CHAPTER 2

ENVIRONMENT AND DEVELOPMENT

Environment and Development

2.1 Introduction

Pakistan, the sixth biggest nation of the world (United Nations 2010) in terms of population size, has immense fragile mountainous, semi-arid and desert areas, the productivity of which is already under serious environmental threat. Moreover, a major part of its rapidly growing population (over 180 million in 2012) lives in near total dependence upon water drawn from the Indus River Irrigation System, the biggest and most delicately balanced irrigation system of the world. The country has a predominantly agrarian economy in which agriculture is the second largest sector of economy, accounting for over 21 percent of GDP and remains by far the largest employer, engaging 45 percent of the country's total labour force and providing commodities that are the major source of the country's export earnings (GOP, 2010). With this dependence on natural resources, it is imperative that Pakistan's capacity for environmental management is adominant element in attaining future prosperity through development. In spite of some setbacks the country has made noteworthy economic progress through development planning since independence in 1947. The need now is to focus on sustainability; a factor becoming more critical when one considers the inevitable future population growth. This chapter traces the trends and dynamics in resource use, population and economic growth, and brings out the linkages and interrelationships between these highlighting the need to seriously take these linkages into account in the development process.

2.2 Resource Trends

Pakistan is endowed with tremendous amounts of natural resources in its ecological regions, ranging from coastal ecosystems, through deserts and flood plains to the mountains of the Himalayas and Hindu Kush ranges. Each of these ecosystems provides resources for economic development and growth. The rangelands, which cover the bulk of the landmass, sustain a growing livestock industry. The coastal zones of Sindh are highly productive ecosystems, with over 800 species of fish and a thriving shrimp industry. The forests are a valuable source of timber and provide vital ecological services that protect watersheds and maintain soil productivity. The waters of the Indus have converted deserts and arid plains into productive farmland.

However, it faces many challenges due to unsustainable use of resources. The country is dependent on a single river system, the Indus and the unsustainable use of its water has resulted in basin degradation and water pollution. The overdraft of water in the upper basin has deprived the coastal wetlands of water, which are losing their productive potential. Furthermore, mono cropping is threatening the soil fertility, overstocking is degrading rangelands and enhancing desertification. An estimated 63 percent of the population in rural areas relies heavily on natural resources for their livelihoods. Consequently, a degrading resource base directly affects outcomes. In short, many of the economic challenges facing Pakistan are embedded or have their genesis in misuse of natural resources related to land, forests, water, minerals as well as marine and coastal resources.

A large part of the land in Pakistan suitable for intensive cultivation is already affected by desertification (GOP, 2002). The suspended sediment load per square km of drainage basin in the country is one of the highest in the world. It is an indicator of the intensity of soil erosion, which affects as much as 18 million hectares of land so far; salt affected soils are estimated to be 5 million hectares while another 2 million hectares is waterlogged (GOP, 2010). In spite of tremendous efforts for reclamation, large tracts of irrigated land are still laying waste as a result of water logging and salinity mainly in the areas where canal irrigation is practiced.

The forests cover about 5.2 percent of the land area of Pakistan (GOP, 2010). The percentage is quite low compared to a desired level of 20 to 25 percent. The low share of the forest area taken in combination with the large population of Pakistan gives only 0.033 hectares of forest per capita compared with the world average of one hectare (NEIMS 2010). Because of the scarcity of wood and its high price, the per capita consumption of wood is estimated at 0.026 cubic meters (NEIMS 2010). Since the supply from domestic resources is less, the gap between supply and demand is met by imports. Rising costs and decreased supply is the most likely future scenario in the wake of increasing population, growing income and demands for forest products. It is estimated that the annual timber requirement of 2 million cubic meters in early 1980s has doubled to about 4 million cubic meters now, while the firewood consumption has also almost doubled from 16.6 million cubic meters to 30 million cubic meters (NEIMS 2010).

The livestock population of Pakistan is over 167 million heads (GOP, 2012). A large portion of this is concentrated in the rangelands, constituting over half of the total land area of the country (GOP, 2010a). Normally, this land would have been capable of providing the needed forage. However, ineffective management of range resources in the past has led to serious overgrazing. The mobility of the herds kept by nomadic people has devastated a very large portion of Pakistan's natural pasture. Goats in particular have eliminated entire species of edible plant causing desertification in many parts. With this ecological degradation the rangelands are facing problems in sustaining the growing number of animals, which increased from 68 million heads in 1976 to 104 million heads in 1990 and over 167 million heads at present (Rehman 1984, GOP, 2012). The existing pressure and the expected increases in the future livestock population therefore calls for improved methods of rangeland management (GOP, 2010a).

The carrying capacity of croplands is also under progressively increasing stress. The per capita cropped area between 1951 and 2010 declined from 0.46 to 0.21 hectares (Khan 1986, GOP, 2010) despite the extension of agricultural lands. A future increase in population of about 3 million every year necessitates focusing on additional food production and farm output. In view of high man: land ratio and limited prospects of increasing arable land, increased production have to be achieved through increased yield per hectare.

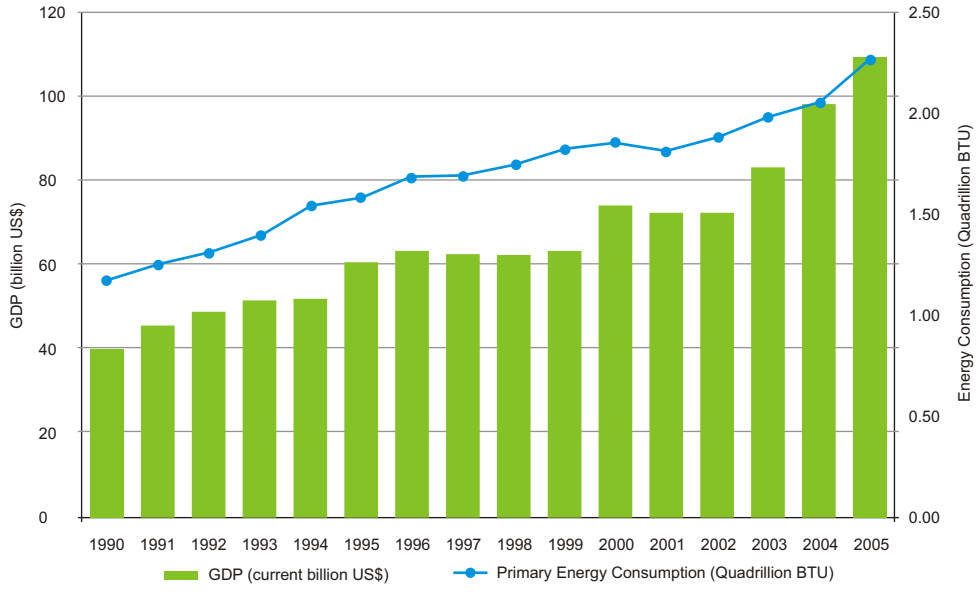
Like land, Pakistan is also becoming deficient in water. Pakistan's estimated current per capita water availability of around 1,000 cubic meters puts it in the “high water stress” category (GOP, 2010). Pakistan is one of the world's most arid countries, with an average rainfall of about 250 mm a year and therefore it has to rely on irrigation for food security and agriculture, which is the backbone of national economy. The country possesses the world's largest contiguous irrigation system commonly called the Indus Basin Irrigation system. It serves an area of about 14.3 million hectares and encompasses the Indus River and its major tributaries (GOP, 2010b). The level of agricultural production is directly related to the availability and effective use of water as a major input. The demand for water is increasing rapidly while the opportunities for further development of water resources or maintaining their use to existing levels are diminishing. The shortage of water particularly in Rabi (winter) season has aggravated the on-going water crisis. Compounding lower availability is the issue of inadequate water storage, so on the one hand flood water cannot be conserved and on the other, not enough water can be released downstream the Indus (below Kotri) during the low water season to save the ecology of Indus delta.

In the last three decades of the 20th century, Pakistan witnessed an unprecedented transformation in agriculture. It was able to achieve food self-sufficiency; triple its agricultural exports, reduce poverty, increase income levels, and improve quality of life of its people. The transformation started in the late sixties with the advent of the green revolution (a technology package of high yielding varieties of rice and wheat, water, and fertilizer). An improved policy environment and an incentive structure in the form of input subsidies as well as investments in agriculture infrastructure, including irrigation, research and extension services supported this. However, it also resulted in over-use of chemicals due to subsidies and promoted mono culture. Thus by the end of 20th century almost all of the irrigated wheat and rice areas in Pakistan (irrespective of farm size) were cultivated with high yielding varieties. Similarly there was a tripling of cotton and a doubling of sugar production. Cereal production per area more than doubled compared to 1970 (GOP, 2010).

However, despite an impressive increase in agriculture production, the living standard of the rural population has not improved to the extent desired. Pakistan's average national crop yields, with the exception of cotton, do not compare favourably with world averages, although the yields in progressive farms are much higher than the national average (GOP, 2007). A major contributor is farm size, with 86 percent of the total number of farms comprising less than 5 hectares; their number is continuously increasing because of land divisions from inheritance. This is impacting agricultural productivity adversely, as small farmers are generally resource poor and need greater support.

Regarding energy, the pattern of economic growth in the past entailed a rising level of consumption for two reasons: the increased use of energy based household appliances and harnessing less efficient technologies of production in agriculture, industry and other sectors. The cost of energy had been stable prior to 1973. It has risen sharply since then, and as a result changed the economics of virtually all processes of production and other energy using activities. The industrialized countries were quick to implement programmes of energy conservation and were able to pass on the higher cost of energy to both domestic and foreign buyers of their manufactured products. For countries like Pakistan, therefore, during the last few decades, a major increase has been in the price of petroleum and its other products (which constituted some 29 percent in terms of value of imports in 2010). Simultaneously, it has resulted in a price hike of imported intermediate and capital

Fig. 2.1 Pakistan: Trends in Energy Consumption and GDP Growth



Source: Energy Information Administration and World Bank

goods, which is not mirrored in the price of export commodities like rice and cotton. The result is a deteriorating balance of payment as the same ton of rice or cotton exported now buys a lot less crude oil or chemical fertilizer than what it used to buy in 1973, The essential task before Pakistan is therefore to decouple economic growth from energy demand. It is good to note that a weakening of this link has already started (Fig. 2.1). The industrialized countries with an energy intensive lifestyle have succeeded in breaking this close link. The adjustment was painful but rewarding. In Pakistan, sustained and aggressive measures are needed to control the energy-intensive production processes and lifestyles now to avoid more difficult adjustments in future.

The supply of mineral resources for accelerated development is not a problem of absolute scarcity but has more to do with inaccessibility and inferior productivity. At the time of independence the country produced very few minerals, confined to salt, some coal and a small amount of sulphur. Over time 250 mineral discoveries have been made in the form of economic deposits, mineral showings and mineral traces. Except for a few, however, the country lacks large and mineralogically rich deposits. The mineral sector contributes very little to the GDP and internationally the country lags behind in the known mineral reserves as well as their mining.

The production of fish in Pakistan went up from 272 thousand tons from the sea and 60 thousand tons from inland water bodies in the early 1980s (IUCN, 1984) to 668 thousand metric tons from the sea and 284 thousand tons from inland water bodies (GOP, 2010). The fish catch potential from the coastal and deep-sea belts in Pakistan's Exclusive Economic Zone (EEZ) needs modelling for finding the sustained yield potential otherwise there is the danger that a major expansion of marine fisheries could over-exploit one or more species to the long term detriment of the resources. In order to avoid this, a project titled “Stock assessment survey programme in EEZ of Pakistan through chartering Research vessel and capacity building of Marine Fisheries Department”, is being implemented. It aims to charter a suitable vessel for conducting stock assessment resource surveys in the coastal and offshore waters of Pakistan, including its EEZ. The project also aims to build the capacity of the Marine Fisheries Department to conduct resource surveys and stock assessments on regular basis and to develop a management strategy for the fish exploitation and utilization.

2.3 Population Trends

At the time of independence in 1947, 32.5 million people lived in Pakistan. By the end of June 2012 the population was estimated to have reached 180.7 million (GOP, 2012). Thus in roughly three generations, Pakistan's population increased by 148.2 million or had grown at an average rate of about 2.7 percent per annum. While Pakistan has more mouths to feed, more families to house, more children to educate, and more people looking for paid employment, the high population also represents an abundance of labour, which can be used for productive purposes. The large population presents a large potential market for goods and services and with increasing disposable income may attract even more foreign investment. The large population also presents an opportunity for Pakistan to benefit from demographic dividend, which can fuel the country's growth for the next fifty years.

The Population Census data depicts two phases of demographic transition in Pakistan. During the first phase that lasted up to 1981, the fertility rates were higher and the share of young (0-14) population continued to rise thereby creating a bulge at the lower end of population pyramid. The proportion of working age (15-59) population continued to decline during this phase. Since then Pakistan appears to have entered a second phase as a result of a decline in the fertility rate from 6 percent in 1981 to 3.5 percent in 2011 (GOP, 2012). This

led to an increasing share of working age (15-59) population from 48.5 percent to 58.8 percent and corresponding decrease in the share of young (0-14) population (from 44.5 to about 35 percent).

The regional distribution of the population mirrors the country's topographical and climatic condition. The arid flatlands and barren mountains are sparsely inhabited. More than half of Pakistan's population lives in the Punjab province, though it accounts for only a quarter of the country's area. By contrast, Balochistan's meagre population of a few millions is scattered across nearly half of the area. The density is highest in the intensely irrigated north-eastern corner of Punjab and the deltaic region of the Indus surrounding Karachi.

An important phenomenon in the demographic dynamics of Pakistan is the increasing urbanization. During 1950-2012, the country's urban population grew more than ten-fold; compared to this, the total population increased over five-fold (Table 2.1). The rate of urbanization was the highest in the formative years of Pakistan, when industrialization was taking place at a faster rate creating ample opportunities for movement to cities. It has reduced somewhat but is still quite high. The urban population of Pakistan was 23.6 million in 1981 and its growth rate was 1.3 to 1.7 percent higher than the national overall growth. The current urban population of the country has crossed 67 million mark with its growth rate of over 3 percent. Today Pakistan is the most urbanized nation in South Asia with the urban dwellers accounting for about 37 percent of the country's total population.

Table 2.1 Pakistan: Population Growth and Urbanization 1951- 2012

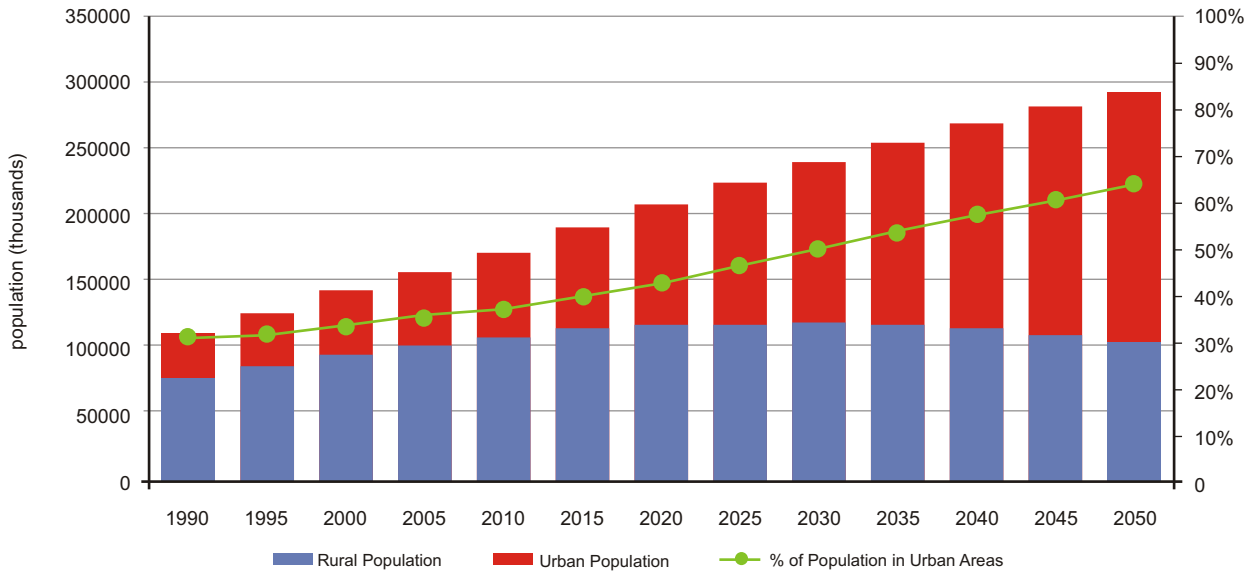
Year	Total population (000)	Urban Population (000)	Urban (%)	Annual Growth Rates
1951	33740	6019	17.8	4.13
1961	42,880	9,655	22.5	4.8
1972	65,309	16,594	25.4	4.8
1981	84,253	23,583	28.3	4.4
2000	142,648	47,284	33.1	3.5
2005	157,935	55,040	34.9	2.4
2012	180,710	67,550	37.4	3.2

Urbanization in Pakistan is likely to continue and by 2030 half the population of the country will be living in urban areas and after that more people will be living in cities than in villages (Fig. 2.2). In the current urban scenario, the large cities dominate the urban scene. Karachi, the largest city of the country has 20 percent of the total urban population, followed by Lahore and Faisalabad with another 20 percent. Rawalpindi, Multan, Hyderabad, Gujranwala and Peshawar together hold another 14 percent, while the remaining 46 percent of the urban population lives in 400 relatively small town and cities. The population in these cities grew at a rate of around 3 percent per year, during the last few years and it is projected that this growth rate will continue for the next decade.

The primary factor in this conglomeration of metropolitan population is the increasing rural-urban migration. In many cases this exodus from rural areas has resulted in abandoning of cultivated land due to lack of human resources (as especially young people migrate), with severe consequences due to loss of top soil through wind and water erosion. Conversely the overcrowding and congestion in metropolitan centres has its own costs such as the deterioration in the quality of life through congestion and pollution of air, water and land.

The phenomenal increase in the population of Pakistan, whether total or urban, without a corresponding

Fig. 2.2 Pakistan: Urbanization Trends 1990- 2050



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat

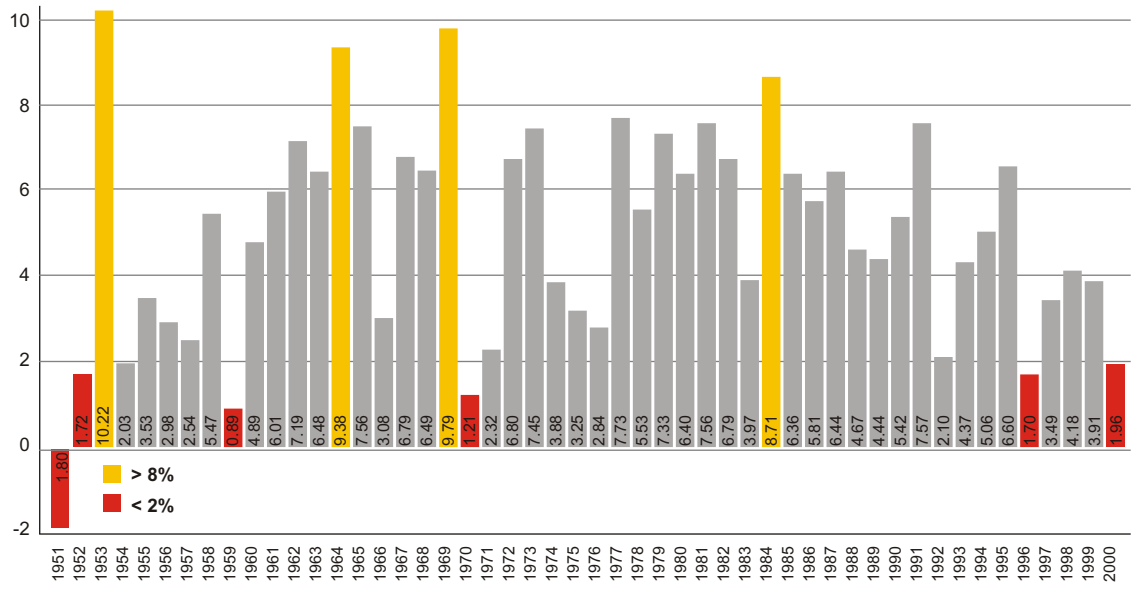
expansion in the basic amenities of life has exposed a majority of people to conditions, which are far from satisfactory. This is likely to deteriorate further in the coming years, due to the absence of well-conceived and properly planned corrective measures, corresponding to an inflating population and urbanization. A 'population explosion' focussed in a few metropolitan centres and the consequent emerging problems are increasing the doubts about the practicality of economically providing more employment and infrastructure in these urban complexes. Conversely the large area of Sind and Baluchistan with highly dispersed settlements offers another serious bottleneck of providing an infrastructure economically.

2.4 Economic Growth

With its independence in 1947, Pakistan inherited an economy, which was widely regarded as an "economic wasteland" (GOP, 1983). However, considerable progress has been made over the years: the flow of goods and services from economic activities within the country's Gross Domestic Product has expanded manifold in real terms, and the per capita income has enhanced substantially (Fig 2.3 and Table 2.2).

Pakistan's average economic growth rate since independence has been higher than the average growth rate of the world economy during the same period. Average annual real GDP growth rate was 6.8 percent in the 1960s, 4.8 percent in the 1970s and 6.5 percent in the 1980s. Average annual growth fell to 4.6 percent in the 1990s with the real GDP growth slowed to an average of 4.9 percent in the first half, and 4.0 percent in the second half (GOP, 2003). The economic growth has varied considerably in the present century. It was depressed at the turn of the century at just about two percent in 2000 (Fig. 2.3). Unprecedented drought and the events of 9/11 were responsible for keeping the growth depressed. However, the growth picked up in the following years. The fiscal year 2002-2003 exhibited a turn in growth at over 5 percent (GOP, 2003). Growth performance for the next four years (2004-08) was striking (Fig 2.4) recording an average rate of 7.0 percent per annum (GOP, 2008). Since the beginning of 2008, however, Pakistan's economic outlook has taken a turn to stagnation. Security concerns stemming from the nation's role in the War on Terror have created great

Fig. 2.3 Pakistan: GDP Growth Rates 1951-1999



Source: Federal Bureau of Statistics, Govt. of Pakistan

Fig. 2.4 Pakistan: GDP Growth Rates 2000-2012

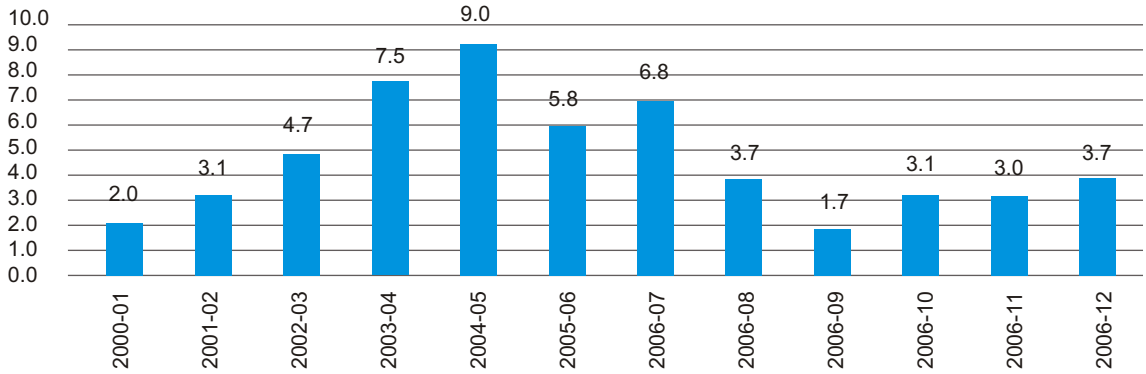


Table 2.2: Pakistan: Economic Indicators 1999-2009

Indicator	1999	2009
GDP	$ 75 billion	$ 185 billion
GDP Purchasing Power Parity (PPP)	$ 270 billion	$ 545.6 billion
GDP per Capita	$ 450	$1250
Foreign reserves	$ 1.96 billion	$ 14 billion
KHI stock exchange (100-index)	$ 5 billion at 700 points	$ 26.5 billion at9,000 points
Foreign Direct Investment	$ 1 billion	$ 4.6 billion

instability and led to a decline in Foreign Direct Investment (FDI) from approximately $8 billion to less than one billion at present (GOP, 2012). The year 2008-09 saw a dismal growth of 1.7 percent, which improved in 2009-10, when the economy grew by an estimated 3.1 percent with slight improvement in 2011-12 (Fig. 2.4). Although the macroeconomic context remains difficult in the near term, the economic resilience shown by the country in past (Box 2.1) and successful resolution of some of the critical challenges the economy faced due to domestic and external shocks from 2007 onwards (including the sharp rise in international oil and food prices, the internal security hazards brought on by the campaign against extremism and the repeated natural disasters in the form of successive floods) could lay the basis for higher growth in future (GOP, 2012).

Box 2.1 Pakistan: Resilience in Economic Growth

Historically, Pakistan's overall economic output or GDP has grown every year since 1951. Despite this record of sustained growth, Pakistan's economy had, until a few years ago, been characterized as unstable and highly vulnerable to external and internal shocks. However, the economy proved to be unexpectedly resilient in the face of multiple adverse events concentrated into a four-year (1998-2002) period.

- The Asian financial crises;
- Economic sanctions according to Collin Powell, Pakistan was "sanctioned to the eyeballs";
- The global recession of 2001-2002;
- A severe drought the worst in Pakistan's history, lasting about three years;
- The post 9/11 military sanction in neighboring Afghanistan, with a massive influx of refugees from that country.

Despite these adverse events, however, Pakistan's economy kept growing, and economic growth accelerated towards the end of this period. This resilience has led to a change in perceptions of the economy, with leading international institutions such as the International Monetary Fund (IMF), World Bank, and the ADB praising Pakistan's performance in the face of adversity. Additional confirmation that the country's economy is not as weather-sensitive as had been previously perceived comes from a 2008 analysis that "examined 68 countries, quantifying their sensitivity to fluctuations in weather, using figures on GDP by industry sector and the sensitivity of particular sectors to given weather variables." The analysis found that out of the 68, the "least weather-sensitive country was Pakistan."

Source: WBCSD 2008; Alphaville 2008.

2.4.1 Economic Growth and Development

Economic growth is one of the main vehicles for promoting development and reducing poverty. However sustainability encompasses environment, thus a sustainable economic growth per definition includes environmental degradation. There was a wrong notion in the past that environmental degradation is the inevitable price to pay for economic success. This is typically clarified in terms of an empirical regularity termed the Environmental Kuznets Curve, which shows that as countries develop, pollution intensity increases at first and then declines. However, it would be misleading to assume that this empirical finding implies that environmental neglect is an economically prudent development strategy. In many cases prevention or mitigation of damage may be more cost-effective than neglect. In the short run environmental interventions may lower profits or utilize scarce public funds, but these costs need to be compared to the associated benefits (World Bank, 2006).

Furthermore environmental degradation disproportionately affects the poor and vulnerable, hence interventions that mitigate environmental damage also help to convert growth into broader development benefits. To illustrate the importance of these issues, the World Bank (2006) compared the development of the relationship between income and infant mortality in Pakistan to that of other countries in the same income group. Initially infant mortality rates in Pakistan were lower than the average for its income group, but with faster growing income, Pakistan disappointingly started to lag behind on infant mortality. A similar pattern holds for other measures of environmental performance and development. For instance Pakistan's rate of deforestation between 1990 and 2000 has been greater than that of other countries in its income group. What these examples illustrate is that development outcomes are a consequence of policy choices and there is no assurance that through economic growth a country can simply "grow-out" of environmental or social problems (World Bank, 2006). Put simply, any given amount of growth can deliver higher development benefits if there are policies in place to address the negative externalities that impede progress, such as impacts on health, social welfare and degradation of the natural capital productive resource base.

In the past economic planners in Pakistan favoured a strategy termed as 'pure growth-man-ship' with the hope of eventual 'trickle down'. The later has not occurred as evidenced in the presence of poverty and inequality. There is a need now to amend these policies, which are too much focused on capital-driven growth, practically disregarding the fact that there are different types of 'capitals' that sustain human wellbeing including natural, human and socio-cultural capitals. Amended policies, which take all forms of capital into account in promoting development, are likely to improve the state of future generations of Pakistan and therefore the 'state of Pakistan'. A pointer for likely success by following such polices comes from international experiences. Based on this global summits (Earth Summit, World Summit) recommend that the development effort gives due importance to 'environmental' as well as 'social' dimensions in order to be sustainable. Currently economic planning and development in Pakistan is carried out through the development of Medium Term Development Framework (GOP, 2005), and Annual Development Programmes (ADP). The Planning Division also finalized a long-term plan document 'Vision 2030' in 2006 (GOP, 2007) and 'A Framework for Economic Growth' in 2011 (GOP, 2011). These do include aspects of environment and talk about saving the natural capital. However, they fail to take into consideration the sustainable production, consumption, trade and investments as the principal elements in saving the natural resources.

Pursuit of sustained economic growth in Pakistan demands reduction in the resource intensities of consumption - at least for those impacts that are at the threshold of sustainability. This can be achieved by reducing the material/resource intensity of the growth through the application of eco-efficiency standards which will decouple the economic growth from materials, land and energy use, whereby the increase of their use needs to be less than the growth of the GDP achieved. The result of decoupling means more efficient use of resources. Nevertheless this is not sufficient to achieve environmental sustainability, which ultimately requires absolute reductions (as opposed to relative reductions from decoupling) in the use of energy and materials to reach the level of dematerialized growth. Hence if material consumption can be brought to such limits, economic growth can surely be sustained and development can be guaranteed to be sustainable.

2.5 Population, Resources, Environment & Development

Environment and development are inextricably linked with population and resources. The planners in this country have to understand and incorporate these relationships clearly for pursuing a policy of sustained

development in both short and long term, as envisioned in Vision 2030 and Growth Framework, the long term perspective plan of Pakistan (GOP, 2011). The very key constraints underlying population, resources, environment and development are: a) the inadequacy of reproducible capital, b) the spectre of diminishing returns, c) the miasma of poverty and consequent human degradation and d) the problems of technology transfer.

A major development problem in Pakistan is paucity of investment resources. It has been estimated that up to the end of ninth 5-year plan, with maximum borrowing and wise economic policies, the nation can invest at the most around 1550 to 1800 billion Rupees (about 15.5 to 18 billion US dollars) in urban areas and for related infrastructure. However, the needs for machinery plants, factories, dwelling, roads and dams etc. exceed Rs. 4300 billion (about 43 billion US dollars) and if concentrated in and around large cities may exceed Rs. 5200 billion (about 52 billion US dollars). This problem is further compounded if diminishing returns are taken into account. Agricultural production in the 80's represented a record experience for Pakistan but when compared with the expansion in physical and technical inputs in agriculture (water, seed, fertilizer, pesticide, machinery etc.) the increase in inputs does not appear to have produced a corresponding growth in yield per hectare and also resulted in the pollution problem. Diminishing returns and damage to environment has also become prominent in mining, fishing and other sectors. Protection of the environment is not only vital for human existence and welfare but also crucial for growth and productivity of natural assets and maintenance of human health in Pakistan. Therefore, improving the national environmental performance and assessing it by the application of environmental index and assessment of Biocapacity is imperative for the health and vitality of the life support system.

Table 2.3a and 2.3b: Environmental Sustainability Index for Pakistan and selected countries (a: arid zone countries, b: high population density)

RANK	COUNTRY	ESI	RANK	COUNTRY	ESI	RANK	COUNTRY	ESI
1	Namibia	56.7	8	Niger	45.0	15	Iran	39.8
2	Israel	50.9	9	Morocco	44.8	16	Saudi Arabia	37.8
3	Kazakhstan	48.6	10	U.A.E	44.6	17	Yemen	37.3
4	Oman	47.9	11	Egypt	44.0	18	Kuwait	36.6
5	Jordan	47.8	12	Mauritania	42.6	19	Uzbekistan	34.4
6	Algeria	46.0	13	Libya	42.3	20	Iraq	33.6
7	Azerbaijan	45.4	**14**	**Pakistan**	**39.9**	21	Turkmenistan	33.1

RANK	COUNTRY	ESI	RANK	COUNTRY	ESI	RANK	COUNTRY	ESI
1	Japan	57.3	8	Poland	45.0	15	Philippines	42.3
2	Germany	56.9	9	Rwanda	44.8	16	Lebanon	40.5
3	Netherlands	53.7	10	Jamaica	44.7	17	Burundi	40.0
4	Italy	50.1	11	Belgium	44.4	**18**	**Pakistan**	**39.9**
5	**Sri Lanka**	**48.5**	**12**	**Bangladesh**	44.1	19	Trinidad & Tobago	36.3
6	**Nepal**	**47.7**	13	El Salvador	43.8	20	Haiti	34.8
7	**India**	**45.2**	14	South Korea	43.0	21	Taiwan	32.7

2.5.1 Sustainability Index

A number of environmental sustainability indices as an approach to assess human interaction with the environment have been developed to measure the environmental performance of a nation. The most comprehensive and widely quoted measure is the Environmental Sustainability Index (ESI), a collaborative venture of the Yale Centre of Environmental Law and Policy and CIESIN at Columbia University. The World Bank (2006) citing the study provided a comparison of Pakistan with other South Asian countries (Tables 2.3a and 2.3b). The results put Pakistan at the bottom with the lowest ESI scores in South Asia. It should be emphasized, however, that the ESI lacks precision in ranking closely clustered countries. Nevertheless, as the World Bank states, "the large disparity between Bhutan and Sri Lanka's score on the one hand, and that of Pakistan, India and Bangladesh on the other, is sufficient to indicate that Bhutan and Sri-Lanka are on a more sustainable growth trajectory than most of their South Asian peers which have to deal with high population densities, pollution intensive industrial structures, vulnerable natural resource bases and limited capacities to mitigate environmental stress" (World Bank, 2006).

The first table shows that Pakistan is more susceptible to land degradation than most nations in the arid-zone category. This vulnerability reflects not only the country's water scarcity, but also its inability to cope with the problem. For instance, Israel and Oman are water stressed like Pakistan, but their higher ESI scores indicate: a) that they face fewer additional environmental pressures, such as salinization, water logging, or uncontrolled pollution; and b) a greater capacity to address environmental stresses.

The second table compares the ESI scores of countries with a high population density. Pakistan lies in the lower half of the distribution. Somewhat surprisingly the ESI scores of India, Sri Lanka and Nepal appear in the upper quartile. All in all whether judged in terms of regional performance or environmental stress factors, the aggregate sustainability indicators suggest that Pakistan faces many environmental challenges that could undermine sustainability.

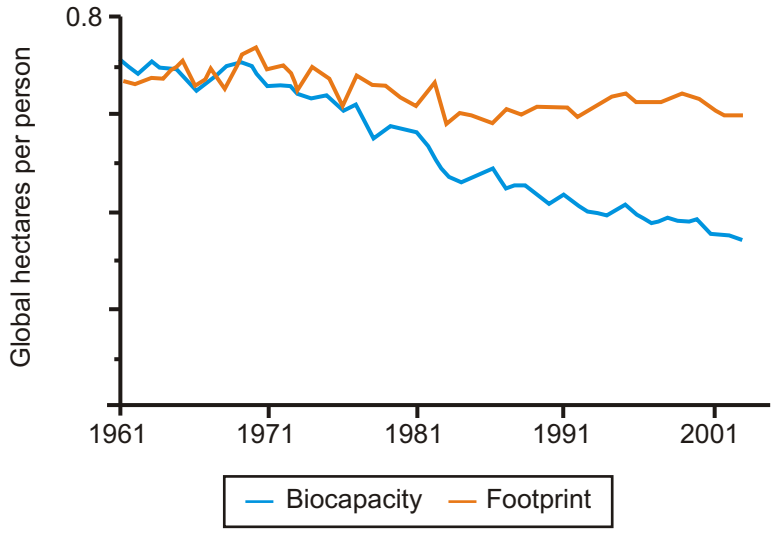
2.5.2 Ecological Footprint and Biocapacity

Another measure of environmental sustainability is the "Ecological Footprint (EF)", a measure of the consumption of renewable natural resources by a human population. A country's EF is the amount of productive land and sea which a given population requires to produce all the resources (such as crops, meat, seafood, wood and fibre) it consumes including space for its infrastructure, and absorb or take in all the waste they produce using prevailing technology. The EF can be compared with the biologically productive capacity (Biocapacity) of the land and sea available to that country's population (Rees, 1996).

Figure 2.5 tracks, in absolute terms, the average per person resource demand or Ecological Footprint and per person resource supply (Biocapacity) in Pakistan over a 43-year period. Components of ecological footprint include six human activities growing crops, grazing animals, harvesting timber, catching fish, accommodating infrastructure (housing, transport, industry and other built up area) and absorbing carbon dioxide emissions.

Biocapacity varies each year with ecosystem management, agricultural practices (such as fertilizer use and irrigation), ecosystem degradation, and weather related management. The case for Pakistan shows that the country's Biocapacity is reducing and hence the ecological deficit (the difference between ecological demand (EF) and supply is increasing with time.

Fig. 2.5 Pakistan: Ecological Footprint and Biocapacity 1961-2001



Source: Global Foot printing Network
http://www.footprintnetwork.org/webgraph/graphpage.php? country=Pakistan.

A comparative study of Pakistan with other countries in the table 2.4 below again does not show a preferential situation although it can be seen that in terms of ecological deficit Pakistan is better off than India and Sri Lanka. However, it is still below Bangladesh and Nepal. Among 21 Asian and Pacific countries, only seven countries rank below Pakistan. This index again highlights the need to enhance the environmental stewardship by conserving resources and cutting down emissions in Pakistan.

Table 2.4 Ecological Footprints, Bio Capacity and Ecological Deficit/Reserve for Pakistan and Selected Countries

COUNTRY	EF	BC	ED/ER	COUNTRY	EF	BC	ED/ER	COUNTRY	EF	BC	ED/ ER
Australia	6.6	12.4	5.9	Korea DPR	1.4	0.7	-0.8	New Zealand	5.9	14.9	9.0
Bangladesh	**0.5**	**0.3**	**-0.2**	Korea Rep.	4.1	0.5	-3.5	**Pakistan**	**0.6**	**0.3**	**-0.3**
Cambodia	0.7	0.9	0.1	Lao PDR	0.9	1.3	0.4	Papua New Guinea	2.4	2.1	-0.3
China	1.6	0.8	-0.9	Malaysia	2.2	3.7	1.5	Philippines	1.1	0.6	-0.5
India	**0.8**	**0.4**	**-0.4**	Mongolia	3.1	11.8	8.7	**Sri Lanka**	**1.0**	**0.4**	**-0.6**
Indonesia	1.1	1.0	0.0	Myanmar	0.9	1.3	0.4	Thailand	1.4	1.0	-0.4
Japan	4.4	0.7	-3.6	**Nepal**	**0.7**	**0.5**	**-0.2**	Viet Nam	0.9	0.8	-0.1

EF: Ecological Footprint BC: Biological Capacity
ED/ER: Ecological deficit (-)/Ecological Reserve (+)
Source: Global Foot Print Network: Ecological Footprint and Bio capacity 2006 Edition

Box 2.2 Economic Cost of Environmental Degradation

The Government of Pakistan is conscious of the need for environmental protection and has undertaken a number of measures for the same through enacting legislation, setting standards, and developing and implementing policies. Despite these initiatives limited successes were achieved for two reasons. Firstly because these policies, strategies and initiatives could not be integrated into the overall development plans of the country, as environment is still considered as a sector rather than a cross cutting issue. Secondly, Government efforts alone, because of limited resources, are not enough and demand a much larger participation and support from other stakeholders including industry, civil society, and public at large as well as donors. The country has continued to experience environmental degradation at a great loss during the last two decades. The World Bank Country Strategic Environmental Report (2006), monetizing these losses, states, "The mean estimated cost of environmental and natural resources damage is about 365 billion rupees per year in Pakistan or 6 percent of GDP." This comes to loss of a billion rupees a day.

Pakistan: Cost of Environmental Degradation

Type of Environmental Damages	Annual Cost in Pakistan Rs.
Inadequate Water Supply, Sanitation & Hygiene	112 Billion
Agricultural Soil Degradation	70 Billion
Indoor Pollution	67 Billion
Urban Air Pollution	65 Billion
Cost of Lead Exposure	45 Billion
Rangeland Degradation & Deforestation	6 Billion
Total	**365 Billion**

A US $ is equivalent to about 100 Pakistani rupees

Source: World Bank (2006)

The causes for environmental problems in Pakistan are numerous and complex. However they can be summed up to include a) the past tendency in the country to emphasize quantitative growth at the expanse of quality, b) the failure to take environmental factors into account as a normal and integral part of planning and decision making, c) the country's dependence on expediencies without regard to their impact on environment and more fundamentally d) the inadequacy and failure of institutions to perceive the environment in its totality and to understand or recognize the fundamental interdependence of man, resources, environment and development.

The present drive for economic growth in Pakistan will continue to exert a complex variety of impacts on the environment. Individuals, government functionaries, and institutions, depending on the value each attaches to quantitative growth as against the broader and less measureable aspects of the quality of life, may see these impacts in different lights. However, one has to recognize that human environment is not an abstract concern or simply a matter of aesthetics or of personal taste although it can and should involve these as well. Moreover, the growing economic cost of environmental degradation in the country (Box 2.2) is clearly bringing forth the fact that economic growth can only be sustained by safeguarding the environment.

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