

POVERTY AND ENVIRONMENT - A VIEW DR. QAIS ASLAM¹

The relation between poverty and environment is found to be complex and not as well understood, as it needs to be. Poverty causes environmental degradation and environmental degradation causes poverty. But it is not an egg and chicken question. This question has an answer. It should be noted that apart from poverty, affluence also causes environmental damage and still environmental damage causes poverty in return.

It has been rightly observed by many researches, that the people most gravely affected by environmental problems are generally the poor. This may be seen in terms of rising health bills due to water borne and air borne diseases; or in case of water logging and salinity; or in terms of desertification and drought. For instance, a poor farmer tilling ecologically fragile land is too resource poor to make required investments in resource conservation. Hence, he keeps farming this already degraded land, which results in complete loss of fertility. In this way, the poor become poorer, or in other words, by tilling ecologically marginalized land the person himself / herself becomes economically marginalized. All these problems hurt the poor the most and in response poor are bound to revert to unfriendly environmental practices. It might be true that poverty causes environmental degradation, because poor people have no choice but to live a life under some 'set rules' that their 'absolute poverty' dictates. In no way are we emphasizing that only the poor are responsible for environmental damage. As it is explained in later sections of the paper, in a lot of places, poor are seen as the very people involved in environmentally friendly practices.

There are other equally important causes to environmental degradation.

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It is also an equally important statement that the rich and affluent also cause environmental damage with their over-consuming life-styles and less care for their surroundings.

Lack of education, lack of knowledge about the environment and lack of know how about environmentally friendly techniques on both the opposite rings of the socio-economic ladder can cause serious and irreplaceable damage to the environment.

It is appropriate to say that the economically lucky among us have to help save both the environment and those that are not so lucky among us in order to save mother earth from serious environmental degradation and damage. It is important that this habitat of ours keep on being alive and healthy and a livable planet (for all-living organisms and humans). It is also important that there is economic prosperity and a reasonably decent standard of living for all. Most important there should also be an inter-generation equity and sustainability for the future. All this needs not only a certain level of education, a certain level of knowledge about our environment, but also a certain level of environmental friendly technology, a certain level of change in our consumption and production behaviors of both the rich and the poor alike. Most importantly it needs to reduce marginalization of the poor themselves, and a certain level of their empowerment so that they can not only sustain themselves, but also help sustain the environment and development processes for this and for future generations.

The purpose of this paper is to analyze the linkages between poverty and environment. We believe that environmental protection is as much as our concern as of the developed countries. We also believe that environmental protection and poverty alleviation should be as much concern of the developed world as of the less developed world. We also believe that policies aiming at poverty alleviation also in turn help preserve the environment, if they are pointed in the right direction. In other words: a) This paper may be considered as an attempt to clear this misconception that environment is not a concern of the less developed countries and is just a fashionable fad! b) We have tried to analyze historically the doubts that existed in the minds of the third world about the environmental movement. And c) we have also focused on Pakistan and the environmental problems it faces.

HISTORICAL CONTEXT TO ENVIRONMENTAL AWARENESS

People have been living in different parts of the world in different stages of relative and absolute poverty and affluence, practicing different believes, having different cultures and perusing through different ways and techniques in their quest for economic sustenance and development. Most of these methods and believes were regional in character, also were sustainable both to human environment as well as to the natural environment around them.

With industrialization, the advancement of technology, and technological development came both the rapid production techniques, as well as the dependence on the market economic system. This brought about affluence and prosperity in many parts of the world, especially the North, where industrial / technological development had taken roots and sown the seeds of market economic system. Soon the quest for expansionism started. With this the replacement of centuries old sustainable techniques of production and consumption with modern capital intensive techniques of production and commercialism.

The world was fast becoming one in many aspects of the word. With prosperity also came exploitation and degradation – both of human as well as natural environmental resources.

Thus poverty and environmental degradation both became synonymous to the Third World or the less developed South since the beginning of the 20th century the problems of cross border pollution and environmental degradation had become matters of concern in the developed North, although the use of the word environment is quite recent.

All these treaties show that care for our natural and economic environment had become a part of international economic, political and diplomatic concern. Non of them had poverty as its cause.

Most important about Rio Summi1992 is that a new era of relationship between environmental degradation and economic development had started. A shift from the realization that economic prosperity brings environmental degradation and that environmental conservation brings about poverty and a decrease in standards of living.

DEVELOPMENT AND ENVIRONMENTAL MOVEMENT

In developing nations of the South there has traditionally been a great deal of distrust of the environmental movement. It was viewed as a new way of colonization and is still sometimes referred to as neo-colonialism. Third world countries saw it as a movement, which suspiciously rose when these countries had broken off the yolk of colonization and were embarked on the path of rapid industrialization in order to develop themselves and compete with their developed counterparts. Environmentalism was seen as another ploy to retard the pace of development in the former colonies and make them conserve the natural resources, which they could exploit to grow as the industrially developed North did in their own respective growth period.

But in spite of all these suspicions about environmental movements, by the 70s most developing nations were encountering severe environmental problems such as self-inflicted flooding and drought, urban plight, and industrial pollution.

Moreover, development theories, which were prevalent in the past decades, were the ones advocating the 'growth' phenomenon. Growth models like Harrod-Domar and Solow advocated capital accumulation at all cost in order to attain high levels of GNP and GDP. And in pursuit of such high levels of economic growth, the concern for environment never surfaced. Third world economists termed environment as a 'superior good' and referred to it as concern of the rich. The literature that existed then also supported the paths of industrialization.

In the development field, it had already been recognized by the late 60s that policies aimed at the maximization of economic growth did not have the anticipated effects on the alleviation of poverty, both within and between nations. It could be seen that rapid and unprecedented growth lead to greater inequality but at the same time it still served to achieve high GNP rates. But this led the change from simply 'growth' to 'redistribution with growth'. Later in 70s, the debate shifted to 'basic needs approach', but environment was never a concern.

One of the best examples which confirmed the aims of developing countries regarding development was the survey conducted by Wassily Leontief ¹ and a team of collaborators in 1973, sponsored by the United Nations. The initial objective of the study was environmental, being concerned with projecting to the year 2000 the interrelationships between population, resources, environment and development. The world economy was desegregated into fifteen regions, and within each region forty-five sectors of economic activity were described, linked by the inter-regional flow of forty classes of goods and services, capital flows, aid transfers and foreign interest payments. Interestingly, the principal environmental issues taken into account were those concerning pollution, constraints on the extraction of mineral resources and the production of food. Leontief and his colleagues concluded that there were no physical barriers to accelerated developments during the rest of the century. That a much higher rate of development, accompanied by heavy industrialization, is a necessary condition if the average income gap between the developing and the developed countries is to be reduced. Regarding the food production they suggested that to feed the growing world population, it would be necessary to increase the area under cultivation in developing countries by some thirty percent in thirty years, while at the same time, productivity should be doubled or trebled. Leontief was confident that this could be done, given institutional changes. He also concluded that contemporary pollution-abatement technology was sufficient to hold emissions at current levels, at a cost of 1.5 and 2 per cent of GDP. According to him, developing countries did not have a serious problem at present, and therefore need not suffer any penalty if their per capita GDP was below 700 dollars. A fundamental philosophy towards environmental protection was clearly stated as: “For developing regions planning a limited implementation of pollution-abatement techniques, a realistic estimate of the share of investment diverted from other purposes would not, on the average, be larger than 2 or 4 per cent.” ²

This report was severely criticized but at the same time it served as an argument in favor of the developing countries who wanted to accelerate their growth process and considered anything which came in the way as a deceleration and hindrance. But Leontief’s

¹ Leontief, et al., 1977

² Leontief et al., 1977, p. 7

projection about food production was regarded as correct, and demand for major increases in productivity and further development of unutilized arable land was seen as just. About the pollution problem, Leontief seemed to believe that the problem was associated with industrialization only and at that time there were many who agreed with him. The economists of the developing countries agreed with Leontief and were of the view that developing nations could afford to ignore pollution, or at least treat it as a relatively minor problem in the course of their early industrialization.

The famous Pakistani economist, Dr. Mahbub ul Haq raised the question of a geographical redistribution of industry arising from the growing concern over pollution. He wrote: “There is absolutely no reason why the developing countries should not increasingly concentrate on some of the industries which the developed countries find too “pollutive” or too costly in their context. This, after all, is the basic principal of international division of labor and the shifting comparative advantage. The developing countries, on the whole, have imposed a relatively low demand on their environmental resources in the past so that they can accommodate a greater volume of waste products, or residuals, at this stage of their development. At the same time, there is no reason why they should not put in some safeguards against major environmental degradation arising out of these industries. These safeguards are obviously going to be much less stringent and, in many cases, relatively less expensive than in the developed countries. As such, the developing countries do not have to give up their concern with environment while specializing in some of these so-called pollutive industries. In fact, a historic opportunity has opened up for them.

The developed countries, in their anxiety to grow fast, ignored some of the social costs of their industrialization and these postponed costs have accumulated by now to pose difficult choices for their present generation. If this contributes to slow down the growth of some of these industries in the developed countries and to encourage a move toward a better geographical redistribution of industries toward the developing countries, which were left behind in the race for development, it would only be a just redressing of the international economic balance.”¹

¹ Haq, M. ul. 1976, p.117.

Stockholm and Rio (and *Agenda 21*) laid down principles that give a guideline on how countries and communities can maintain a reasonable standard of living, eradicate poverty and at the same time preserve the environment for this generation without compromising the needs of the future generations (sustainable development).

DIMENSIONS OF POVERTY

Poverty has many dimensions – economic, political, social, historic, environmental and more importantly human.

Poverty has an Economic dimension.

In economic terms, a country, region or household are poor when the per capita income of a country or the income of a household is very low. When the buying power of the economy or of the household is below a certain minimum standards. When there are in a nation, region or a household, low medical care and health facilities. When the productivity of the nation, a group or an individual in the nation is very low. When there is illiteracy, lack of basic education, and lack of knowledge about the people's physical, intellectual, spiritual, and moral environment. When a majority or a minority of the people in a community are hungry, venerable and powerless to make their life better for the present or for the future.

Poverty has a Political dimension.

In political terms a country, a region or a group of people are poor, when they do not have a voice in the community, or are dependent on other more powerful groups or individuals in order to express their own rights or choices. Political poverty is expressed in the fact that the democratic process in a country or community is usurped or hindered and institutions that safeguard the basic human rights of liberty, life and freedom of majority or minority in that community cease to exist or do not function.

Poverty has a Social dimension.

In social terms poverty in a country, region or household breeds all types of socially unacceptable behaviors like drug addiction, crime, prostitution, violence in a family or in the community and terrorism, all of which degrade human self respect, moral and social values

of the society as a whole, when more and more people in the community become intolerant of each other and are rude towards each other in their day to day life.

Poverty has a Historic dimension

In its historic dimension, people who were poor have remained poor over centuries (with a few exceptions of those that were innovative or adventurous). What is meant here is that those in the remote past who were not property owners, or those who got vanquished in wars and strife as well as those that fell into debt to others through the institution of usury, became slaves, were sold in slavery and a life of misery. Once the slave society was abolished, they became free men, but still did not get any entitlement to means of livelihood, except being bonded to the land as serfs and peasants. With the advent of industrialization and the development of means of communications as well as the market expansion and usage of money as a medium of exchange many serfs and landless peasants went to the cities and towns to work as free labor to the industry or just joined the endless army of unemployed city dwellers. Industrialization might have given them bigger economic and geographical mobility as well as increased their choices over goods and services but still they remained poor. Some living just above poverty lines, others less fortunate living in absolute poverty. But relatively speaking they all were poor compared to those that historically were landowners or became entrepreneurs and businessmen forming the upper strata of the society.

Poverty has an Environmental dimension

In its environmental terms, poverty destroys the living environment not only of those that live in poverty but of all others humans and non human species that depend on the same resources and ecosystem on which those living in poverty depend and survive upon. People living in poverty can not change their behaviors easily, not only because of lack of resources, but also because of lack of knowledge about their own surrounding and survival techniques, lack of education, illiteracy and more importantly if they do change their already marginalized living behaviors they might die, therefore it is easy for them to survive on what ever they have without regard to their physical and spiritual environment, rather than take measures that might protect their environment. Thus by destroying their own living

environment the poor in reality are destroying their own resources on which they survive in the long run.

Poverty has a human dimension

Poverty in its human dimension is the most important of all, because poor people live in conditions that are miserable, conditions in which they or some members of their family die of hunger, disease, famine, or of violence. When a child is down with a curable disease and the parents have to take a decision whether to take the child to a doctor and buy expensive medicines for that child which would take up a major portion of the family's income or to spend that much needed money on the food of the other children in that family. Poverty has a human dimension when the parent of a child sells his or her child into slavery or prostitution because of lack of resources to feed or care for that child and its siblings. Poverty has a human dimensions when government institutions not only fail to protect the poor, these upholders of law, freedom and human rights commonly abuse the poor through the very institutions that have been created in a civic society to protect them. Poverty has a human dimension when the feudal lord or some person with political and economic power abduct the daughter or wife of those that serve under him or takes the poor into bonded labor and the aggrieved are powerless to do anything. Poverty has a human dimension when governments, institutions, groups, individuals in that society or nation have become inhumane towards those that are more unfortunate than them – women, children, religious or political minorities, economically poor, etc.

Moneylessness and economic vulnerability are forms of powerlessness, and Absolute poverty can be defined as a state of *moneylessness and powerlessness*.

In Pakistan in 1996-1997 the percent share of income or consumption of the lowest 10 percent of people was 4.1% compared to 27.8% share of income or consumption of the highest 10 per cent of people.¹ In the words of Professor Rein, "People must not be allowed to become so poor that they offend or are harmful to society. It is not so much the misery and plight of the poor but the discomfort and cost to the community, which is crucial to this view of poverty. We have a problem of poverty to the extent that low income creates problems for

¹ World Bank Report 2000-2001, *Attacking Poverty*, Oxford University Press, Washington DC, p 283

those who are not poor”. In the words of Amratia Sen., “to live in poverty is sad, but to offend or to (be) harmful to society, creating problems for those who are not poor is, it would appear, the real tragedy”.¹

SOME ENVIRONMENTAL PROBLEMS IN PAKISTAN

Pakistan has abundant fresh water resources from surface water of the five rivers and their tributaries, local rainfall, ground water and glaciers. Massive pollution overloading of rivers occurs at various points on Pakistan’s river system. Due to the inadequacy of the water supply and sewage disposal systems in almost all industrial cities of Pakistan sewage is carried by surface flow into open drains, which ultimately discharge into streams, rivers or the sea.

River Ravi around city of Lahore has a sewage dilution of a ratio of 1:1 and the river is now merely a sewage carrier void of any marine life around Lahore.

Presently, agricultural fertilizers and deforestation are the biggest source of environmental degradation in the country, followed by vehicular and industrial pollution and pollution caused by municipal and hospital waste.

Poverty and affluence combined with lack of education and knowledge of environment friendly techniques are also the cause of pollution and environmental degradation.

This unplanned, uncontrolled by law and unsustainable economic activity degrades the environment as well as increases the risk of poverty of the poor in the country.

Pakistan’s population is increasing rapidly, and in 2006-2007, it became more than 160 million people. 50% of this population lives in rural areas, and is poor, and it is in this same majority of the population that the illiteracy rate is more.

These people usually live on those areas of the land where the productivity potential is low. Their methods of farming are primitive, due to which natural resources are wasted

¹ Sen, Amratia. Poverty and Famin

even more. These people and their animals destroy nearby forests and plantations for fuel and fodder. Because of this, the country's forests are depleting.

Now as almost 50% of Pakistani's population lives in urban areas. Due to this, noise, environmental, water and air pollution and rubbish are spreading. Not only does illness spread as a result of this, but natural resources are also wasted, and are becoming short to rare for one future generations. They hinder economic development.

Any poverty reduction strategy for Pakistan must focus on the rural economy, given that two-thirds of Pakistan's poor reside in rural areas and their poverty is both deeper and more severe than urban poverty. Moreover, such a strategy should be informed by a detailed micro-level analysis of the important constraints that operate in the rural economy.

Moreover, despite population pressure and inheritance practices, the distribution of land has not become more equitable over time. Inequity in land ownership is also one of the reasons why overall agricultural yields in Pakistan remain below that of other countries with similar resource endowments, the impact on productivity can occur in various ways.

There are studies that point to the role of agricultural expansion by poor farmers as the cause of deforestation and other environmentally damaging land use changes¹. The argument goes that poor farmers usually have access to ecologically fragile land². The literature points out the 'vicious circle' between poverty and degradation. This circle is *Malthusian* in inspiration, where farmers, pushed by population increase and poverty, extend cropping onto fragile marginal lands, thus, degrading them. The latter reduces the yield, which further impoverishes farmers.³ The implication of the focus on vicious circle of poverty and degradation is that poverty alleviation will necessarily reduce degradation of the environment, and its inverse, that arresting and reversing environmental decline will help the

¹ Southgate, 1988; Mink, 1993

² This view is also supported by Blaikie and Brookfield in their historic work on the concept of 'Political Ecology' where they put forward the idea of marginalization which says that people who are politically and economically marginalised are usually ecologically marginalised too. For details, see Blaikie and Brookfield, 1987, '*Land Degradation and Society*'.

³ This has been shown by Dasgupta and Maler, 1994, Pearce and Warford, 1993, Mink, 1993

poor¹. It is argued that in an environmentally degraded situation, poorest sections of the society are most adversely affected.

According to Dasgupta², the vulnerable are often the users of marginal resources and also the most dependent on the common resources of the community in which they live in. Hence the causality runs in both the directions. Poverty causes harm to the environment and environmental degradation affects the poor.

Poor are also at a disadvantage regarding agricultural intensification. Boserup³, in 1965, outlined a number of technologies and investment paths to agricultural intensification that farmers follow in the wake of increased land constraints and demand for land. Two broad paths can be distilled from Boserup's framework. i) Labor-led intensification path where farmers merely add labor to the production process on given land, allowing them to crop more densely, and weed and harvest more intensively. And ii) the other path is the capital-led intensification path where farmers augment their labor with variable and capital inputs, in particular fertilizers, organic matter and capital that facilitates land improvement. Boserup identifies the second path as having higher land productivity than the former.

Similarly, Matlon and Spencer⁴ note that the capital-led path is more sustainable and productive in fragile, resource-poor areas as the fertility-enhancing input use helps the farmer to avoid exhausting the soil during intensification and the capital (land improvements) help avoid erosion and runoff. Therefore, in situations of fragile and degrading environments and land constraints, and lack of opportunity to extensify, poverty-ridden households are unable to make the requisite investments for the capital-led intensification path and find themselves amongst increasing rate of degradation and vulnerable to its productivity consequences.

It is known that population is inversely related to the level of income. Poor tend to have larger families as each child has an economic and financial value in the Third World culture and tradition. Also, due to high infant mortality rates prevalent in developing societies, population tends to be higher.

¹ Leonard, 1989, Cleaver and Schreiber, 1994.

² Dasgupta, 1993, 1996

³ Boserup 1965

⁴ Matlon and Spencer, 1984

Population dimension relates to poverty and then to the environment.¹ There is no doubt about the fact that larger population exerts greater pressure on the natural environment as natural resource base is fixed and as more and more people demand their use, the pressure on it increases resulting in exploitation and decline in environmental quality.²

There is considerable evidence to suggest that education especially female education, the level of agricultural employment and level of nutrition and the extent of civil liberty all act to reduce total fertility and thereby, pressure on the environment and natural resource base. Some of these also help reduce poverty.

Economic growth has been negatively associated with the level of population growth and so it has been argued that in this way economic growth will be helpful for the environment in the long run. Dasgupta³ has shown how sections of the community dependent on natural resources may get locked into a cycle of poverty where high fertility rates are maintained and that in turn exacerbate the pressure on the natural environment. He argues that as common resource management systems break down, then individuals are more able and willing to make family size decisions that do not take full account of the social costs of child rearing, with the use of common resources treated as a free good. With the passage of time, the natural resource gets increasingly depleted and the family unit requires more members to achieve the same level of welfare. Thus a cycle of increasing degradation is initiated.

NATIONAL CONSERVATION STRATEGY OF PAKISTAN 1992 & VISION 2025

National Conservation Strategy of Pakistan 1992 has three overriding objectives:

1. Conservation of natural resources
2. Sustainable development of the country
3. Improved efficiency in the use and management of resources.

The National Conservation Strategy recommends the following 14 core program areas for priority implementation:

¹ Aslam, Qais *Economic Journal*, Lahore 1992

² Aslam, Qais *Political Science Journal*, Lahore 1998

³ Dasgupta, 1995, 1997

1. Maintaining Soils in Croplands
2. Increasing Irrigation Efficiency
3. Protecting Watersheds
4. Supporting Forestry and Plantation
5. Restoring Rangeland and Improving Livestock
6. Protecting Water bodies and Sustaining Fisheries
7. Conserving Biodiversity
8. Increasing Energy Efficiency
9. Developing and Deploying Renewables
10. Preventing/ Abating Pollution
11. Managing Urban Waste
12. Supporting Institutions for Common Resources
13. Integrating Population and Environmental Programs
14. Preserving the cultural Heritage.¹

CONCLUSION

The importance of environmental considerations in the planning of development has now been recognized.

By signing *Agenda 21 of United Nations Conference on Environment and Development, 1992*, in Rio de Janeiro, countries of the world have committed themselves to sustainable development. A lot has changed since the first UN conference of 1972 at Stockholm. Environmental movement is at its full maturity, in developed world as well as the developing world. But the difference between the commitment levels of the states remains. Developed world has followed the path of environmental regulation and is trying to control

¹ National Conservation Strategy p 4

emissions of dangerous substances like CFC's in wake of international agreements such as *Kyoto Protocol*, etc. But still there is a lot to be done on their part especially with threats like global warming in the air.

As far as developing world is concerned, poverty remains a severe problem. But they have realized the adverse effects of environmental degradation. Self inflicted floods, landslides, droughts, famines, lower agricultural productivity; all have been proven to be human induced numerous times. Most of these countries have inducted public awareness programs and have formed environment ministries. But this is not enough. In our opinion, poverty is a serious problem in all aspects. Poor are mostly the most vulnerable. Policies aiming at poverty alleviation have multiple effects for a country. Educating the masses enables them to have information that is a cornerstone for civil liberty. Controlling population rates lessens the pressure on resources thereby guaranteeing greater productivity. To expect from poor that they would protect as well as use their resources in a sustainable way is naïve. The priorities of a poor household do not at all include environmental protection or resource sustainability. So we believe that poverty alleviation is the cure to most ailments of the third world. But poverty alleviation does not necessarily mean faster unprecedented growth rates. A growth path, which fulfills equal distribution of wealth as well as a safe and healthy environment, is conceivable. Public awareness programs and general education are the key to success. Enlightened and educated people are in a better position to help form a good healthy environment and a better society. Once the people are educated and are well informed they can themselves decide their future and help design such policies, which are over all benign.

POLICY RECOMMENDATIONS

What framework of action is needed to effectively reduce poverty in all its dimensions is up to the national government and economy to decide upon its policies and objectives of the strategies. Poverty is the outcome of economic, political and social process that interacts with and reinforces each other in ways that can worsen or ease the deprivation of the poor.

1. In order to attack poverty requires promoting opportunities, facilitating empowerment, and enhancing security. This action has to be taken at local, national as well as global level. Making progress on all three levels can only generate the dynamics for sustainable poverty reduction.
2. Economic Growth is essential for expanding economic opportunities for the poor. Key in expanding economic opportunities for the poor is to help build up their assets. Human capabilities such as health and education are also powerful tools, which affect the material well being of the poor. Also important are the material prospects of the poor is ownership of (or access to) land, infrastructure, and financial services. Social assets important to the poor would include social networks like family ties and traditional networks which should not be dismantled due to the modernization process.
3. Expanding economic opportunities for the poor indeed contributes to their empowerment, but efforts are needed to make state and social institutions work in the interest of the poor.
4. Formal democratic process is part of empowerment. It is needed to mobilize the poor in their own organizations to hold state institutions accountable and ensuring the rule of the law in their daily lives for empowerment to work for the poor.
5. Social interaction between individuals and communities also has an important influence on poverty reduction. Confronting gender inequalities is a fundamental part of reducing poverty and enhancing empowerment.
6. Also enhancing security for the poor means reducing their vulnerability to such risks as ill health, economic shocks, and natural disaster and helping them cope with adverse shocks in their daily lives when such shocks occur. Supporting the range of assets of the poor – human, natural, physical, financial, and social – can help them manage the risks they face And supporting the institutions that help poor people manage risks can enable them to pursue activities that can lift them out of poverty.

If Developing nations like Pakistan carry on haphazard development strategies in without taking the interest of the poor as well as protecting the environment, then by the time they achieve a decent employment and growth levels the problem of environmental

degradation, depilation of resources and pollution of air, water and land would have become so grave that sustainability would not be able to be achieved and food production because of land erosion and water shortage would have become so immense that poverty alleviations strategies might fail.

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