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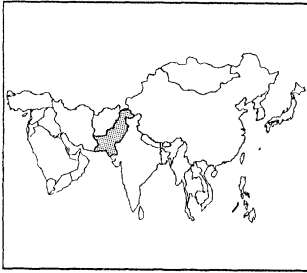
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Environmental problems in Pakistan; their origins and development and the threats that they pose to sustainable development

Arif Hasan and Ameneh Azam Ali

I. INTRODUCTION

THE PAPER DESCRIBES Pakistan's environmental problems and how these can be traced to policies and changes in resource management regimes instituted under colonial rule - although the scale of these problems has been magnified by post-colonial development models. The paper considers the social and economic changes in recent decades in agriculture, forestry and fisheries, industry and human settlements and the environmental problems that these have caused. It also considers the deficiencies in government policies (or their implementation) in addressing these problems. The government has stated its commitment to environmental protection and to linking this with development and community involvement but the laws and institutions needed to ensure its implementation have not emerged. Pakistan's environmental problems are largely the result of the physical, social and economic repercussions of colonial and post-colonial development models promoted by the North. Tackling these problems is made more difficult because these development models still persist. The task is further complicated because of increasingly unequal social, economic and political relationships within the country and unequal trade relations between Pakistan and the North. Environment related problems cannot be viewed in isolation from these larger realities.

Poverty is the main impediment to dealing with the environment related problems that development has created. Because of poverty there is an increasing demand on the already meagre resource base

of the country. This problem is compounded by exceptionally high population growth rates and the very high cost of installing, maintaining and operating contemporary development. Neither the urban nor rural populations possess the vision or the managerial and technical tools for dealing with the changes that have taken place in the last hundred years in their social and physical environment.

The state also has problems in dealing with environmental matters. Per capita revenue generation and production is declining while per capita non-development expenditure is rapidly increasing. The state has traditionally used the old feudal or clan system as an intermediary between itself and the people for all development and its subsequent maintenance and operation, thus freeing itself from much of the financial and management burden involved in the process. The old feudal order helped the state collect revenues, maintain law and order, invest in agriculture infrastructure and manipulate election results. The feudal and clan systems have now ceased to operate effectively and no new institutional structure has yet replaced them.

II. DEVELOPMENT POLICIES AND THEIR REPERCUSSIONS

a. Historical

PAKISTAN'S ORIGINAL DEVELOPMENT policies were established by the British during colonial rule. The major objectives were to exploit existing natural resources to serve the needs of industrialization in Britain. This meant a concentration on increasing agricultural production in response to the demands of industry and domestic consumers in Britain and preventing the development of an indigenous industrial sector in British India (which included the area which is now Pakistan). It also meant limiting or destroying existing industrial activity and increasing the revenues for the empire. This resulted in an increasingly unequal balance of trade between Britain and India. This unequal balance persists to this day in Pakistan and it has severe consequences for natural resources.

The process of colonial development involved taking over large areas of natural resources such as forests, lakes and mineral deposits for large-scale commercial exploitation. The British also undertook the development of perennial irrigation in the Indus valley to increase agricultural production and revenues, a process which has brought about widespread and often irreversible changes in the relationship between human and natural resources. A railway system was developed and the existing road network improved to help the development of trade and the movement of produce. Port cities became dominant settlements whilst the traditional industrial centres diminished in size. Finally, in order to carry out this process of development, major administrative changes were adopted which took effective power away from the old feudal order and local communities, with their functions increasingly taken over by the colonial administration.

After independence, the government of Pakistan adopted most of the policies of the colonial state and embarked upon further major development initiatives that had far-reaching environmental implications. These included the expansion of the irrigation system; the

development of large dams for water storage and power generation; the green revolution; new roads and communications; industrialization; and the control of epidemics through preventive measures. These developments have resulted in the growth of commercial agriculture, the creation of new *mandi* (market) towns, rapid urbanization and a very large increase in population. As a result of these developments and the inadequate government response, a large rural and urban informal sector has developed.

b. The Development of Perennial Canal Irrigation

Most of the upper and the entire lower Indus plains acquired a system of perennial irrigation and the desert was brought under the plough through a weir construction programme between 1872 and 1929 and four further major barrages built between 1932 and 1962. Ever since these first canals were built there have been competing demands for water during critical growing seasons. After independence, a major dispute on the use of the Indus river waters arose between India and Pakistan. Despite various government acts and treaties, and dams with additional storage capacities, disputes still remain.

The development of perennial irrigation had various economic and social repercussions on the areas themselves: technical skills were developed and a new entrepreneurial class emerged to help in construction. A government irrigation department was created, bypassing local and traditional organizations and thus rendering them ineffective. The production of agricultural surpluses and the ensuing development of transport, storage and marketing led to the emergence of *mandi* towns. The development of a cash economy encouraged migration to these towns and the flow of urban produced consumer goods. These social and economic changes led to the destruction of many old communities and social systems.

There were also important environmental repercussions. Communal lands were appropriated and exploited by more powerful village members, thus denying rural populations access to land for housing, fuelwood, construction materials, water and grazing. The development of a cash economy and increased migration meant that many rural settlements experienced physical degradation, overcrowding and increasingly unhygienic conditions as neither finance nor skilled labour was available to sustain their infrastructure. There was great water seepage during transportation along the canals thus raising the water table and causing widespread waterlogging and salinity.⁽¹⁾ Riverine forests were no longer sufficiently inundated because of the diversion of waters into the irrigation system and large areas have been destroyed or badly damaged.⁽²⁾ This deforestation, in turn, added to the siltation problem of rivers and increased the risk of flooding. The Indus delta has been adversely affected. With reduced volumes of water, there has been increased salination, the destruction of tamarisk forests and pasture and arable land, a threat to fish life, a lack of potable water and a decrease in available nutrients. Finally, siltation of the reservoirs and major canal systems is causing flooding and reducing storage capacities, and is likely to affect the operation of the hydro-electric power systems in the not too distant future.⁽³⁾

1. Government of Pakistan, *Environmental Profile of Pakistan*, EUAD.

2. World Bank (1985), *Pakistan: Environmental Rehabilitation, Protection and Management: Reconnaissance Mission Report*, Washington DC.

3. Federal Planning Cell (1990), *Water Sector Investment Planning Study*, Lahore.

c. The Green Revolution

In order to increase agricultural productivity and incomes from agriculture, the government decided in the 1960s to launch the "green revolution". This consisted of introducing high yielding varieties of crops (which required large quantities of water and thus restricted the "revolution" to the irrigated areas of the country) and chemical fertilizers and pesticides. To make the process affordable to the farmers, the government extended loans and gave out subsidies. As a result of the new technologies, agricultural growth increased, with the profits finding their way into the urban economy. There was growing mechanization of agriculture. During this period, hydro-electric power stations were developed leading to the electrification of villages and towns, and road networks and communications improved. This supported the mechanized processing of agricultural produce through rice husking and cotton ginning units and the transportation and marketing of produce.

Many social and economic changes occurred as a result of the green revolution. With the development of increased surpluses and a services sector for the new technologies and inputs into agriculture, the old *mandi* towns expanded rapidly. Established government departments and institutions grew and new ones developed both in the *mandi* towns and rural areas to deal with the economic growth. A light engineering industry developed in the *mandi* towns to manufacture spare parts and goods integral to agricultural production, and a range of financial and commercial services developed in towns and villages in prosperous agriculture areas.

However, the optimum use of green revolution technologies requires land holdings of over 42 hectares (100 acres). Richer farmers bought out smaller farmers and peasants, making them landless. The larger and better connected farmers obtain financial support from the state agencies, whilst smaller farmers have to rely on a more informal and traditional system of credit. These traditional sources of credit entitle the lender to purchase the crop at 40-60 per cent of its market value. The cost of these inputs has made small-scale farming uneconomic and many small farmers rely on remittances from family members in industrial/service sectors or large urban areas. Because of the above mentioned factors, there has been a very large-scale migration of farmers and labour from rural to urban areas. Another consequence of the green revolution has been the emergence of a new entrepreneurial class in the rural areas and small towns. This class includes those who provide machinery; the pesticide and fertilizer agents; white collar workers in banks and government departments; small industrialists and spare part manufacturers. These people are gaining increasing political power at the level of local government.

The green revolution has also had more direct environmental repercussions. The increased use of agro-chemicals, mechanical means of land preparation, heavy applications of water and the introduction of mono-cropping have all had significant impacts on the environment. A high dependence on chemical fertilizers and a lack of organic matter has led to a deterioration in soil structure, resulting in a lower capacity to absorb and retain water, rapid leaching of nutrients from the topsoil and reduced aeration of the root zone. All these have adverse effects upon plant growth and hence on agricultural production and the economy. Pesticide use increased by about 40 per cent a year between 1980 and 1985. The result has been considerable contamination of

4. Government of Pakistan (1988), *Report of the National Commission of Agriculture*, Ministry of Food and Agriculture.

ground and surface waters and likely further impacts on the health of wildlife and rural populations.⁽⁴⁾ A more qualitative and quantitative analysis of the environmental impact is urgently needed.

Box 1: Barani Areas

Most of the land area of Pakistan is classified as a *barani* (rainfed agriculture) area although only 10 - 12 per cent of the population live in these regions. The *barani* areas have been affected by the spread of irrigation in adjacent areas, the use of green revolution technologies, the growth of urbanization and industrialization and the development of a cash economy.

People living in *barani* areas had previously migrated to the flood plains of the Indus during the dry season in order to obtain grazing and water for their animals and to exchange goods. Now they can no longer have access to their grazing lands and there is no longer a market for their products. As a consequence, some have migrated to the cities, while others try to raise increasing numbers of cattle for the urban market. The break up of the old feudal order has meant that traditional controls over the use of water and land resources have weakened and current pattern of use is unsustainable. The people of the *barani* areas do not have the skills to sell their goods to urban areas directly and are exploited by the traders who act as intermediaries.

In those areas in which change happened first, agricultural and pastoral activity is no longer the primary income source and the communities are maintained through remittances from urban areas. It is likely that this pattern will be repeated throughout the *barani* areas.

The increase in the number of cattle has resulted in the overgrazing of land and the desertification of large tracts of land together with large-scale soil erosion. Natural sources of water have been over-exploited and, in some cases, have dried up. In richer areas, mechanical extraction of water has been introduced. However, the water table is now falling and many tubewells are becoming inoperative.⁽⁵⁾ As a result of overgrazing and the decay of old systems of water management, these areas are becoming unproductive deserts. This process is being accelerated by the need for cash which in turn leads to the over-exploitation of scarce natural resources.

5. See reference 2.

d. The Exploitation of Natural Resources - Forests

Pakistan's alpine (coniferous) and sub-alpine forests cover about 30 per cent of the total forest area and are mostly under the administration of the Forest Department. The tribal forests are owned outright by the communities, which decide how they are to be exploited. The Forest Department extracts a royalty on felled timber from the contractors who enter into an agreement with the community. Half the royalty goes to the community, the other half to the department for management costs. Contractors are meant to plant

seedlings to replace felled timber but this is seldom done. State owned forests, which include previously feudally owned forests, are administered and managed by the Forest Department which issues permits for exploitation and levies a royalty on felled trees. They are also responsible for reforestation.

Deforestation has accelerated in the last century and in the past 75 years forest cover has decreased from 14 per cent of the land area to 5.2 per cent whilst timber supplies from state forests declined by 45 per cent between 1974 and 1985.⁽⁶⁾ Heavy deforestation has taken place in the past decade through uncontrolled exploitation, heavy grazing pressure, the clearing of land for cultivation and increased demand for timber. Efforts at afforestation and attempts at watershed management have not kept pace with increased demand and excessive cutting and overgrazing.

There are many reasons for deforestation. Large tracts of forest traditionally used and owned by communities for subsistence level use were taken over by both the old colonial and newly independent state or powerful groups or individuals, and commercially exploited to satisfy the demands of a growing urban and rural population. Second, with the development of the canals, hundreds of thousands of hectares of riverine, scrub and thorn forests in the Indus plains were cleared for agriculture. Finally, the demands on timber for cooking and heating purposes are increasing. It is estimated that 90 per cent of all wood consumed in Pakistan is for fuel.⁽⁷⁾ And fuelwood needs are expected to double by the year 2000. The building of roads has made previously inaccessible mountain areas reachable and logging commercially viable.

The consequences of deforestation are numerous. The increased scarcity and cost of fuelwood and building timber is becoming an economic burden on low-income communities. Soil erosion is a very serious result of deforestation: the mountainous areas which are the main sources of commercial timber are quite fragile and when the tree cover is removed, valuable topsoil is washed away. This leads to desertification of once-productive upland areas and the silting up of waterways in the plains, making them more prone to flooding. There is increased silting up of irrigation and hydro-electric systems, lowering their efficiency and shortening their lifespan.

e. The Exploitation of Natural Resources: Fisheries

Fishing started to become a major commercial activity following the development of the irrigation system. The Department of Fisheries was established in the late 1950s and fish production expanded tremendously between 1958 and 1985, mainly in the coastal regions, as a result of increased credit facilities, better materials and technical assistance. The fishing industry is now the sixth largest foreign exchange earner in Pakistan.

Traditionally, fishing rights in lakes and barrage areas were extended to the local fishing communities through a licensing system. In the 1960s, the Department of Fisheries introduced a contracting system whereby fishing rights in these areas went to the highest bidders, namely big businesses or powerful local landowners. Local communities could only fish as employees of the contractors and have become highly dependent upon them.

Coastal fishing developed with the aid of loans and technical assistance from the Fisheries Department; again it was the more powerful entrepreneurs who benefited. Local communities, with little access to

6. See reference 4.

7. See reference 4.

government officials, found themselves working for these entrepreneurs via intermediaries, and were required to sell their produce to these intermediaries at greatly reduced prices in return for loans for boats and nets and help with new fishing techniques.

There have been various social and economic repercussions of the development of fisheries. The subsistence pastoral and agricultural economy along the coast has been replaced by a cash economy and the associated service sector has developed greatly. Many have abandoned their traditional agricultural and pastoral activities for fishing with the result that the area is dependent on outside sources for its agricultural produce. The emergence of seasonal employment has also made a previously static population more mobile, thus breaking up the old social order.

The commercialization and mechanization of coastal fishing is having a severe impact on marine life and on the coastal environment. Over-fishing by commercial vessels is causing rapid depletion and conflicts are arising between the larger and smaller scale fishing enterprises as they encroach on each other's fishing zones. Although regulations governing fishing activities according to breeding season and geographical limits do exist, they are not enforced. Fishing operations produce large quantities of solid, mostly inorganic waste (nylon nets, ropes, fibre glass containers and plastic bags) which, in the absence of any waste management system, causes pollution of the beaches and sea. Furthermore, thousands of tonnes of oil are deposited on beaches, in harbours and fishing grounds.⁽⁸⁾ The development of fisheries has resulted in growing populations in arid coastal areas and the depletion of already scarce sources of potable water from desert aquifers.

8. See reference 1.

f. Industrialization

At independence in 1947 Pakistan was an entirely agricultural country. Today its industrial production and related sectors account for over 30 per cent of the GNP and, in 1983, 48 per cent of the labour force was involved in industry. There are two main types of industrial activity: large-scale state and private industrial enterprises and multinationals, which include energy production, agro-chemicals, oil refineries, engineering and textiles; and small-scale enterprises serving the larger industrial units, many operated by the informal sector, and including tanneries, cotton ginning, brick manufacturing, foundries, dyes and chemicals. Most industries are located in large urban areas, the larger ones in industrial estates, except the major agro-chemical plants which are located in rural areas. Smaller industrial units, especially the informal sector ones, are located in low-income residential areas of cities, near transport routes, on the periphery of formal industrial estates or near wholesale markets. Small units and informal industrial activity have developed mainly in the rural and urban areas of the districts of central Punjab.

Industrialization has created a large number of jobs in the urban areas. These are more lucrative than traditional agricultural work and an increasing number of people from low-income rural areas have moved to the cities and now send money back to their families in the villages. Those affected by the green revolution and the break-up of traditional institutions have also joined the urban economy. These changes have affected the lifestyles, cultural values and production modes of the rural areas, and have prompted a growing

awareness and demand for services such as piped water, sanitation, education, health services and consumer goods. A new type of leader has emerged in rural areas - university educated young men who take on the role of development activists.

The environmental effects of industrialization can be divided into two: air and water pollution; and the encroachment by industrial units on farmland and on the habitats of plant and animal life. Little work has been done to assess the quality and quantity of industrial effluent in water bodies and their impact on the environment but the few studies that have been done (mainly in Karachi) have shown high concentrations of toxic metals, metal salts, bacteria, acids and oils.⁽⁹⁾ The intake of sea water for cooling industrial plants in Karachi and the subsequent release of heated water into the sea has a harmful effect upon many organisms. Tests on sea-water show some industrial contamination, although this is not yet a threat to the marine environment. There is a high level of mercury pollution, but no studies have been carried out to evaluate its effect.

Atmospheric pollution resulting from industrial activity is creating major health hazards in some areas. Thermal power plants using diesel, sited in densely populated areas, produce sulphur dioxide, nitrogen oxide and particulate matter which affect plant, animal and human life. Studies in the Punjab have shown large sections of various populations suffering from respiratory problems, eye problems and vomiting, and there has been evidence of plant and crop damage. Similar effects have been caused by emissions from chemical plants and cement factories have also been shown to cause allergies and respiratory problems.⁽¹⁰⁾ Another major source of atmospheric pollution is automobiles (the number of cars tripled between 1975-84), with emissions in some cities creating very serious health problems for the residents.⁽¹¹⁾ There is also the burning of solid wastes for heating, lighting and disposal although there are no estimates on the pollution this causes.

The impact of pollution in terms of occupational exposures on the industrial labour force is not yet known. Although certain safety measures are required by law, it is often only the larger industrial units that comply with the regulations.

Both atmospheric and water pollution are becoming serious environmental problems in Pakistan. There are some laws to try and deal with the issues but no standards have been incorporated into the legislation as yet. It is very difficult to control the functioning of the small and informal industrial estates. Pollution control devices mean an increase in the price of manufactured goods. The introduction of gasoline with lower concentrations of lead additive would raise transport and related costs. Neither of these measures can be afforded by poorer sections of the community. Other avenues for dealing with the issues need to be investigated, but awareness building and environmental education are the most important tool.

g. Human Settlements

At independence, 18 per cent of Pakistan's population lived in urban settlements; by 1981 that figure had risen to 30 per cent. Intermediate sized cities have shown an accelerated growth since 1971, large cities a slow decline in their growth rates and small cities a rapid decline in population.⁽¹²⁾ Between 1980 and 1990, the urban population of Pakistan increased by 10.5 million.⁽¹³⁾ Rural-urban migration is the main cause of the higher urban growth rate. The main cause

9. See reference 1.

10. See reference 1.

11. Government of Pakistan (1983), *Pakistan Statistical Year Book - 1983*, Federal Bureau of Statistics.

12. See reference 1.

13. Asian Development Bank (1990), *Pakistan Low-Cost Housing Project*.

14. See reference 4.

15. See reference 13.

16. See reference 2.

17. See reference 1.

18. SDC and Arif Hasan (1989), *Community Development Groups in the Urban Fields in Pakistan* (a paper based on this report was published as "Community groups and non-government organizations in the urban field in Pakistan" in *Environment and Urbanization* Vol. 2, No. 1, April 1990).

19. See reference 3.

of migration is the reduction in per capita cropped area for the rural population as a result of population growth and sub-division of land.⁽¹⁴⁾ This process is continuing.

The urbanization process and the rural to urban migration which underlies it have broken traditional values and social systems. The migrants' new aspirations and demands have resulted in class, ethnic and political conflict, crime, violence and social alienation. The management of large cities is complex and expensive and requires the development of institutional arrangements. In Pakistan, the economic resources of urban areas have not been efficiently tapped, nor have skills been mobilized or local government institutions developed.

A major problem is land for housing low-income groups, with the state and formal sector only providing a fraction of what is needed and even then at prices that the poor cannot afford.⁽¹⁵⁾ The rest of the population uses the informal sector, with *katchi abadis* (squatter settlements), and informal settlements housing over 50 per cent of Pakistan's urban population. These settlements are unserved, and the houses are of very poor quality because of the lack of credit and technical advice. Much of the urbanization process has taken place on productive agricultural land. And land use changes have contributed to a decrease in the amount of open space, green areas and playgrounds available.

Piped water has been extended to many informal settlements; 68 per cent of the urban population is now served by standpipes or house connections. However, both quality and quantity are inadequate. Over 40 per cent of the water put into the piped system is lost in leakages and much of it becomes polluted from seepage from neighbouring sewage pipes. Many cities are facing water problems due to increased levels of salinity and falling aquifer levels.

Only 47 per cent of the urban population has sewerage and drainage facilities; in the informal sector this figure is 24 per cent.⁽¹⁶⁾ This often results in contamination of the sub-soil water used for drinking. Only about 20 per cent of Karachi's sewage is treated, the rest flows directly into the sea.⁽¹⁷⁾ Only 33 per cent of Karachi's solid waste is transported to the dumping sites; the rest is left to rot.⁽¹⁸⁾ The situation is much worse in smaller towns. These flows of untreated sewage, open drains and piles of garbage are serious health hazards. They are major contributors to the high levels of malaria, diarrhoea and typhoid, which account for 60 per cent of all diseases in the informal settlements.

There has been much degradation of old city centres as a result of increased populations. Traditional markets and commercial centres have expanded into old residential and civic areas, the elite have moved to the suburbs and the migrant daily wage labour have moved into the city centres. Old neighbourhoods are being used for manufacturing enterprises and warehouses, often with the destruction of historic buildings and have become highly polluted (as a result of high traffic volume and congestion).

Whilst some rural settlements are becoming less populated, many large villages are expanding. Here, environmental conditions are also fast deteriorating, often because the traditional division of tasks between the different social groups has broken down and not been replaced with modern institutions. It is estimated that only 17 per cent of the rural population have access to potable water and 4 per cent to sewerage and drainage facilities.⁽¹⁹⁾

III. GOVERNMENT RESPONSE TO ENVIRONMENTAL ISSUES

UNTIL RECENTLY, ENVIRONMENT related problems were not viewed in their larger ecological context nor was the philosophy, politics and practice of the development that produced them questioned. Some environmental problems were tackled individually through the enactment of isolated laws and regulations. The first government attempts to relate development to larger ecological issues are to be found in the fifth five-year plan (1978-83) and are further expanded in the sixth and seventh five-year plans. Government response can be divided into two areas: specific responses to the effects of development and plans for a more integrated environmental policy.

a. Responses to the Effects of Development

i. Salinity and Waterlogging

To tackle these problems, the government has been operating two major programmes, the SCARP (Salinity Control and Reclamation Project) and surface drainage projects, plus a smaller programme for lining water channels with concrete.

The main aim of the SCARP programme, started in 1959, is to install tubewells in waterlogged areas to pump out sub-soil water and discharge it back into the irrigation system. Water table levels have dropped and salt affected areas are decreasing but there have been some problems with the disposal of saline sub-soil water and with operation and maintenance costs. Surface drainage of saline water in the Indus plains is being undertaken because vertical drainage through tubewells is not possible. But there have been substantial problems in draining the saline water successfully. One solution, the Left Bank Outfall Drain Project, has attracted much criticism because of the large financial, technical and managerial problems posed by its operation and maintenance.

The concrete lining of water channels is a programme aimed mainly at smaller farmers, but this has not been carried out on a large enough scale to have had any significant impact.

Prevention of waterlogging and reclamation of salt-affected land is essentially an on-farm activity requiring proper water management practices and maintenance of on-farm and common infrastructure. Only the farmer, or an association of neighbouring farmers, can undertake this activity effectively. But to do so they need to own the land and receive technical assistance plus incentives. Without including the small-scale farmers and supporting them to look after their own land, the highly technical large government projects will be ineffective.

ii. Green Revolution Technologies

A lot of research on the use, effects and yields of the green revolution technologies has been carried out by government organizations, but the results of this research have reached neither the farmers nor the agricultural departments of provincial governments. Neither has the extent of pollution, soil damage and environmental problems resulting from the green revolution been quantified or fully studied. Nor has any proper legislation been developed or programmes for raising

awareness of the potential problems and dangers developed.

iii. Watershed Management and Afforestation

Watershed management through afforestation and soil conservation is one of the major environment protection programmes of the government of Pakistan. However, the watershed management programmes so far have not been very successful because of a reluctance by farmers, particularly subsistence farmers, to let their land be used for terracing or tree-planting, especially in areas used for grazing and cropping. Unless the programmes can provide alternative means of livelihood plus technical support for improved agricultural production and animal feeding, there is little chance of these programmes achieving their objectives.

Considerable effort has been made towards afforestation but rates remain inadequate. Technical research institutes are well established but attempts at social forestry, seen as potentially the most effective part of the afforestation programme, have yet to be developed. There is also a need to re-examine current timber harvesting practices and amend the legislation.

iv. Fisheries

There are no government plans for dealing with the environmental problems created by the expansion of mechanized fishing in coastal regions or inland fisheries. Although it is recognized that there are severe environmental problems, the fishing communities are dependent on the large enterprises which dictate the methods. The strengthening of independent fishermen or small-scale fishing associations would help, but this requires a comprehensive social, technical and financial programme.

v. Atmospheric Pollution

Various small surveys and studies have been undertaken, but no overall national study has been completed. There is some legislation for regulating industrial and automobile emissions but very little public awareness of them and there are no institutions for implementing the laws or for monitoring emissions.

vi. Aquatic Pollution

Except in a few large and intermediate sized cities, there are no government plans to tackle the problem of sewage pollution from human settlements. There is some legislation controlling the quality of industrial wastes and potable water, but very little public awareness of this and no monitoring facilities or arrangements to take action against defaulters

vii. Urbanization

Urban areas are receiving much government and international attention. Master plans for all major and intermediate cities have been or are being prepared, and there are also plans for a limited number of small towns and for the rehabilitation of city slums.

However, previous international agency aided projects and plans have not met projected targets. One reason is that community par-

ticipation in project design, development and implementation failed to materialize. In addition, the planning, monitoring and implementing agencies of the projects lacked the necessary technical and managerial skills and the political will to see them through. Furthermore, the administrative structures of the urban development authorities and local government were not compatible with the nature of the proposed developments. It is feared that given the nature of urban development authorities, local government and the increasing scale of environmental degradation, the developments proposed for the 1990s will also be unsuccessful.

b. Plans for a Larger Environmental Policy

In 1983, the government of Pakistan enacted the Pakistan Environmental Protection Ordinance whose objective was to "...provide for the control of the pollution and the preservation of the living environment." Through its institutions, the ordinance seeks to establish an integrated approach to environmental legislation. As a result of the ordinance, the Environmental Protection Council was set up, but this body has never met. There is a proposal to set up a Pakistan Environmental Protection Agency whose function would be to administer the ordinance and prepare the national environmental policy for approval by the government. This agency would also be responsible for developing national environmental standards and for establishing systems of monitoring environmental pollution. There has been a request by the government for provincial environmental protection agencies but the response has been very limited. Various other agencies have been provided for in the ordinance but few have developed. Given the lack of these bodies, the Environment and Urban Affairs Division remains the main government agency concerned with environmental matters. However, it is too weak to have an effective coordinating function.

The National Conservation Strategy was initiated in 1986. A wide-ranging investigation into the current state of the environment and subsequent recommendations for policies and action is taking place and final conclusions are expected in late 1991. Subject to Cabinet approval, these recommendations will become the National Conservation Strategy. The strategy's recommendations are to be implemented through three channels: environmental concerns are to be incorporated into the planning and development process at both federal and provincial levels; the Environmental and Urban Affairs Division will ensure implementation occurs; and specialized institutions will develop policy recommendations, carry out studies and give training to government and NGO staff. The strategy also recommends specific programmes and projects dealing with key environmental problems. However, no drafting of new legislation relating to the recommendations is proposed and no enforcement measures are envisaged at the present time. The main weakness of the strategy is that there was little broad political or public involvement during its formulation and that the strategy is likely to remain administrative rather than participatory. As the kinds of measures required to tackle environmental issues and problems are heavily dependent on the acceptance and involvement of communities, implementation of the strategy may be difficult.

IV. CONCLUSIONS

GOVERNMENT COMMITMENT TO the protection of the environment is clearly stated in the sixth and seventh five-year plans. The link between development, environment and community involvement for sustainable development is also clearly spelt out. To translate government commitment into action, it is necessary to develop

Box 2: Environmental Community Action Groups and NGOs

The last decade has seen the emergence of the environment as an issue of public and donor concern and a number of community action groups and NGOs have emerged with a specific environment focus. In addition, there were already a large number of community organizations and NGOs involved in supporting local development. Some of this work has improved local environmental conditions although it was never consciously related to larger scale environmental issues.

Informal community action groups are more common in urban areas. In most low-income settlements and now sometimes in large villages, residents come together to tackle some of the problems they face, primarily those related to sanitation and solid waste disposal. All the work done by such groups is self-financed and self-managed. In most cases, the work is often of poor quality due to lack of skills and finance.

Neighbourhood social welfare groups are those registered with the Social Welfare Department. Many are led by relatively well educated young men. Few of these groups undertake development work that has an environmental impact. Instead, they provide schools and clinics and lobby state agencies for basic services and infrastructure.

There are four main kinds of NGO. First, scaled up neighbourhood social welfare associations who provide health, education and training facilities. They raise large amounts of finance from abroad. Their programmes are limited by a lack of self-sufficiency, replicability and their lack of willingness to undertake programmes which change the living environment, attitudes, awareness and organizational ability of the urban and rural poor. Second, there is a small number of NGOs who focus on a single subject such as labour education or family planning. Third, there are the larger scale development NGOs focusing on people's empowerment and the conditions necessary to achieve this. Many of these have secured funds from abroad and some have been successful in developing workable and replicable models. Finally, there are a group of environmental NGOs, most of which have been created in the last five years. Nearly all focus on awareness raising and lobbying with government agencies for improved environmental conditions. Funding comes from a range of sources. Almost all of these NGOs are urban based and focus primarily on the problems of the upper-middle class.

appropriate institutions and orientate planners and supporting staff. Yet, although decentralization of the planning and implementation of development is advocated, to do this, administrative and local government structural changes are needed, which have not yet taken place. In tackling environment related problems, the government is faced with a number of constraints:

- most government planners have little understanding of how poor urban and rural communities function so that translating environment related guidelines into operational plans poses many problems;
- due to an absence of institutional arrangements and procedures, any research that takes place does not reach planning and implementation agencies, NGOs or community groups (see Box 2); - almost all research is scientific and technical with little social research undertaken; as a result, effective extension programmes cannot be developed;
- programme planning and implementation agencies are geared towards the physical implementation of programmes and often ignore the social sector components such as community participation, awareness-raising, training and education;
- most government institutions do not have the technical and managerial capacity to operate the programmes. This results in poor implementation, over-expenditure and long delays;
- provincial departments, which are responsible for implementing local level development, are organized at a highly centralized provincial level and do not involve community leaders or local representatives. The same is true in larger towns;
- local governments have weak technical and managerial capacities and are subservient to the provincial bureaucracy, thus affecting their independence and effectiveness;
- there is no clear-cut division of functions or coordination between the agencies involved in development, which results in a lot of parallel and uncoordinated development and more environment related problems;
- organizations for monitoring aquatic and atmospheric pollution and for developing standards are being set up but there is no institutional support to enforce these standards. Neither are there organizations that develop and operate awareness raising programmes. The problem is further compounded by the diversity of environmental problems in different parts of Pakistan and the different levels of social and economic development in different regions of the country.

Finally, poverty is a major constraint to the effective development of environment related programmes. Many programmes can be of long-term use to poor communities but in the short term, they often have a negative impact on their already meagre levels of agricultural produce and their very limited possibilities for income generation.