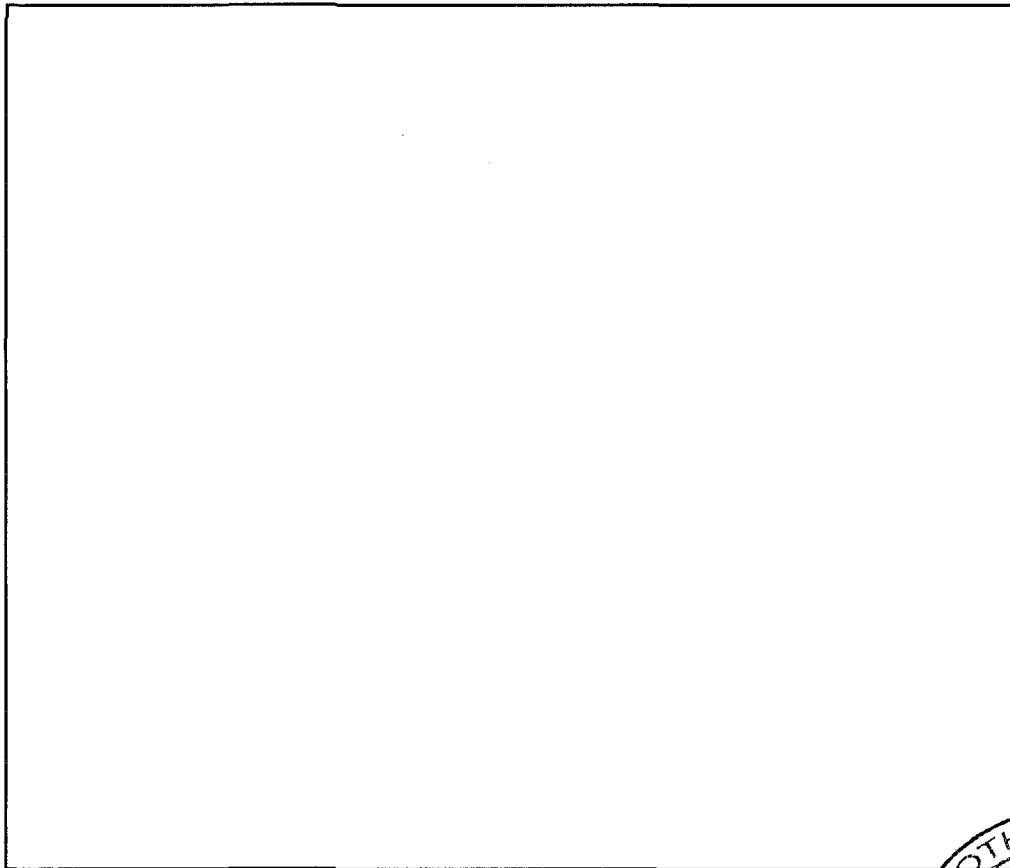
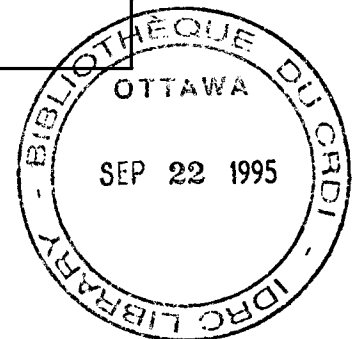


RESEARCH AND DEVELOPMENT IN PAKISTAN: PRIORITIES AND INSTITUTIONS



DR. NASIR ISLAM

DR. RICHARD MacLEAN



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Country Background: Pakistan in Brief

Pakistan came into existence as an independent country on August 14, 1947. It borders China, India, Afghanistan, and Iran and covers an area of 796 thousand square kilometres. Its population at birth, of about 32 million, has now grown to an estimated 121.5 million and is expected to reach 154 m. by the year 2000. The population density stands at 142 per sq km, and about one-third of the population lives in urban areas.

Geographically the country consists of five major ecological zones: the mountainous north consisting mainly of Himalayan, Karokoram, and Hindukush ranges; the semi-arid Pothwar Plateau to the south; the plains of the Punjab and Sindh to the south-east swept by the Indus river and its tributaries, reaching up to the Arabian sea; the Thar desert and the vast but arid and sparsely populated Balochistan plateau in the west. The climate is generally subtropical, hot, and dry in most of Pakistan with the exception of Northern areas. The average precipitation is lower than 25 cm, the northern areas receiving the highest and Balochistan and Sindh the lowest.

The country boasts one of the largest surface irrigation systems in the world. It has been greatly expanded since the Indus Water Treaty with India leading to the construction of link canals, barrages, and dams. Thanks to extensive irrigation, Pakistan produces a wide variety of food and non-food crops, including cotton, wheat, rice, sugarcane, pulses, and tobacco. Over one-half to three-quarter of the production of cotton, wheat, and rice comes from the Punjab province. Pakistan is also endowed with fairly large forest and fish resources.

Since its birth, Pakistan's accomplishments in terms of economic development are fairly impressive, particularly in agriculture, water & power, physical infrastructure, and communications. The country had to overcome the initial handicap of inheriting very little in terms of physical, manpower, and managerial resources from the colonial administration as well as an exchange of Hindu-Muslim populations leading to a mass migration. The three costly wars with India, the loss of East Pakistan and more recently the Afghan war were also very serious setbacks. Despite these difficulties, the economy grew steadily and the growth was particularly impressive during the 60s and the 80s. This strong growth was led by industry, specifically the manufacturing sector. The income per capita doubled between 1960 and 1990. Life expectancy, infant mortality, nutrition and literacy improved although at a rather sluggish pace. (See appendix I.) *World Development Report 1993* estimates the GNP per capita at US \$ 400 per annum and ranks Pakistan 27th from the bottom among 40 low income countries. In 1980, the GNP per capita stood at US \$ 230. Pakistan ranks 132nd according to the *Human Development Report 1993* and its real GDP per Capita (Purchasing Power Parity) is estimated to be US \$ 1850.

Although the GNP has grown strongly during the last decade, this growth has not resulted in improving the level and quality of life for a vast majority of Pakistani people. Access to primary health care, potable drinking water, primary education, and sanitation is still limited. Women are disproportionately discriminated against in all of these sectors. The gender disparity in literacy is appalling in some parts of Pakistan. There are also serious regional imbalances. Pakistan's population has continued to increase at 2.8 to 3.1% per annum, blunting the positive effects of economic growth. Industrialization, green revolution, and galloping growth in population have also led to severe environmental degradation in various parts of the country. During the recent

years, fiscal deficits and external debt have posed serious difficulties. Consequently the government has undertaken a massive program to reform macro-economic policy and management. Privatization, deregulation, devaluation, trade liberalization, reduction of subsidies, state enterprise, and fiscal reform are the key elements in this program.

Administratively, Pakistan is divided into four provinces-- Balochistan, North-West Frontier Province (NWFP), Punjab, and Sindh as well as the Federally Administered Tribal Areas (FATA), Federally Administered Northern Areas (FANA), and Azad Jammu and Kashmir (AJK). The country is governed under the 1973 Constitution (as amended from time to time) which provides for a modified parliamentary form of government. The legislature consists of two houses — the National Assembly elected on the basis of universal adult franchise with reservation of seats for the official minorities and a Senate elected by the provincial legislatures. The Prime Minister is elected by the National Assembly. The President is elected by the national and the provincial legislatures under a formula in which the electoral votes are weighted in favour of the smaller provinces. Pakistan's president, unlike other parliamentary democracies, is a powerful actor in the policy process and has the power to dismiss the national and provincial legislature in emergency situations. He also has the key power to appoint the Chief of the Army Staff.

The 1973 Constitution also provides for a federal form of government in which the provinces have been given important powers and functions including the areas of health, education, and agriculture. However the provincial taxing powers are rather limited and the provinces are largely dependent upon federal government for funding their development programs as well as their recurrent expenditures. The provinces have their own elected legislatures headed by chief ministers and federally appointed governors. AJK has its own elected government headed by a president and a prime minister as well as an elected legislature. The tribal and northern areas are directly administered by the federal government through a system of political agents and local tribal leaders. These areas have been allocated seats in the national legislature and elect their own representatives.

The recent political crisis in Pakistan — a power struggle between the former President, Prime Minister and Leader of the Opposition — has been resolved in favor of Ms. Bhutto as a result of last October's elections. The Peoples Party of Ms. Benazir Bhutto has formed a government at the federal level. They have also formed governments in two of the four largest provinces (Punjab, in coalition with the breakaway Muslim League in Sindh, their majority). This gives them a fair degree of stability and they also seem to have the support of the army leadership. More important, the Peoples Party was also able to elect their candidate Mr. Farooq Leghari as the President of Pakistan, thus putting an end to the political see-saw between the PM and the President. Hopefully this government would be able to give its full attention to the crucial development policy issues facing the country and would be able to implement its policies with the cooperation of the provincial governments for the first time since 1988.

**Development Priorities
of the
Government of Pakistan (GOP)**

The priorities of the GOP are reflected in three important government documents: the Perspective Plan, the Five Year Plan (current), and the Annual Plans. The perspective plan views development in a wider context and from a longer term time perspective. They provide a framework for the five year plans, which are medium term planning instruments. The plans are finally implemented through the annual development programs of the federal and provincial governments.

The First Perspective Plan covered the period 1965 to 1985. The Second Perspective Plan (SPP) extends from 1988 to 2003. These long term plans furnish a vision and a future profile of Pakistan in the context of changing global and national environment. They also provide the guideposts or milestones for the five year plans. The SPP fixes the following guideposts:

1. Reduction in population growth rate from 3.1% to 2.6% by the year 2003.
2. Eradication of illiteracy among youth through full primary enrollment.
3. Access to clean water for the entire population of Pakistan.
4. Access to sewage facilities to all urban areas and 60% of the rural areas.
5. Provision of telephones to 50% of the population.
6. Increase in tertiary roads from 80,000 km to 140,000 km.
7. Provision of a Rural Health Centre for each Union Council.
8. Establishment of a Politechnique in each district.
9. Attainment of 80% literacy rate by the year 2003.

The SPP stipulates 6.5% annual rate of growth and 59% rise in per capita income by the year 2003. The SPP emphasizes the distribution of economic benefits and alleviation of poverty as a priority. In this context, the employment generation and human resource development should be given special attention. The SPP predicts only marginal changes in the socio-economic structure of Pakistan. Agriculture is expected to remain an important factor in the structure of the economy. The overall share of the manufacturing would increase substantially. Within the manufacturing sector, the engineering and electronics industries would claim a relatively larger share in investment and output. The prospects of oil discoveries being bright, Pakistan would be able to meet 50% of its crude oil needs from domestic resources by the end of the century. There would be a very substantial increase in the demand for transport and communication facilities as well as for skilled manpower. (See Planning Commission, *Seventh Five Year Plan 1988-93 & Perspective Plan.*)

Since its inception, Pakistan has used medium-term planning to set overall and sectoral priorities for giving direction to the process of socio-economic development. The plan document provides a framework for designing development projects and programs. The 7th Five Year Plan has just ended in 1992. The 8th Plan (1993-98) is due to be made public shortly after the election of a new government. According to an official document of the GOP, the underlying approach of the 8th Plan is to promote a concept of development befitting a sovereign, self-reliant Islamic nation with a full participation of its people in a democratic and decentralized framework. The following fundamental values have been emphasized: Islamic way of life, good governance, affirmative action, social justice, and socio-economic well-being of the Pakistani people (*Eighth Five Year Plan, 1993-98, Approach Paper*, Planning Commission, Government of Pakistan, 1991).

The Draft 8th Five Year Plan reflects the recent recognition of the imbalance between economic growth and human development. It focuses on poverty alleviation and social development as well as accelerated economic growth through privatization and deregulation. Within the framework of the comprehensive structural adjustment program targets of a 7% per annum growth rate, a fiscal deficit reduction to 5% of GDP and external deficit reduction to 2.5% of GDP have been fixed.

The planning division is responsible for formulating a long-term perspective plan, a medium 5-year term, and an annual development plan. The latter reflects the immediate priorities of the GOP. The 7th 5-year plan ended as of June 1, 1993, and the 8th will be released after the election in October 1993, as it is essential the document receives endorsement from the new government.

Rural democratization through local government reforms and decentralization is an important priority of the 8th Plan. The Plan would attempt to change the political culture from clientism to shared citizenship. The plan would focus on generating higher incomes and reducing unemployment and under-employment through rural industrialization, public works, and community development. Further poverty alleviation would be achieved by mobilizing the Zakat (a 2.5% tax on wealth imposed on Muslims by the Sharia laws) funds for the destitute groups.

Literacy and education would be accorded a very high degree of priority. The 8th Plan aims to increase the literacy rate to 50% by the end of 1997-98. Improved access would be achieved through democratization and transfer of primary education to local institutions. Primary education for girls will receive a special priority. The quality and relevance would be emphasized.

In the area of **Health**, there will be a shift from concentration of resources on urban areas and upper income groups toward rural areas and low income people. Integrated health delivery programs incorporating nutrition, education, and population welfare would be encouraged. The Plan recognizes the need for transmitting knowledge about health issues through educational curricula at various levels. These measure are expected to increase the life expectancy to 63 years and reduce infant mortality rate to 80 per one thousand live births.

For the first time in the history of planning in Pakistan, **Environment** is being treated as a separate sector in the 8th Five Year Plan. An allocation of 1% of GNP is being made to environmental protection and pollution control to implement the recently formulated National Conservation Strategy (NCS). In addition to sustainable development, the second new buzzword popular in the development industry has been given its due place in the Plan. The findings of a working group on **Good Governance** have been incorporated in the 8th Plan.

A high rate of growth in **Agricultural output** remains the corner stone of the agricultural strategy of the 8th Five Year Plan. This would require the maintenance of a positive flow of resources to agriculture, irrigation, rural infrastructure, and research. Other priorities in this sector include sustaining food security, raw material needs of agro-based industries, productivity of livestock and fisheries, prospects for agricultural trade, and environmental degradation & conservation of natural resources.

According to Fasihuddin, the economic growth and prosperity achieved thus far have been largely due to improved agricultural production, and consequently, agriculture is one of the main sectors. Therefore irrigation and efficient water use remains a GOP priority, particularly in view of the increased shortages of water.

As far as **industry** is concerned, the 8th Plan would attach a great deal of importance to encourage private sector participation in industrial sector by reducing controls and regulations. Important priorities include the following: productivity of capital and scarce resources, enhancing industry competitiveness to improve exports, creating favorable environment for the growth of small-scale enterprises and exploring the role of foreign investment in country's industrial development. (See *Eighth Five Year Plan (1993-98)*, Approach Paper, Planning Commission, Government of Pakistan, Islamabad.)

According to Fasihuddin, the Acting Chief Economist, Planning Division: One of the major priorities of the present government is to sustain annual growth at around 7% through increased use of appropriate and efficient technologies. Because of budgetary deficits, debt, high prices, and balance of payment problems, sound macroeconomic policies are required. Note, in this regard, Pakistan has undertaken a World Bank sponsored structural adjustment program to achieve trade liberalization, access to greater market share in an effort to increase exports, promote greater investment, and eliminate subsidies. He also emphasized the importance of improved farm-to-market roads for Pakistan's economy.

Although productivity per unit of investment has improved, increasing the level of investment is an important concern of the government. He emphasized that there has been a shift in policy from government control towards liberalization of the economy, and reduced government intervention. He stressed that this should lead to opening up of industrial sectors like telecommunication, shipping, etc. The policy shift emphasizes policy planning rather than allocative planning which should provide the private sector with the incentives to stimulate the economy. He also emphasized the need for improved infrastructure for industrial development.

The cutting edge of planning and priority determination in Pakistan rests not with the five year plans but the **Annual Public Sector Development Program (FSDP)** which is based on the **Annual Development Plan**. The Annual Plan and FSDP are prepared as integral parts of the annual budget and reflect government priorities, the size and composition of public investments in concrete terms. According to the Annual Plan 1993-94, four broad objectives have been visualized: recovery in the rate of economic growth, macro-economic stability, priority to social and physical infrastructure and restoration of business confidence to attract investments from the private sector (local & foreign). The FSDP 93-94 gives a concrete shape to these objectives.

Sectoral Priorities: Agriculture

During 1992-93 the economy grew only at the rate of about 3% instead of the expected 7.5% per annum. This was largely because of the negative growth in agriculture due to floods in the preceding year, a cotton virus affecting production and the slow growth in the manufacturing sector. The growth rate for 1993-94 (Annual Plan) is forecast at 7.5% and the agriculture is expected to recover with a growth rate of 9.4%, depending largely on cotton escaping the effects of the virus which caused a significant decline in production last year. Mr. Fasihuddin, however, indicated that the present government's priority is to maintain growth at or about 7% per annum. Federal government has allocated Rs. 700.008 million including Rs 561.206m for agriculture in the 93-94 FSDP. Major projects relate to agricultural research, education & extension, forestry, animal husbandry and fisheries. The research activities would concentrate on improvement of crop production, through involving of high yielding, disease resistant varieties, improvement in agronomic practices, and post harvest technologies. The teaching, research, and laboratory facilities of Agricultural Universities at Peshawar, Faisalabad, and Tandojam would be strengthened. The transfer of technologies developed at the research institutes to the farmers would be a priority.

Water Resources

The 1993-94 annual plan proposes to raise the availability of ground and surface water from 125.12 MAF to 128.01 MAF. This will be accomplished through watercourse improvement, canal remodelling, and small irrigation schemes and tubewells. Drainage and reclamation will continue to receive the major share of water sector allocation. Ongoing projects in irrigation will be completed as well as the water distribution among the provinces will be ensured according to the recent Water Accord. On-farm Water Management projects will be implemented with the help of the World Bank, the Asian Development Bank, and the Government of Japan. The WAPDA will continue its Survey, Research, and Investigation program. Ongoing projects under this program are: Investment Project Preparation in Water Sector Umbrella II, Monitoring of Salinity Control and Reclamation Project, International Water and Salinity Institute and Pakistan Snow and Ice Project. Water sector has received an allocation of Rs 8368.589m including foreign aid of Rs 5383,583m — the highest amount allocated to a sector for 93-94.

Energy, Industry, and Transport & Communications

The 93-94 allocation to these sectors stands respectively at Rs. 3150.5 million, 142.676 million, and 3463.865 million. In industry major projects include the Heavy Electrical Complex, modernization of the Central Testing Laboratories and some research oriented projects. The program stipulates increased installed capacity for power, increase in crude oil production and the supply of natural gas. Building and upgrading of infrastructure remains a high priority in Transport and Communication sector and has received the second highest allocation of funds in the 93-94 FPSDP. Projects include upgrading of

equipment and infrastructure in railways and ports as well as building of new dual highways.

Science and Technology

An allocation of Rs. 151,220 million including foreign aid has been made for Science and Technology during 93-94 fiscal year. The manpower development program of the Ministry of Science & Technology is an important priority in this sector. Over the last few years, 931 scholars in hi-tech areas have been sent abroad for graduate studies, including 100 last year. Another 100 will be sent during the current year to countries other than the UK and the U.S. to undertake post graduate and doctoral research, including the "split PhD" program with approved foreign universities.

Social Action Program

Despite impressive economic growth during the last three decades, Pakistan lags far behind in human development. *Human Development Report, 1993*, ranks Pakistan 132nd among 173 countries with literacy rate of 34.6%, access to safe water for 50% and sanitation for 22% of its population. Pakistan's infant mortality rate stood at 106 per one thousand and the average life expectancy at 57.7 remains one of the lowest among low income countries. Pakistan's performance in terms of social indicators and its failure to address human development needs has been on the agenda of the GOP-donor dialogue since the beginning of this decade. The UNDP's *Human Development Report, 1990*, declared Pakistan to be a case of "missed opportunities" in terms of human development, and its human development profile was published in 1991 report as an example of low level human development. Serious concern was raised regarding the level of female education and the skewed emphasis on higher education and curative health in urban areas.

The Social Action Program (SAP) is Pakistan's response to these criticisms. It is an official priority both at the provincial levels as well as the federal level, as was evident from our interviews with Mr. Fasihuddin, Chief Economist, Planning Division, the Government of Pakistan as well as Dr. Shaheen, the Chief Economist, Planning and Development Department, Punjab. The program is based on a national consensus about the need for accelerated action in social sectors. It represents the culmination of a long process of consultation that began with a special report — *Toward a Social Action Program*, presented at the May 1991 meetings of the aid Consortium by the GOP, pledging to prepare and implement a Social Action Program as an integral part of the 8th Five Year Plan. The GOP undertook a wide range of consultations with the provincial governments and the NGO sector over a period of 12 months. The culmination of this cooperative process was the document, *Social Action Program, 1992-95*, often referred to as the Blue Book, was presented to aid Consortium in April 1992. A revised SAP was later placed before the Executive Committee of the National Economic Council (ECNEC) and approved as a major priority of the 8th Five Year Plan.

Designed to redress the neglect of basic social services, the SAP focuses on the need of basic education, nutrition, primary health, family planning, rural water supply, and sanitation. Its major objectives are to improve access, coverage, and quality of basic social services. The SAP gives particular attention to the primary education for female children. Sixty-one per cent of the new places in schools are to be reserved for girls and co-education is to be provided at the primary level. Primary school enrollment for girls is to increase to 81.6% in 1997-98 from 53.7 in 1992-93. Expanded Program of Immunization (EPI) is another priority. Particular attention will be given to increasing the immunization coverage in Balochistan and Sindh provinces. The already existing system of Primary Health Care through Basic Health (BHUs) and Rural Health Centres (RHCs) will be upgraded. In addition, 37,811 Community Health Workers (CHWs) will be recruited and trained to provide preventive health care in the rural area. Similar targets have been set to improve nutrition, family planning, and safe water supply. A sum of RS.102.4 billion has been allocated to the SAP for 1993-1998 in the 8th Five Year Plan. In SAP, more emphasis is placed on integrated rural projects rather than on separate, functional area projects in urban areas.

The success of SAP, according to the Chief Economist, Fasihuddin, depends on community participation and building community level institutions. Therefore the SAP is being implemented through a close collaboration between community institutions, provincial and federal government departments. There is now a consensus in government circles that the implementation of social sector programs is effective only where the beneficiary community is organized and participates in the decision process. Therefore a decentralized implementation framework involving line departments, local bodies, private sector, and NGOs is being evolved. A National Rural Support Program (NRSP) has been established to operate in selected districts. This program is modeled on the experience of the Agha Khan Rural Support Program in Northern Pakistan.

Similar programs have been initiated in the provinces. Dr. Shaheen, Chief Economist, P&D Punjab indicated that SAP is certainly a priority in Punjab. According to Mr. Ghulam Qadir (Chief, Social Action Program, Planning & development Department, Province of Punjab), the implementation of the SAP suffers from the same problems as the social sector programs of the past. "Infrastructure has been built but it is not clear what the impact has been — almost every village in Punjab will soon have a primary school but the literacy rate has not moved up proportionately. Same is true in health and water supply. There are operational problems and little allocation for recurrent expenditures." The Acting Chief Economist, NWFP reverberated similar ideas. He also mentioned that despite SAP water and electricity remain priorities.

Environment

The 8th Plan places the concerns about environmental degradation on the national planning agenda. The environment is being treated for the first time as a separate sector and 1 % of country's GNP is being allocated to this sector. The emphasis is on the issues which highlight national practices and their local consequences. The main areas of concern extend across the major sectors of the economy. Deforestation, soil degradation, industrial pollution, long-term effects of big dams, accumulation of chemicals in the food chain and the loss of biodiversity are important priorities. The plan draws upon the

National Conservation Strategy (NCS), approved by the government in 1992, to seek solutions to some of these problems. The plan recognizes that the issue of conservation highlights the crucial role of research in new technologies particularly the bio-technology and pollution control technologies. In our discussions with the Chief Economist of the Planning Division, he indicated that more significant and effective environment-related research would be conducted if NGOs and government research agencies were linked. He acknowledged the effectiveness of the AKRSP type agencies, but he felt that they are costly. He stated that there was a need to study replicability of the AKRSP model in other provinces and that was the objective behind the creation of the national and provincial rural support programs (NRSP, SRSP, etc...). In addition, he pointed out the need to conduct research on water management (drains, lining, and water-user associations). Many water management projects previously funded have suffered considerable setback due to withdrawal of donor financing.

The second matter he raised was deforestation. He felt that education to create awareness as well as providing alternative sources of fuel and income were crucial. In his opinion, both the loggers and the farmers are responsible for the present level of deforestation. He stated that logging is concentrated in limited areas, while deforestation and degradation were widespread, and therefore both groups need to be made aware of the consequences of continued abuse. He restated the need to diversify incomes since poverty is the main cause of environmental degradation. He reiterated the need to conduct biodiversity conservation in the Juniper forests of Balochistan.

Despite the priorities fixed in these planning documents, the emphasis in implementation may change depending on which political party is in power and the mix of leadership in the government. As we have mentioned above, the newly installed federal government is probably the most stable government Pakistan would have since the death of President Zia in 1987. It appears that this government will have the political capacity to implement its policies and programs.

We believe that the new government will continue to implement the Structural Adjustment program and the macro-economic policies are unlikely to change in any significant manner. The reduction of external debt and budgetary deficit will remain a priority. However, there will be less enthusiasm for further aggressive privatization or deregulation. The Social Action Program (SAP), the National Conservation Strategy (NCS) and Agriculture will also remain priority areas. PPP's election manifesto promised increase in cultivation through land reclamation, better water supply and improving the quality of soil. They emphasized building of social infrastructure particularly schools and hospitals with the cooperation of public and private sectors. Their program also included a "complete devolution of authority" to the elected district councils and other local institutions (*The Herald*, Election Special, 1993). Most of these have already been incorporated in the 8th Plan. Hopefully the Plan will be approved by this government with minor changes.

**ODA To Pakistan:
Donors, Priorities & Programs**

During 1960-1988, Pakistan received US \$ 24 billion in disbursed foreign aid, of which 13.8 billion was project-related aid; 81% (11.21 billion) of this was given to agriculture, manufacturing, water & power, and transport & communication. External assistance has been a significant factor in financing the capital expenditures in Pakistan. It accounts for about 20% of total investment during the last decade. During 1991 and 1992, total disbursements including loans and grants amounted to US \$ 2.32 billion, 7.7% higher than the previous year. Of this, 66% was project-related aid, 15% non-project related, 12% food aid and 7% relief assistance (UNDP, DP/CP/PAK/5, 1 March 1993). Estimated portion of grants was about 16 per cent. The leading donors in 1991-92 were: the US, Japan, Asian Development Bank (ADB) and the World Bank Group.

Official development assistance (ODA) to Pakistan has generally coincided with the priorities set by the GOP in its plans and PSDPs. In terms of sectorial distribution, a lion's share went to Agriculture, Forestry, Fisheries, Transport & Communication, and Energy. A very substantial proportion of funds has been devoted to capital investments and relatively fewer donors have supported research, human development or operation & maintenance of the existing infrastructure. This imbalance is being recognized and consequently there has been an increase in commitments to social sectors. Although Pakistan receives a substantial amount of foreign aid from various donors, the ODA accounts for only 2.8% of its GNP and comes to about US \$ 10 per capita (UNDP, *Human Development Report, 1993*). Pakistan has been one of the largest recipients of Canadian ODA. Until 1991, it was one of the ten largest recipients of country-to-country assistance.

The World Bank

The World Bank (WB) is the largest multilateral donor to Pakistan. It provides assistance in the form of concessional financing and technical assistance. It provided US \$ 180 million in 1990 and 209 million in 1991. The Bank has played a crucial role in the areas of agriculture and irrigation. It has contributed to agricultural research, often in cooperation with other donors. It has also played a significant part in energy and industrial development. Since 1982, the Bank has offered technical assistance credits to support the structural and sectoral reform programs.

The following is a summary of the Bank's major activities in agriculture, forestry, and environment based on our interviews with three Bank officials in Islamabad (Mr. Rashed-ul-Qayyum, Projects Advisor, Agriculture; Mr. Abdul Qayyum Sheikh, Projects Advisor, Forestry; Mr. A.H. Qureshi, Advisor, communication).

Assistance for agricultural projects is a WB priority, but funding was significantly reduced in 1993. Under the Pakistani constitution, agriculture, and forestry are provincial subjects. Consequently, any aspect that is directly related to either sector within the National Conservation Strategy (NCS) is a provincial responsibility. To facilitate implementation of the NCS, the agricultural division at the WB is promoting collaboration, coordination, and liaison between the provinces and their numerous research institutes. The WB is proposing that one large research body rather than several research institutes be created. An autonomous research board made up of representatives from each provincial department of agriculture along with members of the Pakistan Agriculture Research Council (PARC) would be responsible for formulating a master plan for the provinces, and carry out research planning and priority development in a coordinated fashion.

The forestry department is one of the oldest government agencies founded on colonial traditions. Policing of forested lands rather than their management has been the standard practice. Lack of staff and resources has resulted in a diminishing forest cover, presently estimated at approximately 5% of the national area, and only 2% is considered productive. Mr. Sheikh felt that forest privatization and research were essential to increase forest productivity. The two main forestry research institutes in Pakistan are the Pakistan Forestry Institute (PFI), and the Punjab Forestry Institute. The latter was established 3-4 years ago with USAID assistance and is likely receive WB support for a social forestry project. Some forestry research is also being conducted at the Arid Zone Research Institute in Balochistan.

One of the major problems associated with forestry is range management. In some northern regions, overgrazing by goats and sheep has resulted in zero natural forest regeneration. According to Mr. Qayyum Sheikh, range management has been neglected because of the social complexities associated with the problem.

Since the stipulation that IDA recipients require an environmental conservation plan, a National Conservation Strategy (NCS), a 5-year National Conservation Action Plan, and a 5-year Forestry Master Plan have been formulated and approved by the Government of Pakistan (GOP). This led to the development of a major WB funded project entitled

"Environmental Protection and Resource Conservation" valued at \$ US 29.2 million. This is expected to be the first phase of a long-term, internationally funded program which encompasses a) institutional strengthening and b) environment and natural resource rehabilitation (World Bank, 1992). The project focuses on strengthening newly created federal and provincial Environmental Protection Agencies (EPAs) and increasing their capacity to conduct environment impact assessments (EIAs). Raising public and private sector awareness of the impact of environmental degradation is also a priority. In addition, a series of sub-projects on watershed rehabilitation, alpine and sub-alpine range management, and wildlife conservation are to be conducted.

These sub-projects are implemented by the provincial forestry departments (FDs) with assistance from the provincial agriculture livestock (DOL) and communication and works (C&W) departments. Coordination is provided by the provincial Planning and Development Divisions (P&D), and monitoring by the Environment and Urban Affairs Division (EUAD). Community involvement will be encouraged from the design to implementation. A local contribution, raised from various local sources, is expected to cover 40% of the cost of the work (World Bank, 1992).

In Punjab, two sub-projects have been initiated: 1) the Murree, Kahuta, Kotli Sattian Upland Rehabilitation and Development project and 2) a riverain reforestation project along the Chenab and Ravi rivers. In Sindh, the provincial FD's coastal division is replanting the Indus delta mangroves. In the North Western Frontier Province (NWFP), the Dir Kohistan Upland Rehabilitation and Development project has been launched to address issues associated with agricultural extension, animal health, and farm-to-market roads. In Azad Jammu and Kashmir, the provincial FD is responsible for the Bhimper Upland Rehabilitation and Development Project and the Alpine and Sub-Alpine Pasture Study.

In the power sector, 3 projects were active as of July 1993, all with the Water and Power Development Authority (WAPDA). In Islamabad, preliminary work includes the acquisition of about 3600 hectares, relocation of approximately 980 persons, and construction of access roads, permanent colonies at the barrage, completion of geological surveys, etc.... In Lahore, the project involves the design, supply of equipment, installation, and commissioning of a 60 MW combined-cycle power plant in Sahiwal. Another project deals with the implementation of a time-slice of WAPDA's least-cost investment program and includes the restructuring and privatization program of WAPDA. Several cofinanciers are involved in this latter project.

Four agriculture projects were active as of July 1993. The first oversees the transfer of all Salinity Control and Reclamation Project (SCARP) tubewells in the fresh groundwater areas to farmers and/or farmer organizations in Punjab. In Balochistan, a project with the objective to a) increase irrigation and command area development works, b) improve institutional capacity for planning and implementing irrigation projects, and c) encourage local participation in irrigation development is underway. The third project with WAPDA's National Drainage Program has the objective to rationalize public expenditures for drainage, streamline implementation arrangements, complete ongoing projects, and strengthen drainage institutions. The last project in Azad, Jammu and Kashmir is a farming systems project that also focuses on restructuring some government agencies, and introduces policy reform and privatization.

In the environment sector, two projects were active as of July 1993. The first aims to strengthen the Balochistan EPA and to help develop and conserve the province's natural resource base, particularly watersheds, national parks, and coastline. The second project will help the Punjab EPA to a) safely dispose of hazardous wastes (particularly of tannery effluents in Kasur), b) protect ground-water resource, and c) mount public awareness campaigns. The project includes a landfill gas extraction component financed by the Global Environment Facility (GEF).

The only forestry project was in Punjab with the objective to rehabilitate scrub forest areas and promote social forestry. Linkage with the Punjab Forestry Research Institute at Gutwala was expected.

Two urban works projects were active. The first, with the National Housing Authority, will a) upgrade urban and rural slums, b) develop a land registration program, c) introduce policy reforms for cost recovery programs, and d) strengthen community infrastructure. The Japanese and Swiss are also involved. The second project focuses on environmental and infrastructure problems in Karachi and 3 inner cities. In addition, the project strengthens the Sindh Government's framework and procedures for policy formulation and implementation. Lastly, engineering studies for the Government's longer-term core investment program for environmental upgrading, transport improvement, and municipal development are being prepared.

The Asian Development Bank

The Asian Development Bank (ADB) has been the second largest multilateral donor to Pakistan in recent years. During 1990 and 1991, it provided US \$ 166 million and 175 million in aid. The ADB assistance is provided on the basis of 1% surcharge on concessional loans and no interest (UNDP, 1991 Report, Development Cooperation, Pakistan, 1993). The ADB has been involved in traditional infrastructure projects. In recent years, it has provided assistance in the area of primary education as well as it is one of the main donors in technical assistance.

We interviewed Mr. Rinus Zijsveld, Senior Project Implementation Officer in Islamabad. A summary of information collected at this interview follows:

The ADB gives very little priority to research per se. It presently has no involvement with the Pakistan Agricultural Research Council (PARC). Forestry and environment make up approximately 40% of the agricultural sector assistance. The three main activities are: on-farm water management in rainfed areas, lining of water-courses in irrigated areas, and farm-to-market roads. Energy and social sector — primarily support for the Social Action Plan (SAP) — represent the remaining 60 per cent. The expenditures for agriculture over the last two years have decreased because of fewer irrigation projects. In the social sector, the water supply project for Rawalpindi and the population planning and education projects account for a bulk of ADB's investment. With respect to the NCS, technical assistance worth \$ US 600,000 was provided to the NCS Unit of the Environment and Urban Affairs Division. In addition to project loans, ADB provides assistance in the form of program loans, particularly in the industrial sector.

The following desk research is based on ADB documents published in May 1993. The ADB assistance is divided into 2 sections: the loan projects, and the technical assistance projects. Presently, there are 10 loan and 8 technical assistance projects listed.

A. LOAN PROJECTS

1) Sindh On-Farm Water Management (\$ US 30 million)

The objectives of this third phase are to increase agricultural production and to enhance farm income and rural employment opportunities. Priorities include a) rehabilitation of water courses, b) construction of irrigation and drainage facilities, c) selective land levelling, and d) strengthening of agricultural support services in Sindh.

2) Rawalpindi Water Supply and Sanitation (\$ US 72 million)

This project provides financing for the water supply and sanitation systems in the city of Rawalpindi including the rehabilitation of the Rawal Lake Filtration Plant, chlorinator and booster pumping station, renovation of slow sand filters, and construction of pump buildings and water storage tanks, rehabilitation of sewers and surface water drains, supply and installation of treater water conductance pipelines etc....

3) Third Punjab On-Farm Water Management (\$ US 48 million)

The objective of this project is to reconstruct nearly 3000 water-courses in the D G Khan and Bahawalpur Divisions of Punjab and to provide institutional and farmer user-association strengthening, and improved extension services.

4) Basha Hydropower Engineering Loan (\$ US 20 million)

This study will enable the GOP and WAPDA to conduct a feasibility study on the proposed Basha Hydropower Project to be located 315 km upstream of the existing Tarbela Dam on the Indus River.

5) Karachi Electricity Supply Corporation (KESC) Sixth Power Sector Loan (\$ US 220 million)

The objectives of this project are to a) complete existing programs for expansion and augmentation of transmission line and substation capacity, b) rehabilitate KESC's distribution system, c) upgrade system control and protection facilities, d) acquire computer hardware and software for accounting, reporting, and financial planning, and e) provide resources to implement a program of end-use management.

6) Second Industrial Sector Program Loan (\$ US 200 million)

This loan is a continuation of ADB's support for restructuring of the GOP's industrial sector, and for policy reform with specific attention to privatization and export development.

7) Technical Education (\$ US 60 million)

This project aims to assist the GOP in developing a policy framework for a comprehensive reform of technical education and vocational training.

8) Lower Secondary Education (\$ US 28 million)

This project aims to increase accessibility to lower secondary education by upgrading existing facilities and constructing new facilities where demand warrants. Provisions have been made for a) curriculum and instructional materials, b) teacher training, and c) planning management and supervision training.

9) Cholistan Area Development (\$ US 20 million)

This project concentrates on a) supply of irrigation, b) electrification of tubewells, c) on-farm water management, d) farm-to-market roads, e) development of water for livestock and associated range management practices, and f) provision of rural health services.

10) Population and Family Welfare (\$ US 30 million)

The objectives are to a) formulate quality standards and ensure distribution of well-trained doctors and paramedics for family planning services, b) increase awareness, acceptance, and accessibility to family planning at the district level and in rural areas, and c) strengthen population planning and management capacity at the various government levels in order to implement effective decentralization.

B. THE TECHNICAL ASSISTANCE PROJECTS

1) Implementation of National Conservation Strategy (\$ US 600,000)

A technical assistance team established a working and consultative relationship with the GOP, EUAD, environment units, and EPAs.

2) Flood Forecast and Warning System (\$ US 3 million)

The technical assistance complements financial investments in radar, telemetry, meteorological hydrometry, and computer equipment needed to refine and update the flood forecast and warning system to be implemented under the ADB-financed Flood Protection Sector Project. Improvement and upgrading of the system serves to minimize loss of life and damage to private and public assets as a result of severe flooding on the Indus River and its major tributaries. Specifically, technical assistance was provided to a) conduct a series of hydrological and meteorological baseline studies, b) develop flood forecasting models, and reservoir management and routing plans, d) prepare a flood warning manual, and e) strengthen institutional arrangements for flood modelling and forecasting.

3) Forestry Sector Loan (\$ US 750,000)

This project led to the development of the 5-year forestry master plan in which recommendations were made for significant policy and institutional reforms. In addition, a detailed long-term investment program to revitalize the forestry subsector was developed.

4) Second Urban Water Supply and Sanitation (\$ US 500,000)

Assistance was provided to the GOP to conduct a feasibility study for the development of water supply, sewage, surface drainage, and solid waste management in Larkana, Shikarpur, Mansehra and Sibi. Recommendations include institutional arrangements, review of water and sewage charges, and proposals for improvement in technical, managerial, and administrative capability of the water supply and sewage agencies.

5) North-West Canal Remodelling (\$ US 575,000)

Technical assistance for the formulation of a project to remodel the North-West Canal such that water supplying capacity, cropping intensity, and yields on the right bank of the Indus River below Sukkur Barrage in Sindh may be increased.

6) National Ports Master Plan and Management Study (\$ US 800,000)

Objectives include the examination of future investment needs in ports and provides an in-depth study of the management and organization of the Karachi and Qasim ports.

7) Acquisition of Compressor at the Pirkoh Field (\$ US 100,000)

Assistance to the Pirkoh Gas Company Ltd (PGCL) and the Oil and Gas Development Corporation (OGDC) was provided to select the most economical and expeditious mode of acquisition of the first 5000 HP compressor unit to be operational by early 1996.

8) Non-Formal Education (\$ US 250,000)

To prepare a feasibility study to support the GOP's ongoing mass education and literacy program.

The United Nations Development Program (UNDP)

We interviewed Mr. Neil Buhn, Assistant Resident Representative and Ms. Fatima Shah, Program Officer, in Islamabad. The following information is based on this interview and some documents provided by the UNDP office. They were extremely cooperative and forthcoming .

UNDP operates solely in the area of technical assistance (TA). It funds usually a larger number of smaller but strategically significant TA projects and plays a coordinative role for other specialized agencies of the UN. For example, the UNDP support for the Cotton Research Institute in Multan led to the development of a new cotton variety which has had a significant impact on cotton yields and exports. Since its aid comes in the form of outright grants and it offers a great deal of flexibility in the choice of consultants, it is attractive for the recipients. Many of its projects, have resulted in substantive benefits for Pakistan because they have attracted substantial investments by other donors. It may be noted that UNDP does not provide capital assistance. (See, R, H. Cassan et. al., *The Effectiveness of Aid To Pakistan*, International Development Centre, Oxford University, 1990.).

The fourth UNDP country program (1987-92) was initiated at a time of increasing levels of foreign assistance. It aimed to utilize development resources more effectively and increase the absorptive capacity of the national development infrastructure. The UNDP access to world-wide expertise is very useful to Pakistan's highly diverse development program. The UNDP has given special attention such thematic issues as gender-sensitive project design, environmental impact analysis and population growth. Support to investment was the main area of concentration in the 1987-92 program. Assistance was also provided to agricultural and industry development institutions. The UNDP supported the Social Action Program (SAP) at the national level and the establishment of a multi-donor support program for the SAP. For its future strategy, the UNDP considers that its priorities (poverty alleviation, WID, management development) coincide

with the recent GOP emphasis on social sectors. This emphasis also matches with the UNDP's comparative advantage in capacity-building and cross-sectoral programming. The future strategy is to focus on assistance in the development of national programs, mobilization and coordinating of donor assistance and coordination & monitoring the implementation of multi-donor programs. (See *Fifth Country Program For Pakistan*, DP/CP/PAK/5, 1 March, 1993).

UNIFEM

UNIFEM is a U.N. sponsored fund which supports the development initiatives of the poor women across the developing world. Its primary objectives are a) to provide financial and technical assistance to women involved in cooperative activities — food production, fuel and water supply, health services and small businesses, b) to ensure that the needs of both *women and men* receive consideration in large scale funding of development projects. The UNIFEM acts as a catalyst to promote the integration of women into the mainstream economic development and provide direct support to more innovative and experimental projects.

In Pakistan, UNIFEM has played a key role in addressing the gender issues and have made a significant contribution toward making the 8th Plan gender-responsive. They have organized training courses for senior government officials to make them more gender sensitive in making policy decisions. They have carried out a base-line survey to assess the role of women in agriculture and non-agriculture sectors in Sialkot. They sponsored a pilot project on Integrated Development of Fishing Communities in Pakistan. One of the major accomplishment was to raise the Fisheries Department's awareness about the gender issues. Another important project used radio technology to transmit information about women's role in food cycle. Another innovative project organized a Peasant Women's Conference during which peasant women expressed their concerns about poverty and environment. The conference initiated a dialogue, probably for the first time, between the policy makers/researchers and the peasant women.

Japan International Cooperation Agency (JICA)

While in Islamabad, we interviewed the Assistant Resident Representative of JICA. The following is a summary of the information based on this interview and some of the documents provided by him.

Japanese aid strategy in Pakistan recognizes the importance of the social sector like the other donors, noting however that careless investment in this sector may contribute to the already high population growth rate. The Japanese *Country Study for Development Assistance to Pakistan* points out that despite Pakistan's high rate of economic growth, the manufacturing sector has been sluggish, and it is not healthy for a developing economy to have a rapidly growing service sector and a stagnant production sector. Activation of the industrial sector is crucial to Pakistan's development. It is important, therefore, to encourage private sector, particularly small- and medium-scale, enterprises

and Japan has a comparative advantage in this area. Japanese consider that emphasis should be give to promote small and medium enterprises, providing capital outlays as well as technical and managerial training (JICA, *Country Study for Development Assistance To Pakistan*, 1991).

JICA is responsible for providing and administering assistance in the form of grants and technical assistance. Japan also offers concessional loans, administered by OECF. Japanese grant aid to Pakistan for the current year is approximately 8 billion yen (US \$ 80 million). In addition 1.5 billion yen is being provided in technical assistance. The OECF budget for Pakistan is 42 billion yen. In recent years the social sector, particularly primary health care, has been emphasized by JICA. They recognize the fact that agriculture is an important area in Pakistan and environment is being given a priority status as it is a global issue. JICA sends approximately 120 Pakistanis trainees to JAPAN. JICA has funded a state-of-the-art Genetic Resources Research Lab at the national Agriculture Research Centre (NARC). They have also upgraded lab facilities at the University Of Engineering at Peshawar as well as provided equipment (boats, nets, engines etc.) to the Coastal Fisheries Lab in Karachi. Agricultural machinery, fertilizers and other inputs have also been donated. Mr. Sato stated here that 99% of the tractors in Pakistan were Japanese, donated by JICA. We are not sure if this is so. They have been involved in remote sensing. When asked the extent of the research component in their projects, Mr. Sato replied that a large proportion of JICA aid is in equipment for research, particularly for the Centres of Excellence created by the GOP at various universities, but that funding for research per se was not substantial. It is interesting to note that JICA provides little assistance to the NGOs - only to the tune of 5 million yen (US \$ 50,000). JICA considers the SAP to be relatively more important than the NCS at present.

GTZ — The German Aid Agency

The following information on the GTZ foreign aid program is based on our interview with Ms. Karen Mitten, the GTZ representative in Pakistan.

In 1991 Germany provided 7% of the total aid received by Pakistan and it was one of the top 10 donors. In absolute terms, this amounted to US \$ 94 million, a tremendous increase over the previous year when the German aid was only US \$ 32 m. Most GTZ projects are 8 to 10 years duration, and on average approximately US \$ 750,000 in value. They are primarily technically oriented. An important focus is technical/vocational training in forestry, hydro power and mining. In recent years they have had many small hydro power stations projects in NWFP, Chitral and Kohistan. Women and environment is another important activity. In this context, they are involved in fuel efficient technologies for women in the NWFP. For example, they have financed the private sector to produce stoves to save fuel-wood consumption in households. In 1991-92, they also provided US \$ 4.2m to the Agha Khan Foundation for primary health care in Northern areas. GTZ normally does not work with the NGOs, largely because of lack of staff and facilities to deal with them and monitor the projects. The German foreign aid is administered by two separate agencies: GTZ which provides project assistance and FGZ which is responsible for financial aid.

Canadian International Development Agency (CIDA)

The following is the summary of information about CIDA's current activities in Pakistan, based on an interview with Mr. Dean Frank, Ms. Wendy Miller, and Ms. Wendy Quarry of the Canadian High Commission in Pakistan:

Mr. Frank indicated that expenditure planning both at the federal and provincial level was an important emphasis. CIDA has funded a project, presently being carried out by a team of economists from the Applied Economic Research Center (AERC) at Karachi University. The aim is to develop a computer model to administer the public sector expenditure plans of the provincial and federal governments. Dr. Hafeez Pasha, the Minister of Commerce in the Interim government and former director of the AERC is the team leader of this project. Dr. Ayan-ul-Hassan, an economist (and a former student of Dr. Pasha) from Acadia University is also involved in this project. We met him briefly in Karachi to get some more information, but he was not very forthcoming about the details. The project is entitled: "Resource Mobilization and Planning". Even Due is the key person responsible for this project in Ottawa. Another Pakistani economist, Dr. Ashfaq Khan from PIDE, is also involved.

Ms. Wendy Quarry has been a CIDA officer at the High Commission for an extended period but is leaving shortly to work as an independent consultant. She felt that IDRC should support projects that develop new approaches and methodologies to solving problems, particularly those dealing with the irrigated lowlands since "a significant percentage of research assistance is spent on poorly designed lowland projects with inadequate research methodologies". Wendy also stated that more research on social issues was critical. She emphasized the need for training in GIS, particularly at the CIDA, NORAD, and WB funded Environment Planning and Management Division at the University of Peshawar (see in interview). CIDA has also funded a relatively small center at the Lahore University of Management Sciences (LUMS), a private sector funded university. CIDA is also funding the federal EUAD.

She stated that one of the major roles of IUCN was environmental communication and that a project on research methodologies to document traditional knowledge would be very useful. CIDA is responsible for founding the Sustainable Development Policy Institute (SDPI). "This NGO was created in an effort to support the formation and development of a policy institute for intellectual leadership and policy advice on sustainable development" (CIDA, 1992). She felt that SDPI could successfully achieve its goals if Dr. Banuri and the present board of governors remained at the helm, but higher calibre research staff was required. In addition, Ms. Quarry feared that SDPI could become an ivory tower think tank isolated from other government agencies.

CIDA's Environment and Development Strategy for Pakistan

CIDA was instrumental in helping Pakistan develop its National Conservation Strategy. CIDA funded a project worth US \$ 2,810,000 to establish a NCS secretariat and develop the NCS on behalf of the GOP. The project was carried out by the International Union of Conservation of Nature (IUCN) a Swiss-based NGO. A comprehensive strategy document was produced and presented to the national cabinet which approved it in 1992.

The NCS has had a significant influence on environmental policy formulation in Pakistan and is the basis of the 8th Plan Priorities in this sector. "This led to CIDA becoming a lead donor in environment and as a result, CIDA has developed a Program Environment Strategy which builds on the success achieved as a result of the NCS" (CIDA, 1992). This program is structured around 3 strategic interventions: a) the environment projects which support the strengthening of environmental institutions, b) environment as a priority across the Pakistan program, and c) the promotion of policy dialogue and influence. The first intervention targets the following key institutions: the Federal Planning Commission (PC), the Federal Environment and Urban Affairs Division (EUAD), the Sustainable Development Policy Institute (SDPI), and IUCN Pakistan. The second intervention centers more around sustainable energy resource management. "CIDA's experience in energy in Pakistan, and discussions with the government, have put CIDA in the unique position of being able to become a lead donor providing policy level support to those institutions responsible for most of Pakistan's energy planning and coordination" (CIDA, 1992). The last intervention emphasizes project level support of the NCS. This should create a flow of information between CIDA and the GOP. Knowledge gained will then be applied to policy analysis and help Pakistan in implementation of the NCS.

BILATERAL PROJECTS

(Source: CIDA programs in Asia — Pakistan, June 1992)

A. ENVIRONMENT

1) National Conservation Strategy (NCS) (\$ Cdn 3.75 million 1987-93)

The objective of this project was to assist the GOP, IUCN, and participants in the development of the NCS, a 5-year NCS Action Plan, and a public awareness program. Funds have also been allocated for the establishment of two federal government environment units and SDPI.

2) Snow and Ice Hydrology project — phase II (\$ Cdn 6.0 million 1991-1995)

This project was developed to improve the water resource management capability of the Upper Indus River Basin through the establishment of improved hydro-meteorological information gathering systems and the development of a flow forecasting model of the basin.

B. ENERGY

1) Oil and Gas Development Corporation (OGDC) — phase II (\$ Cdn 43.5 million 1984-93)

The project's goal is to assist the GOP in developing indigenous oil and gas resources and to enable OGDC to mobilize the human and technological resources necessary to conduct its expanded exploration, development, and production program.

2) Tarbela Units 11-12

(\$ Cdn 18 million 1989-94)

The objective of this project is to double the generating capacity of Tarbela through the addition of four 432 MW units. This project is co-financed with the Export Development Corporation (EDC) which is contributing \$ Cdn 22 million.

3) Water and Power Development Authority (WAPDA) Maintenance and Training — phase II

(\$ Cdn 11.7 million 1985-1991)

This project provided WAPDA with the technical assistance and training of staff engaged in the maintenance of the 500 KV transmission system. This phase had three main elements: technical assistance, training of WAPDA personnel, and the procurement of equipment, tools, and essential spares for field training.

4) Power Sector Program Contribution

(\$ Cdn 38.4 million 1987-93)

The project provided \$ Cdn 35 million for the procurement of Canadian manufactured electrical equipment and components required to upgrade and expand its power generation and transmission systems. In addition, \$ Cdn 3.0 million was provided to engage an engineering firm to assist with the preparation of specifications and procurement.

5) National Power Plan

(\$ Cdn 11.7 million 1991-94)

This project's objectives are to a) assist WAPDA to develop a National Power Plan to the year 2015, b) provide support for the establishment of an energy planning division, c) prepare various studies related to new thermal generation sites, and d) make recommendations to improve existing power transmission systems.

C. ECONOMIC POLICY/PRIVATE SECTOR DEVELOPMENT

1) Private Sector Development Initiatives Fund (PSDFUND)

(\$ Cdn 5.0 million 1991-96)

The PSDFUND is one of four pilot projects which enables interested Canadian companies to use their expertise and knowledge to identify and implement bilateral projects which are mutually beneficial and of long-term commercial value to Canada and Pakistan.

D. SOCIAL AND HUMAN DEVELOPMENT

1) Immunization/Polio III

(\$ Cdn 4.92 million 1989-92)

This project assists the GOP in its efforts to locally produce quality polio vaccines and supports the national vaccination program of children up to age 5.

2) Rabies Vaccine

(\$ Cdn 4.6 million 1986-90)

The project provided rabies vaccine concentrate, training, technology, and equipment to the Pakistan National Institute of Health in an effort to assist in the production of a local vaccine.

3) Communication/Motivation Support

(\$ Cdn 3.268 million 1986-1992)

The objective of this project is to assist the Pakistan National Institute of Health in its Accelerated Program of Immunization by developing improved communication facilities and improve motivation activities. A training component is helping to develop trainers and to train para-medical personnel.

4) McMaster University School of Nursing — phase II

(\$ Cdn 4.882 million 1987-92)

This project is helping to raise the standard of health care by improving the quality and status of nursing. A comprehensive training program for nurses at McMaster University has been linked with the Aga Khan University School of Nursing in Karachi.

5) Training of Traditional Birth Attendants (TBA)

(\$ Cdn 4.9 million 1989-94)

The project, managed by UNICEF, is designed to assist the GOP in reducing maternal and infant mortality rates by training TBAs in the rural areas. A large technical assistance component is serving to increase UNICEF Pakistan's monitoring and evaluation capacity.

6) IDA Vocational Training

(\$ Cdn 8.0 million 1986-94)

Objectives include raising the quality and expanding the capacity of the National Vocational Training System such that the skill requirements of industrial, agricultural, and rural sectors are met and to draw women into the skills labor market in non-traditional sectors, in ways sensitive to the culture of Pakistan.

7) South Asia Partnership (SAP) Support Program

(\$ Cdn 1.9 million 1987-1995)

The objective is to promote linkage between Canadian and Pakistani NGOs. SAP Canada is responsible for the coordination and selection of proposals originating from SAP Pakistan. The latter, over the duration of this project, has matured into an effective organization for mobilizing and training community organizations.

8) Social Sector Fund (SSF)

(\$ Cdn 19.5 million 1986-93)

The SSF supports selected social projects of the GOP's Annual Development Plan which undertake capacity-building activities with Pakistani NGOs. The SSF also finances small social development projects that focus on women.

9) Aga Khan Rural Support Program (AKRSP) — phase III
(\$ Cdn 14.8 million 1991-96)

This phase of the project emphasizes the reduction of poverty and improved socio-economic development through community participation in Pakistan's Northern areas of Gilgit, Chitral, and Baltistan. The project is addressing key sustainability issues including savings and credit, natural resource development, human resource development, institutional maturity, women in development, and enterprise development/income generation. The CIDA contribution, mainly dealing with savings and credit, is managed by the Aga Khan Foundation Canada. Remaining donor activity is coordinated by a Donor Liaison Group in Pakistan.

10) Household Survey Capability Project
(\$ Cdn 2.14 million 1985-92)

The objective of this project is to provide technical assistance, training, and equipment to support the Federal Bureau of Statistics in developing its capability to generate a variety of socio-economic data, especially those related to the situation of women.

TABLE 1. Summary of agriculture, fisheries, forestry, environment, communications, and health CIDA projects (1970-1991).

Project #	Title	Amount \$ CDN	%
A)	AGRICULTURE/FORESTRY/ENVIRONMENT		
0010592	Barani Agriculture Research Dev't	16 176 294	
0013870	Aga Khan Rural Support Program II	5 940 000	
0011979	Aga Khan Rural Support Program I	3 290 000	
71400058	Forestry - hardboard mill	2 360 000	
0010599	Food grain storage and handling	520 632	
0013277	National Conservation Strategy I	107 400	
0010598	Barani Agriculture Research Dev't	61 402	
71400806	Tandojam land/water management	55 525	
71400403	Forestry fact-finding mission	6 500	
71400509	Animal health fact-finding mission	4 100	
	SUBTOTAL (AG/FOR/ENV)	28 521 853	17.6
71400124	Fertilizer loan 1970	12 300 000	
71400612	Fertilizer loan 1976	9 400 000	
71400408	Fertilizer loan 1977-80	10 000 000	
71400705	Fertilizer loan 1978-81	33 297 600	
	SUBTOTAL FERTILIZER LOANS	64 997 600	40.0
	TOTAL (AG/FOR/ENV/FERTILIZER)	93 519 453	
B)	LAND, WATER, ENERGY MANAGEMENT (L/W/E/M)		
0010602	Salinity control reclamation SCARP - I	29 228 817	
0010509	Salinity control reclamation SCARP - II	18 740 246	
	SUBTOTAL DRAINAGE PROJECT	47 969 063	29.6
0011149	Irrigation/drainage training (6)	441 970	
71400805	Balochistan Water use	25 800	
71400503	Tubewell casing (1976)	25 600	
71400606	Lakhra coal/thermal energy	76 200	
	SUBTOTAL TRAINING	569 570	
	SUBTOTAL (L/W/E/M)	48 538 633	
C)	SOCIAL SECTOR		
0010587	Accelerated immunization II program	6 972 614	
0014607	Afgan Refugee income generation	4 100 000	
0010600	Polio vaccines and equipment	3 015 225	
0011545	Traditional birth attendant (Dai) I	2 748 467	
0011302	Baluchistan integrated area dev't	988 500	
0011962	Nurse training-McMaster/Aga Khan Univ. I	756 065	
0015155	NGO Population welfare I	500 000	
0014530	NGO Population welfare II	500 000	
0016058	NGO Population welfare III	499 350	
	SUBTOTAL SOCIAL SECTOR	20 187 389	12.4
	TOTAL ASSISTANCE	162 338 994	

The International Development and Research Centre (IDRC)

IDRC has funded several projects in Pakistan. The following is a breakdown of the projects by division along with a brief summary of the objectives and of the lessons learned.

A. AGRICULTURE, FOOD AND NUTRITION SCIENCES (AFNS)

1) Paulownia (87-0170)

The recipient for this project is the Pakistan Forestry Institute (PFI). Growth and performance of 14 species of Paulownia and several clones is being measured under different climatic, soil, and water conditions. In addition, they are determining Paulownia's potential for agroforestry systems. Propagation methods are also being developed and evaluated.

2) Irrigated forestry (87-0263)

The recipient for this project is the Pakistan Forestry Institute (PFI). The objectives are to determine the optimal, cost-effective water requirements of six different forestry species and to measure each species' corresponding yield response. In addition, research is being conducted to determine how effectively these species can be used to reclaim saline and sodic soils.

3) Food legumes I and II (79-0090)

The recipient for this project was the Pakistan Agriculture Research Council (PARC). The objectives were to develop high yielding and disease resistant varieties of the major pulses in Pakistan, namely, chickpeas, lentils, mung beans, and green and black gram and to generate improved agronomic practices. During phase I a strong, national, multi-disciplinary legume research program was developed and consequently, continued support was recommended. Several varieties of each crop were identified and released along with a package of recommended practices.

4) Meat processing (84-0024)

The recipient institute for this project was the Pakistan Council of Scientific and Industrial Research (PCSIR). The objectives were to improve and develop processes for the production of a wide range of dried and low moisture beef products using mechanical and solar dryers developed at PCSIR. Microbiological and biochemical studies were conducted to determine quality and nutritive value of dried products before, during, and after prolonged storage.

B. SOCIAL SCIENCES (SS)

1) Public Enterprises (86-0294)

The recipient was the Investment Advisory Center of Pakistan (IACP) in Karachi. The objectives were to a) document previous economic interventions made by the public sector in agriculture, mining, manufacturing, construction, service, trade, and banking over a 15-year period, particularly of state-owned enterprises (SOE), b) to analyse the impact of such interventions, and c) to review the role of the public sector in future economic development. Based on economic and financial performance evaluations, it

was recommended that SOE be largely autonomous, be integrated into the process for the development of the GOP's industrial and social policy, and invoke new production-oriented labor policies. The evaluator, however, felt that the recipient failed to meet objectives, results were mediocre, the final report was poorly done, and no final workshop was held. Neither the institution, management, nor the individual researchers were strengthened by the project and in terms of capacity building, all rated poorly. Overall impact of the project was judged as insignificant. It may be noted that Pakistan undertook extensive reforms of the SOEs in early 1980s and developed a signalling system, a mechanism for SOE performance evaluation. An Expert Advisory Cell was created in the Ministry of Production to administer the computerized information system designed with the help of the Harvard International Institute for Development. However, these reforms may have become somewhat redundant with the large scale privatization of SOEs in the manufacturing and financial sector.

2) Open University Drop-Outs (85-0214)

The Allama Iqbal Open University (AIU) in Islamabad was the recipient. The general objective was to determine the cause of students dropping out of certain courses and to develop strategies to minimize this. Specifically, the team was to a) identify courses with high drop-out rates and analyse course content and material, b) interview students and identify course and system characteristics related to high drop-outs, and c) formulate recommendations to reduce drop-out rates in identified courses. The project was part of a series of related studies in Thailand, Malaysia, and Indonesia. Based on the PCR, the team satisfactorily achieved their objectives and project impact obtained a fairly significant rating. Overall, the project was rated good.

3) Evaluation of Field-Based Teacher Training (84-0341)

The recipient was the Aga Khan Foundation, Geneva. The objective was to evaluate and compare teachers who received conventional training versus a new field-based innovative training (FTB) course organized by the Ismaili Islamic community in the Northern Region of Pakistan. Conclusions indicated that FTB trainees were more effective at communicating with students than their conventionally trained colleagues. Recommendations included greater access to FTB training and a periodical refresher course, greater emphasis on science, improved school conditions, more primary school teachers, and teaching aids. The project exceeded its original objectives as well as the Centre's expectations. New methodologies were developed and disseminated via reports and an article published in a special edition of the Times Higher Education Supplement, and a report on the BBC by Peter Goodwin. The project was well rated in terms of impact on the community and in general.

4) Small Scale Industries (81-0055)

The recipient for this project was the Quaid-i-Azam University, in Islamabad. The increase in demand for agricultural machinery as a result of the green revolution in Pakistan has been met by both small and large-scale manufacturers. The project objective was to compare economic performance of both types of manufacturers, their linkage with the rest of the economy, and their role in the economic development of Pakistan. Three surveys were conducted: the first was a detailed examination of farm machinery manufacturers as a whole. The second, focused on skill acquisition, investment decisions, planning for growth, and the labor market. The last survey examined the issue of sub-contracting in the manufacturing industry.

5) Socio-Demographic Impact of Basic Services Program (81-0098)

The recipients of this project were the East-West Population Institute in Hawaii and the University of the Punjab, in Lahore. The focus of the project was to conduct a comparative study of the social and demographic impact of the Basic Needs Program initiated by the GOP in 1971. The objectives were to identify, following the basic needs approach, policies and programs directed towards poor urban families, describe the social and cultural conditions of these families, and examine community participation. Project recommendations included improved physical infrastructure (land, sewage, potable water), more family planning facilities, immunization, educational health programs, and political commitment to improve basic needs.

6) Absorption and Diffusion of Imported Technology in Asia (76-0119)

Industrialization in many Asian countries is a function of movement of technology. After initial import, the degree and nature of subsequent absorption and diffusion is an important factor in the development process of that importing country. This project was designed to describe and compare the extent to which technology is absorbed in different sectors in different countries throughout Asia and to identify patterns of absorption.

7) Performance of Public Enterprise in Asia (74-0055)

Many developing countries in Asia adopted a development strategy that relied heavily upon the ability of state-owned enterprises (SOE) to generate needed capital. Public enterprises, however, have been plagued by serious management and economic problems. The objectives of this project were to enable several developing countries to describe the economically relevant behavior of their public enterprises so as to allow for concrete policy recommendations to emerge such that actual behavior may more accurately reflect the ideal.

C. COOPERATIVE PROGRAMS

1) Dobby Mechanism (85-1037)

The recipients of this collaborative project were the Industrial Technology Center/Manitoba Research Council (ITC/MRC) and the Pakistan Council of Scientific and Industrial Research (PCSIR). Fierce competition within the textile industry has forced Pakistan, which relies heavily upon textile exports for foreign currency, to modernize its power-loom cottage industry. The project objectives were to design and manufacture two new dobbie prototypes, to evaluate prototype performance in lab tests, to determine the manufacturing techniques necessary for the pre-production of the dobbie mechanism, and to fabricate, field test, and market 30 dobbie units. Although not without difficulties, this project received high marks in terms of realizing its objectives. The collaborative nature of this project was instrumental in ensuring its successful completion. Transfer of technology was smooth and research capacity was strengthened, particularly that of the individual researchers. In fact, recently, Dr. Wasey Omar, the initial project leader, received a prestigious Pakistani award (the Rolex Award) for his scientific contribution to the industry. In terms of impact, the project is anticipated to have a very significant impact, particularly in India, where the mechanism is being incorporated into the local design. The project's overall evaluation was very good. Commercializing of the Dobby Mechanism is running in to difficulties and the PCSIR would like to receive some help from the IDRC.

2) Dyestuff Production (86-1042)

The recipients of this collaborative project were the University of Sherbrooke and the Pakistan Council for Scientific and Industrial Research (PCSIR). Of the total dyestuff required, Pakistan only produces 5% locally. Project objectives were to develop appropriate manufacturing procedures and the technological capacity for the production of disperse, reactive, and acid dyes in Pakistan, from a core of locally produced chemical intermediates. The project satisfactorily achieved its objectives and the collaborative efforts were pivotal in the capacity building of PCSIR, the management and individual researchers. Canadian collaboration was judged as extremely important. The project should have fairly significant impact on the industry as a whole and on the PCSIR specifically. The fact that PCSIR is not burdened by an enormous bureaucracy likely contributed to the overall success of the project. There was, however, a misunderstanding between the University of Sherbrooke and IDRC with respect to the patent laws that IDRC includes in the MGS which resulted in a two-year delay of the project.

3) Snow and Ice in the Upper Indus Basin (83-1020)

See project description in CIDA section.

D. INFORMATION SCIENCES (IS)

1) Asian and Pacific Skill Development Information Network (APSDIN) (87-0093)

The recipient of this project was the Asian and Pacific Development Program (APSDEP) of the International Labour Organization, which was created to promote the development of vocational training. This project strengthened the linkage of five vocational documentation centers in India, Malaysia, Pakistan, Philippines, and Sri Lanka through APSDIN. The project also expanded each recipient's capacity to use Micro-ISIS (the network's software), to produce specialized automated databases on legislation, test questions, and graphics related to vocational training. As a result of this project, network members exchanged information and benefited from lower operating costs.

E. THE INTERNATIONAL FOUNDATION FOR SCIENCE (IFS)

1) Influence of different nitrogen levels from broiler droppings on the growth performance and meat quality of carps (A/1596-1)

The recipient is the University of Agriculture in Faisalabad. This project aims to reduce the cost of quality fish and avoid water pollution from poultry manure managed haphazardly. Experiments will also be conducted on polycultural systems that include three carp species. The meat study section will involve proximate analysis, protein fractionation, and organoleptic tests.

2) Fertilization of fish ponds and artificial feeding of cultivated fish (A/0192-3X)

The recipient of this project is the University of Agriculture, Department of Zoology, Faisalabad. This aquaculture project focuses on survival, and growth studies of three carp species under various feed regimes.

3) Studies on natural repellents for protection of stored grains from insects (F/0225-3)

The recipient of this project is the Nuclear Institute for Agriculture and Biology, Faisalabad. In the proposed study, a biological evaluation of some indigenous plants was conducted to determine their properties as insect repellents and feeding deterrents. Active compounds were determined and isolated, and their effects studied at various growth stages of the insect pest.

4) Use of local plant materials for protection of stored food grains against insects (F/0655-3)

The recipient of this project is the Pest Management Research Institute of PARC at the University of Karachi. This project is very similar to the previous project (F/0225-3). It may be a follow-up or it may be that the first project was cancelled and transferred to PARC.

5) Taxonomy, incidence, intensity, and seasonal variation of helminth parasites of sheep and goats of NWFP (B/0265-1X)

The recipient of this project is the University of Peshawar's Zoology Department. The objective is to identify the parasites responsible for poor meat and hide quality and to develop appropriate and effective control measures.

6) Isolation and characterization of the volatile aromatic compounds from a local Basmati rice variety (F/0532-3X)

The recipient of this project is the Nuclear Institute for Agriculture and Biology, Faisalabad. This project conducted a systematic investigation on the volatile compounds responsible for the aromatic flavor of Basmati to develop a more comprehensive quality control method which could be used by breeders.

7) Characterization of cellulases produced by bacterial species isolated in Pakistan (E/0795-3)

The recipient of this project is the University of Punjab, Institute of Chemistry. The objective is to study the production of cellulases by locally collected thermophilic bacterial species. The long-term objective is to develop an enzymatic system for efficient breakdown of cellulosic materials to glucose.

8) Studies on the cyst nematodes of Pakistan with special reference to *Heterodera synodontis* (C/1801-1)

The recipient is National Nematological Research Centre of the University of Karachi. A survey of various economically important crops was conducted in an effort to isolate cyst nematode species. Follow-up studies on the biology, life cycle, and host range were conducted to develop effective control strategies.

Management of Foreign Aid and Project Approval

The Federal Ministry of Finance, through its Economic Affairs Division (EAD) is responsible for coordinating all foreign aid. Any project involving foreign assistance to a government agency will have to be approved by the EAD. However, for assistance to the NGO, this is not required. Since a great majority of the IDRC projects are carried out by the research institutes/ centres or universities which in Pakistan happen to be government bodies, prior approval of the EAD will be required.

We had an interview with Mr. Farhat Hussain, Joint Secretary, responsible for Canadian aid. He was of the opinion that IDRC should have a protocol for project approval, which will facilitate the process in general. We raised this question with the High Commissioner, H.E. Delvoie. He thinks it is quite unnecessary because the IDRC assistance is integral part of the Canadian ODA and the Government of Canada has an agreement that covers the entire ODA. Prof. Islam later checked with other EAD officials informally, who agree with the High Commissioner.

The question of administering the IDRC assistance through Delhi or Cairo came up in our discussions with Mr. Farhat Hussain. In his opinion, Delhi is not "convenient" for the GOP. He pointed out to the communication difficulties despite the physical proximity of Delhi. The High Commissioner also supported this view and was of the opinion that in the present climate of India-Pakistan relations, it is better to leave Pakistan either in the MENA or with Singapore. This question cropped up in our discussions with the Secretary, Agriculture; Chairman, Pakistan Agricultural Research Council and the Director General, Pakistan Forestry Institute. All were in favor of Cairo or Singapore.

Before the funds are disbursed, all public sector projects have to be included in the provincial or federal annual development programs and budgets, depending on where the recipient agency is located. A project costing up to PK Rs.4 million can be approved by the Secretary of the concerned department. The projects worth between Rs.4 and 20 million are approved by the Provincial and the Central Development Working Parties (CDWP and PDWP). These are usually constituted of representatives from Planning, Finance and the concerned departments. Projects over Rs 20 million are to be approved by the Executive Committee of the National Economic Council (ECNEC) at the recommendation of the CDWP. Since most IDRC projects are likely to be about Rs 4 million (app. CAD \$ 174,000) or below, approval may not be a serious problem. It may be noted, however, that Pakistan is known for its cumbersome approval process and blockage problems in aid disbursement and consequently a crowded project pipeline. The entrepreneurship of the recipient agency and its leadership is often a key factor in approval. Farhat Hussain mentioned a recently instituted procedure of concept approval at the design stage which facilitates the eventual approval. Three lead agencies are the Ministry of Finance, EAD, and the Planning Division. At the provincial level Finance and Planning & Developments play the key roles in project approval.

Environment-Related Policy Institutions

Environment and Urban Affair Division (EUID), GOP, Islamabad

According to the Pakistani Constitution, environment is a concurrent subject. Therefore, both the provincial and the federal governments have jurisdiction. At the federal level, the primary responsibility rests with the EUID. In the provinces, the subject has been assigned to the Physical Planning & Housing Departments (PP&HD), with the exception of the NWFP where it is the responsibility of the Planning & Development Department (P&D).

This division is the central agency with responsibility that cuts across both governmental and non-governmental organizations. The design and management of environment policies is coordinated through this Division. Until recently the GOP did not have a formal policy or strategy on Environment. This void has now been filled by the GOP approval of the new National Conservation Strategy (NCS) in 1992. EUID is headed by an Additional Secretary to Government. The activities of the Division are grouped into two sectors Human Settlements and Urban Affairs headed by a Director General and the Environment headed by a Joint Secretary.

Mr. Ul-Haq began the interview by stating the EUAD was not the only organization responsible for coordinating the implementation of the NCS. He stated that federal, provincial, and local institutions, NGOs, and the people at large, needed to cooperate. He mentioned that a prerequisite to successful implementation was a vibrant movement of reputable NGOs and that increased cooperation between NGOs and research institutes was necessary. According to Mr. Ul-Haq, the government's role was to design an effective policy framework, laws, and regulations, while research institutes should concentrate on developing technical and knowledge-based solutions to issues identified by the community. These solutions should then be disseminated by NGOs. Researchers, however, have little contact with either the community or NGOs and, consequently, much of the research conducted is on issues that are in vogue rather than a priority to the people. In addition, because few reputable NGOs exist in Pakistan, of the total budget allocated to NGOs for NCS implementation, only a fraction (3 million PKR) had been disbursed.

When asked about NCS implementation priorities, he remarked that the division had identified broad priority areas, but that within each, specific priorities were determined by the relevant department. As far as an overall priority was concerned, he stated water stood alone — "WATER, WATER, AND WATER". First of all, safe drinking water; secondly, efficient delivery of drinking and irrigation water; and lastly, safe disposal and/or treatment of industrial effluents and domestic waste water. He mentioned the impending shortage of water, a finite resource in Pakistan.

To deal with water effectively, he stated the federal government had to increase funding to local governments to strengthen their technical and analytical capacity. He stated that local politicians wilfully participated in projects dealing with increased water supply because of the political mileage that could be gained from such endeavors. However, when water disposal projects were proposed, local government often refused to take part because of the long-term institutional maintenance required. Mr. Ul-Haq stated that

NGO participation in creating awareness and mobilizing the community was crucial, particularly in coastal communities where fisheries was an important component of the local economy. He also stressed the importance of forestry and watershed management because of overgrazing and deforestation. In addition, he stated that EUAD was cooperating with the provinces on biodiversity.

In terms of pollution, a baseline survey would enable authorities to establish to what extent rivers were polluted, with what, and by whom as well as set priorities and take appropriate action. Although awareness creation was critical, particularly in the industrial sector, illiteracy was a major impediment, and novel dissemination methodologies needed to be developed. He told us that EPA units had been set up at both federal and provincial levels and that EPAs were responsible for regulation and enforcement of the 1983 legislated ordinance. EPAs, however, presently do not have the teeth, the qualified staff, nor the facilities required to carry out their mandate. When we inquired about possible linkages between EPAs, he stated that linkage varied on a case-to-case basis.

Federal NCS Unit, EUAD, Islamabad

Mr. Jarlal told us the NCS unit was responsible for coordinating NCS implementation. Since several government officials told us the same thing, we asked Mr. Jarlal to elaborate on the unit's function. His response was vague. He told us that the 14 areas of concentration had been identified (all are described in the NCS document itself) and that an action plan had been developed (IUCN). He stated that both federal and provincial governments had concurrent powers in environment policy formulation, but that implementation was a provincial matter since federal legislation and the Pakistan constitution do not cover natural resources. They are a provincial matter. This may be true in terms of legislation, but in terms of finance, the federal government controls the purse.

He emphasized that environment impact assessment (EIA) was an essential component in implementing the NCS. It was here that he mentioned that newly established industries have 1 year, and older industries have 3 years to conform to the EPA legislation. EIAs are now an integral component of projects, particularly those that are foreign-funded. The World Bank technical assistance program, for example, has EIAs as a prerequisite to project approval. He specifically focused on the Balochistan portion of the World Bank project ("Environmental Protection and Resource Conservation" (see the section on The World Bank above) and the crucial role the Balochistan EPA can play in this regard. He felt that both the World Bank and ADB were still following the traditional approaches and that new and more participatory approaches were required to ensure the implementation of the NCS. Funding for urban waste, pollution, and forestry research should be increased.

In terms of project selection and approval with foreign funding, he stated that the Economic Affairs Division (EAD) has the most clout because of EAD's coordinative function within the central government. Projects Wing in the Planning Division is responsible for monitoring the progress and ex-post evaluation. This unit appears to be simply another layer of bureaucracy that projects proposals need to clear. The office is

isolated, not being located in EAUD or Planning Division and how much interaction they have with other departments remains unknown.

Planning Division, Environment Cell, Islamabad

This small section is located within the Planning Division and is headed by a Deputy Chief. It is the focus of environmental planning within the Division and consolidate the environment section of the 8th Plan and the annual plans. It also help in prioritizing the environment projects. Thus Mr. Qayyum is in a strategic position to prioritize and incorporate projects into the annual development plans (ADP). He pointed out that for the first time, environmental issues are recognized in a 5-year plan. The 1993-94 ADP is the first year of the 8th plan in which priorities include regulation, legislative framework, plan of action, and standards.

When asked where was "the biggest bang for the buck", he replied, "Although potable drinking water is a basic necessity, in rural Pakistan it has become a vector of water borne diseases, and in major cities, increased water supply has created waste management problems. In addition, inefficient irrigation systems are severely taxing this finite resource". He then mentioned that solid waste management, and water and air pollution problems in Karachi should be priority areas, but UNCED's Agenda 21 has focused on smaller cities and, consequently, steps would be taken to identify cities from which experience could be gained. Smaller cities were also recommended by Mr. Shams-ul-Haq.

Strengthening EPAs was another priority — the need for diagnostic facilities and labs at the provincial level along with the appropriate legislative cover. He stated that JICA was interested in helping establish provincial EPA infrastructure and projected that by the end of the 8th 5-year plan, that effluent and emission standards would be developed. Because EIAs were new, Pakistan had very little capacity to conduct them. To assist Pakistan, two Canadian EIA specialists, namely Mr. Bob Walker and Steve Fuller, are working with IUCN and the provincial environment divisions. Mr. Walker has been in Islamabad 6 months working with the EUAD and EAD, while Steve Fuller is directly involved with the drafting of the NWFP strategy (see P&D, Peshawar).

Project formulation has not kept pace with the allocation of resources in this year's ADP. Out of the 60 million PKR allocated for 93-94, only 2.1 million PKRs. have been projectized. It is quite obvious strategisation, conferences and awareness creation have taken a lot of time and resources when it comes to implementation there is very little on the ground.

Sarhad Provincial Conservation Strategy (SPCS-IUCN Unit)

Dr. Khattak began the meeting by stating that research was not a tradition at the provincial level. However, when the NCS was first presented to NWFP officials, it was openly embraced. Since the NCS was approved, this CIDA-funded, cross-sectoral environment unit was created within P&D to develop a provincial strategy, and an action

plan particularly relevant to NWFP. The fact that a separate section with an annual budget within the ADP has been created, reflects the support that SPCS is enjoying. In addition, the fact that this year's budget was doubled this year to 14 million PKRs. 7 million for specific projects, 5 million for programs, and 2 million contingency fund.

This unit is not an implementation unit, however. It is a policy formulation and ADP development unit presently drafting parallel provincial statutes to implement the NCS in NWFP. Priority research topics include a) a project on the Kabul river to address the issue of industrial and human effluents and b) a goat and sheep fodder evaluation trial.

The NWFP EPA is to be responsible for regulating, enforcing, and sensitizing business, industry, and trade unions. Originally housed in the Physical Planning and Housing Division, EPA is now within P&D. The move has provided EPA with greater autonomy and status, and will enable EPA and the SPCS unit to coordinate directly with the head of P&D. EPA presently has 2 professionals on staff, but this is expected to increase to 30.

This group appears very committed and will continue to ensure that environmental issues remain at the forefront of the government's agenda. They themselves, however, are not research oriented and, consequently, they will rely on the respective departments to conduct the research in their given field. The problem is, however, that these respective departments are not research-oriented either.

Some questions were raised by Nancy McPherson, an IUCN employee who participated in the drafting of the NCS. She states "that IUCN has been enormously successful at conceptualizing strategies and working out guidelines, much less so at following through to see how those strategies are working out and who is using the guidelines". Bearing this in mind, one must remain optimistic about the whole process.

Department of Forests and Fisheries, NWFP, Peshawar

The newly appointed Secretary, Mr. Shinwari, organized a meeting with the Chief Conservator of Forests, Director of the Forest Development Corporation (FDC), Director of NWFP Wildlife, and the fisheries officials.

The Chief Conservator's first comment was "they did not conduct forestry research since this was PFI's responsibility and because they lacked the necessary infrastructure". The next speaker claimed that applied research in Kohistan and a Swiss-funded integrated forestry project in Swat valley were being conducted. During this meeting, it became clear that linkage between the province and PFI was weak. According to the group, PFI and NWFP research agendas are different and NWFP forestry research proposals are often declined by granting agencies because PFI is present in the region. The trouble is that PFI is under federal jurisdiction and apparently there are some problems of territorial imperative, jurisdictional conflicts and bureaucratic politics. The Secretary stated that improved linkage would be a priority during his administration. He went on to describe many previous social forestry projects as "provincial collaboration with farmers to establish nurseries and plantations, followed by farmers harvesting trees for quick income

generation". It may be noted that the Secretary belongs to an all Pakistan elite cadre — the District Management Group — and carries a great deal of clout. If he wants he is in a position to get support and cooperation from the PFI.

The wildlife person stated that most of Pakistan's wildlife was in NWFP. Several inventory surveys have been conducted in collaboration with the World Wildlife Fund. Documentation, however, remains very incomplete due to a critical shortage of trained staff and resources. He expressed the need for more land allocation for national parks, wildlife sanctuaries, and game reserves and explained that income generated from a viable tourist industry could support research and conservation activities. He mentioned that obtaining funds from the Global Environment Facility (GEF) was difficult.

If forestry conservation is to succeed, it is imperative that the nomadic grazing of goats and sheep be controlled. The 5-year forestry master plan acknowledges the complexities of the problem but offers no solution. The group suggested that corridors for grazing be identified for rotation.

Provincial fisheries are not research oriented. They mentioned that industrial and agricultural effluents were the likely cause for high mortality rates in carp and telapia observed in hatcheries. Several new hatcheries are being constructed in an effort to promote inland fisheries in NWFP. AGRODEV Inc. is presently working in NWFP and in Punjab.

The Secretary ended the meeting by stating that income-generating activities (mushroom culture, medicinal plants) would be promoted and that improved relations with PFI would be encouraged. During this meeting we stressed the need for linkage between research institutes, government, and NGOs. At this meeting, the principal players regarding implementation of the NCS, were Secretary Shinwari, Mr. Raffiq from P&D (see SRCS unit), and the wildlife person. Provincial priorities will be determined during the development of the provincial conservation strategy and the government will likely endorse the outlined priorities.

Functional departments like this one will play a key role in the implementation of the NCS, particularly in enforcement. They also have day to day contact with the end users — the farmers, the tanners, the small businessmen, the loggers etc. Technically, it should be the role of research grant recipient to develop cooperation and gain support from them. But if the IDRC program officer while visiting research institutions visits the secretary of the concerned line department, it is likely to promote cooperation as well as give information to the IDRC about priorities and problems in the field.

Environment Protection Agency (EPA), Sindh

EPA Sindh was created in 1989. We were told that most of the 2-3 million PKRs. annual budget is consumed by salaries. Available transport consists of two 4X4 trucks and a car. EPA surveys indicate that Karachi citizens consider air and water pollution main priorities. EPA is proposing to the provincial government a project to examine *ways and means of controlling air pollution. In addition, they are hopeful that a national*

effluent and emission standards act will soon be legislated. Confirming what Mr. Shams-Ul-Haq told us about local politicians, in Karachi provision of potable water rather than disposal remains a priority, even though raw sewage is being dumped into the sea. Another major problem discussed was pesticides. A subtle sense of distrust for customs officials was demonstrated, specifically regarding the import of chemicals, as large quantities arrive into Pakistan weekly either unlabelled or with tampered labels and are sold under the table to industry. Recently, several drums of meta-dinitrobenzene were left abandoned after 2 people died. They showed considerable interest in a study on the process of importing chemicals, a documentation of what is being imported into Pakistan and in what quantities. This type of study is particularly relevant since the GOP has deregulated pesticide importation. In an effort to initiate change, EPA Sindh is exercising friendly persuasion with industry. To increase awareness, they conduct seminars, round table discussions, and workshops in cooperation with IUCN and industry. They stressed that technical assistance was needed to enable EPA to conduct small focused pilot projects, feasibility studies, and applied research. Although IUCN has more technical knowledge and analytical capacity, EPA has the legal authority and jurisdiction to conduct investigations and enforce regulations. However, EPA lacks the teeth, qualified manpower, and financial resources to do so and, consequently, collaborates closely with IUCN and PCSIR.

The Environment Protection Agency, Lahore, Punjab

It may be noted that the time constraint did not permit us to visit the EPA, Punjab in Lahore. It is located in the Provincial Department of Housing and Works and is perhaps the strongest of all the four EPAs. It boasts 240 staff of whom 24 are officers and interestingly fewer than ten are environmental professionals or scientists. (See *The Pakistan National Conservation Strategy*, pp. 4-5.) The agency mainly focuses on industrial and urban pollution. It has, however, identified some 24 projects ranging broadly across many sectors for the current year's ADP. Concept clearance for these have already been obtained. They include cleaning of the river Ravi, development of the systems for environmental monitoring, integrated Pest Management and several projects on forestry, wildlife and fisheries. Punjab EPA is supposed to be relatively more well established than the other provinces. However, even here, many of the professional positions remain unfilled and the agency has hardly the capacity to do the regulatory and enforcement work it is required to do.

Key Research and Development Institutions

Agriculture is an important sector in the context of the GOP priorities. It is also a sector which is endowed with the most developed research institutions in the country and a longer tradition of extension and research than other development sectors.

Pakistan Agriculture Research Council (PARC)

We visited the head office of the PARC in Islamabad and met with its Chairman, the most senior official in the research policy hierarchy of the GOP.

PARC is an umbrella organization, comprising different research institutes and centres located in Islamabad and in other parts of the country. It is headed by a Chairman who also acts as the Secretary, Agricultural Research Division, Government of Pakistan. In addition to its Chairman, PARC is composed of three members and a secretariat located in Islamabad. The Present Chairman is Dr. Zafar Altaf, who holds a PhD in Agricultural Economics and belongs to the elite District Management Group (the former Civil Service of Pakistan).

PARC is the most important agricultural research organization in Pakistan with a professional staff of over 250 PhDs working in its various centres and institutes. Its major publications include the *Pakistan Journal of Agriculture*, a magazine *Progressive Farming*, and an annual report. The activities of the Council are grouped into three main sectors: crop sciences, natural resources, social sciences headed by a member of the Council. There is a finance division and the secretariat. The National Agriculture Research Centre is its major research facility located in Islamabad. Other institutes within PARC facility include the Natural Resource Institute, the Animal Science Institute, the Arid Zone Research Institute, and various regional research institutions.

Dr. Altaf raised several problems which warrant immediate research attention. The first problem was the pest and disease problem in cotton. This was of particular importance because of the severe economic consequences, and the scientific complexity. To discuss the cotton problem, Dr. Altaf promptly arranged an interview with Dr. Ikram Mohyuddin, a PARC scientist in-charge of the Commonwealth Agricultural Bureau — International Institute for Biological Control (IIBC). Secondly, Dr. Altaf mentioned soil and water degradation and the increasing need for efficient management of both resources. He stated that many farmers have short-term interests and are not aware of the environmental consequences of soil and water misuse. Consequently, research and awareness creation were absolutely necessary. Although Dr. Altaf was very supportive of the NCS, he felt that its successful implementation was a long-term process due to the breadth of issues the document covers. He stated categorically that he was against the creation of an entire infrastructure to deal with the NCS. He suggested that integrating the environment components into ongoing projects would facilitate the implementation of the NCS, and would likely prove more manageable. He suggested linking a project on juniper forest/watershed management with a juniper biodiversity germplasm conservation project as an example and stated that funds could be obtained from the Global Environment Fund (GEF) or possibly IDRC. He mentioned that implementation of the NCS was an opportune time for NGOs and government research institutes to collaborate. He emphasized the need for GIS training at PARC and other

data collecting agencies such as WAPDA, PFI, and SUPARCO and that stronger links between these institutes needed to be developed.

During this interview Dr. Altaf told us that criticism of the GOP by NGOs was exaggerated and positive developments were being observed on several fronts; increased rice yields, increased cotton production, removal of subsidies, research in agro-forestry, and in many of the basic disciplines such as soil science (saline and sodic soils). He felt that many NGO leaders have hidden agendas and complain to be heard and made visible, that many of these leaders were "silver spoon kids" from rich families who were simply in the process of self-aggrandizement for personal reasons (political careers) or for higher salaries than those that could be earned in the public sector. He is one of the few generalist administrators in the hierarchy who has a PhD. He told us that he encourages his scientific staff to carry out progressive research and gives them the freedom to do so. He would stick his neck out to support his research staff and consequently, any collaborative effort with PARC, under his direction, is very likely to be fruitful. He definitely has the necessary clout for speedy approval of PCIs (project approval form). We were very pleased with the keen interest Dr. Altaf showed in our mission. Upon our arrival at his office, he had already read the IDRC brochure and material we had earlier sent to him and had several key points written down for discussion. Dr. Altaf is a leader and a man of high integrity. We strongly recommend that the program officers see him.

National Agricultural Research Centre (NARC)

We paid a visit to the Centre and interviewed the following officials/scientists: Dr. M Akbar, Director General, NARC; Dr. Ali Asghar Hashmi, Director, Entomological Research Lab; Dr. Naazer Ali, Principal Scientific Officer, BARD.

NARC is the major research facility of the PARC, located in Chak Shehzad, near Islamabad. It has extensive lab facilities and fields for its research. The research activities are grouped into four areas: Crop Sciences, Soil Sciences, Farm Machinery and Horticulture under the supervision of a director. The Director General of the Centre, Dr. Akbar, is a reputed rice breeder who spent several years at IRRI. He told us that wheat, rice, fruits, and vegetables were the priority crops at NARC. Some work is also being conducted on cotton, primarily on the cotton leaf curl viral disease and its vector, the whitefly. Dr. Ali was involved with the CIDA-funded Barani Agricultural Research and Development project (BARD) under Dr. Mumtaz. His concentration is oil crops; peanuts, canola, rape, mustard, and soybean. Dr. Ali's research is a continuation of BARD concentrating primarily on breeding and some farming systems work. Project staff has been reduced from 76 to 46. Several new varieties and agronomic recommendations for soybean, mustard, and peanut were released in 1992. In addition, three farmer-managed seed centers responsible for the production and distribution of certified seed of new varieties were established.

We then met Dr. Ali Asghar Hashmi, an entomologist conducting multi-disciplinary research on the cotton leaf curl viral disease. A large area in Punjab, the major cotton growing region of Pakistan, is threatened by this disease. Dr. Hashmi is committed and enthusiastic and appears well-informed. His 1993 publication on the disease is thorough

but concentrates on chemical control of whitefly, the said vector of the disease. He has been involved in problems associated with pesticide use in cotton since 1974 when he published (newspaper) toxicological work on reduced cholinesterase levels in hands of women cotton pickers. We left him guidelines for proposal development. NARC is well-equipped in terms of lab facilities. These include a new Genetics Resources Preservation Research Lab, an oilseed quality lab, an Entomological Research Lab and a computer training lab. In addition, the infrastructure, support staff, greenhouses, and vehicles are available. We recommend that the Idrc program officers visit NARC, particularly the GRPRL.

Genetic Resources Preservation and Research Lab (GRPRL)

We visited the GRPRL in Islamabad and interviewed the following people: Mr. Rashid Anwar, Director, Plant Genetic Resources Institute, NARC; Dr. Nobuo Murata, JICA Team Leader, GRPRL, NARC; Dr. Shahid Masood, Principal Scientific Officer, GRPRL.

This modern laboratory was established in April 1993. All of the buildings, equipment, and vehicles were donated by JICA. The agreement makes provisions for 3 Japanese scientists to conduct collaborative research for a 5-year period. In addition, several short-term consultancies are expected. This lab's research objectives are to a) explore and collect germplasm of important plant species found in Pakistan, b) conserve and document information on the germplasm collected, c) evaluate crop germplasm for heritability of highly desirable characteristics, d) multiply conserved germplasm and document genetic resource information, and e) coordinate with national and international institutes for germplasm exchange.

This germplasm conservation lab is a support facility for breeders who can incorporate the desirable material into their respective programs. As of August 1993, collections on maize, cotton, and millet had been conducted in Sindh, Punjab, and NWFP and characterization was presently underway. The group expected the next collections to focus on fruit tree material.

This agreement with Japan also includes a training component: one PhD student will begin this year (a seed health person) and another PhD student, next year. There was mention of allowing students conduct their course work in Japan and their research in Pakistan on issues of importance to Pakistan. All agreed this was preferable. Present staff includes 3 PhDs, and 11 MSCs. Dr. Hafeez Kwadja is presently conducting the *Lathyrus* project with IDRC support. The 1993 core operating budget was 1.1 million PKR and the GOP has committed 4 million PKR over the next 4 years. An additional \$ US 400,000 has been pledged by the Japanese. This group was recommended by Dr. Geoffrey Hawtin at IBPGR. He felt that a collaborative project between this lab, ICARDA, and IBPGR could be developed on the conservation of pulse germplasm, lentils in particular. This would enable IBPGR to link up with ICARDA's activities on lentil germplasm. The director of the lab showed great interest, however, not only in pulses and cereals, but also in medicinal plants, essential oil plants, and the Juniper species, all of which are under severe pressure due to overgrazing by goat and sheep herds. Dr. Shaheed Masood is an enthusiastic, recent PhD graduate from University of

Oregon in Corvallis and may submit a proposal to develop a project on germplasm conservation.

The facilities at this lab are excellent. All equipment is new and very much up-to-date with 2 growth chambers, 6 laboratories (exploration, conservation, evaluation, documentation/database, seed health, and in vitro preservation). The seed health unit is divided into 3 sections: bacteriology, virology, and fungus. Their library also appeared to be up-to-date with several international journals, and publications for ICARDA and IBPGR. their computer hardware consisted of 1 mini with 11 workstations. They are expecting several 486 units in the near future from Japan. Dr. Murata mentioned the availability of single user software from IBPGR, but he was more interested in multi-user packages presently being developed in the US. Their field work appeared to be acceptable in terms of objective, however, fields were weedy and this could affect or impede accurate characterization of the material in terms of potential productivity. This could be due to a lack of support staff. In addition, the lab appears to lack the critical mass required. There are, however, 250 PhDs at PARC- the umbrella organization- whose services could be borrowed for the Lab. Zafar Altaf, the chairman of PARC, however, assured us that adequate staffing of the laboratory was already in the process. The present group could, however, effectively conduct a small focused project. Seed funding for a project which brings the lab and staff together with ICARDA and IBPGR would be very helpful and would likely yield good results. Because operations only began in April, it is impossible to assess their track record. Their Director General (NARC) is a reputable breeder who spent considerable time at IRRI. He should have a good working relation with the upper hierarchy.

The group stated clearly that their objectives were to provide breeders with the collected genetic material, thus incorporating the end-user. They appeared to be genuine. A project on biodiversity conservation in collaboration with ICARDA and IBPGR would be in line with research priorities set by IDRC HQ, MERO and the GOP. Such a project is one of the priority areas set out in the NCS. We strongly recommended that the program officers visit the laboratory together with Dr. Zafar Altaf, the Chairman of PARC to explore the possibility of linking the lab with other activities in PARC. This would likely result in the necessary critical mass to ensure that the lab receives the attention it deserves (see Dr. Zafar Altaf interview).

PARC — International Institute for Biological Control (IIBC)

We interviewed Dr. Moyuddin, the principal scientist in charge of this institute, and Dr. Richard MacLean visited the Labs.

This research laboratory was established in 1957 and is a member of a worldwide network of very distinguished and qualified scientists. Since becoming an institute, 16 PhDs have received their degrees based on field research conducted here. Dr. Mohyuddin holds a Master's and a PhD in biological control of weeds from Queen's University in Kingston. His publications on the biological control of sugarcane borer, as well as his integrated pest management work in mango, and other fruits and vegetables have earned him significant international recognition. His understanding of the issues is enriched by his genuine interest in his work. Dr. Zafar Altaf had arranged for us to see Dr. Moyuddin and spoke very highly of him. We believe that Dr. Altaf recommended him because in all likelihood he is the most accomplished entomologist in Pakistan. Staff at the institute include 2 PhDs, 2 senior scientists (MSc) and 6 junior scientists (MSc) and 5 support staff (BSc).

We spoke about the present situation of declining cotton productivity due to a virus. He told us that he was conducting some IPM work in cotton in the Multan region (the heart of the cotton growing area in Punjab). Support for this work came from a 3-year ADB project that examined cotton production in China, India, and Pakistan. The Pakistan portion of this project was managed by PARC. He told us that funding covered primarily operating expenses (1 MSc research and 2 support staff, 1 truck, 3 air conditioners, and dehumidifiers), but did not include a significant research component. We requested him to prepare a proposal for submission to IDRC as soon as possible. We strongly recommend that appropriate IDRC program officer visit him.

We briefly met with Mr. Salman Farooqi, Secretary, Ministry of Agriculture and his Joint Secretary responsible for forests, Mr. Abeerullah Jan. They were very gracious in receiving us at a short notice. This visit was important more from the protocol point of view and that it would open a few doors for us. They advised us to visit the Central Cotton Committee to discuss the leaf curl virus situation. They considered this as the burning issue of the day, Like Dr. Pasha, the Commerce Minister we had met earlier. The Secretary reiterated the importance of sustainable agriculture in Pakistan and welcomed any involvement by the IDRC to help in the areas of waterlogging, salinity, water conservation, deforestation and of course the cotton virus problem. The preservation of Juniper species near Ziarat, Balochistan also came up in the discussion.

Mr. Abeerullah Jan arranged for us to visit the PFI staff in Peshawar. Mr. Farooqi had just taken over at this Ministry and he did not know much about the IDRC and its objectives. He is regarded as one of the "high flyers" in the GOP and is given charge of important portfolios. We provided him with the IDRC literature. The outgoing Secretary Mr. Mohammad Lutfullah Mufti, with whom we had been in touch from Ottawa, came to see us in our hotel. He also advised us to visit the Cotton Committee, the PFI, and the Faisalabad University. He thought that some institutes of PARC and Faisalabad were the most important research institutions in Agriculture in Pakistan. He believed that the PARC scientists, particularly those who have been there for a longer

period of time, "behave more like bureaucrats than researchers". He suggested, as a solution, "to give the scientists autonomy and hold them responsible for results". He also believes that the sanctions and rewards are not linked to performance.

Pakistan Central Cotton Committee (PCCC)

PCCC was established in Karachi in 1948. It is responsible for improvement in cotton production, marketing, and manufacturing of cotton and cotton by-products through extensive research and development (PCCC, 1991). PCCC is funded by, and reports directly to, the cotton commissioner in the Ministry of Agriculture, Food, and Co-operatives. In addition to the head office in Karachi, two large, multi-discipline Cotton Research Institutes, one in Multan, Punjab (the major cotton growing region in Pakistan), the other in Sakrand, Sindh, and a large network of federal and provincial research sub-stations have been established. Cotton research in Pakistan is heavily financed by the PCCC. The PCCC plays an important role as a funding agency and a catalyser for research and development. During 1991-92 its research budget was Rs. 57 million. Federal Minister of Agriculture acts as the President of PCCC, Vice-President being the de facto executive head. The present V.P. is Mr. M.I. Afzal, who is a former cotton breeder from Faisalabad University. The head office of the Committee is located in Karachi. We interviewed him in his office.

As Dr. Afzal puts it, the cultivation of cotton in Pakistan is legendary and historic. It is largely produced in the provinces of Punjab and Sindh. Pakistan is the 5th largest producer of cotton in the world after China, the US, Former USSR and India. (See PCCC, *Pakistan Cotton Statistics*, 1991-1992.) Cotton is an important part of rural culture in Pakistan and has made an immense contribution to its industrialization through textiles. Cotton and cotton manufactures account for approximately 8% of Pakistan's GDP and 60% of its exports (M.I. Afzal, *Pakistan Cottons: Experience and Achievements*, PCCC, 1993). Cotton probably remains the major reason for the manufacture and import of fertilizers and pesticides in Pakistan. It is not easy to estimate the accurate use of pesticides in the country. During our interviews with various people, it was often mentioned that Cotton farming accounts for 84-85% of the use of pesticides in Pakistan.

Cotton research in Pakistan has a long history and research has made a significant contribution to yields as well as quality.

Mr. Afzal shared with us the history of yield of cotton and some of the factors responsible for the observed trends. During the 50's yields rose due to the introduction of agro-inputs and improved varieties. In 1971-72 the cotton trade was nationalized and yields declined until 1976 when the seed-cotton support price was introduced. The greatest breakthrough for the cotton industry in Pakistan was the release of heat tolerant cultivar NIAB-78 in 1983. Since then, yield of cotton in Pakistan has either equaled or surpassed world yield levels.

The Committee supports research through its network of institutes, research stations and sub-stations in both Punjab and Sindh. The Committee has sponsored major research projects to develop new varieties of cotton and to increase the yield per hectare. It has also developed a Pest Scouting System at its Multan Institute (CCRI). The teams of pest

scouts provide timely information on pest occurrence and teach farmers to spray only when the pest population reaches the economic injury threshold level. Another important project was to increase the cotton farm intensification in both Punjab and Sindh.

Mr. Afzal emphasized the importance of the transfer of technology and knowledge to the farmers. The PCCC has launched a Cotton Maximization Project to help this transfer as well as created a Transfer of Technology Program at its Multan Institute. In addition, the Training & Visit (T&V) system has been used in both provinces with the help of the provincial Agriculture Extension Department. He recognized that serious problems have arisen as a consequence of using pesticides and fertilizers. He believes that the chemicals have alleviated the pest problems but have failed to provide an effective solution. During our interviews with some NGO representatives, it was pointed out that the excessive use of pesticide is a serious health hazard for cotton pickers — mostly women.

He also mentioned the serious implications of the incidence of the leaf curl virus for cotton productivity. Because of the importance of cotton to the national economy, this is the most pressing agricultural problem for Pakistan at this time. Several of the people we met throughout the country are conscious of the problem and many have indicated that research was imperative. We mentioned to Mr. Afzal that the problem was raised at PARC, that contact had been made with Dr. Mohyuddin at IIBC, and that he may propose to develop an IPM schedule for cotton. He replied that some research on IPM had already been conducted at Multan. He was more concerned with this disease than anything else. The fact that PCCC funding follows cotton productivity may have something to do with it.

The leaf curl viral disease was first observed in cotton in 1967 and was considered a minor pest until 1987. From 150 acres in 1989, the disease has spread to an estimated 240,000 acres in 1992-93 (PARC, 1993). The major vector of leaf curl viral disease is the whitefly. In 1990-1992 the disease reduced the number of bolls by 5-8% and the boll weight by 25-30% (Altaf, 1993). Mr. Afzal told us that if IDRC could help him with anything, that control measures for this disease is where he would invest 100% of available funds.

Within the country, Mr. Afzal and PCCC appear to be well respected. Since we were unable to go to Multan, we strongly recommend that program officers organize, sufficiently in advance, to go to Multan and preferably coordinate their visit with Dr. Zafar Altaf (chairman of PARC), Dr. Ikram Mohyuddin (IIBC), and Dr. Mian Afzal. Certainly, some good will come out of this.

According to Afzal, the CCRI at Multan has already begun to investigate the problem. He welcomed the idea of an IDRC sponsored collaborative project between CCRI and PARC on leaf curl virus, cotton productivity, pesticides and women's health. PARC is also interested in this problem, although technically cotton falls in the PCCC jurisdiction. Under the leadership of Dr Zafar Altaf, PARC initiated a multi-disciplinary study to examine the various aspects of the disease and to develop a strategy to avert further spread of the disease. Two PARC entomologists carried out field investigations to assess the damage in Punjab. The virology lab at NARC was involved in isolating the virus from the infected plants. It is a complicated procedure and requires high tech equipment like the electron microscope and high speed Waring blender and it appears

these are only available at NARC presently. (See *PARC Research Digest*, Vol. 3, No 3-4, 1992.)

Pakistan Cotton Standards Institute (PCSI)

PCSI, established as a result of two FAO/UNDP collaborative projects, is responsible for quality control during the handling and processing of cotton from harvest to export. The first project established a national standardization program based on an internationally acceptable cotton grading and classification system. A second five-year project began in 1987 to establish the Cotton Standards Institute with the responsibility of applying quality control measures, training new generations of graders, classers, arbitrators and instructors, and supervising all the cotton handling activities under the proposed project. This project also successfully drafted a comprehensive list of recommendations that encompass legislated rules, quality control measures, and standards that cover 12 different aspects of cotton growing and processing.

During the interview, Dr. Hussain discussed the prospects of collaboration with IDRC on research that would lead to a greater proportion of Pakistani cotton being classified as first class. Presently, most cotton from Pakistan is second and third grade. To achieve this objective, he stressed that greater emphasis must be placed on breeding and genetic engineering, particularly since Pakistan is competing on the world market with developed countries who have the resources to conduct such studies, etc. In addition, he mentioned that acquiring a more in-depth understanding of the physiological processes that are responsible for the phenotypic expression of desired traits is essential if progress is ever to be realized in a sustained fashion. He used the heat tolerance breakthrough as an example. He mentioned that several donors from developed countries are reluctant to assist Pakistan in improving because they also depend on cotton exports. He stated that this was an opportune time for IDRC to participate since the second project with FAO was drawing to a close. In addition, the fact that PCSI was moving into its new facilities with modern equipment, indicates that they are in a better position to undertake the next phase. Because of the importance of cotton to Pakistan's economy and the closing of the FAO/UNDP project, we recommend that program officers visit PCSI.

The University of Agriculture, Faisalabad

This is the oldest and the most well established university in the field of agriculture in Pakistan. We visited the university campus and interviewed Dr. Muhammad Rafiq Khan, the Vice Chancellor, along with a number of his Deans and Departmental Chairmen. We were impressed by the keen interest shown by the Vice Chancellor in our mission. He seems to have a team of very able, research-oriented and committed scientists at the helm of this institution. Dr. Rafiq was able to organize this meeting for us at rather a short notice. It was a Friday, the weekly holiday in Pakistan, and despite this the staff and the V.C. spent the entire morning with us.

The main campus is located in Faisalabad, a bustling textile and commercial centre and probably now one of the most polluted cities in Pakistan. The campus is surrounded by a 719 acre farm for instruction purposes, a Postgraduate Agricultural Research Station spread over 750 acres, and a Farming Systems Research Project with its own 1118 acre research site. The College of Veterinary Sciences is located in Lahore.

The academic component of the university is organized into six teaching and research faculties: Agriculture, Agricultural Economics & Sociology, Agricultural Engineering, Animal Husbandry, Veterinary Science, Sciences. In addition, there is a Division of Education & Extension. These Faculties comprise of 36 departments including major agricultural, social and physical sciences. The university is endowed with a very well-qualified faculty comprising 486 professors, including 144 PhDs and 342 MSc's. One hundred forty of these have received their graduate training abroad in very good universities in the US, U.K. and Canada. A group of another 40-50 faculty members are abroad for their higher studies (PhD's) and are likely to return during the next three years. The university grants BSc, MSc, MPhil, and PhD degrees in various disciplines. Since 1961, the university has granted 122 PhD degrees and 8164 Master's degrees. Currently there are 275 students enrolled in their doctoral programs, 1721 at Master's and 2504 at Bachelor's level.

The Vice Chancellor indicated that long before the NCS, the university was conducting research on environmental pollution and that considerable experience was gained from these activities. The principal agroforestry scientist, Dr. Quereshi, explained that farmer interest in agro-forestry was growing because the rate of return on investment is higher with fast-growing trees than with traditional crops, particularly in rainfed areas. This was confirmed on saline and sodic soils by another soil scientist — a namesake of Dr. Qureshi. His research consists of comparing incomes generated after a 5-7 year period from a) an abandoned 2- and 3-acre portion of saline or waterlogged soils on which *Atroplex spp.* and various fast-growing tree species were planted; with b) the remaining 7 or 8 acres that were traditionally cropped. Thus far, very favorable results have been obtained. This is a collaborative project with the Salinity Research Institute at Pindibhattian situated in a large, highly saline, waterlogged area. The project began in 1992 and is partly funded by the British Official Development Agency (ODA).

Although the university does not have a cotton research mandate, there are 6-7 cotton breeders on staff. They mentioned that transportation is a major constraint to conducting on-farm research.

They admit that linkage with other institutions is the weakest point in the research system. Faisalabad, an industrial city within an agricultural region, is extremely polluted. It is imperative that research be conducted to address the myriad of environmental issues that is choking the very existence out of what, only 25 years ago, was one of the nicest regions of the country. This institution certainly holds the critical mass in terms of research skills to study the problems of sustainable agriculture and other environmental problems within its own backyard. It is also the most well-endowed in terms of facilities. Current research interests range over breeding for stress tolerance, including salinity; agronomic management of crops including pest management, recycling of animal waste, pesticide residues in foods and feeds, farm management and crop insurance. We strongly recommend that program officers visit Faisalabad University.

N.W.F. University of Agriculture, Peshawar

The following people were interviewed: Vice Chancellor, Dr. M. Saeed, Professor; Chairman, Research & Technical Review Committee; Dr. Saeed-ul-Hassan, Professor (BREEDER); Dr. Riaz Khattak, Associate Professor (SOIL CHEMIST).

The university, established 11 years ago, recently received \$US 55 million from USAID for infrastructure, buildings, lab equipment, and computers. Construction is to be completed by August 1994. Professional staff includes 70 PhDs in 5 faculties and 19 teaching departments, granting MSc degrees. A proportion of the USAID funding is earmarked for the TIPAN (Transformation and Integration of Provincial Agricultural Network). The GOP's contribution was 179 million PKRs.

This project was considered to be the highlight of the USAID's technical assistance program as agricultural research has been the primary thrust of the US technical assistance in Pakistan. This project has established, via an outreach directorate, a computerized system linking the four provincial agriculture research institutes (Pirsabak, Sugar Institute, Mardan; Tarnab, D.I. Khan) and various provincial research stations and sub-stations with the university. This would, not only, improve data collection and exchange between researchers but also would provide a continuous communication channel between researcher and the farmer through research stations located across the province. We are not sure in practice how it is working, particularly in view of the US aid withdrawal.

Based on our interview, it would appear that the university's main focus is still green revolution style agriculture. "There is still a large gap between yields obtained on research stations and farmers' fields. If 80% of attained yield could be transferred to farmers, this would represent a substantial gain." Applied research is an immediate priority. The university claims that much of their research is on-farm, and farmer field days are regularly conducted. A mutation breeding program for sunflower, maize, and wheat is ongoing with several promising, non-licensed varieties. Some emphasis was put on canola (BARD promoted), mustard, and rape, but farmers still prefer the latter two because of higher yields. Dr. Khattak (soil scientist) explained that the chemicals from industrial effluents and household sewage may be bio-accumulating in crops, particularly root crops, being grown by subsistence farmers. No research on this matter is presently being conducted at the university. We told him that Dr. Ansari at PCSIR and Dr. Zakir Ullah from Peshawar University had indicated their interests in this issue and that it may be an opportune time to develop a collaborative project, particularly since PCSIR also has lab facilities in Peshawar.

Since USAID has officially pulled out, the GOP has committed an annual budget of 45 million PKRs to the university. The sudden withdrawal of the USAID has been a setback. It would appear that this university has the critical mass and the enthusiasm to conduct effective research, particularly since all facilities are new and a large number of the PhDs are recent graduates from recognized schools abroad. They are not only highly motivated but also are fully aware of the latest developments in their respective fields. Their linkage with the provincial research institutes in NWFP seems to be effective and is another positive factor enhancing their capacity to conduct end-user relevant research.

A new Vice Chancellor has recently taken over who is very research oriented and he seems to enjoy the confidence and support of his staff. A visit by an IDRC program officer is recommended.

Pakistan Forestry Institute (PFI)

The following officers of the PFI were interviewed: Dr. Khalid M. Siddiqui, Director General, PFI; Dr. Bashir Shah, Director, Research, PFI; Mr. Mohammad Khan, Research Officer, PFI.

The PFI occupies the top position in the forest research hierarchy of the country. It is a national institution and is responsible to the Inspector General of Forests (also Additional Secretary), in the Ministry of Food & Agriculture, Government of Pakistan. The organizational setup consists of 6 divisions, namely, forestry research, biological sciences, forest entomology, sericulture, forest products, and forest education. Each of these divisions is headed by a director. Of the research staff, 10 have PhDs and 48 hold Master's degrees, many of them from abroad.

The forestry research division includes the following branches: silviculture, forest genetics, forest mensuration, watershed management, and range management. Dr. Shah is responsible for silviculture, forest mensuration, watershed management, and based on annual reports, these are three very active divisions. Within the biological science division, considerable work has also been done on medicinal and essential oil plants.

The institute seems to have a dynamic program of research. A large number of projects have been initiated since 1989. The overall area of forest genetics and tree improvement seems to be the major thrust of their research. leading to the development of promising tree species. The research in watershed management appears to be the second important activity. They also have an interesting program for the identification and preservation of medicinal plants. The annual research program for 1992-93 lists 34 ongoing and completed projects in forest genetics & tree improvement. A large number of these have been financed by The USAID (26 out of 34). Most of the rest of the research program is supported by the GOP.

IDRC presently has 2 active projects at PFI — Paulownia and Irrigated Forestry. Dr. Shah expressed interest to continue the research to examine in greater detail Paulownia propagation techniques, primarily shoot- and root-cloning techniques. They have been able to develop species of Paulownia trees with much larger circumference and bigger biomass on their experimental farm. In addition, the importance of investigating tree species to reclaim saline and sodic soils was mentioned. Preliminary trials with *Prosopis*, *Casuriana*, *Leuceana*, *Eucalyptus*, and *Acacia* are being conducted in which they are monitoring salt concentration both in the surface soil and ground water in plots with and without trees. No effort has yet been made to determine which species are most effective. On-station nutrient cycling studies with 4 promising species under various irrigation regimes are also being conducted with elaborate lysimeters.

Upon request, farmers can avail of seedlings or vegetatively propagated clones from PFI. Dr. MacLean suggested it may be worthwhile investigating the performance of mixing

different species and clones of Paulownia and that by doing so, we may harvest the power of competition. In addition, such a practice may reduce the likelihood of pest outbreak as was observed with *Leuceana*, another introduced species. This may be critical, particularly where vegetatively propagated Paulownia clones are planted on a large scale. He stated that they have a problem obtaining seeds from their Chinese counterparts and, consequently, the emphasis on clones and vegetative propagation.

They mentioned that fast-growing poplar had become widespread in Peshawar region because of generated income thanks to the market for matches and fuelwood. In an effort to demonstrate, PFI is conducting on-farm research, however, the selected farmers are very progressive and do not represent the average. It is doubtful that conclusions drawn from work conducted on these farms can be extrapolated to the average farmer. Dr. Shah and Mr. Khan, who had accompanied us to these farms, maintained that the choice of progressive middle farmers was necessary to create a demonstration effect on poor farmers.

Concerning the preservation of the juniper forest in Balochistan, Dr. Siddiqui mentioned that the problem associated with juniper was not a forestry research issue, but a social problem — the farmers' inability to earn higher income from activities other than from harvesting of juniper. This may, however, be an excellent opportunity for non-wood forest products income generation project from the green technology fund (Bill Edwards). As far as the mistletoe problem is concerned, he mentioned that management solutions had been developed: lopping and sanitation. These management practices, however, were not successful because of poor sterilization of the implements used for lopping and, consequently, the mistletoe problem recurred after a few years. In addition to the mistletoe problem, they mentioned that juniper was also suffering from poor seed set, possibly due to lack of pollination. There was also the mention of the chalthoza — the edible pine. Again, the species is harvested for the income rather than nurtured for the fruit.

Since 1989 Dr. Shah has published 13 papers, brochures, and reports. All papers were published in the *Pakistan Journal of Forestry*. Both Dr. Shah and Mr. Khan appeared keen and competent, however, there were some questions as to the statistical design used for their on-station trials. We had the opportunity to visit the fields in the Charsaddah area and near Mardan to see the Paulownia grown by the progressive farmers as a part of the PFI experiments. We strongly recommend that the program officers visit the PFI.

Department of Environmental Planning, University of Peshawar

This is a newly established teaching department. Funding was provided by the WB, CIDA, and NORAD. The faculty consists of 11 professors (4 full-time and 7 part-time) and only the director has a PhD. Current budget is provided by EUAD (4-5 million PKR) and operating expenses are paid by the university. Funding is expected from the University Grants Commission (UGC) once a program evaluation has been conducted. The WB granted some GIS equipment (not complete) and the part-time

professor responsible also works at SUPARCO labs at Peshawar. Since this person was not at our meeting and Dr. Zakir Ullah knew very little about the GIS, we could not get much information on the progress of GIS at this institution.

An important contact person is Dr. Rodger Schwass at York University. He helped the department design the Master's degree curriculum which includes a 6-month research project with industry plus a 3-month field study. A course in environmental impact assessment is being taught. Enrollment is around 30 students per class, but they hope to double this. This is the only institution in the country teaching formal courses on environment impact assessment. We are not sure of the quality of these courses. There is a crying need for this type of expertise in the country to help implement the NCS. They have unsuccessfully tried to establish links with Canadian and Norwegian universities.

There are 3 main research themes: 1) the ecological status of surface water in NWFP. A collaborative study with PCSIR has been funded by NORAD (0.8 million PKRs). The objective is to determine heavy metal concentrations stemming from industrial effluents in surface waters; 2) pesticide distribution and bio-accumulation in fruits and vegetables. We told him of PCSIR's interest in this. Although no budget allocations have been made, Dr. Zakir Ullah has joined with his wife from the chemistry department (a center of excellence in agricultural chemistry) to conduct a small pilot project; 3) the last theme was biodiversity & conservation of medicinal plants. This department appears to be a one-man operation. It does not, at present, appear to have the critical mass necessary for conducting elaborate research on its own. They need to develop a team of at least 4-5 PhDs. They would benefit from a collaborative project with PCSIR (in Peshawar) on pesticide residues. We recommend the program officers visit the department.

It may be noted that the University of Engineering & Technology, Lahore, has an Institute of Public Health Engineering and research which also carries out research on environment-related issues. We could not visit this institution due to a very crowded agenda when we were in Lahore. This is the oldest institution in the field of environment in the country and has been mentioned in the NCS report as an important actor in its implementation. There is also the Institute of Environmental Engineering, located within the N.E.D. University of Engineering, Karachi, which we could not visit.

Centre of Excellence in Water Resources Engineering, University of Engineering & Technology, Lahore

This centre of excellence was established in 1976, and has been under the direction of Dr. Awan as a semi-autonomous institution under the University Grants Commission (UGC) and the Ministry of Education since 1979. In addition to research, it is also a teaching institute that has been granting MSc, MPhil, and PhD in Hydrology and Water Resources Management since 1984. Of the 17 academic staff, 6 are PhD, the remainder MSc or MPhil.

The ongoing research program at the centre encompasses 28 nationally and internationally funded projects. The major areas of interest are irrigation modelling, systems analysis, surface drainage, rainfall-runoff modelling, ground water modelling, ground water pumping test analysis, reservoir operation, probability studies of meeting irrigation requirements, sediment transport modelling, salt water intrusion into inland aquifers, and solute movement to ground water (Centre Prospectus). The centre appears to have good field, lab, computer, and library facilities. The centre accommodates several labs including hydraulic engineering, irrigation & drainage, soil reclamation, electrical analogue, remote sensing application and geohydrology. The computer facilities consist of a PDP/1134-A mini computer and several IBM PCs. The research program of the centre lists 28 ongoing projects, of which two are financed by IWASRI. The rest appeared to be finance by the University Grants Commission and The university.

The centre has participated extensively in the past in the SCARP projects. Dr. Awan has had considerable contact with Dr. Braughton from Macdonald College who has spent several years in Pakistan working with the CIDA-funded drainage portions of SCARP. In addition to being a dynamic administrator, Dr. Awan is a dedicated scientist. In 1993 the centre hosted an international symposium on "Environmental Assessment and Management of Irrigation and Drainage Projects". In addition, Dr. Awan is sensitive to the plight of poor farmers. We spoke about farmer knowledge and how he is aware of the problems he is facing. He gave an example of farmers losing their water buffalo who inadvertently drink water from polluted rivers. Due to shortages of water and the need to cultivate their land, farmers have little choice but to wallow their animals where water is available. He also spoke of the diseases that ensue from such a practice: malaria, typhoid, etc. His vast experience and knowledge are surely assets that should be tapped.

Because of the number of people who mentioned the importance of water, we strongly recommend that program officers visit the centre and assess for themselves its capability.

It was impossible for us to visit many centres for excellence in research created by the GOP's University Grants Commission. A partial list is given below:

- H.E.G Research Institute of Chemistry, Karachi
- Institute of Geology, Peshawar
- Institute of Marine Biology, Karachi
- Institute of Mineralogy, Quetta
- Institute of Physical Chemistry, Peshawar
- Institute of Public Health Engineering & Research, Lahore
- Institute of Environmental Engineering, Karachi

Pakistan Council for Scientific and Industrial Research

This is an umbrella organization responsible for research in industry and technology in the same way as PARC is for agriculture. The PCSIR groups a number of institutes, centres and laboratories under its umbrella. They have worked with various donors, including UNDP. IDRC has supported several projects with this institute (see IDRC

section). Total professional staff is 800, of which 158 are PhDs. This council is responsible to the Ministry of Science and Technology.

During 1992-93, the Pakistan Science & Technology Centre's industrial electronics section was upgraded to an Institute of Industrial Electronics. The National Institute of Electronics focuses its research on cypher systems, microprocessor-based UPS and fabrication of electronic components. A new Centre in CAST Metal technology is being created in Lahore. The PCSIR Labs in Lahore are carrying out research work in medicinal botanics, environment impact analysis and control, food preservation and fermentation, chemical dyes and poultry feed. The existing R&D capabilities of the Environment Centre are also being strengthened. This centre has done notable work on the use of hazardous chemicals in industry. National Institute of Oceanography, in Karachi, is conducting a major study of the living and non-living resources of the Arabian sea. (See *The Annual Development Plan, 1993-94*, Government of Pakistan, Islamabad, and *The Pakistan National Conservation Strategy, 1992*.) It may be noted that an allocation of PK Rs. 151.220 million has been made to Science & Technology in the 1993-94 Annual Plan.

According to Dr. Ansari, however, the central thrust of their research is related to pesticides and pollution. They also have a program in metallurgy, ceramics, and food science. Dr. Ansari proposed a pesticide residue project on the major fruits and vegetables in Pakistan. They also mentioned the need for research on aflatoxin-free poultry feeds. They are likely the most suitable organization to conduct a pesticide project from which national standards could be developed. In addition, being an umbrella organization, they do have experience as a coordinating agency. We recommend that program officer visit Dr. Ansari and the Lahore Labs where most of the environment-related work is being done.

**Socio-Economic Policy-Oriented
Research Institutions**

Pakistan Institute of Development Economics (PIDE), Islamabad

The PIDE was founded in Karachi in 1957, moved to Dhaka in 1970, and relocated in Islamabad in 1972. It has been closely involved in economic planning in Pakistan and is the best institution for research in economic policy and theory. The director, Dr. Naqvi is a well-known, well-published scholar who holds degrees from Yale and Princeton. PIDE faculty can be compared with the best of the economic research institutions. The professional staff consists of 41 scholars, of which 23 hold PhD degrees and the other 18 hold MScs and MPhils. Almost all of the faculty members have their graduate training at some of the best academic institutions in the world, including Harvard, Princeton, Yale, Columbia, Pennsylvania, Stanford, Chicago, Cornell, Johns Hopkins, London, Michigan (Ann Arbor), Wisconsin, Sussex, Manchester and McMaster.

"The broad mandate of the Institute is to carry out theoretical and empirical research on development economics in general and Pakistan related economic issues in particular." (See *Pakistan Institute of Development Economics*, 1993.) Another important function of the institute is to give policy advice to the federal government. It was recently responsible for advising the government for developing a strategy for the 8th Five Year Plan. The main research activities of the Institute are grouped into four major research Divisions: Population, Agriculture & Rural Development, Trade, Industry Labour & Social Accounting; and Public Policy. In addition, there are services Divisions like the Library, Data Processing & Computing, Quantitative Analysis and Publications.

PIDE brings out an excellent quarterly journal called *The Pakistan Development Review*. The Review publishes original research both theoretical and empirical through a rigorous refereeing process. The Board of Editors comprises of over 40 well-known international scholars. The Review has a long list of international subscribers. In addition, over 50 books and monographs have been published over the years, most by PIDE staff but a few by other international scholars.

The Institute is mainly funded by the federal government. It also receives funds from other sources. A fund raising campaign was conducted during the recent years and Rs. 30 million was raised for an endowment fund. They had previously received a grant of approximately Rs.20 million from USAID as seed money for the endowment fund for research.

The institute has an autonomous Board of Directors, many of whom are Ministers and Secretaries of important departments like Planning, Finance, Industry or Agriculture. There are two Nobel laureates on the board — Prof. Lawrence Klein and Prof. Tinbergen.

According to Dr. Naqvi, economic development must include economic growth and social justice, yet in the case of Pakistan emphasis has been only on growth. He mentioned that there is a great deal of inequality with respect to land rights. Combined with the overemphasis on growth, this has serious consequences for environmental

degradation. In addition, there is a need to identify economic areas or sectors which lead to growth but are also conducive to the environment. Although some sectors contribute significantly to growth, they are also responsible for many of the observed violations of human rights (child and women labor) and pollution of the environment. An economic anthropology section has recently been created and may be of interest to IDRC. This group is interested in gender issues and is led by Dr. Shanaz Kazi, a well known scholar who is also active in SDPI. They also have a small section that deals with sustainability in terms of economics.

After our meeting with the Director Dr. Naqvi, we met Dr. Ashfaq Khan, who has had contact with the IDRC, regarding a project on structural adjustment, being carried out in Bangladesh and other South Asian countries. He was sent to Dhaka to attend a conference relating to this project and was later asked to submit a proposal concerning Pakistan on the same subject. After several communications with the IDRC, concerning the type of proposal IDRC wanted, this matter was then referred to Singapore. It took a year for them to respond. Khan then drafted another proposal and sent it to Ottawa. They responded that the proposal was okay but that it was no longer a priority and that another proposal should be sent to the head office. However, there was no assurance that it would be accepted and funded. Dr. Khan was very upset that he was simply being asked "to generate one proposal after another without any results". He feels that he "was let down by the IDRC".

We believe that PIDE is an excellent institution and its main strength lies in high quality academic research on economic policy issues. It also commands respect and prestige in Pakistan.

PIDE researchers can play a lead role in any projects where economic components are an important integral element. They would also bring rigor to research. The PIDE is obviously the prime institution for projects related to economic policy reform and the impact of structural adjustment on the economy and society. Program Officers from Social Science group should visit PIDE.

Applied Economics Research Centre (AERC), University of Karachi

AERC is probably the second most important institution in economic research in the country. It was founded in 1973 with funding from Ford foundation and the Government of Sindh. As is evident from its name, it is more oriented to applied research than PIDE. The Centre has focused its research on four major sectors: human resources, urban and regional economics, public finance and agriculture. The Centre has produced 64 research reports on behalf of a diverse clientele including the World Bank, the Asian Development Bank, USAID, Agricultural Development Bank of Pakistan, the Free University of Netherlands, PARC and the Karachi development Authority. Many of these have been published and more widely disseminated. Others were produced mainly for the use of policy makers. The Centre also brings out a professional journal: *Pakistan Journal of Applied Economics*. On the basis of a quick review of 3 issues, the Journal

appeared to be of very good quality, publishing mostly empirical research. Each issue contained, at least, one piece from an international scholar. The list of Associate Editors include such well known economists as Pranab Bhardhan (UC), H.W. Singer (Sussex), Amartya Sen (Harvard), Paul Streeten (Boston), Keith Griffin (UC) and Carl Gotch (Stanford).

In addition to the Director and the Chairman, Graduate Studies, the staff consist of 7 Senior Research Economists. Of this group, 8 have PhDs from renowned academic institutions including Stanford, Western Ontario, Vanderbilt, Temple, Boston and East Anglia. In addition there are 11 Research Economists with Master's degrees (6 of them from the US & Canada).

As we have mentioned above (see CIDA), the Centre is developing a model for public sector expenditure planning with CIDA funding. This project is being carried out under the Direction of Dr. Pasha and also involves Dr. Aynul Hassan from ACADIA University. We very briefly met with Dr. Hassan, on his way back to Canada. He, however, was not very forthcoming in giving us the details about what had been actually done so far. Instead, he was interested in knowing if the IDRC had a "hidden Agenda" in sending this mission. We assured him That this was not true. The Centre has recently developed a model of municipal finances in Pakistan which permits the projection of financial prospects of a city under different scenarios of economic growth. it also provides a separate module of analysis for each of the revenue sources. Other recent project titles include The Fiscal Base of Karachi, Housing Survey of Rural Pakistan, Local Government Finances in Pakistan, Urban Household Credit Study, Farm Productivity, The Determinants of Corporate Savings, The Stock Market and Pakistan Economy, 1964-1987, and Profitability and Industrial Concentration In Pakistan. In recent years the faculty members have published over 100 research pieces, mostly in the refereed journals within Pakistan and quite a few in international journals including *American Journal of Economics*, *Journal of Developing Areas*, *Indian Journal of Agricultural Economics*, *Development Dialogue*, *Asian Economic Review*, *World Development*, *Singapore Economic Review* and *Industry and Development*.

The Centre grants MPhil and PhD degrees. The Centre's total budget amounts to Rs. 660,000 for the current year. Dr. Wizarat informed us that staff salaries account for almost two-third of the budget. The library specializes in economic books and consists of 10,000 volumes. It is also a depository for the GOP documents. The Fareed Memorial Library of the Department of Economics, nearby, is also available to researchers. The computer centre is well equipped with a large number of PCs of varying capability. Software packages for sophisticated statistical and econometric analysis as well as data sets on various aspects of Pakistani economy are available.

In the recent years, well-known international scholars have been visiting professors at the Centre. Some of these include: Eric Gustafson (UC, Davis), Robert Klitgaard (Harvard), James Knowles (the Triangle Institute), Mahmood Hassan Khan (Simon Fraser), Kathryn Hyre (Harvard) and Micheal Wallace (Harvard).

We would rate the AERC to be a very good research outfit. It enjoys credibility in Pakistan, has good functional linkages with the business community of Karachi and the Sindh provincial government. It certainly possesses a critical mass of well-qualified

researchers, used to carry out team research. It also has experience of conducting research for various foreign donors. We are not, however, sure as to its capacity to do research on environment-related issues. We believe it would be suitable for conducting research projects with components on applied economic research particularly in the field of public finance, agriculture, industry (Micro level) etc. We strongly recommend that IDRC explore the possibility of involving them in a multi-disciplinary research project.

Pakistan Administrative Staff College (PASC), Lahore

PASC sits on the apex of the hierarchy of training institutions providing in-service training and development for the public service. All senior officers due for promotion from Grade 20 (Joint Secretaries, Director Generals) to grade 21 (Secretary) must undergo the Senior Management Course given at the PASC. The Principal of the College is usually a very senior public servant from the elite central cadre. The present Principal had just been transferred there from the position of the Chief Secretary of the province of Punjab. The college has a beautiful campus, an excellent library specialized in Public Management and good computer facilities (10 IBM PC 386s). There is a small group of researchers headed by a senior civil service officer with a lot of field experience. There are five research associates, all Master's degree holders, 3 from abroad and 2 from Pakistan. In addition, there is a Member Directing Staff with a PhD in Economics.

PASC's basic mandate is training of senior civil servants and research is only a secondary objective, but in the recent years they have produced some interesting policy-oriented research. Their recent projects include research on behalf of the Export Promotion Bureau, the Central Board of Revenue, the Agricultural Development Bank, and a project on the distribution of emergency flood relief. These projects have made a significant contribution to policy making in concerned sectors. The present Principal and Research Director are both very keen to promote research because they consider policy-oriented research as crucial to policy and training content.

The research/training approach in the PASC is based on the syndicate method developed at Henley-at-Thames by the British Staff College. The participants of the senior management courses are required to produce a research paper at the end of their training. Sometimes the participants are grouped in teams and write a collective research report usually based on field research. Most of these participants are highly qualified people with a lot of field experience. In addition, because of their positions in the public service, they have access to data and information that university researcher may not have. Often the participants also have academic qualifications; for example, a course may have the Chief Economist of a province or the Director General of PFI as participants. They use this research opportunity to develop solutions to their policy problems. After discussions with Mr. Masud and Mr. Ramizuddin, we feel that if the PASC could be linked with researchers from, say, LUMS or SDPI or PIDE to provide some methodological advice very interesting research projects can be undertaken at the PASC, perhaps leading to the solution of many policy issues, particularly the in the implementation of the NCS.

The PASC is also well placed to undertake research on local institutions, decentralization and problems relating to good governance. This is a priority sector in the 8th Five Year

Plan. They have good links with all the central and provincial governments institutions and the district levels. Institutional development will also be an important factor in the implementation of the NCS. Administrative change, coordinating mechanisms, rules and laws have to be developed. The PASC can help the IUCN and SDPI as far as the administrative aspects of the NCS are concerned.

PASC's strength lies in their strategic position in government, their access to information and data, and their capacity to implement a field research project with the help of the field staffs of the functional departments like agriculture, industry, education, health or local government, and not in the number of PhDs they have on staff. The present Principal is known to be very dynamic and will be very helpful in carrying out research projects which need cooperation of other agencies. We recommend that the Program officer visit the PASC and explore the possibility of cooperation between LUMS or SDPI and the PASC in a joint project.

Institute of Business Administration (IBA), University of Karachi

IBA is the oldest business school in Pakistan. The school brochures claim that it is the largest business school in the world. It was set up in 1955 with the collaboration of the Wharton School of Finance & Commerce, University of Pennsylvania. The Institute grants an MBA, an MBA (banking), an MBA (MIS) and a Bachelor's degree. There is no PhD program.

Of 19 full-time faculty, only one (Dean and Director) has a PhD. The other 18 staff members all have Master's degrees, 3 from abroad (W. Illinois, Keele & Leeds), the rest from Pakistani universities, a great majority from IBA. In addition, the IBA brochure (1993) lists 48 adjunct faculty (part-time). They all have Master's degrees, a great majority (39) from IBA and only 5 from abroad. With the exception of Minnesota, all of these are from relatively unknown business schools. According to Dr. Wahab, the institute finds it very difficult to retain highly qualified staff. There are 400 undergrad and 800 graduate students currently enrolled in the school programs. The institute boasts the largest business library in Pakistan with 70,000 volumes in the collection.

It appears that the IBA's main emphasis is on education and training rather than research. It is interesting to note that the IBA literature (a brochure and a booklet published in 1993) do not mention research at all, nor is there mention of any reference to Faculty publications. Dr. Wahab mentioned a survey, carried out by the IBA on behalf of the MITI, about the Japanese investments in Pakistan. Another project was carried out by a visiting Dutch doctoral student in the poor localities of Karachi in reference to the Social Action Program (SAP). The absence of PhDs from the faculty probably accounts for the lack of interest in research. The IBA appears to be very proud of its discipline, well-structured curriculum, rigid schedules conveyed a year in advance to the students and strict control and punishments for cheating in examinations. These values are prominently displayed in IBA literature. The teaching is based on traditional business school pedagogy: class-room lectures, case-method, role-play, simulation etc. One of the business finance classes learns through investing money and is graded on the basis of

their performance at the Karachi stock exchange. The funds for this purpose are provided by IBA.

Within the Pakistani context, IBA is extremely well-equipped in terms of data processing facilities and computer hardware. The IBA Centre for Computer Studies established with the help of the IBM World Trade Corporation has been equipped with the IBM system 4331 model 1102 mainframe computer with 12 terminals, an IBM system 34 mini computer and 40 PCs. Recently an IBM system AS/400 E10 has also been installed. From IDRC's point of view, this is probably an important factor. The institute may be useful in developing new and innovative software packages in cooperation with some business organizations in this sector.

The school appears to be well plugged into the business community of Karachi through its alumni, part-time, and full-time faculty. It could be used to mobilize support for the environment movement and in helping businesses formulate environment friendly policies and strategies. At present they do not have any faculty member interested in environmental research. There is no linkage between the environmental NGOs like the IUCN and IBA.

Ironically, the IBA in 1960s had scores of fresh PhDs trained under the USAID programs in some of the best US universities, though it did not have the high-tech infrastructure. Now that it has established an attractive campus, excellent computing facilities and a very good library, it appears to be very weak in research capacity. The present leadership seems to emphasize teaching, discipline, punctuality and traditional management orientation.

We recommend that program officers visiting Pakistan contact IBA and see their Computer Study Centre and explore the possibility of developing innovative softwares with the person in charge of this facility.

Lahore University of Management Sciences (LUMS)

LUMS was established by Pakistan's leading private and Public sector corporations in response to an acute need for well-trained professional managers in the country. LUMS received its charter from the Government of Pakistan in 1985. The Graduate School of Business was the first school created by LUMS under the charter. LUMS is the only private university in Pakistan. Its Board of Trustees includes leaders of the business community of Pakistan, a High Court judge and heads of the some of the most important education and training institutions of the country. The list of the members of its Board of Governors reads like the veritable Who's Who of the Pakistani industrial elite. The school was established with the following three objectives: to offer an MBA degree, conduct executive development programs, and to provide an intellectual resource base for conducting applied research in business and public policy. Despite its short life span (7 years) LUMS has made an excellent progress. It has been able to attract a group of highly talented faculty, developed excellent infrastructure and gain a high degree of credibility in the community. It is a fine example of institutional development.

At present, they have 14 full-time faculty, of which 11 have doctoral degrees from renowned academic institutions including University of Pennsylvania, Stanford, Indiana, ANU, Austin (Texas), Pittsburgh, Manchester, and Essex. Two faculty members have Master's from Yale and Oregon, the third being an accountant with professional qualifications from England & Wales. Three Teaching Fellows are now on leave to complete their doctorates at Oxford, Chicago and London universities. All in all it is a group of highly talented achievers. What impressed us most was the youthful exuberance and dynamism of the Faculty. They appear to be in touch with the professional and academic world on international level presenting papers, consulting for international agencies and interacting with scholars abroad.

LUMS library, though small in size, is known for its innovative approach to service computerization. It has developed the first resource-sharing network linking 9 libraries in Lahore. It is called the Lahore Business & Economic Libraries Network (Labelnet). This project was funded by the IDRC. LUMS has recently developed the Corporate Library Information Service (CLIS) for its Executive Development Alumni, providing its corporate members with a range of information.

LUMS is equipped with excellent computer facilities including a Compaq 4SL computer and a number of Compaq 386-SX units. Complete desktop publishing facilities are provided on its Macintosh network. Software development has been expanded by the UNIX operating system and the Oracle Database management system. Upgraded hardware facilities now allow students to use "Windows" and "Mouse". According to *LUMS Annual Review 1992*, database and accounting programs were being designed at LUMS for the various departments in the university.

Applied research is one of the three main objectives of LUMS. The young faculty appear to give a great deal of priority to research.

LUMS has a link program with McGill Business School funded by CIDA. One of the component of the LUMS-McGill Link is the establishment of a Centre for Management and Economic Research (CMER). The Centre will focus on promoting regional research linkages and a better understanding of the Pakistani and regional business environment. Another important development is the creation of a small and medium enterprise development centre with the help of the Konrad-Adenaur Foundation of Germany. This centre aims at helping the SMEs in all stages of their development. It will conduct research, promote entrepreneurship and organize training programs. Two research projects have been initiated to understand the behavior of the owner-managers.

Dr. Zafar Qureshi, Associate Dean, acts as advisor to the IUCN for the implementation of the NCS. Ms. Abban Kabraji (see below) of the IUCN mentioned that they have close liaison with LUMS. LUMS is also developing a small centre for environment assessment studies. This is a promising development.

The case unit at LUMS is repository of over 2000 cases from established programs like Harvard Business School, IMEDE, Western Ontario and London Business School. The main focus of the case unit is development of the indigenous case studies, leading to the completion of some 200 cases. LUMS also has a vigorous program of organizing conferences on current policy issues bringing together the senior policy makers, business

leaders and academics. Every year LUMS welcomes a number of national and international scholars as Teaching Fellows giving seminars and courses.

Some recent titles from the faculty publications include: " Private vs Public Ownership: Investment, Ownership Distribution and Optimality", *Journal of Finance*; "Optimal Capital Structure and Project Financing," *Journal of Economic Theory*; "Differential Mortality in Rural Bangladesh," *Journal of Applied Econometrics*; *The Political Inheritance of Pakistan*, Macmillan; *Public Enterprises in Pakistan*, Westview Press.

We strongly recommend a visit to LUMS by program officers. There is certainly a great potential for developing projects in the area of SMEs, development of softwares, MIS and environment policy. Dr. Zahur-ul-Hassan and Dr. Javaid Ghani, both MIS specialists, are very keen in the development of software. The Faculty at LUMS appears to be highly motivated to undertake innovative research projects. They enjoy excellent relations with the business community, the provincial and federal governments, as well as institutions like the SDPI and IUCN. They will shortly move into their new campus built with a substantial grant from USAID.

The NGOs in Environment and Human Development

International Union for Conservation of Nature, Karachi

The IUCN-Pakistan was established in 1987. It has total staff of 61, of which 43 are based in Karachi, 14 in Islamabad, and 4 in Peshawar. The IUCN was the central player in developing the National Conservation Strategy (NCS) for Pakistan, which was approved by the GOP cabinet in 1992. Before the NCS, the Government's approach to environment was fragmented and ad hoc. The Swiss-based IUCN, an NGO with the financial support from CIDA and the UNDP set up the NCS secretariat in Pakistan to prepare the Strategy. The preparation began in 1988. A series of seminars were held to solicit public opinion. Sectoral papers were prepared by experts, public hearings were conducted, and conferences were held before the draft was circulated among the major federal and provincial departments. Finally it was approved on March 1, 1992. The NCS document — the end product — (See *The Pakistan National Conservation Strategy*, Government of Pakistan, EUID and IUCN, n.d.) thus represents a unique blend of factual data as well as the opinions of government departments, bureaucrats, politicians, NGOs, international agencies and donors, specialists and even the grassroot levels. The Strategy identifies 14 program areas including soil degradation, forestry, watersheds, biodiversity, urban waste, pollution etc. It is estimated that the implementation of the proposed 14 area programs would cost over US \$ 150 billion from 1992 to 2001. The requirement for the first year (1992) stood at Rs 4.5 billion and for the second (1993) year over RS 6.5 billion — a huge amount, given the limited resources available for annual development programs. It may be noted that GOP's total Public Sector Development Program (including the provincial allocations) for 1993-94 is budgeted at Rs. 67.6 billion.

IUCN Pakistan comprises the following 8 programs: communications, evaluation and monitoring, business and legislation, NGOs, strategy support, range management, institutional development, and education. The communication division publishes the NCS Bulletin, investigative reports, awareness campaigns, as well as provides environmental orientation to journalists. The project unit, with the assistance of IUCN partners, evaluates, monitors, and reviews projects. The business and legislation section is presently involved in drafting the new statute and by-laws required to administer the strategy (Dr. Zafar Iqbal Qureshi is advising IUCN in this capacity). The NGO group deals with training and institutional development of NGOs; a total of 15 NGOs were members of IUCN Pakistan. The strategy support unit is assisting in the formulation of national and provincial strategies. The range management unit is focusing on the problems in the Swat Valley where a community-based reforestation program is underway. In addition, 2 similar projects are being conducted in Dir Kohistan and in Galiat in Ayubia National Park. Both the education and institutional development sectors required strengthening.

According to Ms. Kabraji, "pure" environmental research is the responsibility of institutes like SDPI. The NCS document after a survey of 53 research establishments, lists 40 which have a major or supplementary focus on environmental research. PCSIR, PARC, PFI, institute of Marine Biology, Irrigation Research Institute, institute of Environmental Engineering (karachi) are the ones with major focus on environment. However, IUCN is in a position to conduct quick operational level analyses and problem solving. She gave the example of solving the juniper mistletoe problem in Balochistan

where the recommended practice is to lop and burn diseased branches of mildly infected trees and to cull heavily infested trees. Ms. Kabraji felt that culling (as many as 30,000 trees) was too drastic a measure and that an alternative solution was needed within 30 days. Another example was the recent discovery in Karachi of several large drums of meta-dinitrobenzene that required immediate, safe disposal (2 people died). Ms. Kabraji [?] that IUCN is continually expected to solve this type of problem that requires immediate attention. Although they do not have their own diagnostic/analysis facilities, they can quickly mobilize a small research team to develop problem-specific solutions. They usually use the lab facilities of the PCSIR located in Karachi. She explained that access to a "petty cash source of funding for ad hoc research is necessary". She explained that such a nest egg for troubleshooting was appropriate in the Third World context and would have enormous impact.

As much as we would have liked to explore more about IUCN activities in Pakistan, particularly the implementation of the NCS and the role of research and research institutions in this effort, it was not possible due to Ms. Kabraji's very crowded agenda. Despite an appointment scheduled well in advance to see us, Ms. Kabraji had to leave a meeting in which a CIDA consultant from Pakistan was present. It was unfortunate that she was too busy, distracted, and unable to share with us more information as we had anticipated. IUCN's recognized success in formulating the NCS may have attracted an inordinate number of potential donors lining up at their door. We had the distinct impression that IUCN (Pakistan) is operating in a recipient's market where there is no shortage of foreign donors.

Since IUCN does not have its own research capacity at present, it is an unlikely candidate for a research grant. However, it can play an important role in mobilizing the end-user cooperation in project design or application of research results where primary research responsibility lies with a recognized research institution like the PFI or PCSIR. We recommend that program officers visit IUCN Pakistan to further explore this possibility.

Sustainable Development Policy Institute (SDPI)

This is a CIDA-funded NGO, established as a direct result of the NCS, to provide policy advice and basic research for government, NGOs and the private sector. At present, there are five PhDs on staff including the Executive Director who is an economist by training. The others have training in Political Science, Sociology, economics, Solar energy, Public Health and Agriculture. They also have a demographer and an expert in gender issues. This institute has two main functions: a) to provide direct advice to policy makers, and b) to initiate research leading to debate and action on environment issues. "SDPI's research program is divided into three broad areas: support to government and NGOs, policy research in sustainable development issues, and contribution to the development of research infra-structure in Pakistan" (SDPI, 1993). They believe this is an effective way to raise awareness on environmental issues relating to the NCS.

To increase information accessibility, a library has been set up in Islamabad. This facility continues to acquire information and databases on environment-related issues. The library has recently obtained additional funding from NORAD for the purchase of books, periodicals, CD-ROM databases, computer equipment, projectors, photocopiers,

TV, and VCR. The SDPI bibliographic collection is on CDS/ISIS software. They are also acquiring data from the Pakistan Statistical Bureau, promoting a library network, and creating research indexes.

A weekly seminar series on environment-related topics was created to facilitate dialogue within the academic community. It is hoped that this forum will create public and private sector awareness, stimulate constructive debate, and mobilize the community to take action. The objectives behind creating this series were to "a) provide insights into policy making; b) identify new mechanisms of implementation within and outside government; c) stimulate participation, and in particular a sense of responsibility for what is happening in Pakistan; and d) engage the international community in a creative dialogue with Pakistani intellectuals about alternative visions of progress. Special research topics include: a) identification and removal of bottlenecks in implementation of the NCS, b) action plans for the local activist NGOs, c) Pakistan's contribution in global discussions of environment and sustainability, and d) lessons from other countries and regions" (SDPI, 1993). In addition, Dr. Banuri specifically mentioned environmental health, population and the environment, environmental law, and waste recycling. With respect to health, SDPI envisioned collaborating with the National Institute of Health on issues such as clean water, curative vs. preventative health, and pesticides in cotton. SDPI has conducted some research on population and environment as preparatory work for the UNCED conference. This work was also presented at a conference sponsored by the UN Social Institute in Geneva. Some research on agriculture is being conducted with PARC. The academically oriented studies, Dr. Banuri mentioned, include historical studies to document the spread of the green revolution throughout Pakistan in general and Punjab in particular, the reasons for such rapid adoption, and the lessons learnt. He also mentioned the history of deforestation in Pakistan — "where the local community acts either as an active participant (in deforestation) or as a passive observer". Dr. Banuri is also interested in comparing forest management practices on government, private, and social forest systems. Although such studies are academic, he felt they could have impact on policy makers. Over the course of our trip, we encountered three different institutes that were collaborating with SDPI, namely, Lahore University of Management Science (LUMS), the Agricultural University in Faisalabad, and the Administrative Staff College in Lahore. When we mentioned that we would like to see a recent paper presented in agriculture, Dr. Banuri provided us with a paper on biofertilizers (green manuring). Dr. MacLean thought that the manuscript read like a paper from a second-year college student. Needless to say, we were not impressed. Hopefully, this is not an indication of the type of speakers that are asked to present. In fact, Dr. Qureshi, a soil scientist from Faisalabad that was to present a paper at SDPI, appeared to be very competent. SDPI's greatest strength may be its ability to coordinate and mobilize a team of researchers from different organizations to achieve a given set of objectives, say EPA legislation, for example.

Dr. Banuri is very intelligent, articulate, suave and sophisticated, and appears to be extremely comfortable with the latest jargon and buzzwords. Sustainable development, governance and leverage are all part of his vocabulary and are prominent in SDPI's brochures. Collaboration between PARC and the SDPI could yield fruitful results. SDPI has a great deal of visibility. At present, it appears to have more strength in mobilization of opinion than the academic or scientific content of its research. It is a very new organization and will take some time to develop a sound research capacity. We

recommend that program officers visit SDPI. It is not clear whether the SDPI will be able to maintain the high visibility and momentum after the external aid is withdrawn or Dr. Banuri leaves.

Pakistan Institute of Environment Development Action Research (PIEDAR)

Established in 1990, PIEDAR is a "non-profit, independent institution bringing together, in a collegial form, reputed and recognized citizens to undertake and learn from action research, and to disseminate findings horizontally to other communities and vertically to governments, the private sector and NGOs" (PIEDAR, 1992). Mr. Qutub was the coordinator of the NCS during formulation stage and played a key role in writing the final document. He obtained his Master's degree in economic geography from Cambridge University in 1971. The research staff (7 - 1 PhD and 6 MScs) have varying backgrounds and expertise in the field of environment, economics, sociology, law, finance, marketing, and management sciences. PIEDAR funding is raised from a) donations from the membership, b) donations, grants, or contributions from national and/or international donors acceptable to the Board of Governors, c) fees, subscriptions, and dues paid to the institute, and d) earnings from consultancies and/or investments. Funding has recently been received from the Swiss Development Corporation to design and develop strategies to implement particular component priorities outlined in the NCS for the district level. Mr. Qutub believes that sustainable implementation of the NCS will never occur unless work begins at the grassroots level, much along the lines of the AKRSP model. Following this approach, PIEDAR is presently focusing on improving on-farm water management by rebuilding canal banks and increasing water utilization efficiency by selecting water lining materials that reduce seepage. They are beginning to replicate these pilot projects in isolated communities in Punjab. He selected water management as an entry point because "over the 40,000 miles of water courses in Pakistan, losses are estimated at over 25% due to infiltration, seepage and evaporation". We mentioned that ADB was financing similar projects and we wondered if he had applied for funding. He told us that "PIEDAR categorically refused to get involved with ADB because such large donors often distort the NGO's initial goals to suit the donor's objectives". Mr. Qutub showed us a sample of the type of work the "barefoot" surveyors do and explained to us some of the difficulties PIEDAR has in interpreting the wide range of issues raised by the community. To effectively reach the community, PIEDAR has incorporated the use of posters, pictographs, and is presently training local people in the use of video and audio equipment to monitor the "community-motivated and community-realized" achievements. Ms. Khawar Mumtaz, a reputable gender researcher, is a key member of the team responsible for many of these activities.

Although we were able to see Mr. Qutub twice, we had difficulties in obtaining specific information as to what the group's plans were for the near future. He was vague and ambiguous. Under the assumption that this was a communication problem, we provided Mr. Qutub with sample proposals of recently approved IDRC projects on soil and water management that we obtained from MERO. Hopefully, these will give Mr. Qutub and PIEDAR an idea as to the type and scope of projects IDRC funds. PIEDAR applied to IDRC for funding back in 1990, but was refused. According to Mr. Qutub, the institute

has matured considerably since then and greater emphasis is now placed on developing strategies that serve the industrial, public, social, and environmental sectors. We recommend that the program officers visit Mr. Qutub. Based on Mr. Qutub's understanding of environmental problems, we both feel that he and his institute are competent and could conduct significant community-oriented action research.

Sustainable Development Network (SDN), Pakistan

This non-profit organization was set up in December 1992 with UNDP funding, \$ US 300,000 seed money for the launching of SDN Pakistan and another \$ US 200,000 has been promised. IDRC has been involved with the development of SDN Pakistan and the contact person is David Balsom, who was to attend a conference on the status of SDN International, held in Bangkok in September 1993.

Because the NCS emphasizes dissemination of information on sustainable development, the importance of SDN takes on a greater dimension. Presently, there are three technical staff and Mr. Daudpota is the coordinator. The group has been developing a Business, Education, Research and Development Network (BERDNET) which serves to link up various sectors within Pakistan to many of the international networks. They anticipate to have three to five nodal points within Pakistan, namely in Islamabad, Lahore, Karachi, Peshawar and possibly Faisalabad. Where these nodal points are to be located within each city has not yet been confirmed. Each nodal point is to be equipped with a 486 computer.

This network will enable users to communicate via electronic mail as well as electronic conferencing. Initially, they anticipate the business community will be the major users and will provide a large proportion of the initial funds. Mr. Daud Pota was convinced that business usage of the network will generate sufficient profits to enable the NGO, education, research and development sectors to gain access to the network — i.e. that the business sector would initially subsidize the network. Mr. Daud Pota acknowledged, however, the danger of the business sector monopolizing the network but felt that without the participation of the business community, the network would not be financially sustainable.

BERDNET was modelled after a WEB network in Canada initially launched by 90 business organizations and is supposedly now widely used. The proposed network (BERDNET) provides users access to conventional information and databases. He did not elaborate to any great extent as to how the education, research, and development sector will use the network. One example he mentioned was E-mail communication between universities or between district education officers. This would enable primary and secondary school officers to communicate electronically to design new courses, update curricula, or improve teaching methodologies. He briefly explained the Netherlands Library Development project that has provided computer cataloguing and electronic systems. These libraries could easily be linked using BERDNET. In addition, he mentioned that 17 education centers have been provided hardware by USAID and that these centers could be plugged into the proposed network — Lahore University of Management and the Azad Kashmir University, for example. He emphasized that the

network will provide an alternative source of information and will be user friendly, but acknowledged that some training will be necessary.

A survey has been conducted to identify potential users and will shortly be available. A user directory will be posted on the bulletin board to provide user addresses. BERDNET will also enable users to access several databases, including that of IUCN. Without IDRC funding, there may be a serious shortfall which could jeopardize the launching of BERDNET. As far as government is concerned, SDN Pakistan has proposed to develop a system to enable the GOP to index their 5-year and annual development plans as well as develop electronic reporting and documenting of information. The Federal Bureau of Statistics has shown great interest in this proposal. Besides BERDNET, SDN Pakistan has a formal proposal before the Environment and Urban Affairs Division of the GOP to set up a database on demographic statistics at the district level. We recommend that program officers visit Mr. Daudpota and SDN Pakistan.

National Rural Support Program (NRSP)

NRSP is a community-based rural development program based on the Agha Khan Rural Support Program (AKRSP) model which has been successfully implemented in northern Pakistan over the last decade. The AKRSP was based on three main elements: a) economic incentives to off-set the potential risks for the risk-averse poor population; b) a community-based social organization at the village level to undertake development projects and c) a technical package of appropriate technologies, skills and credit. A substantial amount of research (data collection and analysis) is required to learn about the socio-demographic characteristics of the targeted populations, for developing appropriate technologies and for marketing of the produce. By all accounts AKRSP has been very successful building village organizations, develop physical infrastructure, promote savings and investment in productive projects at the village level. (See The World Bank, *The Agha Khan Rural Support Program in Pakistan*, Operation Evaluation Department, 1990). At the same time it was, by no standards, an organization operating on a shoe-string budget. It was able to attract substantial amounts of foreign aid from multiple donors. During 1983-1989, the AKRSP received over US \$ 22 million in aid and in 1991 alone their aid grants stood at over US \$ 11 million.

The AKRSP model is now being replicated on national basis and the NRSP and the provincial RSPs are the vehicles to achieve the replication. Another innovation is that these organizations have been launched as joint stock companies, equity capital being a Rs. 500 million grant from the GOP. The director and general manager of this autonomous organization are the former AKRSP founder Shoaib Sultan Khan and Najma Siddiqui respectively. NRSP has 5 divisions: physical infrastructure, natural resource management, human resource development, rural credit, and planning and monitoring.

The initial program has been launched in 8 districts, strategically selected in the remote regions of Khoshab, Bedin, Mirpurkhas, Turbat, AJK, and the barani areas of Islamabad. Based on our interview, it appeared that one of the basic criteria NRSP uses in the selection of a community is the size of the community's aggregate savings on which the level of credit extension (7% interest) is based. Other criteria include the lack of social organization, level of poverty, and the absence of other NGOs. Once a community has

been selected, the core staff of NRSP, mostly Master's degree holders in agriculture and related disciplines, with 5 years' work experience, begin to train community workers chosen individuals to become Master trainers and para-professionals. To reduce the risk of para-professionals migrating to urban areas after training, course certification is not granted. These para-professionals then train farmers in such diverse fields as pest management and agronomy to tractor repairs. For this, they receive a salary from farmers within the targeted community.

The basic modus operandi is to obtain from the community a prioritized wish list from which the problems are identified. The group then, along with national and provincial research institutes, tailors site specific solutions. The scope of problems addressed ranges from animal vaccination campaigns and special feed and fodder programs to training of traditional birth attendants. One problem that Dr. Hijazi felt rather strongly about was the adulteration of certified seed, fertilizers, and pesticides by small and medium level intermediaries between importers and end-users. To overcome the high degree of corruption, NRSP purchases agri-inputs in bulk directly, and makes them available to farmers upon request, including pesticides from multinationals like Cieba-Giegy.

As mentioned above, the NRSP has been developed basically to replicate on a national level, the work of AKRSP. From the CIDA portion of this report, we see that AKRSP has no trouble in obtaining funds from various donors, both national and international. Upon arrival at the posh NRSP offices, it became evident that the same holds true for NRSP. This was further substantiated by the new, interim Minister of Commerce, Dr. Pasha, who mentioned that NRSP was very wealthy as a result of the sophisticated savoir faire of Shoaib Sultan Khan. Irrespective of the availability of funds, however, some concern should be raised regarding the capacity of para-professionals after only three months of training. Are they really in a position, say, to give sound pest control advice to farmers? Is this leading to overspraying? Upon consultation with Dr. Altaf (chairman of PARC), we found out that there have been recent pest outbreaks in the apricot, plum, and other fruit orchards in the northern regions where AKRSP has been working. This he attributed to increased and possibly, indiscriminate use of pesticides, resulting in a reduction of natural enemies populations. Is it feasible to attempt to make first world farmers out of subsistence farmers without adequate understanding of the impact of the inputs? In our opinion, NRSP is already well funded and does not seem to be interested in basic research; their bandwagon thus should be left to other donors.

Sarhad Rural Support Corporation (SRSC)

This NGO follows the AKRSP model and according to Ian Smillie, the principal author of an assessment report at the Behest of SRCS, "There has not likely ever been such a large-scale attempt to replicate, to scale-up, to expand the benefits, and to apply the lessons learned by another organization in the Northern Pakistan" (Ian Smillie et. al., *The Sarhad Rural Support Corporation*, 1992) Their objective statement reads as follows: "The long term objective of SRSC is to facilitate rural economic growth by supporting the evolution of organized rural communities capable of carrying on their socio-economic development with improved managerial abilities and financial means" (SRSC, 1992).

SRSC has 1 main office (Peshawar), 3 regional offices, and is active in 4 districts in NWFP. USAID was the first foreign donor and granted \$ US 2 million over a 2-year period. The NWFP government also provided funds. SRSC collaborates with the IUCN — Sarhad Provincial Conservation Strategy unit (SPCS) in the NWFP P&D.

SRSC concentrates on irrigation, forestry, and agriculture. They are also involved with several women's organizations. Social organizers establish contact with the community selected based on poverty incidence. They promote awareness of local issues, and encourage people to create a vision of their village. A resource baseline survey and a socio-economic assessment serve as a basis for credit extension (12% per annum interest on loans extended for agro-inputs) and enable the group to monitor and evaluate project impact, although such evaluation has not yet been conducted.

Similar to AKRSP, para-professionals receive a 3-month training and return to their community to train farmers. Mr. Madjid affirmed that pest control was necessary but that greater importance should be extended to biological control. He explained that less emphasis was put on agro-chemicals (pesticides in particular), because only 2 out of 10 para-professionals successfully completed their training in proper and safe pesticide use.

In addition to pest pressure, he explained that farmers also face fluctuating crop prices due to shifts in supply. A price-fixing strategy or econometric model for price forecasting would be an effective tool.

We also met Dr. Roidar, the person responsible for agriculture who joined SRSC from the Arid Zone Institute in Balochistan. They are focusing on deep tillage using the moldboard plow to reduce the impact of drought in rainfed regions and positive results were convincing farmers to adopt. Dr. Roidar also stressed the need for agro-inputs to increase yields.

SRSC has transport and computer facilities and the staff appeared qualified. We were told that salaries needed to be reduced to ensure that an operational minimum was maintained.

SRSC appears sincere. Our impression was that they would be most effective if they were linked with either the University of Agriculture, the University of Peshawar, or PFI. Their financial instability could prove to be a problem. We recommend that SRSC be visited by a program officer.

SUNGI-SEBCON, Islamabad

SUNGI and SEBCON are sister organizations headed by Mr. Khan. He belongs to an old political family from NWFP and holds an MPhil. His expertise lies in the area of SMEs, micro economics, and project evaluation. He has taught courses at Quaid-e-Azam University in Islamabad. Kamran Sadiq is an accountant with diverse experience in taxation, auditing, mergers and acquisitions. Present staff comprises 8, all master degree holders and one of whom is the former Chief of Federal Bureau of Statistics in Pakistan. Another researcher Rabia Khan is a well known for her work on women's issues. In addition, they have a financial analyst, information science specialist,

and an anthropologist on staff. They also have associates who work on a part-time basis. A couple of these are academics with PhDs and a solid record of publications.

SEBCON has been in operation for approximately 6 years, while SUNGI has been active only for three years. SEBCON's budget is estimated at approximately 5 to 6 million Rs. and SUNGI's budget is only half of that.

Some examples of SEBCON's research are projects funded by International Labor Office, Swiss Development Corporation, DANIDA, and CIDA. They have had a fair degree of involvement in monitoring and evaluating community health programs like mother and child health care in Baltistan, north of Gilgit. They have also conducted studies on rural health programs for JIKA. They have studied the impact of cement plant effluents on the environment. Results from these studies were used to organize public hearings and to mobilize public support for environmental issues. They claim that they are bringing together government, business and unions to initiate a dialogue on environment and have received funding from IUCN. Some studies have also been conducted for PARC and results according to Zafar Altaf were inconclusive and somewhat vague.

They have done contract work — mostly research reports and investigative studies — for a large number of multilateral, bilateral, and GOP agencies. They have also carried out surveys, impact evaluations and feasibility studies. They seem to have done a lot of work in WID/Gender related studies as well as in small enterprise development. Another area of their expertise seems to be the community and rural development. They are also somewhat regionally or geographically specialized since most of their work seems to have been done in NWFP or FATA. Overall, this organization seems to have a lot of experience in applied policy-oriented research. They have carried out over 50 such projects.

This organization carried out surveys of enterprises in an effort to determine the kinds of industries that were growing in the rural areas. Results indicated that the largest industries were cement and sugar refineries while the small enterprises were sheet metal welding. They then studied the types and chemical content of the effluent from cement and sugar plants. They are very concerned about the depletion of natural resources in the Hazara district (Omer Asghar Khan comes from this area). He believes that the timber mafia is logging on a very large scale and many of [?] the often the members of the provincial assembly have personal interests in the timber industry. We have also found out that the leader of this NGO, Omar Asghar Khan is a candidate in the upcoming elections. We are not sure whether he would stay at the head of this organization if he is elected. This is not to say that they cannot function without him, but it would represent a significant loss.

SUNGI is involved in community-based work and is a non-profit, non-government development organization. Its main objective is to promote self-sustained development of low income villagers and urban communities. It plays an intermediary role between the governmental and International development agencies and helps in the implementation and monitoring of community development projects. It carried out a survey on the role of women in urban water supply in Faisalabad and Lahore. It was also involved in community-based environmental projects in Haripur and Abbotabad. It participated in the process of formulating the NCS and was involved in preparing a background paper

on types of NGOs and their capacities. SUNGI has been closely linked to many NGOs like Aurat, Sheri and the Orangi Pilot Project. (See, SUNGI Development Foundation, *Third Annual Report, 1991-92*, Islamabad.)

We left SUNGI-SEBCON with a positive impression. It did not appear to be a flashy organization with a dazzling foreign-funded office, decorative desktops, a few parked Pajeros and safari suits. Their work appeared to be of good quality. We reviewed some of the studies done by them. We felt, both Omer Asghar Khan and Kamran Sadiq are people of integrity and dedicated to their work. They have put together a small but effective team of researchers. Their strength lies in linking their community-based experience through SUNGI to the research/consultancy work of SEBCON. They also seem to know NWFP rather well. They could be very useful for carrying out small projects or bigger projects in tandem with a university or PFI, where end users/community involvement in research is required.

Aurat Foundation, Lahore

Aurat in Urdu means a woman. Aurat Publication and Information Service Foundation was set up in 1986. Its main objective was to act as an advisory service for women as well as a clearing house of information about women. "The organization generates concerned information for women's empowerment in society and disseminates it through established and alternative channels." Particularly, the women from the low income category, with least access to information, are the major focus of foundation's activities. This information helps women make decisions in their daily lives and thus reduces their dependence on social structures and relationships which perpetuate their subordination.

A Documentation and Resource Centre has been established to undertake this work. A number of information services providing information on employment, health, financing, legal process, and environment have also been set up and are operational. Another important objective of this foundation is research and training for NGOs and women at the grassroots level. The strategy is to enhance the women's capacity at the grassroots level so that they can make independent decisions and claim their due share of services being provided by the various levels of government. At the other end, at the macro-level, the foundation strives for bringing change in policies, programs, and laws as well as sensitizing the policy-makers to the gender issues and the plight of women.

This strategy is being implemented through collection, development, and dissemination of information as well as through networking and training. Research plays a key role in this process. Project funding has come from Canada, Holland, Australia, Norway, and the ILO in the first few years of AF's existence. Since 1989 the UNICEF and UNFPA have provided project and institutional support. The learning phase of the AF seems to be near peaking and the AF is going into expansionary mode recently. AF has undertaken a major project to provide information to women on food technologies through Radio. Field research is being conducted to build an activity profile of rural women with information about indigenous food technologies in the production cycle; available appropriate technologies, and women's listening time preferences. The vehicle of Radio play will be used to disseminate this information.

In addition, a large number of youth groups in rural area are being given training on gender sensitivity. Most of these consist of young men.

AF has a total of 47 employees and five office across Pakistan in Islamabad, Karachi, Quetta, Peshawar, and Lahore. Its founding Director Nigar Ahmed is an eminent Economist who teaches at Quad-e Azam University and is an author of many books and papers on social development in Pakistan. We believe that AF can be a crucial link between the predominantly male, formal research institutions and peasant women, particularly where the women are the end users of the research results or bear the unintended consequences of development projects. If IDRC is genuinely interested in empowering women through knowledge, AF will be a good instrument to use in collaboration with traditional research organizations.

Shirkat Gah, Karachi

Shirkat Gah — a place to share in Urdu — is a women's collective formed in 1975. It strives to enhance the participation of women in national development. Shirkat-Gah, like AF, is also following the strategy of empowerment at grassroots levels and lobbying policy makers in the Penthouses if not the treetops. It is a non-hierarchical organization. Projects are run by individual members responsible to the Working Committee of Shirkat-GAH. The decision making is consensual. Funding largely comes from the multilateral and bilateral donors. Consultancies provide a small share of revenues and sale of publications account for a much smaller portion of income.

Shirkat-Gah has offices in Lahore, Karachi and Quetta. They maintain an excellent, specialized library on women in Pakistan and the Muslim world. The organization runs a dynamic documentation and resource centre addressing particularly the demand for information on economic autonomy of women and women and environment. They publish books like *The Rehnuma Guide For Women*, which give poor women information such as how to open an bank account etc. They also publish a newsletter.

The ongoing research projects include "Women and Law in the Muslim World" involving 26 Muslim participant countries, from which documentation is provided based on research and analysis. Another project — "Women and Environment" — englobes several environment-related activities in collaboration with IUCN including consciousness-raising, women and natural resource management. "Female Credit and Marketing Field Project" is another ongoing activity in Karachi. In the recent past, research projects on "Women, Religion, and Social Change", "Micro and Small Enterprises", and "Women In Formal Industrial Labour Force" have been undertaken. They are working in the coastal communities and Kachchi Abadis (Squatters Slums) of Karachi. They have a great deal of experience in conducting baseline surveys, collecting socio-demographic data about women and doing follow-up studies to see how the life of women has changed through the generations. They have been funded by CIDA, NORAD, and IUCN.

We met Ms. Mehran Nosharwanji very briefly in our hotel lobby due to time constraints. She provided us with some basic material about Shirkat-Gah. We did not have a chance

to look at the research papers produced by them. It is difficult to assess their capabilities. Ms. Noshirwanji, like most other women in the NGO movement we met in Pakistan, was very articulate and well-informed. The organization appears to be very genuine and some eminent women, like the journalist Najma Sadek, are a part of Shirkat-Gah.

Private Sector Organizations — Miscellaneous

Pakistan Potash (PPIC, Canada)

Salim is a retired official from the federal department of agriculture. He is presently leading a newly approved CIDA project valued at more than \$ Cdn 1 million to explore the potential of Canadian muriate of potash (mop) in Pakistan. This project was developed in the context [?]fertilizer subsidies being phased out in Pakistan. Subsidies on urea and other nitrogenous fertilizers were removed in 1992 and those on potash are to be eliminated by 1995. In Pakistan, the major source of potash are potassium sulphates which are rather expensive. Consequently, the wisdom at CIDA is to explore the potential for Canadian potassium chlorides from Saskatchewan which sell for half the price. CIDA told us that the project will include a research component to determine if there are any adverse effects of mop application on Pakistan soils, particularly with respect to salinization. Mr. Tahir Salim also mentioned that no research has yet been conducted on trickle irrigation which could, if implemented, reduce the need for large quantities of fertilizer and water resources. In terms of Mr. Salim's research capacity or track record, it is impossible to judge from our short interview. What may be worthwhile is to obtain results generated from this CIDA research and to determine his capability and if further action is warranted.

Enterprise Development Consulting (EDC) Pvt. Limited, Islamabad

EDC is a private consulting firm. Its expertise resides in social, management and agriculture sectors. Its main activity is researching and consulting for international and private sector agencies. It claims to be the country's largest consulting firm in non-infrastructure development related sectors with 70 full-time employees and a roster of over 100 short-term experts. This firm has executed 100 contracts worth over US \$ 65 million on behalf of donor agencies (12), international centres and institutes (11), development projects (5), NGOs (9), and international consulting firms (9). It appears to have sound sectoral expertise in agricultural and rural development, microenterprises, WID, and training in these sectors.

Tariq Hussain holds a Bachelor's degree from Columbia, a Master's and a PhD from Chicago. He has worked for Pakistan's most successful NGO — the Agha Khan Rural Support Program (AKRSP) — as its Deputy General Manager. This gives him a unique blend of best economics training and field experience in rural development. Dr. Zahur Alam is an agronomist and a breeder. He holds a PhD from Wisconsin and a Master's from Gainesville (Florida). He has been the Director of Horticulture for PARC and agricultural specialist with the AKRSP. The leadership of EDC is impressive and the list of their clientele is equally impressive. They have extensive experience in field research in Pakistan and both have also worked at the international level. They are dependable and reputable professionals. We believe EDC will be a suitable candidate for research projects in agriculture and rural development, particularly on applied and policy-oriented topics.

Media-Link International, Islamabad

This is a private firm specializing in computer aided design & manufacturing (CAD,CAM), personal computer-based data acquisition and instrumentation control, mechanical part design and geographical information systems (GIS). They represent several software and hardware companies in Islamabad. Their staff comprises several Master's degree holders in Physics, Electronics, and Business. We did not have an opportunity to see them due to a very tight schedule and only had a brief telephone conversation with the Dr. Sohail Hamid. They may be an important source of information about present and potential applications of GIS and other software in Pakistan in development-related sectors.

**Research Environment
and Institutions in Pakistan:
Some Concluding Remarks**

There are 22 universities operating in Pakistan. Of these, 3 specialize in the field of Agriculture (Faisalabad, Peshawar and Tandojam); 4 in Engineering & Technology (Lahore, Peshawar, Jamshoro & Karachi), and the other 15 located across the four provinces are generic with Science, Social Science, and Humanities faculties. In addition there are 22 affiliated (to the latter) medical colleges. Generally speaking, the specialized universities are more research-oriented as compared to the generic ones. In the latter, the government designated Centres of Excellence usually are at the forefront of research. We were able to identify at least 8 such centres/institutes sponsored by the Universities Grants Commission (UGC).

In general, however, most of the university budgets are consumed by staff salaries and very little money is available to actually carry out research or fund logistical support necessary for field research. The number of PhD graduates produced by the university system remains very low, particularly in pure sciences. Very few faculty members venture to publish in the international journals and there is relatively little incentive to do so. Participation in International Conferences even when funded by foreign donors requires government permission and the bureaucratic procedures tend to discourage frequent interaction between Pakistani academics and their international counterparts. In recent years the younger scholars who have returned from abroad over the last 5-6 years are beginning to change this situation. Academic promotions often are not based on research and publications and the number of senior posts, i.e. Associate and full Professors are very limited. This probably explains why many bright, young PhDs now are working for NGOs rather than universities.

The research tradition in the field of agriculture is relatively better established both in the universities as well as the government institutes/centres sponsored by PARC and the provincial governments. All three universities are known to have fairly up-to-date curricula and relatively more robust research and PhD programs. PARC family of research institutions is well equipped in terms of Labs and facilities and has a large number of academically trained scholars. Some excellent research has been undertaken at the PARC institutions and at Faisalabad University. Agricultural research accounted for 30% of total funding for research & technology under the 7th Five Year Plan — probably the largest single category. It is largely due to organized lobbying by the farmers who have recognized the link between the productivity of their farms and research. (See *The Pakistan National Conservation Strategy*.)

Yet the ethos and ambience of these institutions still seem to be immersed in bureaucratic and hierarchical values which tend to discourage cross-sectoral, cross-institutional communication between researchers and scholars. It probably also leads to underutilization of some highly sophisticated equipment as well as manpower. The present leadership at these institutions, particularly, Dr. Zafar Altaf at PARC, Dr. Rafiq Khan at Faisalabad, and the new Vice Chancellor at Peshawar are very sensitive to these concerns and are striving to promote a corporate culture more conducive to research.

Despite the growing number of scientists and institutions, there is an overall lack of trained staff to carry out world class research in science and technology. The range of scientific disciplines listed in the brochures of the universities and institutes is impressive, yet their tangible output in terms of research remains rather low. A lot of institutes/centres were created in areas in which well-trained staff was lacking. These

institutions have failed to produce any significant research. Those built around a core of a few capable researchers have flourished. Thus it is estimated that out of over 100 institutions, barely a dozen are carrying on productive research. (See *The Pakistan NCS*, p. 257.) Some of the centres and institutes within the umbrella of the PCSIR are well endowed and are doing innovative work.

Time constraint did not permit us to visit research institutions in the field of health and education. We would venture to say that most of the medical colleges tend to emphasize teaching rather than research and do not have a very rich tradition of conducting major research. The Agha Khan University in Karachi may be the exception. Some of the Post Graduate Medical Centres like the one in Karachi do carry out research. The AKU also have the most well-developed program in community-based preventive health care in the country.

Recently the GOP has upgraded the facilities at the National Institute of Health (NIH), established in early 1980s, in Islamabad. Among other projects, the NIH is carrying out a project on "Environment Health Hazard Control" to study the effect of environmental pollution on the health of general population. It is also setting up a Traditional Medicine Centre to promote research in traditional medicine and medicinal plants. These projects are being funded by the World Health Organization (WHO). These projects may be of interest to IDRC for possible participation, to help NIH develop information systems to collect, analyse, and maintain data.

In the area of education, the Central Bureau of Education is probably the most important research (CBE) organization. Under UNDP funding the CBE is setting up a computerized data network linking the district, provincial, and federal level institutions. This is being supplemented by the USAID project to provide hardware for primary education projects. These developments also may be of interest to the IDRC's information science group. It may be noted that the health and education are crucial areas of priority for the GOP in its Social Action Program.

In general, research in Pakistan tends to suffer from an acute lack of funding, institutional proliferation, and bureaucratic leadership, a lack of effective mechanisms of commercialization of research results and weak linkages with the end users. The system is vertically oriented and is founded on the basis of functional specialization in which institutions are linked to functional Ministries. This organizational pattern discourages horizontal communication between scholars across disciplines — a crucial pre-requisite for resolving development problems.

According to Mr. Fasihuddin, the Chief Economist, IDRC involvement be very timely and important because very little project funds were allocated toward research. Even when research is funded, it is often a small portion of some other project. Since the projects are housed in one agency, cross-disciplinary cooperation with other agencies is not possible. Very few agencies fund research per se. IDRC has a natural advantage in funding research because of its expertise in this area as well as relatively little competition from other agencies. Environment appears to be the most suitable theme around which cross-sectoral research can be funded. As of now, there has been little attention from other agencies to this sector. IDRC's reservoir of expertise in environment will naturally be of immense advantage.

Recommendations

In our discussions with Dr. Rached and Mr. Cliche in Cairo, the following areas were identified as important priorities in the context of MENA strategy for the region: sustainable utilization of resources — particularly land and water, dryland development, range management; economic participation and industrialization through SMEs; strengthening institutional capacity of research organizations, particularly information systems and data collection and analysis capacity.

These priorities have to be considered in the context of overarching values of the IDRC: empowerment through knowledge and involving the end-users; commercialization of technologies; strategic, multi-objective projects rather than single purpose research, i.e. breeding of crop varieties; and the impact on environment, particularly in view of the IDRC mandate to coordinate the implementation of the Agenda 21 after RIO.

For the GOP the crucial priorities are: sound macro-economic policies within the framework of the structural adjustment program; the implementation of the NCS; the Social Action Program; sustainable agriculture with emphasis on increasing productivity, Barani (drylands) area development, conservation of water resources, deforestation, and range management. We believe that there is a fairly close "fit" between these three sets of priorities.

We have tried to identify some of the best Pakistani research institutions working in these sectors. These institutions have been chosen on the basis of their research staff, track record, lab and physical facilities, funding, linkages with end users and institutional stability.

1. Broadly speaking, in the area of Agriculture, PARC and its family of institutes and centres — particularly the National Agriculture Research Centre (NARC), Plant Genetic Resources Institute including the Genetic Resources Lab, International Institute of Biological Control — as well as the Faisalabad University of Agriculture and Peshawar University of Agriculture are the most suitable. We recommend that the IDRC establish links with these institutions with a view to develop projects.
2. In Forestry, the Pakistan Forestry Institute (PFI) has already undertaken one project funded by the IDRC. There is certainly great potential for more collaborative ventures. By far it is the best research institute in this sector and has research projects in all the provinces.
3. In Science and Technology, particularly developing new environmentally friendly technologies and research in the area of pesticide residues in food as well as chemicals and hazardous waste, at present the best institution is the PCSIR and institutes/centres under its umbrella. We recommend IDRC program officers to explore the possibilities of cooperation.
4. Although environment cuts across all sectors and scientists in PARC, PCSIR or PFI can be of help, yet there is a need to strengthen the institutional capacity of those institutions which are directly working on Environment as their primary focus. There are three candidates: Environmental Planning Department at Peshawar University, Institute of Environmental Engineering (Karachi University), and the Institute of Public Health Engineering University of Engineering & Technology,

Lahore. The Department at Peshawar which is supposed to have received the GIS is very weak in terms of research capacity, with only one PhD. Even the quality of teaching may be less than desirable. There is a crying need for expertise in Environmental Impact Assessment and none of these institutions are meeting this need. We recommend IDRC explore the possibility of building the institutional capacity of these organization through training projects abroad or within Pakistan.

5. In Economics/policy-oriented research, both PIDE (Islamabad) and AERC (Karachi) are first rate institutions and are most suitable to do research on the impact of structural adjustment programs, macro-economic policy, social impact of the structural adjustment, deregulation, etc. If IDRC decides to fund research in these areas, PIDE and AERC would be two top candidates for collaboration.
6. LUMS is probably the finest Business School in the country today despite being smaller than the IBA, Karachi. They have two very highly trained people in Management Information Systems and a well-equipped computer centre. LUMS appears to be a very suitable place to develop software for use in various development and environment-oriented programs. LUMS is already collaborating with the IUCN. It would also be a good place to lead policy-oriented research on environmental issues and on the role of business sector in environment. There is also a keen interest at LUMS to pursue research on Privatization.
7. Pakistan Administrative Staff College, though thin in research capacity, can be utilised in an innovative manner. Its Senior Management Course which includes top level policy-makers, could produce problem-oriented research crucial for the implementation of the NCS in various sector, leading to solutions of the administrative bottlenecks and design of institutional reform. This could involve LUMS or SDPI to provide some academic support. The PASC is also interested to pursue research in the area of Devolution, Decentralization and Governance at the local level. This has been treated as key priority in the 8th Five Year Plan. This project could be a good candidate for the cooperative programs of the IDRC.
8. We believe that most of the traditional research institutions in Pakistan today do not have effective linkages with the end users or the community at large. Even the Agricultural Universities or PARC whose research involves field work and extension are not very effective. they suffer from so-called road bias or are often oriented to "model" or "progressive" farmers. The end-user involvement is often post facto after the research has already progressed rather than at the design stage. For environmental research community involvement at all stages of the research project is a prerequisite. Some of the NGOs are much better at involving the community than the research institutions. Therefore it would be beneficial to link research centres with the organizations like Aurat Foundation, IUCN, SUNGI, PIEDAR, NRSP or SRCS. The latter are not only well plugged in the community groups but also are staffed with well-qualified people who share the lexicon of modern researchers and thus can cooperate with them.
9. In Pakistan, horizontal communication between researchers from different organizations, even when they work in the same or related disciplines is not encouraged. Often Lab facilities and equipment is not used to their full capacity.

The organizations with ample facilities may not have adequate staff while those with state-of-the-art equipment may suffer from personnel shortages.

IDRC's "new" type of projects will necessitate horizontal linkages between researchers from various research centres — PFI, University of Agriculture Peshawar, Faisalabad — as well as vertical linkages between the researchers and the NGOs like the IUCN. We recommend that IDRC make it a grant condition to have such linkages (wherever they are necessary) built into the project proposal. Thus funds are to be granted to teams of researchers from different organizations which are best equipped with requisite resources and expertise needed rather than just funding a project housed only in one institution.

Some Project Ideas

1. During our visit to Pakistan, the issue of *Cotton Leaf Curl Virus* came up many times. Dr. Pasha, the Commerce Minister in the interim government, raised it in our breakfast meeting with him the first day we arrived in Pakistan. Dr. Altaf (PARC Chair) thought it was an urgent issue. He arranged an interview with Dr. Mohyuddin, an entomologist immediately. Dr. Afzal at the Central Cotton Committee agreed that it was urgent. The decline in cotton production is a serious set back for Pakistan's export and the Balance of Payments. Sixty (60) % of the exports are accounted for by cotton and cotton manufactures. The Annual Plan 1993-94 mentions that the future recovery in export performance depends on the behavior of the cotton virus significantly. It was also brought up that 84% of the pesticides in Pakistan are being used for cotton. The farmers may increase the use because of the virus. The Women's NGOs — particularly Aurat Foundation — believe that the use of pesticides has devastating effect on the health of cotton pickers, who are predominantly women. Needless to say they are very concerned.

This problem is multifaceted — cotton productivity, the virus, use of pesticides and women's health — requiring a multi disciplinary team of researchers. The IDRC could be a catalyst to put together such a team, consisting of Dr. Mohyuddin (PARC-IIBC), Dr. Zahur (CCIR, Cotton Committee), a cotton expert from Faisalabad University, a health expert from National Institute of Health and the Aurat Foundation.

2. Pakistan's unique *juniper forest* near Ziarat, Balochistan is believed to be in danger both from indiscriminate logging as well as mistletoe problem. In addition to being a serious biodiversity problem, Ziarat area represents a special historic and symbolic value because Quaid-e-Azam, the founder of Pakistani nation spent the last few months of his life there as he was suffering from tuberculosis. A research project on the mistletoe, development of the resistant species of juniper, alternate source of fuel and creating awareness about deforestation could be put together with the help of the PFI, provincial forest institute, Balochistan Rural Support Program and Genetic Resources Lab of the NARC.

3. Chemical residues in food due to pesticides as well as industrial effluents dumped indiscriminately into sewers or other water sources appears to be widespread in various areas of Pakistan, particularly near the major urban areas with industrial concentration, where vegetables are usually produced. This is being considered a major health problem. There is, however, little research on the extent of the problem, the types of residues, their major ill effects and solutions. A collaboration between the researchers of the PCSIR (in lead) with those of the Faisalabad University, Peshawar Ag. University and the National Institute of Health and or the Agha Khan Medical University could be worth exploring.
4. Pakistan Agriculture Research Council (PARC) is not equipped with a system like the GIS. Dr. Zafar Altaf, Chairman, PARC indicated a strong interest in the system. He thinks such a system could give a real boost to the work of PARC. This is certainly worth exploring.
5. Devolution, decentralization and building the institutional capacity of the local and municipal councils to implement the NCS is another idea worth pursuing. This combine good governance and environment and both are priorities in the 8th Five Year Plan. This could be undertaken by the Pakistan Administrative Staff College in lead with the collaboration of the SDPI and or AERC.
6. There is a dearth of research in health provision, particularly the cost-effectiveness of various technologies, brain drain in health care, manpower needs and training, infrastructure & institutions which account for good performance. There is a great deal of variance in the performance of the health care delivery systems in the provinces. Nobody knows why? A covering these topics will be very useful. We are not sure which institution is more suitable for undertaking such a project. We believe that the Agha Khan University, National Institute of Health and AERC could provide an effective team to carry out such a venture.
7. According to the NCS (See the Pakistan NCS, p. 259), "Because of the importance of irrigation agriculture and looming water shortage, Pakistan should be in the forefront of research into the efficiency of irrigation water use." The NCS proposes the creation of an Islamic Institute of Water Use Efficiency in Pakistan. The research on water use efficiency could benefit Egypt, Jordan, the Gulf States and possibly North Africa. A consortium of the Gulf States could be persuaded to set up an endowment fund to create the Institute and to facilitate the transfer of technology. The institute could be linked to PARC and the Centre for Excellence in Water Research. IDRC can play the role of a broker to help create this institute and MERO can use some of its network of scientists/researchers in the Middle Eastern countries to lend support to this idea.

List of People Interviewed

Applied Economics Research Centre (AERC), University of Karachi

Dr. Hafiz Pasha, Former Director and Minister of Commerce, Interim Government

Dr. Shahida Wizarat, Director, AERC. Tel. 92-21-474749, Fax 92-21-471634

Agriculture Division, GOP

Mr. Salman Farooqui, Secretary

Mr. Abeedullah Jan, Joint Secretary (Forests)

Aurat Foundation, Lahore

Ms. Nigar Ahmed, Director

CIDA / The High Commission for Canada in Pakistan

H.E. Mr. L.A. Delvoie, High Commissioner for Canada

Mr. Dean Frank, First Secretary (Development)

Ms. Wendy Quarry, First Secretary

Ms. Wendy Miller, First Secretary

Centre of Excellence in Water Resources Engineering, University of Engineering & Technology, Lahore

Dr. N.M. Awan, Director

Department of Environmental Planning, University of Peshawar

Dr. Zakir Ullah, Chairman

Department of Forests and Fisheries, NWFP, Peshawar

Mr. Ahmed Nawaz Shinwari, Secretary Tel. 270 147

Mr. Gilani-ul-Rehan Khan, Director General, Fisheries

Enterprise Development Consulting (EDC) Pvt. Limited, Islamabad

Tel. 92-51-255823, Fax 92-51-254024

Dr. Tariq Hussain, Managing Director, Tel. 92-51-211661, Fax 92-51-254024

Dr. Zahur Alam, Division Manager, Tel. 255823

Environment and Urban Affair Division (EUID), GOP, Islamabad

Mr. Shams-ul-Haq, Joint Secretary, EUID, Tel. 822757

Mr. Akhtar Iqbal Jarlal, Chief, NCS Unit, Tel. 217018

Environment Protection Agency (EPA), Sindh

Ms. Mehtab Akbar Rashdi, Director General, Tel. 92 41 476442

Genetic Resources Preservation and Research Lab (GRPRL)

Mr. Rashid Anwar, Director, Plant Genetic Resources Institute, NARC (Tel. 240146, Fax 92-51-240104)

Dr. Nobuo Murata, JICA Team Leader, GRPRL, NARC

Dr. Shahid Masood, Principal Scientific Officer, GRPRL

Institute of Business Administration (IBA), University of Karachi

Dr. Abdul Wahab, Dean and Director, Tel. 92-21-475021, Fax 92-21-466671

International Union for Conservation of Nature, Karachi

Ms. Abban Marker Kabraji, Director, Tel. 573079, Fax 021-530976

Mr. Abdul Latif Rao, Program Director, Islamabad

Mr. Robert Walker, Advosor, Islamabad

Japan International Cooperation Agency (JICA)

Mr. Iwa Saki, Assistant Resident Representative

Mr. Mahmood Jilani, Chief Program Officer

Lahore University of Management Sciences (LUMS)

Dr. Wasim Azhar, Dean, Lahore Business School, Tel. 92-42-870385 Fax 92-42-872009

Dr. Imran Ali, Professor, Business History & Policy

Dr. Anjum Nasim, Professor, Business Government Relations

Dr. Zahur-ul-Hassan, Professor, MIS

Dr. Javiad Ghani, Professor, MIS

Economic Affairs Division, GOP

Mr. Farhat Hussain, Joint Secretary, EAD, Tel. 821437

Media-Link International, Islamabad

Dr. Mubashar Ahmed, Chief Executive, Tel. 92-51-211628, Fax 92-21-256701

Dr. Sohail Hamid Khan, Senior Marketing Executive.

National Agricultural Research Centre (NARC)

Dr. M Akbar, Director General, NARC

Dr. Ali Asghar Hashmi, Director, Entomological Research Lab

Dr. Naazer Ali, Principal Scientific Officer, BARD

Tel. 092-51-241460, Fax 092 51 812968

National Rural Support Program (NRSP)

Dr. L.A. Hijazi, Program Manager, Natural Resource Management.

Pakistan Administrative Staff College (PASC), Lahore

Mr. Pervez Masud, Principal; Mr. Ramizuddin, Director Research

Pakistan Agriculture Research Council (PARC)

Dr. Zafar Altaf, Secretary, Agricultural Research Division and Chairman, PARC

Tel. 092-51-823966, Fax 092-51-812968

Dr. Sulaiman Hamid, Member (Natural Resources), PARC

PARC add.; P.O. Box 1031, Islamabad

Pakistan Cotton Standards Institute (PCSI)

Dr. Imtiaz Hussain (Director General)

Pakistan Central Cotton Committee (PCCC)

Dr. Mian Iftikhar Afzal, Vice President, Karachi.

Tel. 092-21 524104, Fax 092-21-5685682

Pakistan Council for Scientific and Industrial Research

Dr. A.Q. Ansari, Chairman, PCSIR, Islamabad

Pakistan Forestry Institute (PFI)

Dr. Khalid M. Siddiqui, Director General, PFI, Tel. 0521-40580, Fax 42457

Dr. Bashir Shah, Director, Research, PFI

Mr. Mohammad Khan, Research Officer, PFI

Pakistan Institute of Development Economics (PIDE), Islamabad

Dr. Syed Nawab Haider Naqvi, Director

Pakistan Institute of Environment Development Action Research (PIEDAR)

Mr. Ayub Qutub, Director

Pakistan Potash (PPIC, Canada)

Mr. Tahir Salim

PARC — International Institute for Biological Control (IIBC)

Dr. Agha Ikram Moyuddin, Director, IIBC,

Tel. 051 423210, Fax 051 842 347

Planning Division, GOP

Mr. Fasihuddin, Chief Economist

Abdul Qayyum, Deputy Chief, Environment Cell

Sarhad Provincial Conservation Strategy (SPCS-IUCN Unit)

Mr. M. Rafiq, Chief, Environment, Planning & Development Department

Dr. G.M. Khattak, Coordinator IUCN, NWFP

Mr. Steve Fuller, CONSULTANT, IUCN

Sarhad Rural Support Corporation (SRSC).

Mr. Javed Majid, Director

Shirkat Gah, Karachi

Meheran M Nosharwani, Coordinator

Tel. 92-21-573079, Fax 92-21-530976

SUNGI — SEBCON, Islamabad

Omer Asghar Khan, Director SUNGI and Chief, SEBCON

Kamran Sadiq, Chief of Operation, SEBCON, Tel. 92-51-852263, Fax 92-51818020

Sustainable Development Policy Institute (SDPI)

Dr. Tariq Banuri, Director, Tel. 92-51-211097, Fax 2182135

Sustainable Development Network (SDN), Pakistan

Mr. Q. Isa Daudpota, Coordinator, Tel. 92-51 213274, Fax 92-21-216909

University of Agriculture, Faisalabad

Dr. M. Rafiq Khan, Vice Chancellor, Tel. 3370, Fax 27846

Dr. Mian Mumtaz Ali, Former Vice Chancellor, tel 218778

N.W.F. University of Agriculture, Peshawar

Vice Chancellor

Dr. M. Saeed, Professor, Chairman, Research & Technical Review Committee

Dr. Saeed-ul-Hassan, Professor, (BREEDER)

Dr. Riaz Khattak, Associate Professor, (SOIL CHEMIST)

UNIFEM

Ms. Asma Sufi and Mrs. Mariam Mehdi

Tel. 821 015

United Nations Development Program (UNDP)

Mr. Neil Buhn, Assistant Resident Representative, Tel. 92-51-822072

Fax 92-21-822793

Fatima Shah, Program Officer

UNIVERSITY OF AGRICULTURE, FAISALABAD

Sh. Muhammad Akram

Registrar

Dr. Bashir Ahmed

Professor, Farm Management

Dr. Mirza Azhar Baig

Professor, Animal Ecology

Dr. Kahalid Mahmood Khan

Professor, Biochemistry

Dr. Iqar Ahmad Khan

Associate Professor,

Horticulture

Dr. Riaz Hussain Qureshi

Professor, Soil Science

Dr. Masood A. Akhtar Qureshi

Professor, Agro Forestry & Range Management

Dr. Munawwar Ahmad Sial

Professor, Animal Science

Dr. Muhammad Yaqoob,

Professor, Biochemistry

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