take care of it and it ceases to be a problem. However, for other types of pollution this is not the case and dilution merely has the effect that the problems are made more difficult to handle. When we changed refrigeration techniques (many decades ago) from ammonia to CFCs, we eliminated a very obvious local health risk but it has proved to be the case that we have acquired global damage to the ozone layer instead.

With better welfare and technology we have a natural tendency to take on and solve immediate local environmental problems. This improvement of (the local) environment is intimately associated with higher incomes and is reflected in the *positive relationships* which can be found between certain environmental issues and income. These are summarised in so-called Environmental Kuznets Curves, (EKC), see Sterner (2000) on the relationship between growth and the environment. The question is, however, where has all the pollution gone? Sometimes it is diluted, or substituted by less hazardous substances and processes, but the pollution is often moved so that it affects people or ecosystems further away from its source.

It is true that research into EKCs shows that local environmental problems of water pollution and poor quality indoor air are "solved" by rising incomes. On the other hand, the regional problems, for example emissions of sulphur dioxide, continue to be exacerbated up to a point where the situation is improved, while global problems, for example carbon dioxide, simply seem to continue to be exacerbated with rising incomes. Some of the regional environmental effects are due to increases in the supply of energy (or materials) to solve local environmental problems. As pointed out in the paper on "Growth and the Environment", there is nothing that is predetermined as far as EKC curves are concerned – they can vary between countries and from one point in time to another. They can also be affected a great deal by changes in technology and by far-sighted policies. Nevertheless the fact remains that regional and global pollution can be more difficult to remedy than local pollution and one of the reasons for this could be the tendency to move the problems rather than solve them.

In other words there are links between large-scale and small-scale environmental problems. We do not yet know exactly what the global climate effects caused by fossil energy will be, but probably they will have "local" effects, for example in the form of higher frequencies of severe storms and other unusual weather phenomena. Recently we have seen a strengthening of El Niño and other severe hurricanes, for example in Orissa or in Central America ("Mitch"). It is not certain that these are the result of the greenhouse effect, but they can illustrate what is expected to be a pattern of the climate in the future, in which unpredictability is a factor and where extreme situations – and not average values – determine how severe the strains will be.

Increase in poverty after Mitch

The hurricane Mitch, which swept over Central America in the autumn of 1998, claimed thousands of lives and left over one million people homeless. Honduras was one of the countries most seriously affected. Large parts of the capital city, Tegucigalpa, were destroyed by the torrential rain which followed the hurricane. Even before the hurricane, social conditions were difficult for the poor people in the city – who were those most severely affected by Mitch. Extremely bad weather, long-term climate change, serious environmental degradation, poverty, population growth, social injustices – all constituted factors which contributed to the lethal result. In rural areas the hurricane led to the destruction of plantations, the exposure of mountain slopes and landslides, with the result that harvests were lost and cultivable land was simply washed away. What human factors contributed to trigger off the disaster? Increases in the greenhouse effect, deforestation, the location of plantations and other forms of cultivation on steep slopes, excessive grazing and road construction in sensitive mountain areas. This had the affect that an increasing number of people left the rural areas for the cities in order to find a way to make a living and this has exacerbated many environmental problems in the cities. The exploitation of natural resources in Central America is permeated today by mismanagement. This increases vulnerability and constitutes a threat to development in the region in the long term.

Source: Red Cross (1999); Sida's sector information (1999a)

The global environmental problems also interact, in turn, with other local changes to the environment, for example the destruction of ecosystems that offer natural protection (mangrove swamps around the coasts or forests on mountain tops and slopes). The effects of, for example, floods and landslides are much greater since more people live in sensitive and depleted ecosystems. Those affected are, to a great extent, the very poorest and it is mostly the rich who contribute to this global problem. Protein intake is threatened, not least for the poor people living near the coast whose main source of protein is fish. Some 60 per cent of the world's stocks of fish are being overfished and many more local fish stocks are seriously affected. In recent years extensive coral bleaching and coral death have occurred on the coral reefs of the world. The reefs are under stress on account of a number of factors, both local in the form of pollution, shipping traffic, harmful fishing methods, and regional or global in the form of higher water temperatures. Thus there is interaction between the problems associated with fish, coastal zones, coral reefs, storms and greenhouse effects.

3 Poverty

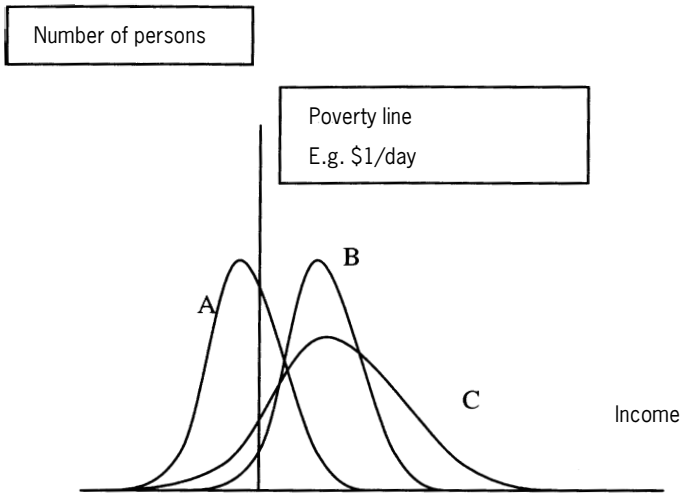
Poverty can be defined in a number of different ways: through absolute or relative criteria, through monetary indicators or physical indicators such as nutrition and health, in relation to objectives such as a dignified life, resources to be developed and so on. The absolute indicators in the form of money or physical variables such as food are the most simple to define, but the most relevant indicators seek to reflect the possibilities available to people to lead a life in dignity including the possibility to develop and to exert an influence on their surroundings.

[2] See Bigsten & Levin (2000) who use the so-called Gini coefficent as an indicator of the distribution of incomes or inequality.

Measuring "poverty" is complicated. It is a deep-rooted custom to think in terms of poor and rich *countries*. However, poor in this context means, in the first place, poor people and it is important to understand that poor people can be found in both rich and poor countries.

Every country has a certain distribution of income (see figure 1) and the number of poor people depends partly on the country's average income and partly on the distribution or spread of income in the country. Global inequality seems to have increased during recent decades.[2]

Figure 1 Poverty, individual and national



Absolute poverty is based on the determination of a "poverty borderline" or "poverty line". It is true that this is arbitrary but it can, and should be, based on material needs of food, clothing and protection. It naturally also has a historical basis and it is probably inevitable that values and comparisons with the incomes of other persons enter the picture here. In a modern society certain goods are essential, not least to obtain and perform a job. These include "socially necessary goods" for example clothing, education and a fixed address, depending on the context. In figure 1 country A is "poor": the average income is low and a large proportion of the population are under the poverty line (but there are also a number of more or less rich people). Countries B and C both have high average incomes but differ since country C has a wider distribution of incomes which has the affect that also C has a larger number of poor people. In the USA there are many millions of very poor people while in India, for example, there is an extremely large and prosperous middle class and many rich people. When we speak about poverty we must carefully define whether we are referring to poor individuals, countries with a low average income or possibly marginal ethnic groups (minorities or particularly poor occupational groups or regions in a country).

Facts on absolute poverty

The World Development Report 1999/2000 shows that the number of poor – based on the simple criterion that they live on less than US$1/day – is still greatly in excess of a billion people and this figure increased by several million from 1987 to 1998. However, the proportion of poor people has decreased since the world population has increased more rapidly. In Asia (particularly China) the number of poor people has decreased considerably but unfortunately it has also increased in other areas: Sub-Saharan Africa, Latin America, Eastern Europe and South Asia, see table 1.

Table 1. Millions of poor people (under $1/day)

	1987	1998*
East Asia and the Pacific Region	417.5	278.3
Eastern Europe and Central Asia	1.1	24
Latin America and the Caribbean	63.7	78.2
Middle East and North Africa	9.3	5.5
Southern Asia	474.4	522
Sub-Saharan Africa	217.2	290.9
Total	**1183.2**	**1198.9**

* Estimated

Source: Chen & Ravallion, quoted in Bigsten & Levin (2000)

Absolute poverty can be reduced either by making the distribution of income more even or by general economic growth which has the result that average income increases. In a long term perspective in particular, rapid economic growth can have greater effects on the incomes of the poor than the "one-time effect" which is obtained by "taking from the rich" and giving to the poor. The best effect can be achieved perhaps by a combination of growth and equalisation, provided that a policy of this type does not lead to excessively great resistance or that companies relocate or reduce investments. Inequality can increase and certain groups are bound to be excluded if growth is very unevenly distributed.

Natural disasters are often caused by environmental degradation

The costs of so-called natural disasters, which are often caused or compounded by environmental degradation, are enormous. One example of this is the El Niño phenomenon of 1997/1998 which was the direct cause of 22 disasters. The cost of interventions in this context has been estimated at SEK 250 – 350 billion. Those who were most seriously affected were the poor.

In 1998/1999 120,000 people died on account of natural disasters and millions became refugees, mainly poor people in areas such as India and Latin America.

In Central America the financial losses resulting from Mitch were estimated at US$ 8.5 billion. This corresponds to the combined national income of Honduras and Nicaragua.

Source: Sida's decision on contribution support (2001-02-16); World Watch Institute 2001; UN's Climate Panel (2001b)

A problem which is often cited in connection with income equalisation is that it can take away the incentive to work and thereby reduce growth. In poor countries it is often more important to work towards equalisation in the basic conditions for survival, through access to clean water, adequate nutrition, health care and education. (There is a difference between "equality of opportunity" and "equality of income".)

In practice it is difficult to measure production and thereby growth in a satisfactory way. If "growth" is based on the destruction of natural resources such as forests, former users of the forest can be marginalised into deep poverty instead of being integrated into the expanding economy. Similarly an increase in industrial production can give rise to pollution which threatens people's health. These cases can result in considerable economic costs which possibly exceed the value of the increase in production. Therefore it is not a question of sustainable development – and not really of *growth* as it should be measured.

It is usually said that saving is a function of income distribution and that an even distribution of income leads to less saving and thereby lower growth (see once again the paper "Growth and the Environment"). However, recent years have seen a perception of the importance of broad sections of the population having access to education, health, an effective environment and resources in order to develop their productive capacity. An exceedingly uneven distribution of incomes combined with a very poor environment and few possibilities for the poorest people to enjoy health services, education and to make a living can thereby stand in the way of total growth in the country since productive potential is never made use of (see further Sterner (2000) and Bigsten and Levin (2000) for a more detailed discussion).

Relative poverty is defined in relation to the average or the norm at a certain point of time and in a certain community. Since the entire community with its prices, infrastructure and expectations varies with changes in its income, the absolute income level cannot give us a complete description of an individual's welfare. The understanding of a certain absolute income level is dependent upon what others have. Living on $1/day and being illiterate in Botswana has other social implications than in Argentina or Sweden[3]. In order to solve the problem of relative poverty, general growth does not help. If the "poverty problem" is primarily a feeling of relative powerlessness, exclusion and an unfair distribution of income, only a redistribution policy can remedy the problem.

Facts on relative incomes

Despite the decline in the proportion of poor people – based on the poverty criterion – differences in incomes in the world, and thereby relative poverty, have increased.

If a comparison is made between rich and poor countries, it is clear that those countries that were rich in 1970 have become richer much faster than those that had lower incomes. If the countries are divided into thirds, the average income for the poorest third has fallen from 3.1 to 1.9 per cent of the income of the richest third, while the corresponding figure for the intermediate third is a decline from 12.5 to 11.4 per cent.

Source: World Bank (2000b)

[3] The development of global media and global cultural ideals can (in the long term) have the effect that all compare themselves with the richest in the rich countries and thus increase the subjective or relative poverty.

In order to discuss poverty in detail, compare countries or evaluate the effects of a certain policy, an empirical definition must exist through which it is possible to *measure poverty*. All attempts to devise an index or indicator of this type clearly reveal the practical and fundamental problems with the concept of poverty. The simplest method is to count the number of poor people under the poverty line. The problem with this is that it does not take into consideration how far below the poverty line the poor actually are. A policy which took half of the income of these poor people would not have an effect on the indicator. Therefore it is possible to imagine a better indicator, which is often referred to as the poverty gap, in which consideration is given to the number of poor and how far below the poverty line they actually are. The poverty gap can also be measured as the total income which would be needed to enable all the poor people to come up the poverty line.

However, the "poverty gap" is not a satisfactory indicator from the welfare point of view. This indicator would not be affected if one person who was just below the poverty line gave a small sum of money to a person who was far below the line, a situation which normally could be regarded as increasing overall welfare (since it is the really poor person who has the greatest benefit from it). The indicators that try to remedy this problem are more complicated and there is no single indicator that is not arbitrary to some extent. This is a complicated area on which the Noble laureate, Amartya Sen, has written a great deal. He is of the opinion that we should primarily regard poverty as a lack of freedom or opportunity for poor people. The factors which prevent poor people from developing can be, for example, health, the environment, education or a lack of freedom – with this approach low incomes are merely a symptom. Our efforts should focus on the underlying factors.

It is also important to see poverty *from the perspective of the poor*. In the project "Consultations with the Poor"[4], the World Bank trained people who were sent to different countries to ask people how they experienced poverty and for their picture of poverty. Not unexpectedly, it was not just low incomes which were mentioned but also a lack of respect, a lack of development opportunities and exposure to risks and mishaps that characterise the life of the poor. The poor are in a number of traps of the "Catch 22" type. It is difficult to get a job if, for example, it is clear from one's clothes that one is poor. It is difficult to come in time, to stay healthy and to do a job well if one does not have regular housing which, on the other hand, can be difficult to obtain if one does not have a job. In addition to this there is a lack of a voice and authority in the social and political life which has the effect, for example, that it is difficult to demand necessary reforms of ownership, the medical services and education. The poor often have difficulties in making themselves heard, even receiving what they are legally entitled to. It is a well known fact that programmes of development cooperation have problems in reaching the very poorest people who, in turn, often have problems in making the effort to take initiatives to make their voices and needs heard.

In its consultations the World Bank structured these questions under five headings: material well-being, physical well-being, freedom, security and social well-being. It can be seen as a shortcoming that the environment and natural resources were not included directly under one of the headings, but they have more of a character of underlying causes. In other words, despite the fact that no specific questions were asked about the environment and natural resources, they were often mentioned in the answers of the poor[5].

[4] See Hossain (2000) for an overview.

[5] The World Bank reports on the results of 217 different questionnaires in 20 countries. Water was (after income) the most important issue for 80 per cent of the respondents. 40 per cent of the respondents also named other environment-related issues such as droughts, floods, fuel wood, pollution or soil erosi

4 Links between the environment and poverty

As mentioned above, the links between poverty, income distribution, economic growth, the environment and natural resources are very complex. There is a web of complex factors which interact in different ways and contexts.

4.1 The depletion of natural resources and environment degradation can cause poverty

The poor have few resources to work with to improve their material situation. For example they have little land or land which gives a poor yield. They often lack other productive resources such as boats and tools. They are forced to live and work in densely populated areas in which natural resources are overexploited and dangerous areas. Perhaps the ecosystems provide poor protection and do not give clean and safe water, wild game, fish, clean air or a pleasant climate. Overexploited natural resources are a threat to their physical well-being. At the same time they are more exposed to the environment-related risks (storms, landslides and so on). A striking example is of course the many millions of farmers in low lying parts of Bangladesh who are threatened by rising sea levels caused by the greenhouse effect. An increase of one metre in the sea level would result in a tenth of the country being be put under water and 70 million people being forced to migrate as a consequence of climate change.

The Aral Sea – an environmental disaster

In the 1960s the Aral Sea was the fourth largest inland sea in the world. Today the water level has decreased considerably and the sea has been transformed into two contaminated lakes, the larger and the smaller Aral Sea. In certain places the shore line has retreated 100 kilometres, leaving a thick crust containing 520 kg toxic salts/hectare. The toxic substances originate from, among other things, the extensive use of pesticides on the cotton fields. The salt content in the remaining water has increased threefold. Storms swirl around the toxic salts and the dust is spread to Central Asia. Ten million hectares of grazing land have been lost, the fishing industry has ceased to exist, flora or fauna die or migrate, and millions of people have lost their livelihoods. Even the climate has changed, the winters are colder and the summers are warmer, with more evaporation as a consequence. Cultivation of the land is only possible with the aid of extensive irrigation systems – but where should the water be taken from – given that a high percentage of the available water is biologically contaminated? Buying clean water is impossible for most people. Earning a living by farming or fishing has come to an end and has led to the migration of a large part of the population. Those that have stayed are poorer.

Sources: International Fund for Saving the Aral Sea (2001); Medécins Sans Frontières (1999)

Environmental degradation and the depletion of natural resources are therefore very important causes of the vulnerability of the poor. The poor are also vulnerable and treated unfairly socially, they have poor education, poor contact with the authorities and health services. They are the last people to be connected to electricity supplies, water supplies and the sewage disposal system, to bus connections in the towns, and roads in the country. This has the effect that they have low "human capital", or at least fewer opportunities to develop their health, strength, creativity and initiative, talents which could provide an income. The privatisation of common lands leads to a loss of physical resources as well as a place in the village community. Low status (for example of poor women in Asia) is a major reason for high rates of child mortality and large families.

Just one single thread separates these people from total destitution. Destitution of this type often affects the poor since they are single, sick, old or confronted with other mishaps (drought, crop failure, war, earthquakes or other economic and social mishaps). Even individual factors such as divorce, the death of a relative, commonplace infections or injuries such as broken legs are, in practice, of great importance for determining whether a person who is already poor shall sink down into deepest poverty. This uncertainty makes the poor cautious and reluctant to take risks, which has the effect that they seldom dare to take advantage of the improvements in working methods which would give them higher incomes. Caution itself is also a factor which leads to low productivity.

Obviously, the depletion of natural resources can cause or exacerbate poverty. The effects could be considerable and do explain the destitution of many people. It suffices to think of those who are victims of soil erosion, storms, forest fires, desertification and overfishing. In the future there is a danger that the greenhouse effect, strengthened by human actions and with accompanying rising sea levels, will make many millions homeless. Often it is the short-term ruthless actions of national or international companies which lead to the unsustainable exploitation of natural resources that affects the poor people.

Poverty spirals in the area around Lake Victoria

The countries around Lake Victoria are struggling with a number of environmental problems which can be seen in the lake in the form, for example, of severe eutrophication. Nutrients and toxic substances are carried to the lake in the form of pesticides from cotton plantations, untreated water from local authority plants, sugar, the paper industry, the fishing industry, soil erosion (see box page 6) and the highly inadequate arrangements for sanitation and sewage. Where the nutrients have accumulated, vegetation has increased considerably. A combination of environment-related problems causes poverty which, in turn, forces the people to farm marginal land with resultant increases in erosion.

The Nile perch was introduced into Lake Victoria in the 1950s. This has had the result that 400 species have been reduced to around 10 (since the Nile perch, which is a fish of prey, has upset the nutrient balance in the lake). The commercial fishing industry has previously fished the large Nile perch and this has resulted in a considerably decimated stock. The fishing industry has therefore started to fish the smaller capenta fish, which the local people concentrated on previously. This species has now therefore decreased in numbers and the protein supply for the local population is being threatened. Capenta are often caught before they have reached reproductive age with the effect that the stock is not reproduced. This has catastrophic consequences for the poorest people who are dependent on fish or shellfish as their primary source of protein.

Source: Jansen (1997); Sida (2001); Sida (1999); Ehlin Consulting (1997)

There is a tendency that the sensitive and marginal ecosystems that are affected are primarily populated or used by those who are already poor. The damage is thus greater, see for example Dasgupta (1995). There are many examples of how the establishment of mines and oil fields, industries and even international tourism result in unacceptable damage to the local ecosystems. Coastal tourism with hotels can lead to severe strains on the marine ecosystems such as coral reefs which are very sensitive to nutrients loads.[6]

[6] In principle there can also be examples of damage that primarily affects groups that are currently rich. One example of this type is the depletion of the ozone layer which leads to skin cancer (primarily for white people living close to the south and north poles, see further section 7)

4.2 Environmental degradation can be caused or exacerbated by poverty

People in the rich part of the world generally put a much greater pressure on nature due to the considerable turnover of energy and materials which is a consequence of high levels of consumption. Companies from the rich part of the world have also often contributed very obviously to marginalising the poor by exploiting resources which the poor are dependent on. Oil companies, mining companies and cattle ranches are often examples of this. In a "perfect" market economy, no resources would be wasted or destroyed, but the world is not a perfect market economy. There are many examples of political failures which have led to serious and sometimes irreversible damage to the environment:

1. Incomplete ownership rights which lead to "external effects"
2. Incapacity to ensure livelihoods with collective commodities and resources
3. Failed policies
4. Short-term perspectives
5. Incomplete information

It is often the case that these failures are often linked to, or reinforced by, poverty.

Marginal resources, for example grazing land in arid areas, often lack the protection of ownership enjoyed by more productive resources. Also, institutions such as land survey and courts that protect ownership rights are not as well developed in many, if not all, poor countries. In certain places institutions of this type have never existed and in other places the local institutions were destroyed by the colonial power. The situation is exacerbated by a lack of economic and administrative resources in, for example, land survey. It is expensive to define and maintain ownership rights and if the return on resources is too low to defray these costs, it is difficult to maintain private ownership. It is often an overlooked irony that, if the market economy is to flourish, strong administrative governmental and local institutions are needed which can create the security and the rules and regulations needed by the market economy.

Public administration assistance in Russia

The transition from a planned economy to a market economy requires changes in many areas, among other things in the forms of work in the public administration. Contributions in this area have been made by several Swedish government agencies such as the National Tax Board, the National Labour Market Board, Statistics Sweden and Swedesurvey.

Source: Sida in the World http://www.sida.se/Sida/

When the ownership situation is unclear, there is an increasing risk that people do not see the benefits of taking good care of their resources. So-called "external effects" are achieved, for example when non-existent or deficient terracing on the part of one farmer leads to erosion which also leads to the soil on the plots of other farmers further down the slope being washed away. In extension the soil in the rivers leads to the destruction downstream of fishing waters and coral reefs outside the coast.

Clear ownership rights need not always mean private individual rights. Often in the poor and traditional cultures there are very effective, often collective mechanisms which demonstrably permit sustainable use. It is sometimes "modern" development with large migration, population pressure, urbanisation, rising income levels, income differences, and national rather than local decision-making processes, which destroy these functioning common lands, so called "Common Property Resource Mechanisms". See Ostrom (1990) who describes how poor people cooperate to protect common lands, irrigation channels and fishing waters which are owned and administered jointly.

No boat – no fish

The local fishermen around Lake Victoria are often poor and do not have boats of their own, instead they "borrow" boats in exchange for a fee in the form of part of their catch. The strong position of the owners makes it possible for them to demand a large amount of fish in compensation, which forces the local fishermen to fish even more. In order to maximise their catches they often use the method of dropping insecticides used on the cotton plantations into the water. The fish are very sensitive to these insecticides and therefore flee into strategically placed nets. The fish stock is further depleted and toxic substances accumulate in the lake and in fish. For the very poorest, who have managed to cope tolerably on account of their fishing, this is a disaster which inevitably leads to hunger and ensuing deficiency diseases.

Sources: Jansen (1997); Sida (2001); Sida (1999); Ehlin Consulting (1997)

These problems can also be seen as a form of policy failure since the decision-makers are unable to make decisions and create structures which are appropriate. This type of policy failure is very common and sometimes it is even the main reason for the degradation of the environment and depletion of natural resources. When this is the case, for example when government-owned forests are mismanaged, it is rather pointless to call for further government controls in order to remedy the situation. Instead other policy measures are required. On the other hand, the fact that there are many policy failures can also be considered to have a connection with poverty. Poorly educated and underpaid civil servants can, for example, be thought to be easy prey for pressure from companies that want to exploit a natural resource.

Another mechanism through which poverty can give an unsustainable use of resources is short-term thinking. Economists speak about high discount rates in economies of this type and say that the poor, who do not have any savings, cannot afford to allocate time and resources to invest in future improvements, even if they should be very profitable. The persons in question often lack resources and most often are unable to borrow (or only at very high interest rates). There are often major shortcomings in the capital and insurance markets for the poor. In order to make sensible decisions there is usually a need for security which is provided by savings and insurance but, for various reasons, the capital and insurance markets are not highly developed in poor countries.

The absence of information can also be a further reason why the market economy does not give the optimal allocation of resources which we would otherwise expect. The market economy requires full information from the parties involved in order to function optimally, but the dissemination of information requires resources and information can

therefore be difficult to obtain, particularly in poor communities. Often ecological, technical and economic links are very complicated, which increases the risk of incomplete information. In other words it is once again a mechanism through which poverty contributes to the imperfect functioning of the market economy. This can, for example, lead to the depletion of natural resources despite the fact that these could be used in a more productive way if only the persons involved had adequate knowledge. This is particularly the case when conditions change rapidly, for example through forced, sometimes environment-related, movement to areas with unknown environmental conditions.

When there is no time to save time

High discount rates sound technical but can be illustrated by the extremely poor man in Mexico, living in the rural district in Michoácan, who did not have the time to build an energy-saving stove although everyone else in the village did so, and he knew it would save a great deal of time in the form of a reduction in the need for fuel wood. He knew how profitable it was but he did not have the necessary "resources" – which in this case consisted of approximately one day's work, an outlay that would be "recovered" in a few weeks!

Source: Cervantes et al (1984)

5 Local environmental problems in rural areas

The most characteristic links between poverty and the environment in agrarian communities are probably those which we usually call overgrazing or overutilisation of vulnerable and limited natural resources. People living in rural areas are affected by global environmental degradation such as the atmospheric precipitation of toxic substances, acidification and effects of climate change. But they are also exposed to local environmental degradation and mismanagement of natural resources – vicious circles where the exploitation of land, fishing water, grazing land and other local natural resources leads to lower productivity and thereby an increase in poverty and once again a strong tendency towards overexploitation. Eliminating this deep poverty while improving the status of the resources one lives off is often essential in order to escape from the vicious circle.

Overgrazing is one of a category of problems which primarily affect the poor. Overgrazing leads to a vicious circle in which the problem is exacerbated by the actions of the poor themselves. It can be that the same group of poor people is affected (as with the transmission of infectious diseases in the use of common water sources) or different groups can be involved, for example when highland farmers cause soil erosion which affects the fishermen on the coast. One common problem that affects one's own group is when users of a resource are forced to compete for the same overexploited resource in a situation of so-called "open access". All have access but nobody can protect the resource by limiting extraction since they lack legal certificates of ownership or other means to protect it.

Overutilisation can also be initiated since the traditional right to use the resource is reduced by external interests. For example, as a result of the exploitation of oil or mineral deposits in the

Amazonas including the construction of roads and the felling of rain forests, the traditional users have smaller areas to use. In the absence of distribution of other and better land, poor small farmers are forced to move, or are simply moved, further into sensitive areas in the rain forests.

New roads: good for trade but what about the environmental effects?

A classic question is whether it is good to build roads from a poverty and environmental perspective? Roads are often high up on the list of things wanted by people with low incomes in rural areas. If they have access to a road they can more easily go to market, sell their products, seek jobs or acquire capital goods. Through this improvement in their living standards it can be thought that they could afford to preserve nature, and even that nature would be more "worthy of protection" as a production factor. At the same time it is the case that new roads can make the extraction of goods possible and make it easier to destroy and exploit forests and other relatively untouched or previously inaccessible biotopes. There is no given answer to whether roads are good or bad. It depends on where and how the road is built and on the institutions in the community. If a road is built in previously untouched forests (with valuable trees in a country with weak controls over illegal felling), the problems of illegal extraction will naturally be overwhelming. On the other hand, if a road is built in areas where people already live and have secure ownership rights, the road can lead to a positive intensification of farming and forestry. Better and more sustainable methods are some effects demonstrated by experience from, for example, Machakos.

In the future other types of technology and infrastructure will probably be as important as roads, channels and dams. The computer network is a modern example of infrastructure and can be regarded as controversial. On the one hand computer networks have a great potential to reduce poverty but, for this very reason, one must think carefully about aspects relating to justice, equality and sustainability in the planning of investments of this type.

The depletion of natural resources or the degradation of the environment almost always leads to an increase in poverty for those who live off the resource in question. Every change in the ecosystem is, of course, not negative. On the contrary the cultivation of natural biotopes can provide sustainable and sound farming. Industrial and other types of expansion are also often important in order to raise living standards, even if they lead to a certain amount of pollution. However, for those who live off the resources that are changed and developed, it is generally a question of a loss, regardless of whether they collect small shells or fish in mangrove swamps, hunt wild game, gather fuel or fetch water. Jodha (1986) shows that common lands in 80 Indian villages meant much more for the poor than for the somewhat less poor. He also showed that the most negative effects of the privatisation of these lands tended to be on the poor. Here there is clearly a difficult conflict. Population pressure, demographic changes and new technology can have the effect that old mechanisms for governing common lands break down. Privatisation can offer one way of saving resources and ensuring that they are also used productively in the long term. However, this can lead to a great risk that the absolutely poorest people, who only had the common lands for making a living, lose disproportionally.

It is important to understand that the only way poor people living in ecologically sensitive zones can make a living is by using environmental resources and natural resources. Leach & Mearns (1991) show that over half of the very poorest people (the poorest 20 per cent) live in ecologically sensitive environments. Many of them are doubly vulnerable since the ecological base of their lives is sensitive and in certain cases they also lack socio-economic safety nets or

political mechanisms to reduce their dependence. In some unfortunate cases their very vulnerability and the lack of alternatives lead to unsustainable behaviour.

Water shortages lead to social unrest

The lack of clean and safe water is the most serious threat today to health, the environment and the availability of food. In certain places the lack of water is also a threat to peace when countries must compete for the expensive water.

China will gradually increase its water prices during the next five-year period to achieve necessary incentives to save water. In a country with low incomes every price increase can lead to social unrest. Of China's 668 cities, over 400 are affected by scarcity of water. In rural areas riots have already occurred as a consequence of competition for water.

Sources: UN's Climate Panel (2001a); Sida's sector information (1999b)

5.1 Overgrazing, cattle herds and harmful insects

In poor countries that do not have savings banks, it is common for people to save in the form of large cattle herds. These cause a great amount of wear and tear on the grazing lands where rights of ownership are often uncertain. Since the financial institutions are undeveloped, the poor can destroy grazing for each other. The best solution is not to ban grazing or to levy a tax on cattle, but to provide better access to other forms of savings.

Felling of forests for agriculture and cattle

Between 1980 and 1990 Mexico lost more than 19 million hectares of forest. Deininger and Minten (1996) show that the forests had mainly been cleared in the poorest states and areas. Primarily it was the need of new land for cultivation and cattle which was the most important driving force.

Source: Ekbom & Bojö (1999)

Another threat to poor farmers is harmful insects such as grasshoppers. These can eat up a farmer's or even a village's entire harvest. For many years insecticides have been sprayed from the air under the auspices of the FAO and other organisations. However, at the national level, damage to harvests is on average small. The damage is even smaller than the direct costs of spraying, which also causes ecological damage and is therefore being questioned by an increasing number of people. The most rational measure would perhaps be compensation for damage to harvests. Unfortunately this is rarely profitable for private insurance companies on account of the risk that people try to cheat in order to obtain compensation they are not entitled to. New forms of insurance are needed and some international organisations are considering working with insurance instead of spraying from the air. Another important way of changing the situation can be, for example, to make local farmers active in ecotourism and other projects which concern them.

Project Campfire

Project Campfire is a project in Zimbabwe which is intended to encourage both rural development and ecological diversity. By allowing income from tourism and hunting to go to farmers and local organisations at village and district level, people have a more positive attitude towards accepting wild animals (for example elephants) which are also a physical threat and which cause considerable costs for agriculture. The project has been initiated and partly financed by development cooperation and shows that there are other ways of protecting elephants, rhinos and other animals than by banning hunting and trade in ivory. A ban can possibly protect adult animals from poaching, but to enable strains of animals to develop, young animals to be born and grow up, a suitable ecological environment is necessary. This will never possible to create in the long term without the active participation of those living in the area. By giving the local population a share of the incomes from Campfire, they see that they have a personal interest in encouraging the existence of wild animals as a complement to other ways of making a living.

Source: Edwin Muchapondwa, Dept of Economics, University of Harare/University of Gothenburg

5.2 Population growth

Population growth can also lead to problems with resources that, strangely enough, are often considered sensitive to talk about. Poverty often means high birth rates. Poor people tend to have more children than the better off in developing countries. The factors behind this, for example economic and educational factors, vary a great deal. One factor can be the need for labour but it might just be the need for old-age security. Without a proper pension system and with expectations of a high death rate (as well as cultural, religious or other factors), many poor people have a large number of children. This, particularly in combination with falling rates of mortality due to better hygiene, leads to an extremely rapid increase in the size of populations and further poverty, instead of the sought for security. Improved education, in particular for women, is of great significance in this connection.

Another totally different aspect is that, per person, rich people in both the North and South contribute more to certain types of environmental degradation than poor people (see also sections 1 and 7).

Poverty thus contributes to high levels of population growth which, in turn, contributes to increasing the pressure on natural resources – often with greater environmental degradation and greater poverty as a consequence. It is important to recognise that rapid population growth is a factor behind the environmental degradation in developing countries. Almost a billion people were added to the world's population in the 1990s and almost all of this increase was in developing countries. In many areas where population pressure is already high in relation to the carrying capacity, growth is taking place so rapidly that farming methods cannot be adapted. However, there are examples where the pressure for transformation can accelerate technical and institutional change in a positive way. Machakos in Kenya is often given as an example where an area that had been depleted by population growth was terraced and cultivated, and flourished. However such steps are not automatic and further population growth can have the result that there is an increase in the pressure on natural resources and in poverty.

5.3 Threats to health

Another category of problems related to the environment and natural resources are those that do not affect livelihoods but have a direct effect on the health and security of those people living in a certain area. One example is of poor people, previously protected by the ecosystem, losing this protection when forests are felled, creating the risk of landslides on the slopes. Other examples are when ecological changes lead to the spread of disease such as gastric disorders, infections of the respiratory passage or malaria. The proliferation of the water hyacinth on Lake Victoria has contributed to the increase in the numbers of mosquitoes, resulting in a growing number of cases of malaria, an increase in the numbers of snails that carry bilharzia, and many other problems. In the same way climate changes can lead to a higher frequency of floods in some places and droughts in other places. In both cases vulnerability is increased and thereby a vicious circle – with a further deterioration in the situation of many poor people.

Preservation of biological diversity – also for health reasons

For many poor people in developing countries, wild plants and animal species are of considerable, and sometimes decisive, importance. People who are dependent on nature's products for their living and well-being are affected directly by the elimination of species since they lack financial means to compensate for the loss by buying farm products, clean water, and other necessities. In Ghana for example, three-quarters of the population is dependent on wild animals, fish, insects, snails etc. as their main source of protein. In Nigeria wild animals constitute 20 per cent of the protein intake of the rural population. People in India use almost 1000 wild species as medicines.

Source: Sida (1995)

Water – in short supply

- About 1.4 billion people around the world live without access to clean and safe drinking water.
- It is estimated that 7 million people die each year on account of water-related diseases.
- Half of the world's rivers and lakes are considerably polluted.
- 2.3 billion people lack satisfactory sanitation facilities.
- In 25 years a third of the world's population will probably live with water shortages

Source: Sida's sector information (1999b); Mothadullah K. (2001)

Pollution connected with the establishment of industries, mines, oil fields or large scale cultivation has, in many cases, led to the extensive spreading of toxic substances which constitute a threat not only to the ecology but also directly to the health of people. One of many examples is the extensive use of pesticides which have harmed many workers in the cultivation of bananas and other fruit in Central America.

Eutrophication problems in Lake Victoria increase the frequency of diseases and poverty

Since the nutrients accumulate in the lake, there is an increase in vegetation, above all in the form of the water hyacinth. The vegetation affects fishing, the water supply and, where the water is more stagnant, there is a greater risk that various water-borne diseases such as cholera, typhoid fever, malaria and bilharzia will be spread. The malaria mosquito lays her eggs in stagnant water. The frequency of mosquitoes increases and, since the mosquitoes function as vectors, malaria is spread at tremendous speed. Poor arrangements for sewage and sanitation have the affect that faeces enter the lake untreated which compounds the eutrophication problem and spreads diseases. Bilharzia is a water-related disease which affects the blood system and leads to weakness and, in the long term, death. A poor person who just manages keep body and soul together through his permanent struggle to meet his needs is affected extremely severely by disease. He does not have the strength to look for food, walking long distances to fetch clean drinking water (to the extent that it is available) is impossible, and seeking medical treatment by walking to the nearest medical centre is an insurmountable obstacle.

Sources: Jansen (1997); Sida (2001); Ehlin Consulting (1997)

6 Local environmental problems in the urban environment

Where environmental and resource problems in towns are concerned, it is natural to concentrate first and foremost on the environmental problems that are related to health. These problems may then, in turn, be connected with energy, transport or industry. The problems can also be similar to those above in section 5. Problems with water, floods, indoor smoke and problems related to cultivation can also occur in urban areas (or their periphery).

6.1 Threats to health

A lack of purification or sanitation systems leads to the pollution of wells and water courses. Poor quality water leads, in turn, to cholera, dysentery and many other gastric infections. Poor indoor air, a result of simple fireplaces that use wood or other forms of biomass, leads to an estimated 2 million deaths a year, mainly in Southern Asia and in Sub-Saharan Africa (WHO 1997).

Diarrhoea and respiratory diseases are the two main health problems in many large cities in the Third World and, in general, they are strongly related to the environment. Songsore and McGranaham (1993) studied 1,000 randomly selected households in Accra, Ghana. They found clear evidence of relationships between environment-related health and income. More than twice as many children in the poorest fifth of the population had diarrhoea compared with the richest fifth. 83 per cent in the latter group could store food in refrigerators as opposed to only 3 per cent in the poorest group. Harmful insects and carriers of disease such as flies, rats and cockroaches were also much more common among the poor people.

Health problems at the Aral Sea

Environmental degradation around the Aral Sea is leading to an increase in health problems, making the poor people even more vulnerable. Acute respiratory infections and diarrhoea diseases are the two main causes of child mortality in the region. Acute respiratory infections predominate. The high frequency of diseases in respiratory organs is caused by the toxic dust and clouds of salt which whirl around in the area.

Infectious diseases are increasing and, according to a study by the WHO on countries in Europe and in the former Soviet Union, the frequency of tuberculosis is increasing most in the Aral Sea area. Cholera and epidemics of typhoid fever have also broken out in nearby areas. The region has the highest incidence of anaemia in the world. 87 per cent of the young women and 92 per cent of new born children are anaemic. Anaemia radically diminishes the strength of people to fight infections. The mortality rate for expectant mothers and new born children is high since anaemia leads to difficulties in coping with possible complications and bleeding. The frequency of kidney diseases has increased twenty fold and the number of defects in new born babies six to sevenfold between 1986 and 1989. Liver cancer has increased fivefold during the last ten-year period in Muynak, the town situated closest to the Aral Sea. Life expectancy and life quality is increasing in most places in the world but not in the Aral Sea area – here they are decreasing.

Sources: International Fund for Saving the Aral Sea (2001); Medécins Sans Frontières (1999); Lindahl Kiessling (1998)

Environment-related health problems are relatively similar in character although they are often worse in urban environments compared to rural areas. In the towns there are naturally much larger concentrations of wastes.

Diseases are caused by environmental factors

In the poorest countries and mainly in Africa, a third of all diseases are caused directly or indirectly by environmental factors. Between 5 and 6 million in low income countries die each year as a consequence of water-borne diseases, air pollution or exposure to chemicals.

Sources: WHO (1997); Sida's formal decision 2001-02-16

Completing the ecocycle between urban and rural areas is a particular challenge faced by humanity. With between 5 and 6 billion people living in cities within a few decades, systems must be created in order to restore nutrients to the soil which shall produce the next harvest. In addition, the increasing population density in the world's coastal tracts will have a great impact on the coastal marine ecosystems. A large proportion of the world's population, not least the poor people, obtain their primary sources of protein here. If the quality of food deteriorates, it is once again the poor people who will be affected most severely.

Urban environmental problems – importance of completing the biological ecocycle

Nutrients and other substances from agriculture must be restored to the land after the farming products have been consumed in the towns. Now, for example, carbon atoms and nutrients disappear into the seas or up into the atmosphere instead of functioning as a basis for future food production. Restoring organic waste from the towns to the rural areas makes it possible to reduce the mountains of waste and to complete the ecocycle. If we are not successful in doing this, poor people in rural areas will be affected by the one-way flow of material and those most severely affected will be those who cannot afford to buy fertilisers.

Source: Sida (1995)

6.2 Transport-related pollution and poverty

One particular environmental problem in the towns is pollution from transport. Many of the mega cities in the Third World have levels of pollution which greatly exceed corresponding levels in the cities in the rich countries. They are also far above the targets of the World Health Organisation, WHO, for parameters such as lead. Low quality fuels and additives of different substances such as lead and sulphur in petrol and other vehicle fuels are a major problem. If the poor condition of engines and the absence of functioning catalytic converters is also taken into account, vehicle traffic generates a large, often predominant, proportion of the pollution which leads to sickness and death from respiratory diseases. And, as usual, the poor people are most severely affected. It is the poor people who live in the most polluted areas, sometimes even on the street. Lead is a particularly insidious health hazard which particularly affects children. Children who spend a lot of time in street dust get high levels of lead in their blood. This affects the central nervous system and results in an obvious and measurable reduction in, for example, intelligence quotients, capacity and well-being.

6.3 International trade and the dumping of environmentally hazardous waste

The globalisation of trade, economy and investments has the effect that environmental problems are also internationalised. Sometimes it is a case of subtle changes, but there are also flagrant examples of transnational pollution through the dumping of environmentally hazardous waste. In order to avoid the cost involved in taking care of or cleaning waste, polluted oils or other chemicals are sometimes sold as fuel or raw materials to unsuspecting companies (or to accomplices) in the Third World. The worst examples cannot be seen in trade statistics but environmental organisations spend a great deal of time tracking down different cases.

Dumping of waste: for example ships

Ordinary people perhaps do not think of ships as environmentally hazardous waste but they often contain great quantity of asbestos (against fires) and extremely environmentally hazardous paints against rust and algae. They can also contain PCB and heavy metals. According to the United Nation's Basle Convention they are regarded as environmentally hazardous waste which may not be dumped in the Third World. However this takes place regularly. Ship-breaking is an industry that is located in its entirety in Asia. In Alang, Gujarat, India, half of all ships are demolished – approximately one a day. Here dry docks, cranes and heavy tools are not used. They ships are driven up on to the beach at high tide and then thousands of unprotected workers take them apart with simple saws, hammers and cutting torches. Accidents, fires and environmentally hazardous spillage are not the exception, but the rule.

Sources: Greenpeace, www.greenpeace.org/pressreleases/toxics/1999feb18.html

7 Global and regional environmental problems

Unfortunately there are many more examples of how poor people are affected by large-scale environmental degradation processes. The incidence of soil erosion and drought and the diminishing availability of water and fuel wood force millions of people into becoming environmental refugees.

Environmental refugees

According to Norman Myers (1995), there were at least 25 million environmental refugees in the world in the 1990s, mainly in sub-Saharan Africa and chiefly in the Sahel area and in the Horn of Africa, the Indian sub-continent, China, Mexico and Central America. According to Nafis Sadik (1995) the number of environmental refugees increased globally from 75 million to 120 million between 1965 and 1990. Regardless of what one believes, the figures indicate that the number of environmental refugees is increasing as a result of the growing incidence of natural disasters that are a consequence of the greenhouse effect. Floods, landslides, erosions and storms are examples of natural disasters that, in connection with local factors such as deforestation, population growth and a reduction in land per person, can lead to a situation in which as many as 200 million people will be forced to flee from impossible environmental conditions. Since the resources are diminishing, conflicts between and within countries are increasing. A large proportion of the migrants make their way into the cities, of which some are growing into so-called mega cities with associated problems.

Source: Myers, N. (1995); Sadik, N. (1995)

The problems which lead to the depletion of resources or environmental degradation (and thereby exacerbate poverty) can be caused by local problems and by regional/global processes. Often the global, regional and local changes interact. The global environmental parameters also determine to a certain extent how the local environment changes and sometimes the effects reinforce each other, for example local forest felling exacerbates the effects of storms. The global environmental changes are, in principle, an important category since the poor will be affected very severely. We in the rich world bear by far the greatest responsibility for the problem.

The environmental problems which we usually describe as global (for example the greenhouse effect or the depletion of the ozone layer) are certainly global in their mechanisms but the distribution of burdens, causes and effects does not need to be the same for that reason. Where the greenhouse effect is concerned, the Western world has been responsible for a greatly predominant proportion of total emissions hitherto. There is some uncertainty about the effects (which in itself is serious) but probably a disproportionally large burden will be borne by the many millions of poor people who will either be affected by floods, violent storms or the spread of certain diseases through changes in climate. The poor are affected more since they live in areas which, from the physical point of view, are not favoured, and also do not have the means to protect themselves.

The greenhouse effect

As a result of an increase in emissions of greenhouse gases and, above all, of carbon dioxide from the combustion of coal, oil and gas, the world's average temperature is rising. The average temperature is expected to increase by 1.4 to 5.8 degrees Celsius between 1990 and 2100. Sea levels are expected to rise by between 0.1 and 0.9 metres.

Extreme climate changes will be increasingly common. Those who will be affected most severely will be poor families living in the tropical regions in developing countries. Their livelihoods are mainly based on farming and natural resources which are strongly affected by the climate. An increase in temperature will result in a reduction in the size of harvests in the tropical areas. This will have a severe effect on the local people who are already poor.

In many sub-tropical areas where water is already scarce, for example in South Africa and Central Asia, global warming will exacerbate the problems that lead to conflicts, migration and diseases such as malaria, yellow fever and cholera.

Source: UN's Climate Panel (2001a)

In countries with a high average income, it is possible to build houses, buildings, roads and other social structures to resist hurricanes, landslides and earthquakes. In Holland banks are being built to meet rising sea levels, but this will probably not be possible in Bangladesh. The millions who fall sick, die or become environmental refugees will mostly be affected by *our* emissions of carbon dioxide. It is difficult to handle this issue morally and politically. Many people who use a car to get to work feel that they do not have a choice, and many are not aware of the mechanisms through which their choice of transport contributes to floods in Bangladesh many years later. Can they then be regarded as guilty? This question, which is among other things a question of conscience, cannot be taken up in depth here – but we should understand that we are at least partly responsible, even if we had no specific intention.

One conclusion is that in these matters we have a greater obligation to help those who are affected than the obligation that we can nevertheless feel that we should have through common compassion or solidarity to help those who are affected by pure natural disasters. One concrete form of assistance is to explain the complicated scientific relationships to enable countries in the Third World to assert their interests and participate as full partners in the international negotiations on, for example, the greenhouse effect and the ozone layer. It is also in our own narrow interest since the global environmental changes will probably have unanticipated effects on our part of the world. One often-mentioned example is the spread of diseases such as malaria which hitherto have only been found in tropical areas.

The depletion of the ozone layer is another interesting example of an environmental problem which concerns both the poor and the rich. Certain chemicals (for example CFCs) damage the ozone layer. If this protective cover around the earth should be seriously damaged or completely disappear, all forms of life would suffer extensive damage. With small emissions the damage will occur, as is the case today, mainly at the poles where mostly people with relatively high incomes happen to live. The damage consists of an increase in ultraviolet radiation which affects light-skinned people most seriously. This can lead to cancer – a medical problem which is only given priority in countries that do not have *infant* mortality or high rates of mortality from simple gastric diseases. In order to reduce the use of CFCs, people must use alternative, somewhat more expensive, refrigerators and air-conditioning equipment. In other words shall poor people in hot

countries pay more to refrigerate their foods and medicines in order that rich people living near the poles shall avoid cancer when they are old? This is a global problem but with a different, very uneven distribution of cost and effects! Naturally the people living in the poorer and warmer countries feel that the rich shall participate and pay for the change in technology. Funds are also being used for this purpose, for example from the Global Environment Facility (GEF), which is administered by the World Bank and the UN bodies UNEP and UNDP.

8 Averting poverty without mortgaging the future

We have seen above that environmental degradation often involves costs and the loss of welfare, either immediately for some groups or in a slightly longer perspective. To achieve sustainable development which focuses on reducing poverty, it is imperative to incorporate effects on the environment and natural resources in analyses and decision-making processes. At the same time we have seen that poverty itself can be associated with certain types of environmental problems. This shall not be interpreted that it is the "fault" of the poor that they destroy the environment. Neither shall it be interpreted in a way that ignores the fact that higher incomes can very well lead to more environmental problems. However, it is constructive to draw attention to certain systematic relationships between poverty and environmental degradation. This can be remedied if suitable interventions are made at the right time by governments and other parties in both developing countries and the rich countries, where most multinational companies have their main base.

Examples of interventions of this type have been given above. Poverty can be associated with poorly defined ownership rights, incomplete information of the parties in the market, incomplete or non-existent markets for savings and insurance, and inadequate public institutions for the identification, monitoring, analysis and remedy of environmental problems. Programmes of development cooperation which have the aim of eliminating or reducing these types of market deficiencies or imperfections in the political decision-making processes can actively contribute to reducing poverty and at the same time take care of environmental resources in such a way that increases in welfare have a greater chance of becoming sustainable. Where the companies, and not least the international companies, are concerned, new ethics are required as well as a greater assumption of responsibility.

There are projects which improve the living standards of the poor so that they are given the opportunity to think in a long-term perspective. A project of this type can be to plan and invest in the immediate environment in order to build up a sustainable future. It can be, for example, to support institutions which offer insurances or micro-credits such as the Grameen Bank in Bangladesh. If the farmers feel more secure, perhaps they do not need to use such large amounts of pesticide or to have such large herds of cattle, or perhaps they have more time and resources for soil conservation.

There are other cases where it can be very difficult to know whether a project or a certain policy is good or bad from the environmental perspective. This applies to infrastructure such as roads, other modern technologies and their infrastructure. For example it is still an open question how far it is possible to pursue the "green revolution" with improved seeds, gene manipu-

lation and control of the ecological environment. The first wave of the "green revolution" provided considerable increases in harvests in countries such as India. It has also led to conflicts since it has meant a focus on large-scale farming which is often (but not always) said to have treated small farmers unfairly. Gene-manipulated seeds and high yield monocultures have also required irrigation and the use of pesticides, which in turn lead to ecological hazards.

In order to escape the vicious circle which can be characterised by poverty, a poor environment and powerlessness, growth which benefits the poor is necessary. The resources of the poor must grow, but growth which takes place without taking the limitations of nature into consideration is not true growth. An activity which destroys natural resources and the environment risks resulting in greater costs than benefits for the poor. To achieve growth that is sustainable and fairly distributed, an understanding is necessary of the environmental economic context as well as an active policy which uses the right mechanisms.

Examples of political measures and mechanisms that can promote sustainable growth are:

a) Clear and recognised ownership rights (not necessarily only private – they could also be collective in certain contexts).

b) Better education on the ecological and economic context. The world's fishing industry is still run on the basis that larger boats give more fish when, in actual fact, immutable biological processes determine the size of the catch.

c) Better facilities for credits, savings, insurance and pension systems. Today people are forced to behave unsustainably, for example having far too large herds of cattle as a way of saving money, having large families to secure their old-age, or using considerable amounts of of pesticides on plants in order to reduce the risk of having their crops destroyed by insects.

d) In many areas large ecosystems have already been destroyed by salination, tree-felling, overgrazing or other forms of environmental degradation. To enable these ecosystems to recover, considerable investments and long periods of time are necessary. The restoration of ecosystems of this type can provide both employment and a better environment which, in the long term, further enhances the opportunities of making a living.

e) Above all the wrong incentives, which can still be found in many areas, must be eliminated. These can include subsidies for cattle ranches or commercial plantations in areas which are not suitable for the purpose. The same applies to low royalties for the extraction of minerals and natural resources. Public services and publicly controlled resources must be priced in a fair and effective way. The structure of tariffs, for example of water and electricity, is an important and sensitive area that can have great effects on patterns of consumption.

f) In addition, all projects must be subjected to a serious environmental impact assessment which takes into consideration the opinions and values of all those concerned. Social engagement, democracy, information and distribution issues are intimately associated with environmental and resource issues.

If the problems associated with an environmentally sustainable development are not treated as part of the struggle against poverty, the effects of the struggle against poverty will not be lasting.

Further reading and references

Bigsten, A. and J. Levin, (2000), "Growth, income distribution, and poverty", Memo from Department of Economics, Gothenburg University for Sida, September.
Cervantes, J., M Martinez, O Masera and F Schutz, (1984), "End Use Oriented Energy Strategies for Mexico" Paper presented at the Global Workshop on End-Use Oriented Energy Strategies, Sao Paulo, Brazil.

Chen, D., Ravallion, M (forthcoming), "Global Poverty Measures 1987–1998 and Projections for the Future", World Bank, Washington DC.

Costanza et al, (1997), Nature Vol. 387, page 253–300.

Dasgupta P., (1995) Population, Poverty and Local Environment, Scientific American, 272(2) pp 26–31.

Ehlin Consulting, (1997), Lake Victoria Basin National Resources under Environmental Stress, Sida/Department for Natural Resources and the Environment.

Ekbom, A. and J. Bojö, (1999), Poverty and Environment: Evidence of Links and Integration into the Country Assistance Strategy Process, Environment Group Discussion Paper No. 4, Africa Region, World Bank.

UN Climate Panel, (2001a), IPCC, (February 13th – 16th 2001), Climate Change 2001, Impacts, Adaptation and Vulnerability.

UN Climate Panel, (2001b), IPCC's report (19-02-2001).

Global Water Partnership, www.gwp.sida.se

Hinrichsen, D., (1998), Coastal Waters of the World: Trends, Threats and Strategies

Hossain, I., (2000), "Poverty, Environment and the Consultations with the Poor", Memo, Environment Policy Division, Sida.

International Fund for Saving the Aral Sea Executive Committee (IFAS), (2001), www.aral-sea.org/ifas/aral/aral-rys.html.

Jansen, E., (1997), Rich Fisheries, Poor Fisherfolk, Report No 1, Some Preliminary Observations About the Effects of Trade and Aid in the Lake Victoria Fisheries, World Conservation Union.

Jayaraman R., & P Lanjouw (1998), "The Evolution of Poverty and Inequality in Indian Villages", World Bank, Policy Research Working Papers, No. 1870.

Jodha, N.S., (1986), "Common Property Resources and Rural Poor in Dry Regions of India", Economic and Political Weekly, Vol 21 (27); 1169-81.

Leach, M. and R. Mearns (1991), Poverty and Environment in Developing Countries: An overview study, Institute of Development Studies, Sussex, UK.

Lindahl Kiessling, K., (1998) Alleviating the Consequences of an Ecological Catastrophe,

Conference on the Aral Sea – Women, Children, Health and Environment April 23rd–24th, 1998.

Medécins Sans Frontiéres in the Aral Sea Area, (1999), Aral Sea Areal Disaster, www.msf.org/aralsea/asa-dis.htm.

Mothadullah, K., (22-03-2001), GWP Executive Secretary, World Water Day.

Myers, Norman (1995), Environmental Exodus – An Emergent Crisis in the Global Arena, Climate Institute, Washington, 1995. (This study on environmental refugees was financed by Sida, among others).

Ostrom, E., (1990), Governing the Commons, The Evolution of Institutions for Collective Action, Cambridge University Press.

Red Cross, (1999), Catastrophes in the World 1999.

Rönnbäck, P., (2001), Shrimp Aquaculture State of the Art, Sida's EIA Helpdesk, EIA Centre, Swedish University of Agricultural Science, Uppsala.

Sadik, N., (1999), 6 Billion, A Time for Choices, The State of the World Population.

Sen, A., (1977), "On Weights and Measures: Informational Constraints in Social Welfare Analysis", Econometrica, 45:7, pp 1539-71.

Sen, A., (1993), "Capability and Well-Being" in Nussbaum and Sen, ed., The Quality of Life, Clarendon Press, Oxford.

SIDA, (1991a), Environment and Poverty – Action Guidelines for SIDA's development cooperation.

SIDA, (1991b), Poverty, Environment and Development – Proposals for Action.

Sida, (1995), Poverty and the Environment – A Contribution to Sida's Poverty Study.

Sida, (1999), Strategy for Support to Sustainable Development in the Lake Victoria Region, The Lake Victoria Strategy Task Team.

Sida, (2001), lake Victoria a Shared Vision.

Sida in the World, http://www.sida.se/Sida/

Sida's formal decision on project support, (16-02-2001)

Sida's Subject Information (1999a), Garbage – a ticking time bomb.

Sida's sector information (1999b), GWP – with the focus on water.

Sterner, T., (2000), Growth and the environment, Sida's Department for Natural Resources and the Environment.

Swedish UNIFEM Committee, (2001), Box 232 37, 104 25 Stockholm.

UNCED (1993), Agenda 21, Ministry of the Environment, Stockholm

UNCED Report from the Working Group on Aid for Sustainable Development, Stockholm, Ds 1994:132.

WHO (1997), Health and Environment in Sustainable Development. Five years after the Earth Summit, Geneva.

World Bank (1992), World Development Report 1992 – Development and the Environment, Oxford University Press, New York, 1992.

World Bank (1993), Implementing the World Bank's Strategy to Reduce Poverty – Progress and Challenges, Washington D.C.

World Bank (2000a), Poverty Reduction Strategy Paper Sourcebook. Chapter on Environment and Natural Resources. Draft of March 2000.

World Bank (2000b), Entering the 21st Century: World Development Report 1999/2000.

World Bank (2000c), Poverty and Environment" April. Draft working paper by Julia Bucknall, Christiane Kraus and Poonam Pillai.

World Watch Institute, (2001), State of the World 2001.

For those who wish to stay informed about the poverty debate, the World Bank's website http://www.worldbank.org/poverty/ is recommended.

SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
S-105 25 Stockholm, Sweden
Tel: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64
Homepage: http://www.sida.se

ISBN: 91-586-8754-8