

**THE ENVIRONMENT AND THE
ECONOMY OF PAKISTAN:
Future Prospects in Past Perspective***

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The economy of Pakistan has a checkered history over the last fifty years. The phases of recession and boom in the economy have affected all sectors with structural changes and the erratic pattern of growth of GDP. The environment and the natural resources of the country have been under tremendous pressure and have degraded over time, worsening the prospects for sustainable development. This paper identifies linkages between economic development and environment of the country over time. The major environmental issues, potential threats to the country's economy, have also been explored.

I. Introduction

The issue of environment is a prime mover in encouraging a more holistic and sound economic development with sustainable future prospects. As pointed out by Pearce and Markandya (1989), a realization has emerged that: "Linear economy approach of economics textbook is a misleading abstraction. Linear economies consist of production and consumption sectors with the process of maximizing the social utility of consumption being constrained only by the rate at which resources can be transformed into production and consumption."

* The paper was presented at the AERC Conference, 1998.

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The observations of Boulding (1966), demonstrated a linkage between economy and ecology in the seminal spaceship earth essay. The laws of conservation of mass which feeds the production sector, links the natural resource base to the emission of wastes, into the receiving natural environment. Because the environment has limited but variable waste-assimilation capacities, there are constraints on the rate of resource transformation, in addition to those cited in conventional economic models and on the time period over which such transformation can take place.

The limits set by the emission of waste and the capacity of environment to assimilate that waste is the analogue of rules for the sustainable use of renewable resources; namely, that harvest rates should not exceed natural or managed yields. The linear economy is replaced by one in which both the flows of finance, materials, and energy are circular. Moreover, the two layers of the system interact; economic and ecological systems cannot be separated.

Norgaard (1984), has termed economy and ecosystem as coevolutionary; development of one requires the harmonious evolution of the other. Antle and Heidebrink (1995) have observed that a vigorous public debate has emerged among individuals who maintain that environmental degradation is a necessary outcome of economic growth, and those who believe that economic growth and environmental quality go together.

The debate on the nexus between Development and the Environment was quite pronounced at the United Nations Conference.¹ While addressing the American Agricultural Economic Association, Ruttan (1971) hypothesized that: "in relatively high-income economies, the income elasticity of demand for commodities and services related to sustenance is low and declines as income continues to rise, while the income elasticity of demand for more effective disposal of residuals and for environmental amenities is high and continues to rise. This is in sharp contrast to the situation in poor countries where the income elasticity of demand is high for sustenance and low for environmental amenities." This hypothesis of Ruttan's lacked quantitative support as he himself noted that "quantitative evidence with respect to the demand for environmental services is inadequate in this time."

Today, the situation in developing countries is not different than in 1971 as availability of data to estimate the demand for environmental quality is still limited. Similarly, quantification of the supply of environmental amenities in the supply side of the environment-development equation is virtually insignificant.

In Pakistan, little or no systematic attempt to quantitatively document the state of the Environment is witnessed. National Accounts data generally lack sufficient

¹ United Nations Conference on Environment and Development in Rio de Janeiro, held in 1992.

detail to ascertain the level of public spending on environmental protection. The budget estimate of spending on environment in annual development plans includes spending in areas, which are indirectly related to environment. The expenditure on land development and land reclamation is estimated as a percentage of current expenditure on rural areas. However, private organizations and international agencies have recently begun to respond to the need for data on environmental aspects of Economic Development.²

II. Relationship between Development and Environment

Economic development intends to improve the quality of life of common people, but it affects both people and the environment. These interrelationships are specially critical for countries which are in the process of modernization and industrialization, but are still in the early stage of such transitions. It is quite important and timely to assess inter-linkages in these countries for present and the future prospects of sustainable development.

The empirical investigation into the pattern of long-term relationship between growth and the environment of some of the high-income economies has identified variation with the type of environmental problem. For instance, the problem of contamination of drinking water and urban sanitation lessens with increasing income levels. The severity of the problem of deforestation and air pollution is intensified with the increase in income up to a certain level but investment in pollution abatement technologies and effective implementation of regulations helps greatly in reversing the situation. Hence, in the last two decades, technological progress and adoption of the best alternatives policies has helped countries to develop in a less (environmentally) damaging way than was observed in many developed countries in the 50s and 60s.

Over the five decades of the last century, Pakistan's history of economic growth and development reflects the fact that the country has made significant strides over a long period. Studies on pattern of economic performance praise the country's average annual growth rate of 6.5 per cent during the 60s, when Pakistan was ranked as the sixth fastest growing economy in the world. In the decade of the 80s the GDP growth rate was low and averaged around 5 per cent. In the last decade of the 90s, the GDP growth remained low in comparison to the decade of 60s with an average of 3.4 per cent.

² Global Environmental Outlook (GEO), UNEP (2000), reports that: "there is a gradual recognition of the need to use geo referenced data in environmental assessment. Some important global, geo referenced data sets, such as population and land cover, have been produced in the past few years. However this should be regarded only as a beginning as few of these data sets are regularly updated."

As mentioned earlier, the economic growth in high-income countries has revealed positive links with environment. Norgard (1984) says, "empirical results suggest that distributive justice has prevailed which ensures efficient and sustainable management of environmental resources to a large extent." The argument could be justified on the assumption that the lesser the poverty level in any society, the more the resources for people to spend on managing the natural and environmental resources. Hence, a positive link is being established on this premise.

Pakistan is precariously placed, with impressive economic performance accompanied by deteriorating standards of living, persistent poverty and very low level of human resource development. Human capital with high literacy and equipped with skilled training is less dependent on natural resources. Hence its use minimizes the chances of over exploitation of environmental resources.

The literacy rate in Pakistan during the last two decades has remained a record low (25-35 per cent) of the total population; with female literacy as low as 19 per cent. The poor live in unhygienic conditions using contaminated water for drinking which has taken its toll on new born babies. As a result infant mortality rate has increased from 94 to 100 deaths of children under one year per thousands live births. Around 60 per cent of the mortality is caused by water born diseases, a consequence of an unclean domestic water supply. Out of the total population of the country less than half (48 per cent) has access to sanitation facilities and around 20 per cent is deprived of access to drinking water. Environmental problems caused by a combination of one of the highest rate of population growth in the world and mismanagement of natural resources, threatens the sustainability of even the moderate rate of growth.

The paper briefly reviews the links of economic development with environment over the last fifty years. The process of development is associated with a sustained increase in GDP and changes in some key economic variable relating to the sectoral composition of production, services, trade and factor use. Macro-economic development implications on natural resource utilization and conservation are looked into in more detail in the following sections of the paper.

III. Slack in Agriculture and Boost to Industries:

The Decade of 50s

Several studies have termed the decade of the 50s as the period characterized by policy biases against the traditional agriculture sector. The macro-economic performance suffered due to a dormant agriculture sector. A distinct feature of the economic policy of this decade was the emphasis on promoting import-substituting industries. Although the consumer goods were being substituted by domestic production but due to the absence of a capital goods sector all the machinery for the capital intensive industrialization drive had to be imported. During this period the

trend was set to allocate resources to the social sector (health and education) parsimoniously for the lower strata of the country.

This period had few implications for natural resource management and environment in context of the policy parameters. Noman (1988) has assessed that "positive environmental development emerged more by accident, than by design."

Karachi had most of the share of industrial allocations due to its advantageous geographical location. It is uniquely placed and a site where industrial discharge could cause the least damage to the environment and people. Karachi is a rocky desert and is not surrounded by agricultural land of good quality. Hence, the opportunity cost of industrial development to agriculture is very low. The ground water table below industrial sites is non-potable or if potable, it is so deep that chances of contamination are minimal. Other environmental advantages include the fact that watercourse is untreated such that waste water discharges are not reused for irrigation and there is a continuous air movement which minimizes the adverse impact of atmospheric discharges from stationary or mobile sources. For all these reasons Karachi is considered to be an environmentally fortuitous location for industrial development. But despite all this the long-term repercussions of industrial and population growth on environment have been extremely drastic in Karachi.

The Karachi coastal and marine environment has changed over time partly as a result of massive take-off from the Indus River for irrigation in the upstream areas and partly by extensive pollution. All industrial waste, effluents and domestic sewage, all the agriculture run-off from the hinterland and the Indus River, find their way into the sea untreated. Air pollution has been rampant mostly because of the increase in production activities (growth in the industrial sector in Karachi) and sharp increase in the number of vehicles. This has done extensive damage. Thus, the urban air pollution has high environmental cost in terms of its impact on urban health.

The decade of the Fifties witnessed a highly myopic attitude of the policy makers, in depriving the social sector of its due share, which left it unprepared to deal with the challenges of a possible population explosion in the years to come. The illiterate, poor and malnourished masses growing in a random and undesired manner put the natural resource base under extreme pressure causing irreversible damage.

IV. Commendable Growth in Agriculture and Industrial Sector:

The Decade of 60s

This was a period of high growth, with a significant increase in per capita incomes. The average annual growth in the GDP almost doubled (6 percent) from the previous decade due to highly productivity of agriculture and the industrial sectors. Responding positively to the generous policy incentives, the large-scale manufacturing sector had a field day during first half of the decade. The seed-

water-fertilizer package was bestowed on the agriculture sector, which resulted in the Green Revolution. The average annual growth rate jumped up from 1.7 per cent in the 50s to 5 per cent in this decade. The implications for natural resource use were not favorable because all the government policies for achieving high growth targets (tax incentives exchange rates), resulted in maximum resource extraction. Hence, the natural resource base of the country was exploited and its unsustainably caused detrimental effects of growth on the environment.

The major environmental repercussions of the Green Revolution were related to high fertilizer and pesticide use [Hassan and Ali, (1993)]. In 1958 the use of chemical fertiliser was almost non-existent in Pakistan. Today, almost 50 per cent of farmers use chemical fertilisers. The domestic production of fertilizers is around 4,165 million tons with an annual import of 1,353 million tons, (see Tables 1 and 2).

Use of chemical fertilizer results in deterioration in soil structure. Poor soil structure means lower capacity to absorb and retain water, rapid leaching of nutrients out of the topsoil, and reduced aeration of the root zone. Waterlogging and salinity were the major hazards of irrigated agriculture of Green Revolution. In

TABLE 1

Fertilisers use in Pakistan

| Period | Fertiliser Offtake (*000 Nutrient Tons) | Annual Growth Rate (%) |
|---------|--|---------------------------|
| 1960-65 | 31 - 71 | 17.7 |
| 1965-70 | 71 - 283 | 31.2 |
| 1960-70 | 31 - 283 | 24.6 |
| 1970-75 | 283 - 584 | 14.3 |
| 1975-80 | 584 - 1079 | 14.5 |
| 1970-80 | 283 - 1079 | 14.2 |
| 1980-90 | 1079 - 2925 | 8.8 |
| 1990-99 | 4165 - 5238 | 28.0 |

Source: Report of the National Commission on Agriculture.

TABLE 2
Consumption of Pesticides in Pakistan

| Year | Imports | Domestic Production (metric tons) | Total consumption | Value (million Rs) |
|------|---------|---|----------------------|-----------------------|
| 1980 | — | — | 665 | 39 |
| 1981 | — | — | 3677 | 213 |
| 1982 | 3552 | 1448 | 5000 | 320 |
| 1983 | 4875 | 1713 | 6588 | 629 |
| 1984 | 6081 | 3132 | 9213 | 2256 |
| 1985 | 8270 | 4260 | 12530 | 2249 |
| 1986 | 8834 | 5665 | 14499 | 2978 |
| 1987 | 8019 | 6829 | 14848 | 3259 |
| 1988 | 6256 | 6816 | 13072 | 2334 |
| 1989 | 6869 | 7738 | 14607 | 3642 |
| 1990 | 4802 | 9941 | 14742 | 4581 |
| 1991 | 6157 | 14056 | 20213 | 5536 |
| 1992 | 6619 | 16748 | 23439 | 6554 |
| 1993 | 6128 | 14151 | 20279 | 5384 |
| 1994 | 10693 | 14176 | 20279 | 5384 |
| 1995 | 20134 | 23239 | 43373 | 7273 |
| 1996 | 24151 | 19068 | 43219 | 9987 |
| 1997 | 31036 | 13836 | 44872 | 9904 |

Source: Food, Agriculture and Livestock Division, Department of Plant Protection.

most areas, the threat of waterlogging has receded since 1970s as a result of launching the SCARP (Salinity Control and Reclamation Project) in which tubewells were installed and drainage was improved. But, the menace of salinity has become more acute in recent years.

The rapidly changing social economic scenario characterized by a high rate of migration of rural labor to urban centres, increased demand of urban infrastructure and of capital intensive industrial growth and measures for averting unrest among job seekers all had their negative impacts on urban and rural environment during this period.

V. Structural Changes: The Decade of the 70s

The breakup of the country during this decade adversely affected the economy and the growth of per capita income was negative, for the first time, since 1969. The new government attempted radical policy reforms to revive the economy and address the distribution of income issues. Public sector intervention in the economy was totally pervasive, as the state was the primary investor in contrast to the preceding decade. The astronomical growth of the share of public sector in the total industrial investment (5 per cent in 1970-71 to 74 per cent in 1976-77) indicated complete change of the economic scenario. Considering the two oil shocks and the uncertain economic situation during this period, the average annual growth rate of GDP (4.5 per cent) was reasonably good. A large share of government investment during this period was made on mega and long gestating projects like the Steel Mill. As a result, the commodity-producing sector suffered and remained stagnant. The population growth surpassed the agriculture growth and consequently per capita agricultural production declined. This period also remained deprived of sufficient resource investment for the social sector and social justice was again a far cry.

The environmental repercussion of growth and development in this period remained unfavorable. The estimated figures for air pollution in terms of pollutants level shows that CO₂ and SO₂ was 12308 and 19 ml/sq. km., respectively. These figures are quite alarming, in terms of National Environmental Quality Standards. The Steel Mill, which has now become a highly polluting venture, along with growing number of industries polluted the coastal areas near Karachi. But there was little realization of the steadily worsening environmental conditions by the policy makers during this period.

VI. Conspicuous Consumption and Inherent Structural Fragility: The Decade of the 80s

Economic development of late 70s and 80s witnessed a phenomenal growth of remittance from the Gulf States. As a result, pressure on unemployment eased considerably. According to one estimate, 33 per cent increase in the labour force

migrated overseas. The overall growth rate was respectable but at the cost of serious structural imbalances in the economy. Noman (1988), has noted: "The pattern of infrastructure investment simply did not keep pace with the demands put on it, leading to a deterioration in infrastructure and the emergence of serious energy shortages."

The spread of informal and underground economies was quite substantial during the decade. Private sector again got boosted but the savings rate in the economy remained extremely low, perhaps due to uncertain socio-political climate. The rate of population growth remained high and the social sectors remained deprived.

The environmental resource conservation suffered serious damage because of the following reasons. The industrial sector was marked by the growing number of petrochemical and leather industries, which are extremely harmful to environment in absence of adequate safeguards. The number of leather tanneries reported in the Census of Manufacturing Industries grew steadily from 50 in 1980s to over 100 establishments by the middle of last decade (1990s). The petrochemical industries also exhibited growing trends in the last two decades. The reported chemical industries in various locations of the country were around 120 producing 134 miscellaneous chemical products. Similar concerns may be applicable for development of engineering and steel industries downstream from the Steel Mill. In other words the composition of the industrial sector in Pakistan was such that it aggravated environmental problems, as rectifying measures were not adopted.

The worrying feature of this decade was a worsening of structural imbalances, especially the balance of payment situation. Noman (1988) has elaborated this situation as: "pressure to diversify the export base leads to the promotion of manufactured exports in sectors such as leather. This is a sector which is inhabited by a number of small units not particularly well informed about the substantial environmental damage they may be inflicting. There is an obvious need to promote the leather sector. Care however, needs to be taken that high environmental cost is not the price paid for competitiveness in the international markets."

The other anomaly in the economic structure was confronted on the fiscal front. The government was expected to curtail expenditures, which included subsidies and mobilize the domestic resources, which it failed to do. Hence, the government was short of resources to undertake environmentally sound programmes and projects.

The period of late 80s to early 90s was marked by the government's activity under the Structural Adjustment Programme (SAP) supported by the World Bank which committed itself to correct the problem of balance-of-payment.³ While analyzing this period the World Bank report on SAP recommended reforms in a num-

³ Applied Economics Research Centre, 1994, University of Karachi, Research Report No.102.

ber of areas with control of budget deficit receiving the most attention. Resource mobilization (higher government and national savings rates), trade liberalization, financial sector reforms, changes in tariff and tax rates, elimination of subsidies and quantitative trade restrictions, and decontrol of prices were the major thrust of the recommended reforms.

While analyzing the outcome of those reforms, during this period, the World Bank has praised achievements of some of the targets. In the agriculture sector, the price related reforms resulted in bringing prices of the agriculture commodities to the level of farm-gate export-import parity. Subsidies on pesticides, seeds and agricultural machinery were abolished. Control on the price of nitrogenous fertilizer (urea) was lifted and prices of phosphorus fertilizers and potash was adjusted upward to bring it in line with international prices. A complementary aspect of this period was that the international agencies and the World Bank stressed the need for integrated development, with environmental issues and national plans, to combat pollution for sustainable development.

This brief review of Pakistan's growth pattern in major sectors of the economy and its consequential impact on environment, reveals a cause and effect relationship between the economy and environmental resources. Since Independence the gains from an impressive GNP growth have not trickled down to the poor and income equality has not been achieved which has put additional pressure on environmental resources of the country.

VII. Institutional Failure, Need of Good Governance and National Conservation Strategy: The Decade of 90s

The last decade of the 20th century witnessed no sign of marked improvement in the economic growth of the country, despite the fact that democratic regime was restored and democratic institutions operated throughout the decade. The process of economic liberalization and privatization caught momentum in this decade. But performance of the economy remained abysmally low, GDP growth averaged around 3 per cent with a per capita income of approximately US\$450 and one third of the population just surviving below the poverty line of US\$ one per day.

Agriculture sector also suffered because of natural calamities like floods and pest attacks. The water management policy failed to achieve its targets because of inefficient and scarce utilization of irrigation water. Pakistan's financial institutions came under severe criticism because of inefficient and inappropriate conduct. The country was accorded the status of second most corrupt country in the world, by an international agency. The institutions, whether governing or social, were a complete failure in achieving stability and growth.

Amidst the institutional chaos in the country, the vital issue of sustainable development and adoption of remedies to check the ever-growing environmental degra-

gradation in the country was ignored. It was raised by many non-government agencies but the issue failed to receive the required attention from the government. Formulation of National Conservation Strategy and adoption of the Environmental Ordinance as Environmental Act by the National Assembly, are the major steps towards acknowledgment of environmental issues by the public sector. The implementation of these strategies in letter and spirit is still to be achieved

VIII. Population, Poverty and Environmental Linkage

The early literature on the subject identifies failure of market institutions as the underlying cause of environmental problems, [e.g., Maler (1974), Boumal and Oats, (1975), Dasgupta and Heal, (1979)]. However, recently it has been generally realized that environmental degradation is a cause of accentuated poverty among rural and urban areas in poor countries. At the same time poverty itself can be a cause of environmental degradation. This reverse causality stems from the fact that, for poor in poor countries, a number of environmental resources are complementary in production and consumption to other goods and services; while a number of environmental resources supplement income, specially in times of acute economic stress. This can be a source of cumulative causation, where poverty, high fertility rates and environmental degradation feed upon one another. In fact, an erosion of the environmental resource base can make certain categories of people destitute, even while the economy grows on a reasonable level [Dasgupta, (1993)].

Today, population growth is widely regarded as the dominant cause of environmental deterioration and rapid use of resources. Population figures in Pakistan show a consistently high growth rate over a very long period. Urban population rapidly increased due to growth in urbanization in some of the important cities of the country. Since deteriorating environments induce poverty, population change is linked to poverty through the environment. The links between population growth and the environment are more complex. Many factors give rise to environmental change and many factors cause poverty. Citing population growth alone as the main cause of either poverty or environmental deterioration is therefore likely to mis-state the problem.

The inequality in income and wealth in many developing countries is often reflected in an extremely skewed distribution of land, which by itself may be an obstacle to sound natural resource management. For Pakistan it has been estimated that a subsistence farm of 2.5 hectares is essential to provide the required calorie intake of an average size farm household of 6.7 persons.⁴ However at present, more than two-thirds of Pakistan's farm households do not have enough land to

⁴ Asian Development Bank (1990).

support themselves at the subsistence level, and their number is growing at an alarmingly high rate.

Maldistribution of natural resources (such as land, forests, water and fisheries) and the man-made resources (such as infrastructure providing people with access to the productive natural resources) impacts directly on the income generating capacity of households and indirectly through their ability to obtain credit. Power concentration and wealth and resource distribution affect the range of production technology choices available to rural residents, mainly owing to the (mal) functioning of capital markets and public institutions. This may limit poor people's resource use and practices to unsustainable ones because a switch to sustainable cultivation and harvesting techniques require a change in the distribution of wealth and income, and access to capital markets and decision making. [Hassan, (1993)].

A number of studies have been carried out over the last many years to assess and estimate trends in income inequality and poverty in Pakistan. Ludlow and Ahmad (1989), have termed the pattern of poverty in Pakistan as fairly diverse. The inconsistencies found in different estimates available show that poverty measures depend on the choice of the poverty line. Hence different approaches result in different magnitudes of poverty.

A study on Income Inequality and Poverty in Pakistan by Jafri and Khattak (1995), showed a declining trend in income inequality between 1979 to 1987-88. The Gini-coefficient also reduced from 0.38 to 0.37 whereas the ratio of population in the highest 20 percent to lowest 20 percent also decreased from 6.1 to 5.5 in the same period. Comparing figures in the following years, a dramatic inequality is observed, (see Appendix, Table A1).

Commonly used indicators of poverty are Head Count Ratio, Income Gap Ratio and FGT index. The head count indicates (see Appendix, Table A2) that approximately 36 per cent of the population remained poor during 1985-1988. But in 1990-91 the increase in the incidence of poverty is reflected by 41 per cent of population living below the poverty line (see Appendix, Table A1). Urban poverty was 46 per cent in 1985-86 which increased to 56 per cent in 1990-91, rural areas show a consistent pattern of 32 per cent during the same period. Shirazi (1995) estimated that 25 per cent of people were living below the poverty line. This figure is high enough to put extreme pressure on the environmental resource base of the country.

Pakistan's National Conservation Strategy (NCS),⁵ is a giant leap towards realization of the existence, severity, and extent of the environmental problems in Pakistan. It is a comprehensive investigation and cross sectoral analysis of the

⁵ A joint venture of the Government of Pakistan and IUCN, completed in 1992.

nature and state of resource degradation in the country. It contains recommendations and measures to address the situation, in particular reforms and adjustment in policies, which are likely to affect the environment.

As understanding of the links between the economy and natural ecosystems grows, a review of the past and existing experience can provide valuable direction to efforts in the future. Experience has shown that an essential step for effective environmental management and pollution abatement is to identify the extent of the problems and to prioritize efforts to address them.

IX. Environmental Problems of Pakistan

Pakistan's environmental issues, essentially fall into two categories:

- a) Pollution issues, which are largely urban and industrial in nature.
- b) Resource management issues, which affect agriculture sector including water, soil, forests, bio-diversity and coastal zone management.⁶

On the pollution side, urban air, water and solid waste problems are leading to significant adverse health impacts. The marine environment is severely stressed by industrial pollution. On the resource side, crop yield is declining on some of the soil, which was previously the most productive because of soil erosion and salinity. Forests have been depleted and degraded for agriculture, livestock fodder and fuelwood. Rangelands are increasingly becoming degraded, some irreversibly, due to uncontrolled grazing of livestock. The country's rich flora and fauna species are being wiped out. Some of them are in danger of extinction.

Brandon (1995) has made a valuable contribution on the subject⁷ some of his findings and estimates regarding extent of the key environmental problems would be beneficial here and may provide a sound basis for analysis of the problems that exist in Pakistan and their possible solutions.

X. Industrial Population and Hazardous Wastes

Being constrained by non-availability of comprehensive data on total pollution loads (output) or intensities, the trends in industrial pollution were estimated by the Industrial Pollution Projection System (IPPS). This system captures shifts in sub-sectoral output, but not in technology over-time. Brandon's estimates show that the two toxic indicators (total toxics and the

⁶ Brandon (1995).

⁷ Background paper for Pakistan 2010 on "Valuing environmental costs in Pakistan of the Economy-wide impact of environmental degradation."

TABLE 3

Summary of Projected Annual Costs of
Environmental Degradation in Pakistan, 1992-2010

A. Projected Annual Costs

| | Env'l Damages, 1992 Average estimated values | Assumed Growth Rate of Env'l | | Annual Projected Env'l Damages, | |
|-----------------------|--|---------------------------------|-------|------------------------------------|-------|
| | | Low* | High* | Low | High |
| Air Pollution | 301 | 8.0 | 12.0 | 1,201 | 2,311 |
| Water Pollution | 748 | 5.0 | 10.0 | 1,800 | 4,159 |
| Soil Degradation | 353 | 5.0 | 6.0 | 848 | 1,006 |
| Rangeland Degradation | 128 | 5.0 | 6.0 | 307 | 364 |
| Deforestation | 32 | 3.0 | 5.0 | 54 | 77 |
| Tourism | 25 | 3.0 | 6.0 | 43 | 71 |
| Total | 1,586 | | | 4,253 | 7,988 |

B. Projected Environmental Damages as % of GDP (in constant 1992 US\$)

| | Low economic growth scenario | High economic growth scenario |
|--|---------------------------------|----------------------------------|
| Low growth rate of environmental damages | 4.2 | 2.9 |
| High growth rate of environmental damages | 7.9 | 5.4 |

Source: Carter Brandon: Background Paper for "Pakistan 2010 Report"

* = Values in percentage.

total heavy metals), grew 6 to 8 folds between 1963 and 1988 as compared with a 3-fold increase in GDP.⁸ The two water related pollutants showed a wider range of biological oxygen depleting (BODs) substances, which rose 5-fold. The total suspended solids increased 11-fold, and the two air pollution indicators (PM10 and SO₂) increased 8 to 10 fold during the same period. In all cases, the pollution indices increased 2 to 3 times faster than GDP.

⁸ All trends are shown as indices, with 1963=100.

TABLE 4

Summary of Major Annual Environmental Costs in Pakistan (1992)

| Problem | Impacts on health and/or production | Low estimate (millions US\$) | High Estimate (millions US\$) |
|---|--|------------------------------|-------------------------------|
| Urban air pollutoin | Urban health impacts. | \$233 | \$368 |
| Water pollution, health impacts | Urban and rural health impacts, esp. diarrheal diseases. | \$403 | \$1,093 |
| Water pollution, production impacts | Higher incremental costs for clean water supply. | not estimated | not estimated |
| Industrial hazardous waste | Long-term health impacts, esp. cancer. | not estimated | not estimated |
| Soil degradation | Loss of agricultural output. | \$317 | \$388 |
| Rangeland degradation | Loss of livestock carrying capacity. | \$93 | \$162 |
| Deforestation | Loss of sustainable timber supply. | \$28 | \$36 |
| Coastal and marine resources | Unsustainable harvesting of marine resources. | not estimated | not estimated |
| Loss of biodiversity | Loss of use, option, and existence values. | not estimated | not estimated |
| Tourism | Decline in tourism revenues. | \$17 | \$33 |
| Total Annual Costs | | \$1,092 | \$2,080 |
| Total cost as % of GDP | | 2.6 | 5.0 |
| Average Cost - US\$ as % of 1992 GDP | | | \$1,586 3.8 |

Source: Carter Brandon: Background Paper for "Pakistan 2010 Report".

XI. Water Pollution

Water pollution has three major sources which can infect surface and ground water, domestic waste water, industrial waste water and the agricultural run-off. Water pollution from domestic and human wastewater is the most problematic and the cause of many severe water-borne diseases. According to World Health Organization (WHO) estimates, 25-30 percent of the diseases in Pakistan are water borne and of a gastro-intestinal nature. Around 60 per cent of infant mortality is also attributed to water-borne infectious and parasitic diseases.

XII. Land Degradation

Pakistan is facing an extensive problem of land degradation caused by water erosion, wind erosion, salinization, water logging, nutrient loss, overgrazing etc. Overall, in all four provinces about 26.5 million hectares (42 per cent) of land has some degree of degradation (these include areas of non-arable and non-range-land). The level of total area degraded because of various adverse factors is highest in Punjab. The figures on total degraded area of Pakistan (46 per cent) are highly disturbing and critical. The intensive consumption of pesticides during the last two decades has reduced soil fertility, in absence of remedial measures. The consumption of chemical fertilizer has grown astoundingly from 665 metric tons in 1980 to 44,872 metric tons in 1997. This shows the severity of the problem, as a steep rise in the use of fertilizers, over a period of time, has contributed negatively to soil fertility.

XIII. Deforestation

Apart from their economic benefits, the forest resources are useful for the balanced agro-ecological development. Forests sustain ecological balance by their beneficial effects on water catchment areas, soil conservation, control of siltation of dams, canals and wildlife habitats. There has been continued depletion of forest resources in Pakistan over the last few years. According to estimates of the International Union for the Conservation of Nature and Natural Resources (IUCN), the rate of deforestation has increased at one per cent per annum, with forest cut for various uses, including agriculture, fuel-wood and settlements.

The data in Tables 3 and 4 depicts the annual projected cost of environmental degradation in Pakistan for 2010. For high growth rate of 5.4 per cent, the estimated cost is 7988 million dollars annually. Figures in the table also show the high annual environment cost to the economy of the country. The impact on health and production have been estimated at 5 per cent, around 2080 US dollars.

The major problem of soil degradation (Table 5) caused by host of environmen-

TABLE 5
Extent of Soil Degradation

| Problem | Total Area Surveyed | Water Erosion | Wind Erosion | Salinity and Sodicity | Water Logging | Flooding | Ponding | Nutrient Degradation | Total Area Degraded Across all Categories | Percent of Total Area Degraded |
|-------------|---------------------|---------------|--------------|-----------------------|---------------|----------|---------|----------------------|---|--------------------------------|
| Punjab | 20,625 | 1,904 | 3,804 | 2,667 | 696 | 915 | 691 | 1,580 | 12,257 | 59 |
| Sindh | 9,222 | 59 | 639 | 2,110 | 625 | 763 | - | 246 | 4,442 | 48 |
| NWFP+ | 9,139 | 4,292 | 36 | 48 | 92 | 276 | 245 | 296 | 5,285 | 58 |
| FATA | | | | | | | | | | |
| Baluchistan | 19,141 | 2,635 | 280 | 502 | 142 | 598 | - | 96 | 4,253 | 22 |
| N.A. | 3,685 | 2,282 | - | - | - | 5 | - | - | 2,287 | 62 |
| Pakistan | 61,812 | 11,172 | 4,760 | 5,328 | 1,554 | 2,557 | 936 | 2,218 | 28,226 | 46 |

Source: Main and Mirza (1993), National Conservation Strategy, Environment and Urban Affairs Division, Government of Pakistan.

tal factors is 46 per cent of the total surveyed area, which by any standards is an alarmingly high extent of soil degradation.

XIV. Conclusions

The roots of conflict of economic development with the environment, corresponds to the historical and traditional evolution of resource management and governance of the country. The conflicts are inherently structured in the social inequality that widen with an unequal development of beneficiaries and victims.

Over a relatively long period since Independence, the economic growth record of Pakistan has been impressive. In 1980s the annual growth rate of 6.5 per cent, placed the country among the category of fast growing economies. But achieving significant growth is not an end in itself, and it may not be worth achieving if no benefits trickle down to the poor. Pakistan's social sectors have remained stagnant and deprived. Countries with comparable level of GNP had much higher life expectancy and literacy rates. Poverty is high and shows increasing trends in both urban and rural areas in recent years. This combined with high rates of population growth and rapidly depleting natural and environmental resources with insufficient management system, jeopardizes the sustainability even of the current inequitable pattern of growth.

There are future threats to environment as the country is entering a new era of privatization and liberalization. As the economy would be opening to competitive pressures all natural resources and the environment would be prone to further misuse and exploitation, unless particular macro economic policies are designed and planned and adjusted to minimize environmental damage.

Alleviation of widespread environmental problems warrants a broad spectrum of actions. Brandon (1995) has advised to set priorities across a wide range of problems and option as the first element in devising an effective and cost-effective strategy for addressing environmental problems. To establish a data base of the environmental resources, valuations of cost and benefits of various types of interventions and economic valuation of natural resources for the purpose of integration in National Income Accounts would be steps in the right direction.

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APPENDIX

TABLE A1

Incidence of Poverty in Pakistan

(percentage below poverty)

| | 1985-86 | 1986-87 | 1987-88 | 1990-91 |
|----------|---------|---------|---------|---------|
| Urban | 45.92 | 48.20 | 44.77 | 56.26 |
| Rural | 31.18 | 32.75 | 33.28 | 32.50 |
| Pakistan | 34.71 | 36.48 | 35.69 | 40.57 |

Source: Various studies published in Pakistan Development Review.

TABLE A2

Household Income Distribution in Pakistan

| Year | Gini Co-efficient | Household Income Share | | Ratio of Highest 20% to Lowest 20% |
|---------|-------------------|------------------------|-------------|------------------------------------|
| | | Lowest 20% | Highest 20% | |
| 1979 | 0.38 | 7.4 | 45.0 | 6.1 |
| 1984-85 | 0.37 | 7.3 | 45.0 | 6.2 |
| 1985-86 | 0.36 | 7.6 | 44.0 | 5.8 |
| 1986-87 | 0.35 | 7.9 | 43.6 | 5.5 |
| 1987-88 | 0.37 | 8.0 | 43.7 | 5.5 |
| 1990-91 | 0.43 | 5.7 | 49.3 | 8.6 |

Source: Various studies published in Pakistan Development Review.