Pakistan

Priority areas for investment in the agricultural sector

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COUNTRY HIGHLIGHTS

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The opinions expressed in this report are the sole responsibility of its main authors.

ACRONYMS

AAs	Amelioration Associations
ABRI	Agricultural Biotechnology Research Institute
ADB	Asian Development Bank
AI	Artificial Insemination
AKIS	Agricultural Knowledge and Information System
APFMIS	Andhra Pradesh Farmers' Management of Irrigation Systems
ASCs	Amelioration Service Cooperatives
AWB	Area Water Boards
CABB	Center of Agricultural Biochemistry and Biotechnology
CCA	Cultivable Command Area
CIB	Credit Information Bureau
CIF	Community Investment Fund
CMP	Crop Maximization Project
CNA	National Water Commission
DAAS	Danish Agricultural Advisory Services
DASM	Department of Amelioration Scheme Management
DAWE	Department of Amelioration and Water Economy
DGBs	Drainage Beneficiaries Groups
DSC	Development Support Centre
DSi	I&D Department
DWR	Department of Water Resources
EDI	Economic Development Institute
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FOs	Farmer Organizations
FSC&RD	Federal Seed Certification and Registration Department
FY	Financial Year
FYP	Five-Year Plan
GCA	Gross Command Area
GDP	Gross Domestic Product
I&D	Irrigation and Drainage
ID	Irrigation Department

IDMT	Irrigation and Drainage Management Transfer
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IMT	Irrigation Management Transfer
IMU	Irrigation Management Unit
IPD	Provincial Irrigation and Power Department
ISF	Irrigation Service Fee
ISTA	International Seed Testing Association
IWMI	International Water Management Institute
LSO	Local Support Organization
LTD	State-owned Limited Company
M&E	Monitoring and Evaluation
MAF	Ministry of Agriculture and Food
MFB	Microfinance Bank
MFI	Microfinance Institution
MoAF	Ministry of Agriculture and Forestry
MOM	Management, Operation and Maintenance
MWRRA	Maharashtra Water Resources Regulatory Authority
NARC	National Agricultural Research Center
NBC	National Bio-safety Committee
NBFI	Non-Bank Financial Institution
NGO	Non-Governmental Organization
NIAB	Nuclear Institute for Agriculture and Biology
NIBGE	National Institute for Biotechnology and Genetic Engineering
NIGAB	National Institute for Genomics and Advanced Biotechnology
NRSP	National Rural Support Program
NWFP	North-West Frontier Province
O&M	Operation and Maintenance
OECD	Organisation for Economic Co-operation and Development
OIP	On-Farm Irrigation Project
OIP-2	Second On-Farm Irrigation Project
PARB	Punjab Agricultural Research Board
PARC	Pakistan Agricultural Research Council
PBR	Plant Breeders' Rights
PID	Public Irrigation Department

PIDA	Punjab Irrigation and Drainage Authority
PIDAs	Provincial Irrigation and Drainage Authorities
PIM	Participatory Irrigation Management
PPCBL	Punjab Provincial Cooperative Bank Limited
PSC	Punjab Seed Corporation
R&D	Research and Development
RA	Regular Authority
SCWRLI	State Committee for Water Resources and Land Improvement
SECP	Securities and Exchange Commission of Pakistan
SIDA	Sindh Irrigation and Drainage Authority
SLRs	Limited Responsibility Societies
SME	Small and Medium Enterprise
SMS	Subject Matter Specialists
SSC	Sindh Seed Corporation
STED	Science and Technology for Economic Development
SU	Support Unit
SWMO	Sindh Water Management Ordinance
TC	Territorial Constituency
TIL	Truth-in-labeling
TIPAN	Transformation and Integration of Provincial Agriculture Network
UPOV	International Union for the Protection of New Varieties of Plants
VERCON	Virtual Extension, Research and Communication Network
VO	Village Organization
WB	World Bank
WUA	Water Users Association
ZTB	Zarai Taraqiati Bank

EXECUTIVE SUMMARY

Introduction

Pakistan has great potential in agriculture. About 27 percent of the total 79.6 million hectares of the country is under cultivation. Agriculture contributes about 24 percent of the GDP and employs 47 percent of the labour force. Most subsectors of agriculture have either remained static or have declined during the last three decades, with the exception of livestock. Therefore, there is considerable scope for improvement in production and in the processing of primary output.

The World Bank, working in partnership with local and international collaborators, including the Investment Centre of FAO, has identified key areas that require priority interventions if the agricultural sector is to address the challenges of rural poverty, and maximize its contribution to export growth and national development. These areas are:

- Agricultural research and extension
- The seed sector
- Water resources
- Rural finance

This document outlines in detail the rationale for an intervention as well as the possible investment areas to support the Government of Pakistan in each subsector. Potential interventions that the Bank could champion are summarized below for each of these areas.

The Bank appreciates that it is important that it work closely with all relevant stakeholders, and in particular, the National Agriculture Forum, in addressing the bottlenecks that are impairing the growth prospects of Pakistan's agricultural sector.

Agricultural research and extension

The agricultural research system in Pakistan is weak. Agricultural extension services are outdated and agricultural universities operate in relative isolation from research and extension institutions.

Specific interventions that the Bank could support in the enhancement of Pakistan's agricultural research and extension system include:

- Developing Pakistan's capability in agricultural biotechnology research;
- The establishment of research coordinating boards in all provinces designed to improve the research capacity of the provinces, modeled on the Punjab Agricultural Research Board;
- Measures to enhance Pakistan's capability in livestock research;
- The implementation of a technical assistance programme to enhance understanding of the socio-economic factors inhibiting technology adoption;
- A study to identify the priority research needs of rainfed agriculture and recommended pilot interventions;
- Measures designed to enhance greater and more systematic collaboration between researchers and extension services;
- A pilot programme in a suitable region designed to demonstrate the benefits of a demand-driven pluralistic extension service;
- The appointment and training of subject matter specialists or technical experts that would be responsible for ensuring that extension workers were up-to-date with the latest research findings by establishing a bridge between agricultural researchers and field extension workers;
- The training of suitably qualified extension workers to acquire up-to-date skills in livestock production and marketing;
- Training and updating of skills in water management for suitably qualified extension workers.

The seed sector

The perpetuation of a traditional business model in Pakistan's seed sector undermines the confidence of both farmers and businesses in the sector. Farmers cannot acquire sufficient stocks of certified seeds. The registration of new varieties is restricted to domestic seed producers and foreign varieties are effectively inhibited.

The key to turning the existing system around will be to change the mindset of those responsible for devising and managing the existing regulatory system. A long process of 'change management' will be required.

The World Bank can assist this process in a number of practical ways:

- Support for a technical assistance programme to assess the existing 'mindset' of the regulatory system and their perception of the need for reform;

- Support for capacity development aimed at key federal and provincial regulators;
- The defining of key areas of competency for the public and private sectors as well as areas where partnership would be of mutual benefit;
- The encouragement of foreign direct investment (FDI) in the seed sector to work with both public and private bodies in Pakistan;
- The establishment of a 'level playing field' between public and private breeders;
- The development of effective systems of seed certification, including legislative protection for farmers;
- The enactment of effective legislation to protect plant breeders' rights;
- The removal of tariffs on seeds imports and the relaxation of the process of registering international varieties;
- The development of an effective 'Knowledge Transfer' system with farmers having a key influence on the system, and based on an effective partnership between the public and private sectors.

Water resources

Water users play a key role in the management, operation and maintenance (MOM) of I&D systems. This section outlines the development of PIM and provides a framework for assessing management performance or transfer before monitoring process performance in a number of countries, including Pakistan.

Pakistan used to have an abundant supply of water. In recent years, however, rapid population growth, urbanization and industrialization have led to shortages and unhealthy competition amongst end users and has caused environmental degradation. Over the last few decades the performance of irrigation and drainage (I&D) systems in Pakistan has deteriorated. Growing water scarcity, inadequate maintenance of I&D systems, inadequate cost recovery, unauthorized withdrawals and uneven water distribution, water logging and salinity, and over-exploitation of groundwater are all major problems. Water shortage is therefore an increasing issue and obstacle for the continued economic and agricultural growth of Pakistan.

Pakistan requires substantial investments in its water infrastructure; and for this, it will need to focus on investment management to deliver adequate returns. Although the World Bank will continue supporting the infrastructural development of Pakistan's water sector

it also intends to ensure cross-compliance with effective system management development.

The Bank could therefore support the following initiatives:

- A strategy paper which would set out the key challenges facing Pakistan's water resources with particular emphasis on the role of the agriculture sector;
- A process leading to the reformation and restructuring of Pakistan's key federal and provincial water regulatory authorities to enable them to exploit the opportunities offered by participatory irrigation management (PIM), and to work in partnership with Farm Organizations (FOs) or Water Users Associations (WUAs) to enhance the productivity of irrigated agriculture;
- The creation of an agreed protocol to ensure the effective management of all new investment which would contain the following key elements:
- FOs/WUAs as key institutions in the management of all significant infrastructural projects;
- FOs/WUAs with sufficient operational autonomy to gain the respect of the farmers they serve.

New schemes will require a large input from central and provincial government in their initiation and for several years following their establishment. A plan to hand over the operation of parts or all of these schemes to FOs/WUAs needs to be put in place from the start.

Both PIM and Irrigation Management Transfer (IMT) have different responsibilities. The former is limited to increasing the involvement of water users in the management of government-owned I&D systems whilst the latter allows for the transfer of specified MOM responsibilities to water users and the withdrawal of government from all or some parts of the I&D system. The reasons for PIM/IMT are discussed in relation to the key factors putting pressure on water resources.

It is essential for irrigated agriculture to increase both efficiency and productivity of water use owing to increasing pressure on available water resources because of population growth and demands from other sectors. Management options change as the available supplies are developed and vary from supply to demand management, with a greater role for institutional measures such as PIM/IMT in order to make better use of water. Different reasons for the failure of government agencies to manage I&D systems adequately are discussed, and in particular, six case studies (Pakistan, Kyrgyzstan,

Georgia, India, Mexico and Turkey) are shown to analyze the PIM/IMT process in depth.

Improving efficiency and productivity of water use in the irrigated agriculture sector is increasingly important. Engagement of water users, better leadership, the formation of a powerful coalition, communication, empowering others to act, consolidating improvements, institutionalizing new approaches, and liaising more with the government I&D agency should all form part of the management transfer package. Institutional change is not an easy process and strong commitment, time, energy and resources are required if this is to be successfully implemented.

Rural finance

Provision of financial services in rural areas is a major challenge in Pakistan. The country has a very poorly developed financial intermediary system for the agricultural sector and it is practically non-existent for the smaller and poorer farm households. Only 15 percent of farmers access the formal financial system (including commercial banks, agricultural banks and other financial institutions), and only 6.5 percent of poor farmers receive credit from the formal sector. Informal borrowing (from agricultural traders, input suppliers, money lenders, and landlords, etc.) acounts for 78 percent of total borrowing in Pakistan, although wealthier farmers get more of their credit needs from this source than poor farmers (82 percent versus 70 percent).

In order to improve and extend availability of financial services to the agricultural sector the World Bank could support the following specific interventions:

- The creation of a Nationwide Credit Information Bureau (CIB) designed to address the lack of information on potential borrowers;
- Support for M-banking that builds on the explosion of mobile telephone ownership in Pakistan;
- Support for the development of grain storage facilities and security of warehouse receipts to address both the acute shortage of storage facilities in Pakistan and to provide an effective tool for creating liquidity and easing access to credit;
- Partial guarantees for financing by commercial banks to microfinance institutions designed to address an evident reluctance of commercial banks to lend to rural finance institutions by providing both a risk mitigation and incentive tool.

Agricultural research and extension

Introduction

The Government of Pakistan requested the assistance of the World Bank and FAO in strengthening its agriculture sector within the context of its National Agricultural Development Strategy, which is a part of Pakistan's 10th Five-Year Plan (FYP) (2010-2015). The round table discussions regarding Pakistan's major agriculture and water issues - held in Islamabad on 8-9 March 2011 and chaired by the Planning Commission - highlighted those areas that require priority attention and action by the Government. Agricultural research and agricultural extension are among the areas that need urgent consideration. This was acknowledged by all federal and provincial institutions concerned as well as by the entire donor community that participated in the event. As a follow-up to the round table discussions, FAO and the World Bank have further reviewed the subsector[1]. This section is based on the findings and recommendations of the review.

It is recognized that Pakistan's agriculture sector made great strides in achieving food sufficiency in the past, especially during the Green Revolution in the 1960s. However, Pakistan's agricultural yields have been stagnant during the last decade and its overall agricultural growth has slowed down. According to the Pakistan Economic Survey 2009-2010, the agricultural growth rate was 5.4 percent during 1980s, 4.4 percent during 1990s, and has fallen to 3.2 percent since 2000. This sustained trend threatens the country's food security in spite of the sector's enormous potential for growth.

1 This subsector review and the preparation of a detailed paper was done by M. Kalim Qamar (international consultant); interaction and discussions have involved Messrs Bekzod Shamsiev (WB), Turi Fileccia (FAO), Jitendra Srivastava (WB), May Hani (FAO) and Karin Nichterlein (FAO).

The below target growth rate has been attributed to:

- Underinvestment in agriculture, particularly in agricultural research and marketing infrastructure;
- Inadequate implementation of envisaged strategy in areas of improved seed and water management;
- A lack of timely announcement of government support and intervention prices and;
- A shortfall in credit disbursement targets.

The countrywide floods in 2010 also disrupted the development process as enormous budget allocations were shifted to emergency work.

Two important events in Pakistan now provide a favorable time and opportunity for any possible external assistance to the country. First, the start of the implementation of the 10th FYP, and second, the ongoing devolution under which several federal functions are being transferred to the provinces[2].

Background rationale

In Pakistan, about 21.5 million hectares are under cultivation (27 percent of the total area). The country has mostly rainfed along with significant irrigated agriculture. Agriculture contributes about 24 percent of the Gross Domestic Product (GDP) and employs 47 percent of the labour force. The sector also dominates exports. Pakistan's agriculture sector is increasingly dominated by small farmers who produce mostly for their own food needs and sell commodities like milk and eggs for income. Only 17 percent of farms are large, but they cover more than half of the land and

2 The application of the 18th Amendment to the Constitution and its devolution obligations to the Provincial Authorities carries numerous consequences for the entire institutional domain. Several institutional changes have occurred since the Roundtable Discussions that need consideration. As of 1st July, 2011, the former Ministry of Food, Agriculture and Livestock ceased to exist and its functions have been transferred either to the Provinces or to specific federal institutions. The functions of maintaining relationship with the FAO of the United Nations, and those for all aid/assistance coordination have been assigned to the Economic Affairs Division of the Ministry of Finance. Policy reform functions have been devolved to the Provinces; the Federal Seed Certification and Registration and the Pakistan Agricultural Research Council (including introduction of improved Germplasm) both maintain a federal stand under the Ministry of Science and Technology. The Pakistan Central Cotton Committee and its research functions are now with the Ministry of Textile Industry.

are largely responsible for cash crop production and value-added activities. The sector is characterized by heavy public intervention aimed at price stability and availability of food staples for the larger non-farming population. During the last three decades, major crops (food grains and cotton) have contributed 60 percent less than their planned production. Minor crops (mainly fruits) have moved ahead but only moderately. Other sectors (forestry, fisheries) have either remained static or their contribution has decreased. Livestock is the only subsector whose contribution has increased significantly: it has doubled. These trends, however, have not changed the cropping patterns. As before, food grains and cash crops still occupy more than 70 percent of the cultivated area. In the livestock subsector, even though the large animal population has doubled since the mid-1980s, no parallel increase has been noticed in fodder area and production. Also, out of the 36 million tons of milk produced annually, more than 95 percent reaches the consumer in unprocessed form.

While tremendous global changes in the climate, economy, and technology are reshaping the lives of people worldwide, the agriculture sector of Pakistan remains traditional. Main reasons for low agricultural productivity include: inadequate certified seed coverage; imbalanced use of fertilizers; insufficient farm mechanization; scarce credit; static cropping pattern; very low investment in agricultural research; weak agricultural extension services; resource depletion due to salinity, water-logging and silting up of reservoirs; low water delivery and low water use efficiency. There are also livestock problems of nutrient deficiency, inadequate artificial insemination (AI), veterinary coverage and price incentive; and fisheries problems of poor infrastructure and little compliance with quality standards.

If Pakistan's agriculture sector is to be transformed, cosmetic measures with the 'business as usual' approach will not bring about much change. Climate change and market liberalization necessitate a fresh look at transforming the sector. The country needs a review of its policies, strategies, and programmes to properly respond to the challenges emerging from global changes. It needs fresh thinking and a new vision on the part of Pakistan's policy-makers, researchers and extension workers to tackle these new concerns. Some of these concerns are: how to prepare farmers to cope with climate change and how to support adaptation efforts; what new farming systems will be

most suitable for adapting to dwindling groundwater resources in a province like Balochistan; should we continue investing in irrigated agriculture at the expense of significant rainfed farming areas, which have been largely ignored so far; are the farming systems in the northern mountainous areas going to survive; what is the effect of climatic changes on livestock rearing; how are coastal farming and fishing communities going to respond to rising levels of sea water such as in Sindh and Balochistan provinces; what kind of plant and fruit varieties will the country need in the medium term both for local consumption and exports; what are the emerging pest and disease threats to plants and livestock and how to cope with them; how to tap new water resources; what are best practices for storing, using and conserving the available limited water, etc. Apart from policy measures to address such concerns, weak agricultural research systems and obsolete extension services will have to be modernized in order to respond to the fast changing conditions to prepare farmers for the best possible management of natural resources.

Mainly because of poor road and communication infrastructure in rural areas, most farmers in Pakistan are still trapped in a cycle of producing and marketing their crops, vegetables, fruits and livestock at the nearest possible market, usually at low prices. While the information technology revolution has shrunk the world in terms of information-sharing, liberalization has expanded the marketing possibilities of local agricultural produce and products to the far corners of the world. The global market and developments in communication technologies offer both challenges and opportunities for advancing the national agriculture sector to an extent where producers could make informed decisions and compete with confidence in international markets. This however will be possible only if proper research programmes are drawn up to investigate what quality standards of production and processing farmers should conform to, and which Pakistani niche commodities enjoy a comparative advantage in world markets. Similarly, extension services will have to shift from the narrow mandate of technology-transfer to a knowledge-based extension philosophy. It will be important to develop the necessary infrastructure, non-formal education facilities, and innovative communication services in rural areas to enable farmers to have timely access to the information they need to improve their productivity and reach new markets. The interest of the private sector will have to be tapped in such ventures.

Agricultural research

Agricultural research programmes are weak and grossly under-funded (0.31 percent of agriculture GDP)[3]. Involvement of the private sector in agricultural research in Pakistan has been very limited due to an inadequate policy and regulatory environment. The system is made up of a vast network of public, national and provincial agricultural research bodies, institutes and experimental stations. Main issues and constraints include: salary and benefits disparities between federal and provincial research scientists; governance shortcomings; lack of partnership with the private sector; imbalanced number of research scientists in federal versus in provincial institutes; centralized and academic approach to drawing up research agenda; unrealistic priority-setting; little collaboration and linkages with international research bodies; weak coordination with agricultural extension, agricultural universities, and other stakeholders; nominal researcher-farmer linkages; probability of overlap and duplication among research programs; a lack of funding for research-to-action phase; low funding and unsatisfactory funding patterns; poor physical facilities and equipment; inadequate mobility means for research scientists; and poor knowledge management and utilization. The system needs to be re-organized and strengthened based on an agenda which takes into consideration the expectations of the government, private sector and producers.

Agricultural extension services

Agricultural extension services are obsolete, lacking capability and capacity for supporting producers in coping with the changing climate, poorly managed natural resources, water shortages, declining productivity, new market demands, rising food prices, and waning food security, not to mention natural disasters. The system is supply-driven and top-down, technology-based, and male-focused. It suffers because each field extension agent is expected to support too many farmers and too vast a geographical area. Other reasons for an ineffective and non-responsive system are an unattractive career development path with little promotion and benefit enhancement; the absence of women Field Assistants; a lack of rewards and accountability and a small number of subject-matter specialists to backstop extension workers. Unlike agricultural research, public agricultural extension in Pakistan has never been

3 About 69 to 88 percent goes to establishment costs including staff salaries, 10 to 25 percent covers fixed operational costs, and 0.2 to 3 percent is taken by capital costs, thus leaving only 0.2 to 3 percent for actual research operations.

a federal government function[4]. The majority of clients of public agricultural extension services are small and medium farmers. The number of commercial producers is rather low and they have their own means for getting extension advice. In the areas of livestock, fisheries, irrigation and on-farm water management, and marketing, extension support remains particularly weak. Among all provinces, the Punjab Province enjoys the best extension services even though there is huge room for improvement. Similarly, extension provision in the districts where there is irrigated agriculture is far better than that in rainfed districts; one of the reasons being a lack of suitable technologies for arid and semi-arid agriculture. Extension services in Pakistan remain traditional, using old extension methods and technology-driven approaches. Linkages with research, agricultural academic institutions and other stakeholders are minimal at best.

There is some private sector activity as extension/advisory service providers. The active private companies engaged in advisory work include Syngenta, Fuji Fertilizer Company, Lakson Tobacco Company, Pioneer Pakistan, METRO, MACRO, and Nestle. Subjects of extension advice include plant protection, plant nutrition, introduction of new and improved varieties, entire crop production cycle and credit. The National Rural Support Program (NRSP) is a non-profit organization which runs a large rural development programme. The NRSP claims to be working with more than 29 000 Community Organizations throughout the country, and undertaking various development initiatives through savings and income-generation activities and/or resources provided by donors and civil society organizations. NRSP does not carry out extension services per se but it has strong potential to engage in such activities.

The way forward

One option is long-term external assistance to develop a meaningful national agricultural innovation system. Analysis of the national agricultural research framework and of the Agricultural Knowledge and Information System (AKIS) and eventually, the

4 Till year 2000, the provision of public extension services was a provincial responsibility. With the start of devolution in 2001, this pattern changed and extension was placed under the district governments, which serves farmers without charging any fee. According to a recent survey conducted by FAO, Pakistan's investment in agricultural extension during the year 2009 was USD 86 million. The extension agent to active rural population ratio was 1: 6 881.

design of a future modern Agricultural Innovation System[5] in Pakistan should be based on a thorough understanding of the sector. A strategy and the investment needed in this respect should be engineered in a client-specific manner. On the one hand, dedicated services and activities will have to be organized to address the specific needs of small-scale men and women farmers to make them more competitive and to enable them to generate higher, sustained income by gradually diversifying or integrating their production systems and adding more value to their outputs in line with the market demands. On the other hand, productivity and profitability issues will have to be resolved for large-scale farmers to allow them to improve their comparative advantage and to respond more competitively to export market requirements. A long-term assistance exercise covering the entire country, aimed at facilitating the development of a meaningful and inclusive agricultural innovation system, will demand at least the following:

- A few detailed studies, including stakeholder analysis, information and communication assessments, and policy reviews;
- Complex political choices (such as giving more financial autonomy to districts under devolution for research, extension and education activities, etc.);
- Major policy decisions (such as shifting of certain government responsibilities to the private sector, empowerment of men and women small farmers and supporting their organizations, enhanced women representation in agricultural decision-making, facilitation and quality assurance of agricultural exports, tackling the issue of taxation on agriculture gains of large-scale producers, etc.);
- A number of institutional reforms (such as revision of the present functions of federal research and educational institutions in favor of strengthening provincial institutions, bringing salaries and benefits of scientists based at federal and provincial research institutes to the same level, etc.);

5 "An innovation system is a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance. The innovation systems concept embraces not only the science suppliers but the totality and interaction of actors involved in innovation. It extends beyond the creation of knowledge to encompass the factors affecting demand for and use of knowledge in novel and useful ways." Enhancing Agricultural Innovation: How to Go Beyond the Strengthening of Research Systems. World Bank. 2006, Agriculture and Rural Development Department.

- Revisiting the roles of research and extension as intermediaries and facilitators in the development of an inclusive agricultural innovation system, and addressing issues of linkages and communication constraints with other stakeholders;
- Capacity-building of a large number of staff based in various institutions; and
- Firm commitment of both donors and the government to the sustained provision of funds for time-demanding reforms keeping in view that the ongoing devolution and the prevailing precarious security situation may complicate and slow down the reform process.

Under present circumstances, the request of the government for assistance may be best met through urgent, short-term, rapid focal assistance in specific areas. The preferred approach will be to identify geographical areas of high agriculture potential for visible impact, and later to formulate precise, relatively short-term interventions, in consultation with the concerned federal institutions and provincial governments. A short-term assistance approach could focus on those components which are included in the 10th FYP, more specifically those listed as 'investment priority areas' in the National Strategy for Agriculture Sector Development, but which have neither effective support by the current agricultural research and extension programmes nor any evident plan for future support to them. This approach will not involve detailed investigations but would require a few rapid surveys on certain aspects of research and extension, information and communication needs, review of secondary sources such as recent studies, follow-up meetings with the federal and provincial government officials and discussions with private sector stakeholders.

Priority areas for short-term interventions

While the strengthening of research and extension institutions is necessary, this alone cannot bring about meaningful agricultural development in Pakistan. Pro-farmer public policies and good governance will also be needed. Allocation of substantially higher operational funds to both research and extension will be essential as will be the exploitation of the full potential of the private sector and agricultural universities for contributing to these two sub-sectors. Academic programmes in agricultural extension need to be

examined for improvement otherwise they will keep churning out weak graduates. Improvement of service conditions, guaranteed career development path and the provision of professional growth opportunities in extension are actions to be favorably considered by the government to attract bright young men and women to a career in agricultural extension.

Research

Supporting biotechnology research

The government's intentions on biotechnology research are to bring about a "Gene Revolution" in Pakistan. About 60 percent of producers in Pakistan are said to be growing Bt cotton. A specific section "Policy on Biotechnology" is included in the 10th FYP. In view of the great potential of biotechnology for improving crops and livestock, external assistance is requested for capacity-building in biotechnology research. The private sector will probably be interested in forming partnerships with the government in the area of biotechnology.

The main Pakistani institutes involved in biotechnology include[6]: National Institute for Genomics and Advanced Biotechnology (NIGAB), National Agricultural Research Centre, Islamabad; Agricultural Biotechnology Research Institute (ABRI); Ayub Agricultural Research Institute, Faisalabad; Centre of Agricultural Biochemistry and Biotechnology (CABB), University of Agriculture, Faisalabad; d) Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad; and e) National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad.

Biotechnology research is an expensive undertaking. The requests coming from several national institutions for assistance[7] in the same technical area are a warning for the need for better coordination among relevant institutions to avoid duplication of facilities and activities. The 10th FYP's policy recommendation for establishing a National Bio-safety Committee (NBC), which should gradually evolve

6 In addition, all major universities located in the provinces of Punjab, Sindh, Khyber-Pakhtunkhwa, and Baluchistan have departments or institutes of biotechnology, genetic engineering and molecular biology.

7 The biotechnology research institutions which are seeking assistance are: NIGAB, ABRI, CABB.

into an autonomous National Biotechnology Regulatory Authority, is a step in the right direction. A comprehensive approach is suggested in the box below.

Assistance is thus required to:

- Assess and evaluate the present capacity of federal and provincial institutions and to design a comprehensive national biotechnology programme;

Box 1. Comprehensive approach for a national agricultural biotechnology programme

1. Assessment of all existing capacity and programme development in a participatory manner involving key stakeholders of the agricultural innovation system, and supported by national and international consultants.
2. Resolution of key issues:
   - Creation of an enabling policy environment and functional regulatory frameworks in support of biotech research and development (R&D) (Seed Act and Plant Breeder Right Bill, implementation of bio-safety guidelines, Bio-safety Committee, etc.) supported by an inter-ministerial task force of respective ministries involved in agriculture, environment, health, education, research, etc.
   - Strengthening of institutions and support services to increase efficiency and relevance of biotech R&D for agricultural development based on capacities, resources, comparative advantage, and national research priorities.
   - Enhancing technology access through regional and international collaboration and networking (link to the new CGIAR and other international/regional research programmes, to Asia-Pacific Association of Agricultural Research Institutions (APAARI), Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) partners, etc.).
   - Development of locally relevant biotechnology products for enhancing food security and rural livelihoods (support to research projects selected based on priorities, comparative advantage of biotech versus other technologies, biotech research linked to a national research programme and partner with those institutions involved in applied research and extension).
4. Enhancing biotechnology transfer and delivery systems through public-private sector partnerships
5. Building/strengthening communication and information system
   - For public awareness and stakeholder participation;
   - For innovation in biotechnology (linkage system/platforms with producers, extension, intermediaries, research, policy, etc.).
6. Development of human resources on biotech R&D and in areas that are needed to achieve impact of biotech R&D (seed production, extension, communication, facilitation of stakeholder processes, etc.).
7. Development of an incentive system for retention of scientists.

- Support the integration of physical infrastructure and scientific equipment based on the assessment and programme;
- Build-up capacity through overseas degree and non-degree training of nationals in specific aspects of biotechnology;
- Provide technical guidance in establishing the NBC;
- Facilitate collaborative programmes between national and international institutions;
- Support and provide technical guidance in establishing biotechnology-focused partnerships between public and private sector.

Strengthening of provincial research institutions: support to the establishment of provincial agricultural research boards

Presently, only one agricultural research board exists, and that is the Punjab Agricultural Research Board (PARB), which plays an important role in coordinating and promoting agricultural research in the Punjab Province. The establishment of such boards in other provinces will be in line with ongoing devolution in Pakistan and will lead to the strengthening of provincial agricultural research.

Agricultural Research Boards should be established in the provinces of Sindh, Khyber-Pakhtunkhwa and Balochistan to serve as the lead provincial body for agricultural research. Provincial governments should channel funding through the boards, which in turn should manage competitive research grants not only for conducting research but also for organization of and participation in professional conferences, seminars and meetings, as is being done in Punjab. They should establish institutional linkages within the province, with other provinces of Pakistan, and also with international institutions.

The new Agricultural Research Boards should have the same objectives as the PARB, that is to improve and strengthen agricultural research capabilities in the departments; support high a priority agricultural research programme in the province; improve and strengthen agricultural research-extension-farmers linkage for effective utilization of agricultural research; and benefit from research undertaken in other provinces and in other countries for local adaptation.

Strengthening of provincial research institutions: support to the decentralization of scientists from the centre to the provinces

Although all provinces are said to have about half of the total number of agricultural scientists in Pakistan, their distribution is not balanced. Without doubt, Punjab enjoys the highest number of scientists. Apart from a small number of research staff, all the provinces combined are said to have only 18 staff with Ph.D. degrees.

There is a heavy concentration of research scientists in and around Islamabad. Out of the total 1 046 scientists of the Pakistan Agricultural Research Council (PARC), 608 (i.e. about 58 percent) are based at the National Agricultural Research Centre (NARC). Most of the geographical area of their research work is in fact rainfed. It is also true that the mandate of the PARC is less research per se and far more policy guidance, coordination, collaboration, technical backstopping, research evaluation and impact assessment. A significant number of this staff may be transferred to provincial research institutions with the objective of strengthening those institutions and letting the provincial agriculture programmes benefit from their expertise. The number of non-scientist staff is also concentrated in and around Islamabad. As many as 547 staff, that is 37 percent of the total non-scientist staff of the PARC, work at the Council offices while 611, that is about 41 percent, at the NARC premises.

With the assumption that provincial research institutions will be strengthened in these aspects, the de-centralization of research scientists to the provinces will (i) strengthen provincial research capacity; (ii) increase availability of subject-matter specialists and two-way interactions with district-level agricultural extension staff and farmers; and (iii) enhance on-farm research work (private sector and universities can also be involved). Moving research scientists to provinces will not make sense unless accompanied by the necessary physical facilities such as offices, labs, materials, mobility and adequate operational funding.

Livestock research capacity-building

The Planning Commission lists the following issues and problems related to the livestock sector: (i) low productivity per animal; (ii) poor genetic stock with only 10 percent coverage by AI, and a yield gap of 61 percent between national milk average yield and that of

progressive livestock; (iii) a mere 25 percent animal health coverage; (iv) inadequate feed resources; (v) shortage of needed skills; (vi) primitive marketing infrastructure and unfair marketing practices; (vii) weak research and extension systems; (viii) inadequate fund allocation; (ix) limited credit ability; (x) outdated regulatory framework including inadequate database and analytical capacity. The government is engaged in addressing these issues through policy and institutional initiatives. Assistance is required in the following five key areas:

Genetic improvement. The emphasis of livestock research has been on large animals especially buffalo and cattle. Small ruminants like goat and sheep, which are numerous and are important from a food security point of view, have almost been neglected. While this particular gap needs to be filled, the country's overall genetic improvement programme needs strengthening. Animal identification is essential for maintaining production records of livestock. It not only helps in keeping track of individual animals but is also a tool for herd management.

Foot and Mouth disease vaccine. Foot and Mouth disease is a major animal health issue in Pakistan. The Foot and Mouth Disease Research Centre, located in Lahore, besides conducting research on the disease, prepares vaccine and antisera and serotyping of prevalent strains of the disease, but the demand by far exceeds the supply. A lack of good quality vaccine at a cost affordable to farmers remains a key problem in combating the disease. Recently, USAID has provided about USD seven million for this activity, but the cost of establishing a vaccine factory needs much higher investment. The private sector is apparently not interested in investing in vaccine production unless the government guarantees purchase of the product for at least ten years. A public-private partnership option needs to be sought.

Livestock feeding. Supply of forage for livestock is grossly insufficient. Concentrate-based feeds are too expensive for small-scale farmers. Special research programmes should be designed for the development of short-duration and high-yielding varieties. Lately, the use of silage has been gaining popularity among farmers due to its low cost and good results for livestock rearing. As many as 15 factories are said to be producing animal feed but their production meets only 6 percent of the demand. Any assistance

towards increasing the production of silage, especially through involvement of the private sector, will be of great tangible benefit to the producers. Extension agents should be given intensive training in order to promote the process of adoption of silage by livestock owners.

Dairy technology development. This is one area in Pakistan that has been waiting for full exploitation of its potential. With approximately 36 million tonnes of milk from about 130 million animals, Pakistan is the fifth largest producer of milk in the world. However, factors such as the absence of an appropriate milk collection system in rural and peri-urban areas, un-hygienic handling of milk and a lack of milk cooling facilities before processing and value addition, adulteration by milk sellers and inadequate processing plants for various kinds of value-addition result in approximately 15 percent milk spoilage. This means annual losses of about 169 billion Rupees. Although the private sector is actively involved in the dairy subsector, it covers only 5 percent of the demand for milk and milk products. Research initiatives are needed which should focus on specific aspects such as cool chain development, value-addition and packaging within an appropriate strategy for developing the dairy industry in Pakistan.

Marketing of live animals. Marketing of livestock is marred by constraints such as inadequate basic facilities, non-availability of proper transportation and an unsatisfactory pricing mechanism, causing persistent losses to livestock owners. The government's strategy, under the 10th FYP, for improving the marketing, value addition and cool chain development includes strengthening research on market issues and related aspects by producing a trained cadre of livestock business managers, technicians and farmers.

Capacity-building for research on rural social aspects

There is little research being done on rural social aspects related to technology generation and adoption at the PARC or other research institutes. The same applies to marketing science. Gender aspects of agricultural production, research and extension also need attention. In addition, areas such as policy formulation and its translation into action and evaluation and impact assessment of development initiatives are of great importance and need a strong research base. WUAs and producers' organizations also need to carry out research in view of the

government shifting emphasis from supply-driven to demand-driven approaches to agricultural development.

PARC has five Technology Transfer Centres, one in each province and also in Azad Jammu & Kashmir, but they rarely collaborate with extension services to organize farmer days or to perform minor field activities. Their main function remains the collection of socio-economic data for research. Apart from their misleading institutional title, they do not have sufficient staff and physical facilities. These centres, if properly staffed and funded, do have the potential to collaborate with their respective provincial Departments of Agriculture and especially with agricultural universities where students conduct research on socio-economic topics as a requirement for their master's and doctoral degree programmes.

Strengthening research on water use efficiency

Water use efficiency cuts across all initiatives whether they are for reducing the huge yield gaps in crops, vegetables and fruits, making farming adjustments to climatic changes, enhancing livestock productivity, or developing technologies for rainfed and irrigated agriculture. The 10th FYP rightly points out that inefficient use of water is one of the major issues confronting the agriculture sector.

Presently, 93 percent of available water is used for agricultural purposes. Irrigated areas are constantly expanding in spite of land losses to water-logging, salinity and alkalinity, evaporation and poorly maintained infrastructures. At the same time demands on water from urban and industrial sectors are increasing. There is a lack of effective agricultural technology for rain fed areas. Water storage and carryover capacities are really low when compared to those in Egypt, South Africa and India. Extension services are not good at advising farmers on water management practices. Shortage of electricity and the high cost of diesel are other negative factors in terms of operating irrigation systems.

The government plans to reduce water losses both at system and farm level through irrigation infrastructure improvement, introduction of effective irrigation systems, on-farm water management research on crop water requirements, water pricing, water losses, water productivity (more crop per drop), cost recovery, and equity

issues under demand versus supply driven irrigation management. Following desert agriculture successes in China, Israel, Egypt, The United Arab Emirates, India and Iran, research is also needed on the potential of agriculture in desert areas. These include Cholistan and Thal in Punjab Province, Pachad and Hill Torent areas in Punjab and Khyber-Pakhtunkhwa Provinces, Thar in Sindh Province and Chaghi-Kharan in Balochistan Province.

Enhancing public-private partnership for research

The private sector will invest in agricultural research and development only when it sees the move as a profit-making venture. The sector will also need some sort of incentive. An example is the guaranteed purchase of animal vaccine production for a certain period, if private companies express willingness to establish a vaccine production factory. Also, the government needs to remove obstacles such as a lack of legislation for plant breeders' intellectual property rights in order to encourage the participation of private companies. Partnerships formed between public institutions and private industries for developing joint projects of agricultural interest under the Science and Technology for Economic Development (STED) programme in Pakistan are a good example.

Extension

Reforming the entire extension system is a long-term undertaking. However, in the short term four entry points are recommended for possible external assistance in selected districts. These topics are also included in the 10th FYP. If the results of extension improvement initiatives are promising, similar initiatives can be gradually undertaken in other areas of Pakistan. A short action plan for the setting up of a pluralistic, demand-driven, gender-sensitive, participatory extension system with a wider technical mandate in selected *tehsils* (subdistricts) is presented in the Appendix.

Pluralistic, demand-driven, gender-sensitive and participatory extension system with a wider technical mandate

A pluralistic extension system will involve public institutions, private sector and civil society bodies in planning and executing extension activities. The demand-driven approach will put the farmers in the driving seat making the extension staff accountable to them and facilitating joint evaluation and impact assessment of extension programmes. The gender-sensitive aspect will benefit rural women in full-time or part-time farming, or who help their spouses in various agricultural and livestock operations (e.g. household farms). The participatory dimension will ensure empowerment of farming communities as well as government officials making decisions on realistic grounds. A wider technical mandate will enhance the extension system's capability to advise farmers on improving their quality of life in a comprehensive and inter-disciplinary manner.

A good example may be seen in Azad Jammu and Kashmir where demand-driven extension was introduced in selected *tehsils* of three districts under an FAO project, which also introduced a community-based planning mechanism for demand-driven extension services several years ago. The same model has been followed by an IFAD financed Community Development Programme in the same region where village level groups of men and women develop comprehensive Village Development Plans.

Comprehensive extension support for exportable fruits like citrus, mangoes, dates and apples

Extension advice focused only on enhancing growth of fruits is not adequate in view of changing food consumption patterns and consumer demands, both domestic and overseas, for diversified, processed food products during and after the growing season. Extension support must be comprehensive enough to address all the phases such as production, quality assurance, post-harvest handling, storage, packaging and marketing to local supermarkets or exports.

There is an example in northern Italy where apple growers have their own cooperative and advisory service which provides extension support covering all stages of apple cultivation including

grading, packaging and marketing locally and overseas. Members of the cooperative are linked to a modern communication network that provides timely advice and warns the growers through radio and/or mobile phones about threats to apple orchards, such as severe frost.

Extension support for production and management of livestock and small ruminants

Both men and women are actively involved in rearing buffaloes, cows, goats and sheep but the present extension support is limited to animal health through Veterinary Assistants. The support has to be expanded to animal production, management, and marketing. Dairy farming, milk processing and raw animal product handling also need to be supported by extension due to their huge scope for improvement.

For example, the Danish Agricultural Advisory Services (DAAS), a private company in Denmark, enjoys the membership of thousands of farmers who pay for advice on several aspects of agriculture including livestock. The company comprises a national centre and a number of advisory centres in the field.

Integration of agricultural education, research and extension

Agricultural universities, research and extension institutions produce knowledge that is beneficial to farmers. However, they work mostly in isolation from one another. In most developing countries, the biggest challenge in the integration of these institutions is to change the mindset of the relevant officials. This needs to change from expanding and developing their individual institutions to an integrated institutional approach where human and physical resources could be shared and joint planning and operations undertaken for a common cause.

The best example of integrated approach is the Land Grant Colleges/Universities System in the United States under which professors divide their time between teaching, research and extension activities. In Pakistan, a USAID funded project Transformation and Integration of Provincial Agriculture Network (TIPAN) was implemented in Khyber-Pakhtunkhwa during the 1980s. In this project agricultural research and agricultural education

(University of Agriculture, Peshawar) were successfully integrated and linked to agricultural extension through an outreach programme of the university. Improvement of linkages with other key actors within the wider agricultural innovation system or at least with the stakeholders along the value chain should also be pursued.

The seed sector

Introduction

The seed industry needs the government to make decisions and take urgent action to revitalize the sector, increase productivity and improve seed quality. This was emphasized and acknowledged by all federal and provincial institutions[8] concerned as well as by the entire donor community that participated at the round table discussions held in Islamabad on 8-9 March 2011 and chaired by the Planning Commission regarding Pakistan's major agriculture and water issues.

The revitalization of the seed industry is indeed indicated as a first priority investment area in the new 10th FYP (2010-2015). This is the outcome of a non-fulfilled objective included in the previous 9th plan which indicated one of its aims as being "the increase of crop productivity through development of high-yielding, disease-resistant varieties, increased use of… quality seed…". The seed industry state of affairs in Pakistan was thoroughly reviewed since its inception in 1976 with the assistance of FAO in 2008. The review monitored the regulatory environment, the research and development segment, and human resources development issues. It also reviewed seed production tiers (public, domestic, private and multinational) as well as the seed market (distribution levels, quality assurance system, financing and seed association conditions). The

8 The application of the 18th amendment to the Constitution and its devolution obligations to the Provincial Authorities carries numerous consequences for the entire institutional domain. There are institutional changes which have occurred since the Roundtable Discussions that need consideration. As of 1 July 2011, the former Ministry of Food and Agriculture ceased to exist and its functions have passed either to the Provinces or to specific federal institutions. The relationship with FAO and for all aid/assistance coordination have been assigned to the Economic Affairs Division of the Ministry of Finance. Functions that merit special attention with regard to the Seed Industry include: policy reform functions which are now all devolved to the Provinces; the Federal Seed Certification and Registration, and the Pakistan Agricultural Research Council (including introduction of improved germplasm) both maintain a federal role under the Ministry of Science and Technology; while the Pakistan Central Cotton Committee (and its research functions) are with the Ministry of Textile Industry. Lastly, the functions of plant quarantine are now assigned to the Ministry of Commerce.

assessment was completed by a number of recommendations that were endorsed by the competent authorities. As a follow-up to the round table discussions, FAO and the World Bank have further reviewed the sub-sector with the involvement of international and national experts[9]. This section is the result of this review update.

Current situation

The pace of agricultural growth in Pakistan is slowing down. This is reflected by the prevailing agricultural output and productivity trends in the country. Major crop yields are generally quite low although equivalent or higher than those in India. However, commercial and export crops (e.g. cotton, rice and maize) are not performing as well as Bangladesh (Table 1). Performance would significantly improve with an increased use of quality seed of valid varieties.

The increased use of quality seed in 2010 was probably due to higher demand (owing to a huge loss of farmers' retained seed) following the August floods. FAO assessment data of 2008 illustrates the average situation (reference year 2006) prevailing in the country (Table 2).

The public seed industry is underperforming. The principal large producer is the Punjab Seed Corporation (PSC) followed by the Sindh Seed Corporation (SSC) and non-corporate operators in various

Table 1. Regional comparison for yields of major crops (t/ha)

	Pakistan	India	Bangladesh
Wheat	2.6	2.7	1.9
Rice	3.4	3.2	4.0
Maize	3.3	2.1	5.7
Seed Cotton	2.0	1.2	2.5

Source: FAOSTAT (average 2005-2009)

9 This review update and discussions involved Messrs. Bekzod Shamsiev (WB), Turi Fileccia (FAO), James Stanelle (international seed industry consultant), Jitendra Srivastava (WB), Aqlaq Hussain (national seed expert) and Thomas Osborn (FAO).

Table 2. Seed replacement rate through formal sector (2010 and 2006, rounded)

Crop	% (2010)	% (2006)
Wheat	27	20
Rice	46	30
Maize	28	35
Cotton	61	41
Sunflower	100	47
Pulses	22	13
Fodders	20	16
Vegetables	100	100
Potato	2	2

Source: FSC&RD.

provinces). The private sector[10] now dominates the market and is currently responsible for supplying wheat (60-65 percent), paddy (75 percent), cotton (90 percent), fodder (100 percent), and vegetables (100 percent) seed that is purchased every year by the farmers. In addition, maize and sunflower seed supply (100 percent) is through multinationals that operate in the country. In terms of seed imports, maize (hybrid) 75 percent, sunflower (hybrid) 100 percent and potato seed 100 percent, are of foreign origin. About 65 percent of vegetable seeds that are distributed in the country are also imported. These crops represent about 80 percent (valued at about PKR4 billion) of seed imports.

Seed industry programmes in Pakistan originated in the public sector. The government established the entities necessary in order to produce new varieties, increase the amount of seed available, maintain seed product quality controls and to transfer seed products to farmers for planting in the field. Crop yield increased with the spread of knowledge about the use of good quality seeds because of these public programmes, resulting in an increased demand for more varieties, better services and offering more opportunity to increase incomes. Many of these public entities that had originally been so instrumental in starting the seed industry gradually became unable to react to change and actually began to be an impediment to the growth of the seed industry. This situation has therefore stifled

10 To date, out of a total of 729 registered private seed companies not more than 350 are actually engaged in seed production and distribution. This number includes five multinationals (Monsanto, Pioneer, ICI, Syngenta, and Bayer Crop Sciences).

private sector involvement and ultimately limited the capacity to supply new varieties and quality seed to Pakistani farmers.

The essence of the 'seed issue' in Pakistan may be broadly defined as follows: Pakistani farmers have little confidence in varieties that are available on the market. Farmers do not consider it worthwhile paying premium prices for seed technology out of a limited list of varieties, most of which are considered outdated[11]and of uncertain industrial quality. This situation concerns the vast majority of small-scale farmers but also affects a good portion of the larger farmers who control more than half of the land. Apart from this situation, very few hybrid varieties are made available to farmers. The private sector, which was only admitted in the market in 1994[12], has made enormous progress. However, the existing regulatory environment prevents any further progress in this sector.

There appears to be considerable scope to improve the market size of quality seed in Pakistan as shown by farmers' reactivity to the exceptional situation of 2010. The market size of 2010 could be used as a first positive benchmark which should be initially maintained and gradually improved upon. As soon as the crop output data for 2010-2011 is available, it will be evident from this that crop performance improved owing to increased use of quality seed. If this to become possible the supply chain must therefore be able to improve its marketing capacity, as well as be able to offer more modern varieties of necessary quality seed that meet farmers' needs. It is time for streamlining a demand-driven seed sector in Pakistan.

Main issues

The regulatory environment is obsolete. The Seed Act is more than 35 years old and was created for a public sector led industry. It is definitely not in line with the needs of the growing private sector. A number of piecemeal amendments have been designed (with a

11 For instance, a major research institute and contributor of crop variety releases in Pakistan (the Ayub Agricultural Research Institute, Faisalabad) has produced only 12 wheat, three rice, four maize (OPV), five pulses and seven vegetable varieties over the last ten years.

12 In the early 1990s, the Government of Pakistan pursued a strategy of privatization, deregulation, liberalization and good governance to promote the private sector. The seed business was declared as an industry and allowed concessions on a par with other industries in 1993-1994. This declaration spurred seed activities in the private sector.

lack of full stakeholder consultations) and then left dormant for years e.g. Plant Breeders' Rights (PBR). These have also been enforced into a superseded regulatory framework e.g. Truth-in-labeling (TIL). A National Seed Association exists headed by the Director General of the Federal Seed Certification and Registration Department (FSC&RD), but it does not truly represent the private sector.

Research and development is concentrated in the public sector. Private sector enterprises are unable to access public germplasm, breeding materials and varieties. The absence of incentives from the Government discourages these enterprises from taking up research and development activities in the country[13]. Public sector R&D being short of funds has been unable to produce hybrid varieties. The absence of a plant variety protection legislative framework hinders primarily foreign investment as well as national private investment. These high-cost hybrid varieties are bred out of Pakistan[14], imposing limited choice and additional costs on the farmers who buy imported seed. Pre-basic seed production by the research sector is not sufficient to meet the demand of private seed enterprises. The production of basic seed is also still an exclusive mandate of the public seed corporations.

Protocol on the use of biotechnology is in its early stages. Twenty-nine institutes and centres are reported to be working in the field of biotechnology: few of them have made remarkable achievements. Biosafety rules and guidelines have been approved[15]. However, in order to set up an effective biosafety regulatory and enforcement mechanism and to stimulate and protect private investment in different disciplines of modern biotechnology, enactment of PBR law and rules are necessary.

13 During the FAO assessment, private seed companies declared readiness to invest in local breeding program of developing hybrids provided: (i) plant variety protection law is introduced to resolve germplasm security issues, (ii) import of breeding material is exempted from taxes, (iii) easy access to local germplasm is ensured, (iv) requirement of VEC approval for introduction/import of hybrids is eased, (v) locally bred hybrids are allowed to be sold under TIL rules, 1991, (vi) clearance of seed imports at Karachi port is made easy and centralized system for seed consignment's clearance from Islamabad is withdrawn (this condition has been imposed on importers by FSC&RD). Basic seed production should be allowed to those private seed companies which have the facilities and infrastructure for the purpose.

14 As of 2010 and since the beginning of the industry, 549 varieties have been released by the R&D system of Pakistan: public sector released 531 open pollinated varieties while national seed companies officially released nine BT hybrid cotton varieties and one sorghum variety. The multinationals have introduced two maize, one fodder, and five sunflower hybrid varieties.

15 Pakistan is a signatory of the Cartagena Protocol on Biosafety since 2001 but it only entered into force in mid 2009.

Quality assurance systems in Pakistan are complex and counterproductive. The FSC&RD needs to be updated[16] and capacity building and training for its staff. Variety registration and release is the responsibility of the FSC&RD. This is mandatory for certified seed production. The seed certification system in place requires lengthy and impractical procedures. After a two year trial and before release, the department looks out for inter alia, distinction, uniformity, stability and value for cultivation and use. The private seed companies that import seed after rigorous field trials are not allowed to import such seed varieties unless these varieties have also passed adaptability trials for two years by the FSC&RD. This prevents the introduction of new varieties, and has led to the slow introduction of exotic material in the country. This situation has also encouraged the illegal importation of material. In addition, one of the impediments to the implementation of TIL is that the private sector has not been allowed to have its own quality assurance systems and to establish accredited seed testing laboratories[17]. Inadequate enforcement capacities of the mandated institutions render the existing TIL seed rules ineffective.

A way forward

Solutions adopted by other countries in the region that had a regulatory framework similar to the one being used in Pakistan may provide useful lessons.

The real need for Pakistan is to bring "formal" seed use to optimal market levels. That would include an upgrade of those entities within the seed industry also to form a sense of responsibility and confidence throughout the industry. This would mean that all involved in variety development, seed production, sales and distribution and regulatory control, as well as farmers should aspire to a greater goal of working together for a better and more complete system.

16 FSC&RD is not a member of International Seed Testing Association (ISTA) or of the Organization for Economic Co-operation and Development (OECD) protocols.

17 TIL seed has been constrained by FSC&RD to seed of a (compulsory) registered variety produced locally or imported. Sale of seed under TIL rules subject to compulsory registration of varieties impedes further growth and investment by the private sector in research and development and is against the true spirit of Seeds (TIL) Rules 1991.

The Bangladesh example

In the late 1980s, the Bangladesh seed policy mandated that all varieties approved for planting in the country be tested for a specified period before being approved for use in the country, and it contained a bias for locally developed varieties with limited scope of support for privately developed varieties. The list was therefore populated by a small number of varieties, most of which were developed within Bangladesh. Rice was a major crop in Bangladesh but the approved list of rice varieties had only 20 inclusions, and many of these held little interest to farmers because they did not fit the seasonal rice planting needs. A rice variety, Pajam, was the most widely used variety in Bangladesh for over ten years but had not been approved, and was not on the recommended variety list.

As officials began to see that the approved variety list was becoming an impediment to agricultural development and crop improvement, the decision was made to change the registration requirement and do away with registration restrictions for all but five of the most popular crops in the country, including rice and wheat. These crops were kept on the required list because there were current research programmes for those particular varieties in the country, and elimination would have been difficult as many of the most powerful scientists and government officials were working on these programmes, making lobbying for approval extremely difficult.

As a result of the liberalized programme, the availability of additional varieties and hybrids increased. Local seed companies began to test and sell seed developed by international companies and private sector domestic companies began developing new varieties and hybrids for sale within the country. A common argument for the use of variety lists is that they prevent significant losses due to the use of non-adapted varieties. Experience gained in Bangladesh did not show this to be the case as new varieties take a number of years to become established and any problems encountered with that variety would be exposed on a relatively small area of land. The eased requirement for variety testing worked so well that that there was an increasing demand to remove the registration requirement for those last five crops.

(Gisselquist, David, "1990 Seed Policy Reform in Bangladesh: Moving Away from Variety Lists," World Bank Discussion Paper No. 367, July 1997)

An enabling regulatory environment is the first crucial step to strengthening the international and domestic private seed industry as well as the Government's drive to make quality seed available at farmer level. A suitable regulatory framework must assist and develop the seed industry further through a modern and future-forward national seed policy. The design of the new regulatory framework would need to verify a number of options:

Enact new seed act and rules to accepted international standards:

- Eliminating the Variety Registration list or reducing the number of crops included or alternatively, the establishment of a modern and stakeholder agreed effective lean system for testing (DUS/VCU) and release of new varieties;
- Removing or modifying of the requirement for compulsory seed certification, e.g. effective TIL;
- Establishing effective enforcement systems and compensation mechanisms on fraud;
- Introducing the protection of PBRs and establish a system that will enforce those rights (conform to the international Union for the Protection of New Varieties of Plants (UPOV) treaty[18]);
- Establishing a set of phytosanitary regulations that serve to prevent the import of diseased seed but are not used as barriers to the movement of healthy seeds;
- Avoiding tariffs involved in seed movement.

Review the role of the public sector in the seed industry and introduce reforms that will create more level playing field between the public and private sectors:

- Making publicly developed seed varieties and genetic material equally available to all;
- Decreasing the role of the public sector in those crops where the private sector is strong;
- Decreasing or eliminating public sector variety production in crops where the private sector is well established or remove artificial subsidies in order to establish a level playing field for all;
- Creating a stakeholder forum where market options and public/private competencies are strategized together to satisfy all clients (small and larger scale farmers) for a strong pipeline of new varieties each year;
- Switching public R&D emphasis from variety development to basic research with the release of pre-variety germplasm available on a fair basis to private breeders;

18 The International Union for the Protection of New Varieties of Plants (UPOV) is an intergovernmental organization with headquarters in Geneva (Switzerland). The objective of the Convention is the protection of new varieties of plants by an intellectual property right. Pakistan should consider becoming a signatory of the treaty. (http://www.upov.int/index_en.htm).

- Moving towards privatization of the public seed production corporations;
- Establishing a communication and cooperative working environment between public and private sector scientists;
- Forming a 'National Seed Association' to provide a common platform for the public and private sector's seed activities and to facilitate investors' interest in Pakistan's seed industry.

Empower the farmer/seed buyers with better information and enable the market chain to provide the seed products and services they need in order to produce high yielding crops:

- Using demonstration plots and farmer field days to show the value of improved seed varieties (demand stimulation);
- Providing for extension training for the farmers;
- Enforcing seed laws so that farmers are protected from being exposed to poor seed by either malicious or inadvertent means;
- Training and enabling local private sector seed dealers on how to be profitable while providing information, products and services to farmer customers;
- Establishing communication between the farmers and the other members of the seed supply chain all the way up to the plant breeders so that seed products being developed meet local farmer needs.

The options described above have been preliminarily discussed with sector stakeholders during the review update in order to have a broad understanding on stakeholder adoption appreciation and government priorities. There is wide consensus on the need to have a new and private sector-friendly regulatory framework.

One area that requires debate and much thought is certainly that of 'who does what' in R&D, particularly with regard to high tech seed (biotech/hybrids). Consensus will also have to be reached on bio-safety and biodiversity regulations to be applied for bio tech seeds. Phytosanitary regulations (under Plant Quarantine Act, 1976) will need updating including infrastructure strengthening and capacity building in order to ease and speed up seed consignments.

A crucial area for discussion with the Provincial governments of Punjab and Sindh will certainly be the privatization of public seed corporations. There is a wish to continue with PSC as the

company is perceived as providing an important service to the farmers of Punjab. According to reports, the company phased out public subsidies a long time ago, and appears to be financially healthy. With respect to SSC, the company performance is very low (satisfying only 3 and 4 percent replacement rates respectively of wheat and rice seed) and is highly subsidized. The option of a public private partnership for SSC would need to be explored. Options of private to private partnerships may also be analyzed for village level enterprises.

Lastly, there is the need for the creation of a stakeholder forum to improve reciprocal confidence and facilitate the debate between the public and the private sector industry at all levels. This body should consist of advisors and coordinators of the process who would monitor progress. The recent National Forum on Agriculture could perhaps serve to facilitate discussion.

A World Bank engagement in supporting the country's overdue reform of the seed industry would have a national thrust on all cross cutting aspects while it may focus in three key Provinces (Punjab, Sindh, and Balochistan) for specific ground level investments. Specific interventions would have to follow a value chain development approach and should aim at:

- Supporting policy and regulatory system reforms and applications;
- Facilitating required institutional adaptations at federal and provincial levels;
- Developing collaborative programmes between public and private sector seed research;
- Assisting and supporting privatisation or public-private sector partnership processes of seed corporations, and joint ventures of the private sector with village level enterprises;
- Promoting capacity building of service providers and end-users including the involvement of a modernised extension support.

Water resources

Introduction

This section discusses the increasing participation by water users in the management of irrigation and drainage systems and identifies countries where such participation has taken place. The section highlights the causes of success and failure in a number of countries where PIM has been introduced and seeks to provide guidance on "best practices" in this process.

The section first discusses the background to PIM, and then moves on to formulate a framework for assessing the performance of PIM programmes before discussion of the initiatives taken in Pakistan and a selection of other countries. The paper concludes with a summary of key features for successful PIM, together with conclusions and recommendations for implementation of successful PIM programmes.

Background

International agencies, such as the World Bank, together with the governments of Asian countries themselves, have recently invested billions of dollars in irrigation development and are planning to invest billions more. Considerable interest has been shown by governments and donor agencies that are keen to ensure that these investments are fruitfully and completely realised. However, there was ample evidence of low irrigation efficiency and crop productivity levels, poor returns on irrigation investments and uneven water distribution in many Asian countries and elsewhere in the world today.

In the early 1980s there was an increased awareness of the poor performance of irrigation and drainage (I&D) systems both in Asia and elsewhere. Enormous investments by governments and aid agencies had been based on misleading appraisals and cost-benefit calculations. Problems included delays in construction, faulty

construction, cost over-runs and the gap between potential and actually irrigated command area. At the same time, research and analysis exposed many deficiencies in the management, operation and maintenance (MOM) of I&D systems.

The concept of an I&D system refers not only to the physical aspect, such as channels and control structures, but also to the management structure by which the physical system is planned, designed, constructed and operated. These two aspects are functionally interdependent, and need to be understood as a whole. Managing an I&D system is a much more complex and difficult problem than is commonly recognised. Part of the explanation for limited success lies in the inadequate recognition that delivery and allocation of water involves complicated social, organizational, legal and economic questions in addition to the undoubtedly important technical matters.

The most underrated and misunderstood dimension of irrigation development today is that of the farmer, who has to use the I&D system. Much is known about the design and construction of dams and canals, crop water requirements, and operational irrigation practices. Unfortunately, the social and organizational aspects of irrigation continue to be the Achilles heel of system development, improvement, and operation. Governments and donors are slowly realising the high economic and socio-political costs that occur when farmers and users are only spectators in designing, organizing, and operating I&D projects and programmes, which directly affect them and depend on their willing participation.

In order to avoid further deterioration of I&D infrastructure and decreasing productivity of irrigated agriculture due to the inefficient operation and maintenance (O&M) of I&D systems, governments and financing institutions are now aware that effective farmer participation in the development and management of I&D systems is required.

As governments in many developing countries face increasing fiscal crises, they have focused their attention on the shortcomings of existing policies regarding the financing of irrigation, especially with regard to O&M costs. The general consensus among governments and financing institutions is that users should at least pay all the O&M costs and that they should also contribute to the capital costs. Apart from the obvious fiscal advantage, a contribution by users

towards the capital costs of a new or rehabilitated scheme is as much an indication of demand and commitment as it is an investment in equity, which creates a sense of ownership and the prospects for sustainability. Ownership and commitment by the users are unlikely to be achieved unless they consider that the project would meet their needs. Therefore, the users should also be actively involved in the planning and design of the I&D systems.

The logic often used to justify policies aimed at the enhancement of farmer participation in irrigation management is that government bureaucracies lack the incentives and responsiveness to optimise management performance. Farmers, however, have a direct interest in enhancing and sustaining the quality and cost-efficiency of irrigation management. Farmers are keen to reduce the cost of water management when given the authority and incentives to act collectively. They are also interested in improving operational performance because it is in their direct interest to do so.

In general, governments have either adopted a policy to increase the involvement of water users in the management of I&D systems PIM programmes or to transfer full responsibility for MOM or part of the I&D systems to water users through IMT programmes.

Reasons for implementation of PIM/IMT programmes
Typical incentives for governments to consider the implementation of PIM/IMT programmes have been:

- Pressure on available water supplies, including the need to increase efficiency and productivity of irrigation water use as well as releasing water for (non-agricultural) use elsewhere;
- Failure of government agencies to manage and sustain I&D systems;
- Increasing cost burden to governments of supporting I&D systems;
- Perceived opportunities for enlisting the active support of the main beneficiaries, the water users.

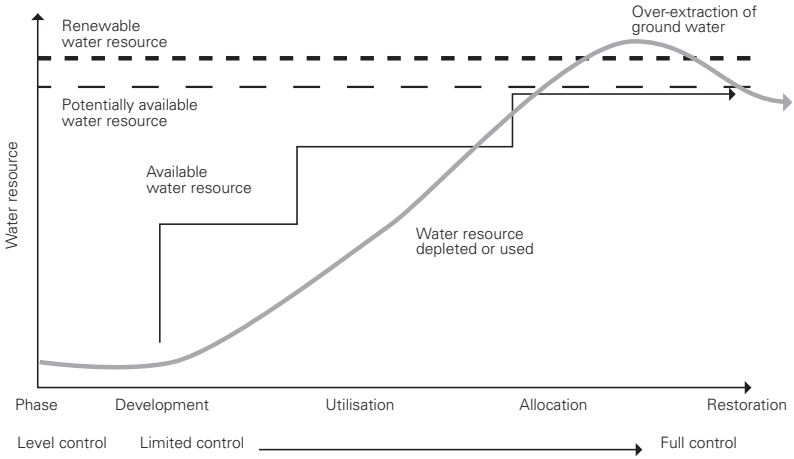
Pressure on scarce water resources. In many countries irrigation is the main user of water, with over 70 percent of all extracted water being used for irrigated agriculture. The limiting constraint on development has been water, rather than land, with many

basins being closed or pending closure[19]. Figure 1 is helpful in understanding how the development of irrigation in many countries has led to this pressure on water resources and how institutional arrangements have adapted to cope with this situation. In many countries the historical approach of building more infrastructure to capture and utilize water resources is no longer feasible as suitable dam sites and irrigation schemes have all been developed. At the end of the development and utilization phases more emphasis is placed on distribution of the available resources (entailing allocation, as well as regulation and conflict resolution). The basin then moves towards full development and utilization of the potentially available resources. Efforts are made to increase the levels of cooperation and coordination between water users in the different sectors and to integrate water resources management. It is at this point that the value and benefit to society of different uses of water are assessed, often resulting in a restructuring of priorities. In Maharashtra State, India, for instance, irrigation used to be the priority allocation for available water resources. It is now third in line behind domestic water supply for cities and towns, and industrial use. Under the restoration phase drastic measures have to be taken to solve the problem of over-extraction and mining of the water resource. Although this often relates to over-extraction of ground water, many river systems have been over-exploited to a degree that has had dramatic and adverse impacts on the related environment.

Planning and construction of infrastructures are carried out during the early stages of river basin development, so as to increase the quantity of renewable resources available. Management rather than construction is then focused on, and measures are taken to match supply with the increasing demand (supply management). Measures to limit demand are then taken to match supply available. Pollution control of the water resource is also increasingly important as water scarcity increases. As one approaches the limit of the renewable water resource there is less room to manoeuvre, and more likelihood of consequences associated with periods of shortage and drought (Figure 2). Management decisions change from top-down to more bottom-up approaches, encouraging

19 A basin is considered closed when all available water has been used. A basin remains open when there are water resources remaining to be developed or used.

Figure 1. Phases of river basin development (after Molden et al, 2001)

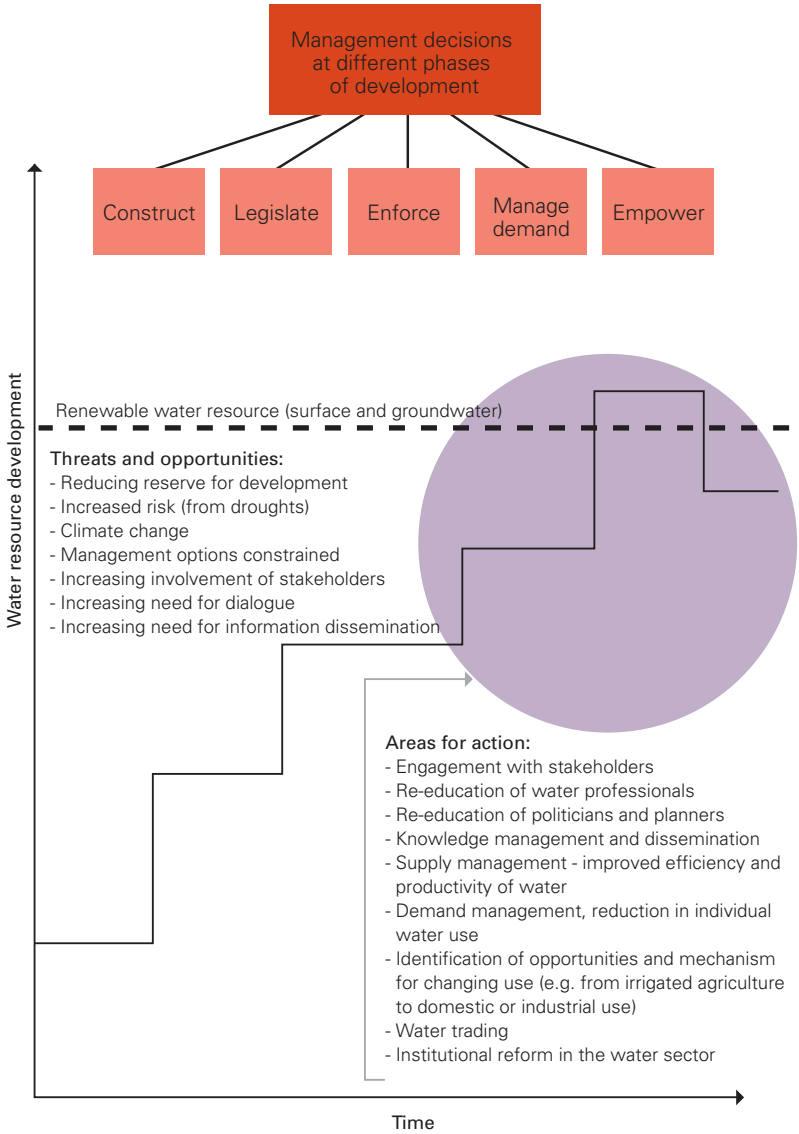


dialogue and empowerment of water users. Areas to focus on at this stage in the irrigation sector include:

- Increased cooperation with water users;
- Institutional reform and organizational restructuring;
- Re-education, training and capacity building (of both service providers and water users);
- Development of information systems;
- Improved operational and performance management in order to keep extractions to a minimum,
- Wastage reduction, with minimal pollution in return flows;
- Increased efficiency and productivity per unit of water extracted.

Failure of government agencies to sustainably manage I&D systems.
There is increasing acceptance that government agencies are failing to manage public I&D systems adequately. This is partly due to lack of funds for operation and maintenance of the systems. Other factors include a lack of service delivery orientation in the government agency, no linkage between the salaries of the system managers and operators and the performance of the system, lack of accountability of system managers and operators to their customers, the water users, and rent-seeking and corruption.

Figure 2: Areas for action as river basins approach closure (Burton, 2005)



Reforming government I&D agencies in many countries is a massive task. These agencies have grown with the construction of new I&D systems and have become focused on new construction rather than the proper MOM of the built systems. Management, operation and maintenance have often been seen as less interesting than construction to the predominant civil engineering core of these agencies.

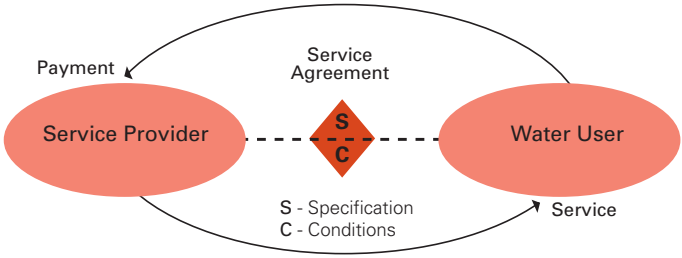
When opportunities for the construction of new systems decline, focus switches to better MOM of existing systems. Water resources have to be used more efficiently and productively to address growing water scarcity and demand and to increase agricultural production. To address growing demand, one option would be to encourage and increase the participation of water users in the management of the system. Another solution would be to change the way in which water resources are managed, by monitoring how the management of parts of I&D systems are organized (currently the responsibility of government agencies).

Step changes are required in the way business is done in the water resources and I&D sectors if the growing crises of increasing water scarcity and food shortages are to be averted.

Increasing government cost burden. Increasing demands placed on the government exchequer from different sectors have forced governments to look at where they can make savings. Irrigation is an attractive area to reduce costs as the provision of irrigation water has a direct link to a farmer's income, and is something for which farmers are prepared to pay as part of a package of crop inputs. The link to drainage is less clear cut, with the result that it is often more difficult to get farmers to pay for MOM of drainage systems.

There is a link between level of service provision and fee recovery (Figure 3). Low levels of service provision will result in low levels of fee recovery, for two reasons: farmers' incomes are likely to be lower with poor provision of irrigation/drainage services and therefore their ability to pay is reduced; and customer farmers' willingness to pay service fees is reduced if the service is poor.

Figure 3: Linkage between service delivery and fee payment (Huppert and Urban, 1998)



The willingness of water users to pay their irrigation service fees (ISFs) generally depends upon the following factors:

- Quality of irrigation services provided (adequate, efficient and equitable supply of water);
- Level of ISF related to quality of irrigation services provided (value for money);
- Confidence in the accuracy of assessment and billing of the ISF;
- Confidence in the willingness and ability to collect the ISF among all water users;
- Confidence in effective enforcement of sanctions against all defaulters;
- Confidence in the financial management and use of the collected ISF;
- Understanding of the composition of ISF.

Government I&D agencies have found it difficult to collect service fees from farmers for a variety of reasons which include:

- Poor service delivery;
- The service fee is seen as a tax (and is sometimes collected by the government revenue department rather than the I&D department);
- Lack of accountability for how the collected funds are spent (often the funds collected go into a general revenue pot and are not spent on the system from which they were collected);
- Lack of coordination with the water users on setting the level of the service fee;
- Lack of analysis and communication with water users regarding the costs of failure to raise sufficient income to manage, operate and maintain the system. The cost of lost production due to poor operation and maintenance of the system is rarely taken into consideration, but generally exceeds service fee costs.

Governments have seen the participation of water users in the management of I&D systems as an opportunity to share or reduce (in the case of IMT) the cost burden with farmers. Unfortunately it is sometimes this aspect of the process which governments have focused on, rather than fully understanding the importance of other key factors i.e. improving service delivery, greater sharing of information between service provider and farmers, greater transparency, etc.

Perceived opportunities to engage water users in system management. Research and studies in the 1970s and 1980s of farmer-managed irrigation systems found that farmers are well able to plan, design and manage their own irrigation and drainage systems[20]. Classic examples of such systems are found in Bali (the subak systems), the hills of Nepal and on the slopes of Mount Kilimanjaro in East Africa. This research contributed to the concept of greater involvement of water users with government planned, designed and managed I&D systems, despite the fact that these were often on a different (larger) scale than the traditional farmer managed systems.

Unfortunately, relatively few of the PIM/IMT programmes are initiated from the perspective that farmers are more capable of managing the I&D systems than government agencies. In a study carried out by the International Water Management Institute (IWMI)[21] the following programme objectives were given for PIM/IMT programmes studied in six countries:

Country	Programme objective
Indonesia	Eliminate government O&M costs of transferred schemes
Sri Lanka	Sustain irrigation network; share decision making
Turkey	Reduce government O&M costs
USA	Beneficiary pays costs and manages facilities
Mexico	Reduce government O&M costs
Nepal	Reduce government workload and O&M costs

20 Geertz, 1980; de los Reyes and Borlagdan, 1981; Martin et al, 1986; Pradhan, 1989; Ostrom, 1992.
21 Frederiksen and Vissia, 1998.

Sri Lanka was the only country that did not shed government workload and costs. A major oversight is the lack of opportunities to facilitate effective involvement of water users in the management of the I&D systems. The structure of the programme should provide them with the necessary knowledge, skills and resources to maximise their engagement and capabilities. This is a contributory factor to the failure of a significant number of PIM/IMT programmes.

Forms of participatory irrigation management

PIM refers to the active involvement of water users in the management of irrigation systems along with the government, ranging from:

- Being only informed;
- Being informed and consulted;
- Being informed, consulted and involved in decision making;
- Being informed, consulted, involved in decision making and responsible for irrigation management.

PIM gained wider recognition regarding small-scale irrigation and drainage systems (although this was general practice for centuries) in the 1980s and 1990s through a number of initiatives in the Philippines, Mexico, Turkey, India, Sri Lanka and Nepal[22]. Studies and research in the 1970s and 1980s on farmer-managed I&D systems led to greater recognition and appreciation of the ability of farmers to manage their own systems, as mentioned above. Associated with this way of thinking was a seminal work by Elinor Ostrom (1992) which outlined measures for "crafting" self-governing irrigation systems. Ostrom's work formed a sound basis for understanding the social interactions and institutions that govern successful user organizations. A significant part of her work focused on rules (rules in use, psychological contracts, rules and culture, conflict resolution etc.). Uphoff (1990) and others supported this point of view which focused on the activities related to irrigation in terms of water (acquisition, allocation, distribution, use and disposal), infrastructure (design, construction, O&M) and

22 Yoder, 1994; Frederiksen and Vissia, 1998; Svendsen and Vermillion, 1994; Kloezen and Samad, 1995; Geijer et al, 1996; Vermillion, 1997; Svendsen and Nott, 1997.

organization (decision-making, resource mobilization, communication and conflict resolution). Uphoff identified three crucial "ships" of successful FOs:

Membership	Definition of who should be members of the organization, and their roles and responsibilities
Leadership	"The effective and equitable functioning of WUAs depends more on the calibre of the leadership mobilized from the farming community than any other factor"
Ownership	Identification of the need for farmers to identify the irrigation system as "theirs", and to take responsibility for it

A major challenge at the outset was how to share the experience of farmers who had designed, built and managed their own relatively small-scale systems over a period of many years (with little or no support from government) with large government planned, designed and built systems.

It is important to note that the move to reduce the role of government in service provision was not limited to the irrigation sector. Financial crises and poor progress with economic development in many developing countries has led to a reevaluation of the role of government since the 1980s[23]. At the heart of the debate on the role of the state in rural development were the issues of effectiveness, efficiency and accountability[24]. Wider economic thinking in market-led economies has led to an evaluation of government's role in the provision of rural goods and services, ranging from seeds and fertilizer to veterinary and agricultural extension services[25].

The Economic Development Institute (EDI) initiated a five-phase programme in the early 1990s on PIM according to the growing interest in transfer of management responsibilities. The purpose of the EDI's programme was to stimulate high-level policy dialogue on

23 Carney, 1998; World Bank, 1981.

24 Carney, 1998.

Effectiveness – the ability to meet goals, objectives or needs

Efficiency – the manner in which the goals are met, at as low a cost as possible without negative impact

Accountability – institutionalized responsiveness to those who are affected by one's actions

25 Smith and Thomson, 1991; Antholt, 1994.

PIM within countries, leading to commitments on policy and action. The EDI initiative was supported by the World Bank, with many World Bank funded I&D rehabilitation projects incorporating an institutional development component related to participatory management.

EDI (EDI, 1996) considered that:

"Participatory Irrigation Management (PIM) refers to the involvement of irrigation users in all aspects of irrigation management, and at all levels.

All aspects: planning, design, construction, operation and maintenance, financing, and policy matter;
All levels: quaternary, tertiary, secondary, main system, project and sector."

They identified four broad categories of approach to PIM:

- The organizing approach in which social organizers are hired through NGOs or from the farming community (and then trained) to act as the initial catalyst for change. These community organizers then help farmers set up the WUAs and act as intermediaries between the government agency and the farmers. This approach was used in the Philippines and Indonesia where the objective was joint management of the government-owned I&D systems, rather than complete turnover to farmers;
- Management transfer in which the MOM of the I&D systems is handed over to water users, as has been done in Mexico and Turkey. The main incentive for the IMT process in Mexico was due to financial constraints within the government. Although it was necessary for Turkey to reduce government expenditure, there was awareness that farmers were well able to manage the I&D systems. In both cases government provided significant support and training to farmers during and after the transfer process;
- The pilot approach where a country experiments with participatory approaches on a pilot basis only. This approach was adopted initially in Colombia, Argentina, Chile, India and Nepal, amongst others;
- The partial approach where WUAs are established at the lowest level where government is not involved in management. This is to strengthen user management at the lower levels rather than replace government management.

At the time of the EDI review there was a growing interest in the second approach (management transfer). The first approach was considered to be needlessly slow in implementation (in the Philippines after 15 years only a small number of small schemes had been transferred to user management). The Mexican Government, on the other hand, had transferred two thirds of the irrigation area under government management to user associations within five years.

Management, according to the above-mentioned participatory, is seen to encompass a broad range of degrees of participation, from partial involvement working with government agencies, to full ownership of the infrastructure and full responsibility for its sustainable management, operation and maintenance.

Irrigation management transfer

Vermillion and Sagardoy (1999) distinguished irrigation management transfer (IMT) from PIM and decentralization where government still retains a significant role in the management of the irrigation system. They defined IMT as:

> "…. the relocation of responsibility and authority for irrigation management from government agencies to non-governmental organizations, such as water users associations. It may include all or partial transfer of management functions. It may include full or only partial authority. It may be implemented at sub-system levels, such as distributary canal commands, or for entire systems or tubewell commands"

IMT usually refers to the relocation of responsibilities and authority for irrigation management from government agencies to non-governmental organizations, such as WUAs at sub-system levels (i.e. distributary canals) or for entire irrigation systems, including:

- Full or partial transfer of irrigation management functions, including maintenance and payment for irrigation services;
- Transfer of decision-making authority, ownership of scheme infrastructure and water rights. Terms as "turnover, take-over, handing over, devolution, privatisation, self-management and disengagement" are used synonymously with transfer.

IMT involves changes in:

- Public policy and legislation;
- Social attitudes, rights, roles and responsibilities;
- Financial arrangements for government irrigation agencies;
- Financing of irrigation service provision;
- Restructuring of government agencies and redefinition of roles and responsibilities;
- Nature of support services provided to irrigation farmers;
- Operation and maintenance procedures;
- Relationships between government and water users.

Many countries have been involved in the IMT process (Table 1). Some countries such as the USA, Spain, France and Argentina have adopted IMT processes for over 30 years whilst others are just starting[26]. Some countries, such as Chile, Mexico and China are well advanced in the process, whilst others i.e. some states in India, Sri Lanka, the Philippines and Indonesia, have started but have, to some degree slowed down. Mexico and Turkey were successful but Sri Lanka failed.

Table 1: Countries or states that have adopted IMT in the past 30 years (Vermillion and Sagardoy, 1999)

Latin America	S, SE and Asia	Africa and Near East	Europe and Central Asia
Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Peru	Australia, Bangladesh, China, India (Andhra Pradesh, Bengal, Gujarat, Haryana, Maharashtra, Tamil Nadu), Indonesia, Laos, Nepal, Pakistan, Philippines, Sri Lanka, Viet Nam	Ethiopia, Ghana, Jordan, Madagascar, Mali, Mauritania, Morocco, Niger, Nigeria, Senegal, Somalia, South Africa, Sudan, Turkey, Zimbabwe	Albania, Armenia, Bulgaria, Cyprus, Georgia, Kazakhstan, Macedonia, Moldova, Romania

26 Vermillion and Sagardoy, 1999; Johnson et al, 2004.

Expected outcomes and benefits of participatory irrigation management

The promotion of greater user participation in the development and management of I&D systems is often motivated by several different and possibly competing objectives. If designed effectively and implemented together with other support policies and programmes, PIM could have the following outcomes:

- Transformation of supply-driven government administration into responsive, demand-oriented service provider;
- Reduction in requirements for government staff and resources in the irrigation sector;
- Improvement of the MOM of I&D systems;
- Reduction in the need for loan-financed rehabilitation projects;
- Diversification of cropping pattern towards high-value crops due to more responsive irrigation and other services;
- Increase in the amount of funds available for O&M due to greater water user control over management and resources as well as better incentives and accountability;
- Promotion of empowerment of farmers through development of strong WUAs.

In general, governments hope that PIM will reduce the cost burden of irrigation on their budget; improve the financial and physical sustainability of irrigation systems; improve water management; enhance the productivity and profitability of irrigated agriculture to compensate for any increases in the cost of irrigation to farmers.

Farmers hope that PIM will enhance their control over the irrigation systems in order to improve irrigation services; enhance their control over use of water charges in order to keep the irrigation costs from rising.

PIM is considered to be successful if it saves the government money; it improves the cost-efficiency and O&M; it maintains or increases the productivity of irrigated agriculture for farmers and urban consumers.

The successful implementation of PIM/IMT programmes could have the following important benefits:

- Decrease in O&M costs as water users are able to undertake the works at cheaper rates with their own financial resources (cost awareness);
- More efficient and equitable distribution of irrigation water as water users have better control over irrigation supply and distribution;
- Increase in recovery of water charges and other service fees as water users are allowed to keep a significant portion of the collected charges and fees for the O&M of the irrigation and drainage facilities;
- Less dependency on Government budget for development and O&M of irrigation and drainage systems as water users will share in the costs;
- User participation in irrigation management contributes positively to planning, design, construction and management of irrigation systems;
- More transparent and accountable relations between water users and the irrigation agency as water users will only pay for the services provided in accordance with the terms and conditions of service contracts;
- Increase in irrigated area as well as quality and quantity of agricultural production due to improved O&M of the irrigation systems and an increase in water use efficiency as water users have to pay the real costs for the supply of irrigation water from the source to their fields; and
- Less corruption and favouritism with regard to the allocation and distribution of irrigation water.

Factors for effective and successful PIM

PIM programmes can only be effective and successful if the following enabling conditions are in place:

- Capacity to create or transform local organizations to take over irrigation management;
- Liberalization and openness of the political economy;
- Supporting legislation;
- Commitment to change within main irrigation agencies;

- Absence of strong opposition to PIM by bureaucratic or political elites;
- Irrigated agriculture with manageable costs and acceptable levels of profitability;
- Irrigation infrastructure that is suitable for management by WUAs.

Based on international experience, the following conditions are most likely to contribute towards favourable outcomes of programmes and projects aimed at the introduction and/or strengthening of PIM/IMT within the irrigation sector:

- Clear and strong legal status of WUA;
- Clear water use rights vested in WUA;
- Irrigation technology is functional and compatible with water rights, service objectives and management capacity of water users;
- Full decision-making authority transferred to WUA;
- Government re-orients its relationship with farmers from top-down to new partnership with service agreements, back-up by irrigation management audits;
- Government restructures and identifies new roles to take on;
- New cost-sharing arrangements for O&M, rehabilitation and modernization of I&D systems;
- Government gives high priority to building the capacity of WUAs through the establishment of an adequate support system;
- High-level political commitment is mobilised and communicated through consistent policies and legislation;
- Strong programme parallel to PIM/IMT aimed at the development of agriculture, agri-business and marketing.

The success of effective farmer participation in development and management of an I&D system is largely determined by the following aspects:

- Farmers must understand their responsibilities, functions and role in the entire process;
- Farmers' willingness to participate in a WUA and comply with its rules;
- Farmers' willingness to pay for irrigation services, backed by adequate provisions to deal with non-payment;
- Farmers' willingness to participate in and/or contribute to the maintenance of the I&D system and realizing that it is in their own interest to carry out the necessary maintenance works;

- Capacity to deal with the managerial and technical aspects of operating and maintaining an I&D system together with the agronomic factors involved in growing irrigated crops;
- Conviction among all stakeholders that farmer involvement in the development and management of the I&D system will produce benefits ultimately and there is no viable alternative; and
- Service attitude on the part of the irrigation agency.

Definition and principles of participation

Participation could be defined as: "a process by which people, especially disadvantaged people, can exercise influence over policy formulation, design, alternatives, investment choices, management and monitoring of development interventions in their communities". Participation of any kind stems from people's decisions to devote a portion of their time, thought and energy to deal with problems through some form of collective action. Organization makes participation patterned and predictable enough to acquire some recognisable and productive structure. Incentives give people motivation and make participation more sustainable. Leadership makes participation more coordinated and effective by providing direction, encouragement and discipline. The main purposes of participation are to:

- Enable people to define and choose their own objectives;
- Enable people to define their own ways to achieve their own objectives;
- Enable people to have full control over the benefits from activities undertaken by them in their own ways to achieve their own objectives.

Effective participation is based on the following principles:

- Participation must begin at the very lowest level and must offer opportunities for all stakeholders to be involved in decision-making;
- Participation must take place at all stages of the development process;
- Participation must deal with the allocation and control of goods and services;
- Participation will be more predictable, productive and sustainable if it is channelled through organizations appropriate to the tasks.

Framework for assessment of PIM

The experience gained during the 1980s and 1990s with IMT resulted in the publication of guidelines for the transfer of irrigation management services[27].

This comprehensive piece of work provides detailed guidelines for the IMT process, broken down into four phases:

- Mobilization of support;
- Strategic planning;
- Resolution of key policy issues;
- Planning and implementation.

The document outlines the need to identify the performance gap and to look at alternative options for bridging the gap (Phase 1). Organizing the strategic change process is discussed, covering identification of stakeholders, identification of major issues and identification and setting of objectives (Phase 2). Phase 3 involves investigation of the key policy issues related to financing, legal framework for transfer, extent of services/goods/infrastructure transferred, and ensuring accountability. Phase 4 outlines the development of the IMT plan, covering irrigation agency restructuring, forming and supporting WUAs, and measures to improve the condition of irrigation infrastructure. There is not much mention of procedures needed to support and build the fledgling WUAs over time, despite the fact that this is under the umbrella of implementation.

Frederiksen and Vissia (1998) reviewed the IMT process in six countries and produced a useful framework for transfer programmes[28]. On the basis of this framework they assessed the performance of transfer programmes in six countries and found serious cause for concern for the sustainability of the process in some countries (Table 2). In Sri Lanka and Indonesia none of the twelve criteria for successful transfer were satisfied, and only four and five criteria satisfied in Nepal and Mexico. Turkey and the USA satisfied seven and eleven of the criteria respectively.

27 Vermillion and Sagardoy, 1999.

28 There will have been changes in these countries since this paper was written, however the framework for analysis remains valid and useful.

Table 2: Rating of IMT programmes in six countries
(Frederiksen and Vissia, 1998)

	Sri Lanka	Indonesia	Nepal	Mexico	Turkey	USA
Scope of transfer	Inadequate	Inadequate	Adequate	Adequate	Adequate	Adequate
Condition of facilities	Inadequate[1]	Inadequate[1]	Adequate	Adequate	Adequate	Adequate
Facility ownership	Inadequate	Inadequate	Inadequate	Inadequate	Inadequate[2]	Inadequate[2]
Water rights	Inadequate	Inadequate	Inadequate	Inadequate	None	Adequate
Service charge, funding and finance						
O&M cost recovery						
For transferred facilities	None[3]	Inadequate	Inadequate	Adequate[4]	Adequate	Adequate
For major facilities	None	Inadequate	Inadequate	Adequate	Adequate	Adequate
Capital cost recovery						
For rehabilitation works	None[3]	Inadequate	Inadequate	None	Adequate	Adequate
For major facilities	None	None	None	None	Inadequate	Adequate
Finance availability	Inadequate	Inadequate	Inadequate	Inadequate	Inadequate	Adequate
WSE legality	Inadequate	Inadequate	Inadequate	Inadequate	Inadequate	Adequate
Preparation for and execution of transfer	Inadequate	Inadequate	Adequate	Adequate	Adequate	Adequate
Follow-up support	Inadequate	Inadequate	Adequate	Inadequate	Adequate	Adequate
Number of "adequate" ratings (out of 12)	0	0	4	5	7	11

1. Rehabilitation of facilities was incorporated into the management transfer programme.
2. Although the ownership of the facilities remains with government, the contract between the government and the Water Service Entity (WSE) contains provisions for periodic inspections of facilities, and if the WSE does not maintain the facilities, the government has the right to do the work and charge the WSE for the cost.
3. By mid 1998 the government and the World Bank were in negotiations for a loan to rehabilitate the distributary systems of parts of the Mahaweli Project. Under conditions of the load the WSEs will be required to pay 100 percent of the O&M costs of transferred facilities and 10 percent of the capital costs of rehabilitation.
4. Groundwater users do not pay any water service fees, even though their supply is directly attributable to recharge from the surface water that is delivered through the transferred facilities. If these beneficiaries were required to pay for the service they receive, the repayment of O&M costs would improve (presently fees cover 85 percent of O&M costs).

A different approach was adopted by Burton (2003) in his study of IMT as a change management process. Adopting change management procedures developed in the corporate business sector he drew on significant experience in this sector with implementing change management programmes. One of the leading specialists in this field is John Kotter from the Harvard Business School, who provides an eight-step framework for change management[29]. In his analysis of change management Kotter emphasises the need for leadership[30].

29 Kotter, 1995; Figure 4
30 Kotter, 1990; 1999

Figure 4: Eight steps to transforming an organization
(Kotter, 1995)

Step 1: Establish a sense of urgency
- Examining markets and competitive realities
- Identifying and discussing crises, potential crises, or major opportunities

Step 2: Forming a powerful guiding coalition
- Assembling a group with enough power to lead the change effort
- Encouraging the group to work together as a team

Step 3: Creating a vision
- Creating a vision to help direct the change effort
- Developing strategies for achieving that vision

Step 4: Communicating the vision
- Using every tool possible to convey the new vision and strategies
- Teaching new behaviour using the guiding coalition as an example

Step 5: Empowering others to act on the vision
- Eliminating hindrances to change
- Changing systems or structures that seriously undermine the vision
- Encouraging risk taking and non-traditional ideas, activities and actions

Step 6: Planning for and creating short-term wins
- Planning visible performance improvements
- Creating those improvements
- Recognising and rewarding employees involved in the improvements

Step 7: Consolidating improvements and producing still more change
- Using increased credibility to change systems, structures and policies that don't fit in with the vision
- Hiring, promoting and developing employees who can implement the vision
- Reinvigorating the process with new projects, themes and change agents

Step 8: Institutionalising new approaches
- Articulating connections between new behaviour and corporate success
- Developing the means to ensure leadership development and succession

Burton used Kotter's framework as the basis for a survey of 23 professionals who had been involved with IMT, using a checklist of questions (Figure 5) to assess the change management process. The resulting scorecard (Figure 6) shows varied experience with IMT. It is interesting to note that there are different perspectives from some of the respondents for some countries (Nepal, Kazakhstan) depending on the individual's experience and the time at which he or she had been involved with the programme. Many

of the programmes failed almost from the start as a result of a lack of support from the top, from either politicians or government personnel. In this regard Mexico scored well, with the transfer programme driven by the senior politicians as part of a wider programme of devolution of government responsibility. South Africa had the lowest score, due to a complete withdrawal of government support from medium and small scale systems; there was little, if any, handover and training of water users to take over system management. The score card emphasises the point made earlier that the transfer programme is at risk and may fail at any stage of the process.

Drawing on the approaches outlined above, Table 3 endeavours to draw together the experience to date with management transfer. It lists the desired outcomes of key activities in the political, legal, social/organizational, financial and technical domains, with principles of change management running through the whole process. Each domain and activity has a role to play at different times during the management transfer process. No domain or activity is more or less important than another as failure or poor performance in any particular activity can lead to a breakdown in the transfer process. As can be seen, the numerous activities lead towards a desired objective. The table demonstrates a particular need to initiate and integrate change for both the water users and the I&D agency. Experience shows that in order to transfer management responsibility to water users that the process will not work or be sustainable without initiating serious change within the I&D agency.

Figure 5: Checklist for assessing IMT change management (Burton, 2003)

A. Context and need for change
   The environment was conducive to IMT
   There was enthusiasm for change
   The key stakeholders were ready for change
   There was limited resistance to change

B. Establishing a coalition for change
   Stakeholders were fully involved in the IMT process from the start
   There was an effective coalition for change
   There was clear leadership of the IMT process in the initial stages

C. Setting direction
A vision was created for the IMT programme
A vision statement was formulated
Clear objectives were set for IMT
A suitable, feasible and acceptable strategy and action plan was formulated
A realistic time frame was set for implementation
The implementation strategy was well balanced in relation to technical, financial and institutional factors
Clear leadership was displayed in setting the direction for change

D. Communicating direction and anticipated outcomes
The vision was effectively communicated to stakeholders
The strategy and action plan were effectively communicated to stakeholders
Stakeholders had a clear understanding of how the changes would affect them
Leadership continued to show commitment to change

E. Empowering action
Change agents were appointed and were effective
A sense of ownership was created of the change process amongst key stakeholders
Stakeholders were encouraged and supported to adapt and improve the change process
New leaders of the change process emerged, and were encouraged and supported
Effective measures were taken to change institutional and organizational structures, systems and processes
Sufficient resources were committed to the change programme
An effective training programme was established

F. Making progress visible
Short-term wins were planned for and incorporated in the IMT programme
Short-term wins were identified and individuals/groups rewarded
Progress was effectively communicated to stakeholders
An effective monitoring and evaluation (M&E) programme was established
Stakeholder attitudes were assessed and acted upon

G. Sustaining and consolidating progress
Progressive stakeholders were identified and supported
The change process was flexible and adaptable, and incorporated emergent strategies
Continuing resistance to change was identified and acted upon

H. Institutionalizing new approaches
Links between new practices and beneficial outcomes of the change programme were identified and communicated to stakeholders
New structures, systems and processes were institutionalised
Future leaders were identified and continued to lead the change process
Following IMT water users felt empowered and able to solve problems

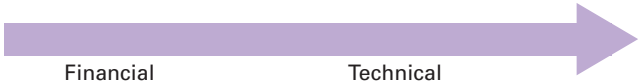
Figure 6: Summary scorecard of IMT programmes (Burton, 2003)

No.	Country	Stage A: Establishing the Context and Need for Change	Stage B: Establishing a Coalition for Change	Stage C: Setting Direction	Stage D: Communicating Direction and Anticipated Outcomes	Stage E: Empowering Action	Stage F: Making Progress Visible	Stage G: Sustaining and Consolidating Progress	Stage H: Institutionalizing New Approaches	Overall
1	South Africa	5.3	0.7	1.9	1.0	0.6	0	0	0.5	1.2
2	Kazakhstan	5.0	1.7	2.1	4.3	3.4	1.0	2.0	3.3	2.8
3	Nepal	4.8	4.0	2.6	2.0	3.3	2.8	1.7	2.3	2.9
4	Nepal	5.5	2.0	2.3	2.0	4.1	2.0	3.7	2.8	3.0
5	Niger	5.3	2.0	3.0	3.5	3.3	1.6	3.3	4.0	3.2
6	Sri Lanka	6.3	6.7	6.1	2.0	4.9	1.4	2.0	2.5	4.0
7	Egypt	3.0	5.7	4.0	5.5	3.6	5.0	5.7	4.3	4.6
8	Albania	6.3	4.7	3.1	3.5	5.4	3.4	5.0	5.0	4.5
9	Yemen	4.3	3.0	3.7	6.0	5.0	3.2	6.3	5.5	4.6
10	Pakistan	4.8	2.7	4.1	6.3	4.7	3.2	6.0	5.3	4.6
11	Nepal	4.5	6.0	4.4	4.0	6.0	4.4	4.3	4.3	4.7
Average – Less well performing programmes		5.0	3.5	3.4	3.6	4.0	2.5	3.6	3.6	3.7
12	Maharashtra	5.5	4.3	3.9	6.0	4.9	3.2	6.7	5.5	5.0
13	Philippines	7.0	6.0	4.1	4.8	6.6	2.0	5.7	5.5	5.2
14	Kazakhstan	7.0	7.7	3.9	7.3	5.1	3.8	6.0	4.5	5.7
15	Viet Nam	7.0	5.3	6.0	6.3	6.3	1.8	5.3	6.3	5.5
16	Turkey	5.5	5.3	6.4	7.3	6.0	5.8	4.3	5.3	5.7
17	Andhra Pradesh	4.8	6.7	6.3	6.5	6.0	6.4	6.0	6.3	6.1
18	Mexico	6.5	8.3	5.1	6.8	6.6	5.2	8.3	6.0	6.6
19	Romania	6.8	7.0	5.4	7.0	7.0	7.2	7.3	6.3	6.7
20	Nepal	7.3	7.7	6.4	6.0	6.6	5.8	7.0	7.3	6.7
21	Kyrgyzstan	8.0	7.7	5.7	5.8	6.6	7.0	7.3	7.5	6.9
22	Kyrgyzstan	7.0	8.0	6.9	8.3	7.9	6.8	7.0	6.8	7.3
23	Mexico	6.3	8.3	8.0	8.3	6.9	6.8	8.0	7.3	7.5
Average – Better performing programmes		6.1	6.4	5.1	6.1	5.9	4.7	6.2	5.8	5.8
Average All programmes		5.6	5.0	4.3	4.9	5.0	3.7	5.0	4.7	4.8
Legend Relative failure Relative success										

Table 3: Framework for assessing performance of IMT

Change management stages in reform of I&D sector	Context and need for change identified	Powerful coalition for change established	Direction, vision and objectives for change clearly set	Direction, vision and objectives for change clearly communicated to all stakeholders	Change agents identified, empowered and actively overcoming obstacles to change
Domains, processes and key results for reform					
	Political	Legal	Social/ Organizational		
			Water users	I&D agency	
Stages of development over time	Senior politicians supportive of proposed change	Current water legislation reviewed and amended/ updated	WUA Support Units formed	I&D agency aware and supportive of reforms	
	All politicians aware of the process	Specific WUA law enacted, with supporting changes in related legislation	WUA Support Units trained and working with WUAs	I&D agency personnel actively supporting formation and establishment of WUAs	
	Politicians actively engaged in promoting WUA formation and development	Water law amended to provide water entitlements/ rights to WUAs	WUAs agree Charter and by-laws	I&D agency personnel providing support to WUAs	
	Politicians not interfering in the setting of the service fee	Training of I&D personnel and water users in WUA law and related legislation	WUAs formed and legally registered	I&D agency withdrawing from management of parts of the I&D system	
			WUAs functioning – distributing water, maintaining systems and liaising with water users	Transfer of management of higher-order system levels to water users	
Desired end point	All politicians supportive of management transfer process	Relevant water sector legislation in place, applied and enforced	WUAs established and functioning effectively	Functioning and effective main system service provider, working in partnership with water users	

Progress being made and communicated to all stakeholders	Improvements consolidated and further changes initiated to address issues arising	New approaches institutionalized and accepted as the norm



Financial — Technical

	Water users	I&D agency
Responsibility for setting of ISF transferred to WUAs/water users	O&M staff employed by WUA	I&D agency staff introduced to and trained in performance and asset management
WUAs assess, discuss, agree, collect and retain on-farm ISF charges	O&M staff trained and gaining experience in on-farm water management	Asset management planning used to assess system maintenance needs
I&D agency assesses MOM costs based on needs of individual systems	Asset management procedures used for assessing on-farm service fees	Performance management used to assess scheme I&D staff performance
Service fees raised over time to target levels with collection rates also increasing to 100 percent	O&M staff reporting to WUA AGM on system performance	I&D agency O&M processes and procedures modernised and functioning
	On-farm maintenance work carried out. System performance enhanced through improved O&M	Service delivery matching water user expectations
ISF for main and on-farm systems set and being collected to ensure sustainable functioning of the I&D system	Water users, through WUAs, capable and experienced in managing on-farm I&D systems	Irrigation agency focused on service delivery and customer support to optimise scheme performance and productivity

PIM in Pakistan

Water is central to the political, social and economic well-being of Pakistan. Only a few decades ago, Pakistan had an abundant supply of water. At present, irrigation uses about 93 percent of the water currently utilized in Pakistan, whereby irrigated agriculture is contributing approximately USD 16 billion, or nearly 25 percent to the country's GDP. However, population growth (by the year 2025 Pakistan's population is forecasted to increase by 50 percent) rapid urbanization and industrialization are imposing growing demands and pressures on water resources, which are already in deficit. The increasing imbalance between supply and demand has led to shortages and unhealthy competition amongst end-users. This in turn causes environmental degradation in the form of a persistent increase in waterlogging in some areas, decline of groundwater levels in other areas and intrusion of saline water into fresh groundwater reservoirs. Water shortage is an increasing impediment towards the continued economic development of Pakistan[31].

Over the last few decades the performance of I&D systems in Pakistan has been deteriorating. Problems have included a growing water scarcity, inadequate maintenance of the I&D systems, inadequate cost recovery, unauthorized withdrawals and inequitable water distribution, waterlogging and salinity, and over-exploitation of groundwater. A major institutional issue has been the almost exclusive control of the I&D systems by public sector agencies[32] characterized by poor service delivery and a rigid top-down supply driven approach to management and control of the I&D systems, with little accountability to the intended farmer beneficiaries. The poor level of service provided to water users has been matched by an equally poor level of water charge (*abiana*) collection resulting in a difference between the money collected and the expenditure required for adequate MOM of the I&D system.

In order to address these issues the Government of Pakistan initiated reforms in the water resources and irrigation and drainage sectors in the late 1990s. The reforms were aimed at improving water resources management, enhancing water use efficiency and

31 NWP, 2002.
32 IBRD, 1994.

productivity, and facilitating active participation by water users in management processes. The reforms resulted in the restructuring of the public irrigation departments (PIDs) by creating autonomous Provincial Irrigation and Drainage Authorities (PIDAs) at provincial level, with Area Water Boards (AWBs) at the scheme level to manage main and branch canals and FOs to manage distributary and minor canals. At the watercourse level the systems are managed by WSCs who federate to form an FOs for management of the distributary and minor canals.

The reforms have been implemented in Punjab, Sindh and the North-west Frontier Province (NWFP), as outlined in the sections below.

Punjab province

The Punjab Provincial Assembly passed the PIDA Act in June 1997 with the intention of implementing institutional reforms focused on decentralizing the management of I&D systems through public and private partnership, farmers' participation and resource governance. The main objectives of the PIDA Act are:

- To implement the strategy of the State Government for streamlining the I&D system;
- To replace the existing administrative set-up and procedures with more responsive, efficient and transparent arrangements;
- To achieve cost-effective and efficient O&M of the irrigation, drainage and flood control systems;
- To make the I&D network sustainable on a long-term basis;
- To introduce the participation of beneficiaries into the MOM of the I&D systems.

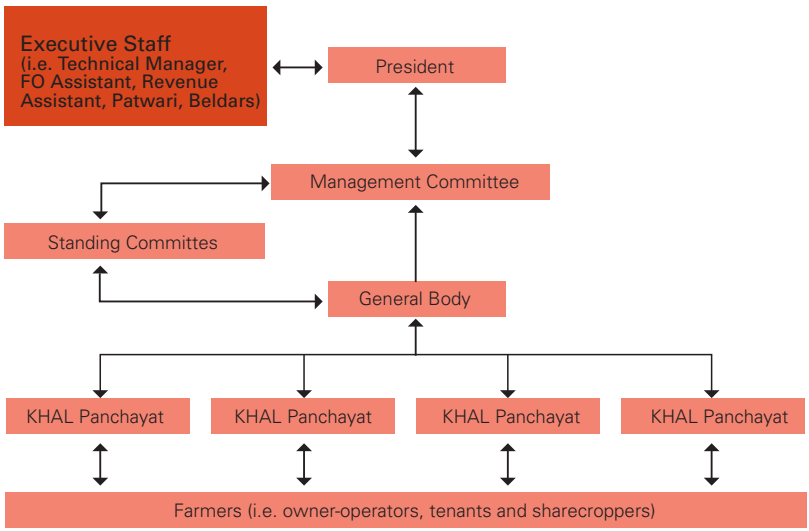
Under the Act the PIDA was formed as an autonomous body responsible for policy formulation, legal enactment and supervision of the overall management of the I&D systems in the province, including the O&M of the irrigation system from the headworks down to the head of the main systems. The Authority essentially has independent revenue and purchasing authority. Under the PIDA, AWBs were formed as financially self-sufficient entities at the canal command level with functions similar to a utility company. The AWBs are responsible for managing the main I&D system, including bulk water supplies to the head of distributaries. Alongside these two entities are financially autonomous FOs responsible

for the MOM of the distributary canals, including the collection of the *abiana*. Within the watercourses farmers are organized into Khal Panchayats to look after MOM within the watercourse. The organizational structure of the FOs is shown in Figure 7. In some locations a number of smaller FOs are brought together as an Irrigation Management Unit (IMU) in order to share the costs of employing executive staff and running an office[33].

According to Memon and Hassan (2009) the current situation in Punjab Province is as follows. The Punjab Irrigation and Drainage Authority (PIDA) established:

- Two AWBs formed - Lower Chenab Canal (East), Faisalabad Circle in 2000 and AWB LCC (West) in June 2007;
- 84 FOs formed and functioning since 2005 in AWB LCC (East);
- 64 FOs formed and functioning since 2007 in AWB LLC (West);
- 30 FOs formed and operational since 2007 in Chashma Right Bank Canal;
- 50 FOs, out of 66 FOs formed in AWB/Bahawalnagar Canal Circle up to May 2008 (Awaiting IMT);

Figure 7: Organizational structure of farmers' organizations



33 Studies carried out by the PIDA concluded that a feasible size for an FO to have an office and employ technical staff was 40 000 acres (16 200 ha).

- 55 FOs, out of 90 FOs formed in AWB Derajat Canal Circle up to May, 2008 (awaiting IMT);
- 3 FOs in Muzaffargarh, 6 FOs in Lower Jhelum Canal Circle and 4 FOs of Lower Bari Doab Canal Circle formed up to May 2008.

Sindh province

In 1997, the Government of Sindh started reforming management of the entire irrigation system with the enactment of the Sindh Irrigation & Drainage Authority (SIDA) Act, shifting the responsibilities for the management of the I&D infrastructure from the centralized government Provincial Irrigation and Power Department (IPD) to the following autonomous bodies:

- SIDA;
- 13 AWBs;
- About 1 500 FOs. In 2002 the SIDA Act 1997 was replaced by the Sindh Water Management Ordinance (SWMO) 2002.

The immediate goal of the reforms in Sindh is to restore equitable and reliable water delivery to the farmers in order to achieve the ultimate goal, namely the improvement of agricultural production. This goal will be achieved by transforming the IPD into a series of autonomous bodies (SIDA, AWBs and FOs), and by increasing the farmers' participation in the management of the I&D system. In addition, it also envisaged that the reforms of the irrigation sector would reduce the costs for the Government of Sindh.

According to the SWMO 2002, the SIDA, AWBs and FOs will be autonomous, which means that:

- They have freedom of action in managing their own affairs;
- They are entitled to establish their own budgets; and
- They have the authority to frame their own financial and staff regulations.

This three-tier system of organizations will permit autonomous but connected bodies to be responsible for the management of each of the constituent parts of the I&D system.

The purpose of the three-tier system is to deliver the following professional services:

- Irrigation water delivery;
- Disposal of effluent to/from drains;
- Where appropriate, drinking water.

Under these reforms SIDA will be responsible for MOM of the barrages and main system down to the delivery points to the AWBs, together with maintaining flood protection along the Indus. The AWBs will be responsible for the MOM of the main and branch canals, down to the delivery points with the FOs. They will also be responsible for intermediate drainage systems and for charging FOs for I&D services provided. FOs will be responsible for MOM within the distributaries and minors, with the General Body being constituted by representatives of WCAs and Drainage Beneficiaries Groups (DGBs). The FO is permitted to set and collect the service fees, and is required to pay the AWB for water received. It is envisaged that the FOs will develop into self-supporting and self-financing entities within a period of seven to ten years after establishment.

SIDA, the AWBs and the FOs will be supervised by a Regulatory Authority (RA), which has the main tasks:

- To approve the annual (business) plans of SIDA, AWBs and FOs;
- To approve the annual reports of SIDA, AWBs and FOs;
- To set performance standards for SIDA, AWBs and FOs;
- To arbitrate in case of conflict between SIDA, AWBs and FOs or between these organizations and individual farmers;
- To provide transparent and publicised guidelines for water distribution in case of drought and/or periods of genuine water shortages;
- To set limits for water charge rates, which is to be negotiated between all parties concerned.

To date three AWBs have been established for Nara Canal, Ghotki Canal and Left Bank Canals. These three AWBs are managing the water resources for more than one third (35 percent) of the command area of the province, with a Gross Command Area (GCA) of 2.1 million ha and Cultivable Command Area (CCA) of 1.8 million ha. By the end of 2009, a total 355 FOs had been formed and registered with SIDA in the command of Nara Canal (162 out of 170), Ghotki Feeder Canal (85 out of 94) and Left Bank Canals (93

out of 105). In addition, 15 FOs were formed outside the commands managed by the three AWBs under different projects executed by IIMI, OFWM Department, SIDA and NGOs. The MOM of distributaries and minor canals has been formally transferred to 315 FOs following the signing of Irrigation and Drainage Management Transfer (IDMT) agreement in the commands managed by the three AWBs.

Northwest frontier province (NWFP)

The PIDA Act for the NWFP by the Provincial Assembly in 1997 created the conditions for a new irrigation management environment. The responsibilities for the O&M of the secondary canal and drainage system and the mobilization of resources were transferred to FOs established at distributary/minor level. The PIDA Act aims to streamline the management of the I&D network in the NWFP by:

- Replacing the existing administrative set up and procedures with more responsive, efficient and transparent arrangements to achieve economical and effective O&M of the Province's irrigation, drainage and flood system;
- Ensuring equitable and assured distribution of irrigation water and providing effective drainage and flood control to the affected lands;
- Making the I&D network sustainable on a long-term basis by introducing beneficiary participation in its O&M;
- Improving the efficiency of utilization of water resources and minimizing drainable surplus.

The main aims of the institutional reforms are:

- To transfer the operation of the I&D system from the control by a central Government Department to the management by decentralized and quasi-autonomous state-own agencies;
- To make that agency increasingly dependent on its own source of revenue, at least for its recurrent/operating expenditure and to some extent for system investment;
- The introduction of significant user representation into system management to ensure its service orientation, to enhance transparency in water and financial accounting, and to ensure users' willingness to carry increased system costs; and
- The creation of a system of entitlements (or water rights) to ensure equity in water distribution.

Under these arrangements, the management of the I&D infrastructure will be decentralized and handed over to the AWB on main canals and to FOs on distributaries and minors. The AWB has been formed on pilot basis for selected command areas in NWFP, including the command areas of the Upper and Lower Swat Canals.

Outcomes of the reform programme

There are mixed results about ten years after the introduction of these reforms. Although the programme was initiated at the national level, various provinces have adopted separate pathways to implementation, with different legal instruments and several institutional and organizational frameworks. In each province AWBs have been established on some canals, and a large number of FOs and WCAs have been started. These are operating to different degrees at the distributary, minor and watercourse levels.

As part of the project preparation for the Asian Development Bank (ADB) in 2006 (Halcrow, 2006) an institutional assessment of existing FOs was carried out. In the LCC (East) command in Punjab Province, seven FOs were surveyed, including one FO in the head reach, three FOs in the middle reach and three FOs in the tail reach of the main canal system. In addition, an institutional assessment of 23 Khal Panchayats was carried out. In Sindh Province, six FOs were surveyed in the Nara Canal command, including two FOs in the head reach, two FOs in the middle reach and two FOs in the tail reach of the main canal system.

The results of the survey showed that the FO management committees believed that the formation of Khal Panchayats, WCAs and FOs has the following major benefits:

- Decisions were made more rapidly and disputes were resolved faster and more easily;
- Better information was provided about sanctioned discharges for distributaries and watercourses;
- Maintenance of the irrigation infrastructure was improved and damage repaired much earlier;
- Supply of irrigation water to all watercourses was more reliable, predictable and equitable as water theft and tampering of outlets was controlled;
- Water distribution at watercourse level was improved in accordance with existing warabandi;

- Performance of the O&M staff improved as they are now fully accountable to the FO;
- Much time and money is saved as farmers do not have to go to the offices of Executive Engineers and Superintending Engineer in cases of a conflict;
- Improved access to and contact with the Executive Engineer and Superintending Engineer;
- Improved relations and communication between farmers due to regular meetings;
- Reduced conflict among farmers, fewer complaints and improved resolution of conflicts at local level;
- Less opportunity for corruption, bribery and favouritism;
- Improved assessment and collection of *Abiana*;
- More transparency over the assessment and collection of water rates, including the issue of (correct) receipts;
- Improved linkage with other departments related to agriculture;
- Platform to discuss other issues related to irrigated agriculture.

A study by Memon and Hassan (2009) on behalf of the World Bank set out to look at the progress made with the institutional reforms and the sustainability of farm level water organizations. The authors discussed I&D systems in Punjab and Sindh with government officials, farmers and members of farmer organizations. A total of 60 FOs were studied on six canal command areas with 240 farmers being surveyed. The findings of the study are summarised below:

- Most FOs in Punjab are relatively new (84 percent less than five years old). In the Sindh about 50 percent of FOs are five to eight years old;
- Most FOs had been organized by PIDAs (90 percent Punjab, 50 percent Sindh). Other organizations involved included IWMI and OFWM. More that 90 percent of the FOs were formed by WCA election process, with over 80 percent of respondents saying they trust FO leadership;
- Between 34-79 percent of FO members in Punjab attended training courses (a variety of ten subjects), in Sindh only 7-40 percent of FOs attended training courses;
- Over 94 percent in Punjab reported that FOs are holding regular meetings, in Sindh the figure is only 82 percent. Record-keeping is good in Punjab, but less so in Sindh;

- 62 percent of respondents in Punjab and 58 percent in Sindh reported that FOs have formal rules, despite the fact that all FOs had been provided with formal by-laws/rules by government agencies;
- Most decisions were taken by consensus (79 percent Punjab, 72 percent Sindh), with most respondents satisfied with FO decision-making processes (96 percent Punjab, 83 percent Sindh), with cooperation between FO members cited as a key reason for successful decision-making;
- Incidences of conflict have significantly declined following establishment of FOs (reduction by 67 percent in Punjab, 48 percent in Sindh). Farmers are usually trying to solve problems locally with the FO Head, before they have to resort to formal complaints to Panchayat, police and courts;
- The survey indicates that FOs are investing in maintenance and construction of I&D systems, including mainly de-silting, repairing of watercourses, improvement of canal banks, lining of watercourse/minor/distributary, remodelling of the mogha, construction of FO buildings;
- Key indicators on changes in water management since formation of FO show improvements, with better performance in Punjab than Sindh:

Indicators	Punjab	Sindh
Water quantity (improved)	80%	51%
Reliability (improved)	80%	47%
Equity (improved)	83%	51%
Water course tampering (less)	86%	67%
Illegal pipes (less)	88%	64%
Obstacles (less)	88%	65%

- Over 90 percent of respondents believed that the FOs should take over the collection of the water charge (*abiana*); they felt that this would create a sense of ownership of the I&D system. FOs are involved in the collection of the *abiana* where management has been transferred to them, but have no part in the setting of the *abiana*. In Punjab *abiana* is collected at a flat rate of about USD 4/ha (PKR 330/ha), in the Sindh a crop-based system is in place with wheat at USD 2/ha (PKR 164/ha) and sugarcane USD 6/ha (PKR 492/ha);

- *Abiana* collection has not met expectations. Based on the survey, figures for 'satisfied', 'unsatisfied' and 'don't know' were 42 percent, 31 percent and 27 percent respectively in Punjab and 29 percent, 40 percent and 31 percent in Sindh (with high levels of "don't know"). Reasons given for poor collection of *abiana* were given as: lack of cooperation amongst farmers; lack of authority; lack of facilities available to FOs; water scarce/insufficient; financial constraints of farmers;
- In Punjab 83 percent are 'very satisfied' or 'satisfied' with FO managerial and technical capabilities, in Sindh 65 percent are 'very satisfied' or 'satisfied';
- The majority of farmers felt that the reforms were a positive step; figures for 'highly satisfied' and 'satisfied' in Punjab are 59 percent and 33 percent and Sindh 20 percent and 48 percent respectively. Figures for 'unsatisfied' were 9 percent in Punjab and 28 percent in Sindh.

Overall the conclusion drawn from the study was that that despite some restrictions and weaknesses FOs are functioning in Punjab and Sindh provinces, though there are some problem areas:

- Relationships between the FOs and the irrigation department are not good, with high levels of mistrust between the two. Many FOs feel that the ID is not supportive of the changes and want to maintain their authority. There is a perception that the ID is not supporting the FOs with water management;
- Farmers with small landholdings are not adequately represented in FOs;
- There has been inadequate training of FO members, especially in Sindh where over half the members have not been included in training programmes;
- Collection of water charges (*abiana*) has not been up to expectation, for a number of reasons, including lack of cooperation amongst farmers, lack of authority, lack of facilities available to FOs, water scarce/insufficient, financial constraints of farmers;
- Both in Punjab and Sindh farmers face difficulties in getting help from government agencies in relation to agricultural machinery, advice on water management technologies, improvement of watercourses, technical assistance to measure flows at outlets, and system maintenance.

Memon and Hassan (2009) looked at the progress made with the reforms in general, as well as discussing issues with farmers and FO personnel at the field level, and identified a number of outstanding issues:

- There is mixed support for the proposed reforms amongst politicians and government personnel, especially those within the IPD. This lack of ownership and full support for the reforms is damaging the chances of success, thus fueling criticism of the reform;
- The process of change management in Pakistan was not fully understood in implementation of the National Drainage Programme, the tool through which many of the reform initiatives were implemented. Sequencing and implementation of a number of the reforms was not good, such that AWBs and FOs are being managed by staff commissioned by IPD, many of whom are not convinced by or supportive of the proposed reforms;
- There is a lack of a clear cut distinction between IPD and PIDA. In Punjab the Secretary of the IPD is also the Managing Director of PIDA. On the other hand, in Sindh the two positions are held by different people - the Managing Director of PIDA is under the administrative control of the Secretary IPD. This impedes full development and empowerment of the new organization. PIDA staff are also often deputy IPD staff, with little if any allegiance to PIDA and its objectives; there are significant conflicts of interest in this regard;
- In three out of the four provinces the Managing Director of the PIDA is also the Secretary IPD. AWBs have only been set up in pilot areas, and though they have governing boards these lack farmer representation and are functioning like the IPD, which they are supposed to replace;
- The PIDA is dependent on IPD for financial resources and technical capability to fulfil its functions. It is subservient to an organization which it should replace. It is therefore not surprising that it is encountering both active and passive resistance to its existence;
- A major issue at the AWB level is that the farmer members of the AWB Board are appointed by government, rather than via elections as intended under the reforms. These AWB Board members are often not acceptable to or trusted by the FO members. The AWB Director, who is Irrigation Department staff, often makes the decisions without reference to the AWB Board;
- Whilst the AWBs and FOs are permitted to collect the *abiana* they are not empowered to assess or set the rate to suit a given

system. The rates are fixed in Punjab government. In Sindh, on the other hand, the IPD sets the rate, but with little or no consultation with AWBs, FOs and farmers. FOs are therefore acting as unpaid fee collectors, without adequate social or legal authority to enforce collection. As a result the fee collection is falling each year;
- Whilst the AWBs and FOs are authorized to manage the I&D systems, they lack the power and authority to take action, or get the police to act against those who violate the provisions of the Irrigation Act (such as damaging the infrastructure, or extracting water illegally) as this power remains with the IPD;
- Without adequate and experienced staff, and poor linkages to the AWB, FOs are failing to update farmers on the rotational plans (Warabandi) for water allocation. They are also unable to operate the systems under the supposed demand based system which in turn causes a breakdown in confidence by the farmers in the FO;
- AWBs are badly under-resourced in terms of technical capability, financial resources and trained manpower. They lack the financial means to hire their own staff and therefore remain dependent on deputed IPD personnel.

Although the basic structures envisaged in the reforms have been put in place, their implementation has been only partial and compromised by a failure by some factions to wholeheartedly adopt. On a more positive note, the general conclusion drawn from the surveys conducted in 2006 and 2009 is that FOs are functioning satisfactorily in Punjab and Sindh, with the following main conclusions:

- A large majority of FOs surveyed have regular General Body meetings and Management Committees, with Minutes prepared for meetings;
- Most FOs have a bank account, prepare an annual budget and financial statements and have their account audited;
- All surveyed FOs are responsible for the collected of the *abiana*, whereas a significant number of surveyed FOs are also involved in the assessment of *abiana*;
- According to the 2006 survey, all seven surveyed FOs in Punjab and four of the six surveyed FOs in Sindh collected more than 90 percent of the assessed *abiana*;
- Almost all surveyed FOs have formally taken over the responsibility for the MOM of the distributary/minor canal(s) following the signing of the IMT agreement;

- The respondents from most FOs stated that the operation of the distribution system, including the equitable distribution of available canal water, has improved following the formal transfer of the MOM responsibility to the FO;
- Most surveyed FOs reported the preparation of an annual maintenance plan following the execution of maintenance inspection as well as the execution of all necessary maintenance works;
- Almost all surveyed FOs stated that water theft and tampering of outlets reduced considerably since the FO is in charge of MOM and that reported water-related conflicts are resolved faster and more easily;
- The decision to unite a number of smaller FOs into one IMU was positive as it enhanced the functioning and effectiveness of these FOs. This was done due to the fact that many (smaller) FOs lack the necessary funds to employ all executive staff required and establish a fully equipped office as well as obtain all the necessary O&M tools and equipment.

Finally, an important finding of the 2009 survey was that 92 percent of the respondents in Punjab, and 68 percent of respondents in the Sindh felt that the reforms were a positive step. The respondents stated that the irrigation reforms have significantly contributed in improving water distribution, better maintenance of irrigation systems and reduction in the number of cases of corruption and water theft.

International experience with PIM

The following sections summarize experience from a number of countries where there has been both good and bad experience of PIM.

Kyrgyzstan

Kyrgyzstan is a small country with a population of some five million people. Agriculture is the backbone of the rural economy and a major driver of poverty reduction, food security and economic growth. Agriculture contributes 25 percent of the country's GDP and supports 40 percent of all employment and 65 percent of rural employment. Around 1.4 million ha (7 percent) of the 200 000 km^2 surface area of the country is classified as arable land of which 1.04 million ha (75 percent) is irrigated. Landholding sizes are small, with an average of 1.5 ha for individual farmers.

The State Committee for Water Resources and Land Improvement (SCWRLI, formerly the Department of Water Resources, DWR) is responsible for MOM of the river system and higher order off-farm infrastructure[34]. Water users manage the lower order on-farm systems through recently formed WUAs, traditional communities or individually. The organizational structure of SCWRLI is largely based on the country's administrative structure, with seven *Oblvodkhoz* and 43 *Raivodkhoz* offices located in each of the Oblast and Raion administrative districts. The SCWRLI has some 5 200 staff including 3 000 operations staff, some of whom are temporary staff employed during the irrigation season.

During the Soviet period the on-farm irrigation systems were managed as single management entities, either as Sovkhoz (State farms) or *Kolkhoz* (collective farms). State and collective farms were privatized following Independence in 1991, with the former workers on these farms becoming the new landowners. Initially there was a period of anarchy at the on-farm level as there was no formal organization to manage the system at the lower on-farm levels. Ownership of the on-farm infrastructure remained with government, but in 1995 was transferred to Village Councils who had neither the expertise nor financial resources to manage, operate and maintain these systems. In order to address the growing crisis in 1997 the government passed a resolution which permitted the establishment of WUAs and the legal transfer of the on-farm infrastructure to the associations. This resolution was upgraded and became the Law of the Kyrgyz Republic 'On Unions (Associations) of Water Users' in 2002 with technical support from the World Bank. This formed a solid base for transfer of responsibility for MOM at the on-farm. Since 2002 the government has actively promoted the establishment of WUAs, and by 2010 some 474 WUAs have been formed serving a command area of 736 307 ha (71 percent of the total irrigated area).

The mode of transition from a fairly chaotic and anarchic state of affairs at the on-farm level between 1991 and the more stable, organized MOM of the present day is worth noting. The initial move of transferring responsibility to local government did not work.

34 The off-farm system comprises the headworks and main canal up to the delivery point to the on-farm systems. On-farm systems generally comprise tertiary and quaternary systems delivering water to farmers' fields. Larger on-farm systems may also include secondary canals.

Although the 1995 government resolution made a move in the right direction by delegating responsibility for MOM at the on-farm level to water users, it was not sufficient to establish sustainable farmer-managed organizations. Between 1998 and 2000 the World Bank prepared the On-Farm Irrigation Project (OIP) which subsequently came into being in 2000 and was completed in 2008[35]. A priority task under the project was the upgrading of the 1995 government resolution, which passed into law in 2002. In addition to securing the legal framework, the project set about strengthening the institutional framework by the creation of WUA Support Units (SUs) at Central, Oblast (regional) and Raion (district) level. International consultants with experience of WUA formation and PIM in other countries were used to train WUA SU staff in procedures for PIM and establishment and support of WUAs. The WUA SUs at the Oblast and Raion levels were provided with an office, training room, a vehicle and operating costs, and spent much of their time in the field working with WUA management and water users. The initial WUA support programme concentrated on establishing the WUAs, defining the (hydraulic) boundaries, helping WUAs to get registered and getting WUAs functioning as a management unit operating and maintaining their I&D systems. The next step was the formation of Representative Assemblies rather than General Assemblies, which required extensive work defining the Representative Zones within WUA commands and assisting WUAs in organizing elections for Zonal Representatives.

Initially the project aimed to work with 160 WUAs spread amongst the seven oblasts in the country. At the government's request, however, this restriction was abandoned and the WUA support programme was expanded to the whole country. This made a dramatic difference as it became a national rather than project programme. Between 2000 and 2008 the number of registered WUAs rose from 132 WUAs serving 199 258 ha (average 1509 ha/WUA) to 474 WUAs serving 736 307 ha (average 1553 ha/WUA), representing 72 percent of the total irrigated area and 96 percent of the SCWRLI-managed command area. Under the project 63 WUAs (serving an area of 121 436 ha, average 1927 ha/WUA) achieving stated levels of performance were selected for rehabilitation.

35 A follow-on project (Second On-Farm Irrigation Project, OIP-2) commenced in October 2007 and will be completed in December 2013.

An important indicator of the success of a WUA formation programme is the transition of the WUAs interest from management of their internal system to water management in the external off-farm or main system. As the WUAs gained confidence and experience they started to look at water management outside the WUA command and formed Water Councils for canal networks together with local government and the main system management (SCWRLI). In other locations WUAs formed Federations of WUAs and after negotiations with SCWRLI took over the MOM of the main system. To date around 40 Water Councils have been formed serving some 250 000 ha, whilst there are 35 Federations of WUAs serving some 184 020 ha. WUAs formed out of their own initiative a National Association of WUAs, with an elected executive in March 2006. By December 2010 there were 201 WUAs registered as members, each paying a membership fee of KGS 2/ha (USD 0.43/ha). The National Association maintains an office, publishes a quarterly newsletter and continues to seek financial support from donors for a number of initiatives.

At present the formation, development and growth of WUAs in Kyrgyzstan can be considered a success. WUAs have been established and function under a purpose-built legal framework and are accepted by water users as the organization responsible for water management, system operation and maintenance. Farmers actively participate in the running of the WUAs through their Zonal Representatives, and have clear and transparent procedures for obtaining irrigation water, for which they pay the ISF. Although the level of the ISF charged by SCWRLI is still low (KGS 50/1000 m^3 or USD 1.08/1000 m^3) the payment percentage is high, between 80-100 percent. The total ISF contribution to SCWRLI is around USD 1.1 million per year, which represents between 8-9 percent of SCWRLI's current total income of approximately USD 14.3 million. The income is significant at the Raion level as the funds are retained at this level and contribute to staffing and other MOM costs. The WUAs are raising additional funds to cover the costs of MOM of their own systems, and in some cases the water users are contributing further funds for specified capital works or O&M equipment.

From analysis of the Kyrgyz case study the following factors have contributed to the success of the transfer programme:

- Support from government. In general the government has been supportive of the IMT programme;
- Relatively stable political environment. During the initial period of establishment (2000-2008) there was a relatively stable political environment in the country;
- Well drafted legal framework. With the support of the World Bank a comprehensive legal framework was formulated to support the establishment of WUAs;
- Well established and well-functioning WUA support units. WUA Support Units were formed and were well established, with external international assistance initially, adequate finances and resources, including offices and vehicles. They were able to get to the field frequently to work closely with WUAs and water users to build well functioning WUAs. As a team they were well led and have become highly valued and respected by WUA management and water users;
- Active and consistent support and supervision from the World Bank. The World Bank project supervision team have been closely involved with the two projects (OIP-1 and OIP-2) from 2000 to date. Timely measures have been taken as required to adapt the projects to suit developing needs;
- Supportive communities. In general Kyrgyz village communities are community orientated, farmers cooperate and work together;
- Viable size to support adequate staffing levels. The boundaries of the WUAs are based on the former state and collective farms, and are generally between 1 500-3 000 ha in size. This is a viable size to support the management and O&M staff costs. There are high standards of water management and system maintenance owing to experienced paid staff;
- Organic growth of higher level management structures. The initial focus was on the establishment and strengthening of the WUAs, followed by deepening of the representative system so that water users became fully engaged with the management of their WUA. When the WUA had become established and functioning, water users tried to improve the management of the main system and have decided to form Water Councils, Federations of WUAs and a National Association of WUAs.

However, such change management programmes are fragile until they become fully established, and there are therefore some areas of concern:

- Political instability. In April 2010 there was serious unrest throughout the country and the President was ousted. There were instances in the south of the country of differences arising between different ethnic groups, leading to uncertainty and discord. In general the WUAs have weathered this situation, and have been able to provide some stability for water users during the crisis;
- Changes in senior management. Up to October 2009 the Directors-General of SCWRLI were supportive of the WUA formation and support process. However during this period a Director-General of the old order was brought in (top-down, not trusting water users). This put the process on hold, and in some respects moved it backwards for a while;
- Weakening of the WUA support units. Under the agreement with the World Bank the government agreed to take over the funding and management of the WUA Support Units during OIP-1. This was delayed until OIP-2, and staff were transferred from the project to government when their salaries and support facilities (transport, operating costs) were reduced. There was serious discontent amongst WUA Support Unit staff, owing to their lower salaries as well as on a professional level because of not being able to get to the field to liaise and work with WUAs and water users;
- Low ISF and continued deterioration of I&D system. The formation of WUAs has significantly improved the water management and system maintenance at the on-farm level, but the MOM of the main system remains a concern due to lack of adequate finance. Service fees will need to increase four to five times more in order to meet the actual MOM needs;
- Need to modernize the main system management agency. There is a pressing need for SCWRLI to modernize and become more customer focused and service orientated. It needs to work in partnership with WUAs and water users, rather than in its historic top-down mode.

Georgia

Georgia is a small Caucasus country with a population of approximately 5.5 million. Following independence from the Soviet Union in 1991 there was a period of civil strife, as well as problems with land reform, the loss of traditional markets, conversion to a market economy and a general decline in living standards and

finances for the public sector. The political instability has continued, with an ongoing dispute between the government of Georgia and the Russian Federation which has had a significant detrimental effect on farmers by restricting trade and export of Georgian agricultural products to their traditional major market in the Russian Federation. The dispute with the Russian Federation resulted in a trade embargo in 2006 and conflict in August 2008.

In 2006 prior to the dispute with the Russian Federation, agriculture contributed 36 percent of the GDP and created employment for 54 percent of the total labour force. By 2009 the contribution to GDP had fallen to 13 percent though 65 percent of rural employment is in agriculture (53 percent subsistence, 12 percent non-farm sector). Land has gone out of production and agriculture has become more subsistence based as export difficulties have increased.

There are an estimated 720 000 landholdings, the vast majority of which are smallholdings. Over 90 percent of landholdings are less than 2 ha, of which only 52 percent are in the range 0.5-2 ha. With an average annual rainfall of over 3 000 mm in the west and averages of less than 400 mm in the eastern and southern regions irrigation is supplementary to rainfall. In the west drainage is required in some low lying regions for productive agriculture. As in many parts of the former Soviet Union the irrigated areas expanded significantly in Georgia during the Soviet era, and reached 469 000 ha under irrigation and 163 000 ha under drainage. Pumping was used on 143 000 ha of the irrigated land, and on 35 000 ha of the drained land. The irrigable area declined due to civil unrest, theft and vandalism (of steel pipes, pumping equipment, etc.). In 2000 for instance, only about 110 000 ha were irrigated by the government irrigation agency, Department of Amelioration and Water Economy (DAWE)[36]. A further 50 000 ha were irrigated without a contract with DAWE and only 20 000 ha were drained.

In 1996 the government established around 200 Amelioration Service Cooperatives (ASCs) on about 200 000 ha owing to the difficulties of DAWE supplying water directly to the many thousands of new landholdings (rather than the previous state-owned and managed large estates). The ASCs were made responsible for

36 The Department of Amelioration and Water Economy, Ministry of Agriculture and Food (MAF), which was subsequently renamed the Department of Amelioration Scheme Management (DASM).

MOM within the boundaries of the old state and collective farms and were supplied with water under a contract with DAWE. However, most ASCs failed to function as there was little support and no training given to these new entities. Membership charges were high, there was little participation and transparency, and service delivery was poor. As a result, few farmers agreed to join the enterprise. The government transferred responsibility for MOM of the secondary systems to Village Councils when ASCs failed; unfortunately they had neither the expertise nor the financial resources to manage and maintain these systems.

In November 2001 the World Bank provided support for a five year programme[37] to rehabilitate irrigation and drainage infrastructure and to develop and strengthen water users associations (referred to as Amelioration Associations, AAs, in Georgia). An IMT was established within the project implementation units (PIU) with responsibility for establishing and supporting AAs under two components: the Rehabilitation Program for AAs within four large and medium scale I&D schemes being rehabilitated, and the National Program for AAs in other schemes who wanted assistance with system rehabilitation.

The IMT comprised a team of 21 staff, of which 14 were AA Support Specialists operating out of field offices and in direct contact with water users. IMT staff were provided with offices, equipment and vehicles by the project. By the end of 2005 the IMT had assisted some 255 AAs serving some 228 000 ha to register under the revised Law on Amelioration[38]. This was well in excess of the 50 000 ha specified in the Project Appraisal Document. The IMT had provided training and support to the AAs which involved defining the AA boundary, training AA management, training AA O&M personnel, assisting with planning, design and construction of on-farm infrastructure, carried out by the water users, and liaising between DASM and AAs.

In 2005 a new Minister of Agriculture and Food was appointed and the previous MAF policy of supporting AAs was rescinded under a new policy of privatization of public sector activities. After

37 The project was extended and finally closed in April 2008.

38 Initially under the Law on Amelioration AAs were established as private, non-profit-making entities. Following discussions with the World Bank legal specialist the government agreed to re-draft the law so that AAs were constituted as legal bodies under public law. In addition the law was revised to allow transfer of on-farm I&D infrastructure to AAs under long-term usufruct basis.

discussion with the World Bank support was allowed to continue for the 44 AAs within the large-scale I&D systems and a handful of the AAs under the National Programme. IMT staffing was cut from 21 to 9 staff, with the result that support was withdrawn from the majority of established AAs. Whilst continuing with the privatization policy, MAF dissolved the government irrigation agency DASM in December 2006 and handed over the physical assets and responsibility to MOM to four completely new state-owned limited companies (LTDs). When they were formed in February 2007 each of these companies had only two staff, the government appointed Director and an accountant. Subsequently former DASM staff were employed to operate the irrigation and drainage systems. None of the LTD Directors had any previous experience in the agricultural sector, let alone in irrigation and drainage.

The LTDs had been provided with minimal financial resources and were expected to raise their operating costs from water users. With no transition phase this proved impossible, with farmers refusing to pay the increased charges. Prior to the formation of the LTDs, Parliament had capped the irrigation service fee at Georgia Lari (GEL) 4 per 1000m^3 (USD 2 per 1000 m^3) for irrigation and GEL 2 per ha (USD 1 per ha) for drainage, despite protestations from DASM that these figures were insufficient. Even with full recovery these fees would only have covered 30 percent of the costs required for sustainable MOM[39]. The LTDs went bankrupt, and in 2010 the government placed an advert in the Economist offering three of the LTDs for sale.

Consequently the PIM programme in Georgia had failed by 2010, as well as the government's privatization plan for the irrigation sector. The failure of the programme can be attributed to the following factors:

- Lack of support from government. The change of approach by the government in 2005 with its focus on privatization of public services led directly to the end of the World Bank funded AA formation and support programme. The government's radical privatization approach failed to appreciate the need to provide initial

39 Prior to independence the funding for MOM was USD 45 million per year. This dropped to between USD 2-6 million per year between 1990-2004, of which the EU contributed some USD 1.5-2 million per year between 2000-2006.

training and support to enable water users to manage the on-farm systems;

- Lack of coherent strategy for the I&D sector. The government failed to formulate a coherent strategy for the I&D sector, despite significant pressure over several years from the European Commission, which was providing financial support (grants) to maintain the I&D system;
- Radical privatization of main system service provision. Further radical and ill-planned moves by the government to privatize the main system service provider resulted in the closure of the government I&D agency and transfer to poorly resourced and inexperienced private entities, which collapsed after three years resulting in a further loss of agricultural production as farmers reverted to rainfed agriculture within irrigation commands;
- Supplementary nature of irrigation. Well organized and reliable irrigation is beneficial to agriculture in Georgia, but in most regions farmers can obtain a (lower) yield from rainfed agriculture. With the functional collapse of the main system service provider farmers either found alternative employment or grew rainfed crops;
- Difficulties with input provision and marketing. With the deteriorating condition of the I&D system farmers faced difficulties with obtaining agricultural machinery, credit and crop inputs. Markets were also restricted as a result of the disputes with Russia.

India

Experimentation with PIM began in India around the mid-1970s with the Ministry of Water Resources, supported by a number of NGOs encouraging farmer participation in management at the tertiary level. From the mid-1980s Command Area Development projects supported with funds from the Government of India (GoI) encouraged farmer participation in the planning, design and construction of on-farm systems. In 1987 the concept of greater farmer participation was adopted as official GoI policy and incorporated in the National Water Policy:

> "Efforts should be made to involve farmers progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water rates. Assistance of voluntary agencies should be enlisted in educating farmers in efficient water-use and water management".

Although pilot projects had been initiated in several states in India during the 1980s, Andhra Pradesh was the first Indian state to adopt PIM state-wide through the enactment of the Andhra Pradesh Farmers' Management of Irrigation Systems (APFMIS) Act in 1997. On the basis of this Act some 10 000 WUAs were formed and legally registered. The Act was revised in 2003 and formed the basis for much of the legislation adopted in other Indian states. By March 2010 over 56 000 WUAs had been formed in 28 states, serving an area of some 13.5 million hectares (Table 4). Many of these initiatives have been instigated by the state governments without external support, in other cases the World Bank and other funding agencies have been incorporating measures to increase farmer participation in their water resources and I&D projects. Under the Water Sector Restructuring Programme the World Bank has been providing support for the WUAs in six of the larger states, including Andhra Pradesh, Maharashtra, Madhya Pradesh, Tamil Nadu, Rajasthan, and Uttar Pradesh, whilst the Asian Development Bank has been providing support in Chattisgarh.

In some states NGOs are actively promoting and supporting participatory irrigation management, with particularly successful models in Gujarat and Madhya Pradesh. In Gujarat the Development Support Centre (DSC) NGO has established over 200 well-functioning WUAs serving an area of over 60 000 ha. The difficulty now being encountered with these models is how to scale them up to cover the whole state.

However, for a number reasons the PIM programme in India has not been a great success to date, with many of the WUAs formed on paper but not active. PIM in India is at a crossroads; it has not yet failed but requires a revised approach and re-invigorating if it is to be successful. Some of the current issues related to WUAs include:

- Top-down formation. WUAs were formed top-down rather than bottom-up, with inadequate consultation with water users on the structure and role of the WUA and with too heavy an involvement of the Irrigation Department (ID). Under the law the ID engineer is designated as the Competent Authority responsible for the WUA, and is Secretary of the WUA. This level of involvement by the government agency in the management of the WUA is contrary to the formation of self-managing, self-reliant farmer organizations, and perpetuates the farmers' dependency on the ID;

Table 4: Number of WUAs formed in each state (2010)

Name of State	Area covered (thousand ha)	Number of WUAs formed
Andhra Pradesh	4 169 00	10 800
Arunachal Pradesh	9 02	39
Assam	47 04	720
Bihar	182 36	67
Chattisgarh	1 244 56	1 324
Goa	7 01	57
Gujarat	96 68	576
Haryana	200 00	2 800
Himachal Pradesh	35 00	876
J&K	2 76	39
Jharkhand	0 00	0
Karnataka	1 318 93	2 557
Kerala	174 89	4 163
Madhya Pradesh	1 691 88	1 687
Maharashtra	667 00	1 539
Manipur	49 27	73
Meghalaya	16 45	123
Mizoram	14 00	110
Nagaland	3 15	23
Orissa	1 537 92	16 196
Punjab	116 95	957
Rajasthan	619 65	506
Sikkim	0 00	0
Tamil Nadu	1 176 21	1 457
Tripura	0 00	0
Uttar Pradesh	121 21	245
Uttarakhand	0.00	0
West Bengal	37 00	10 000
Total	13 537 94	56 934

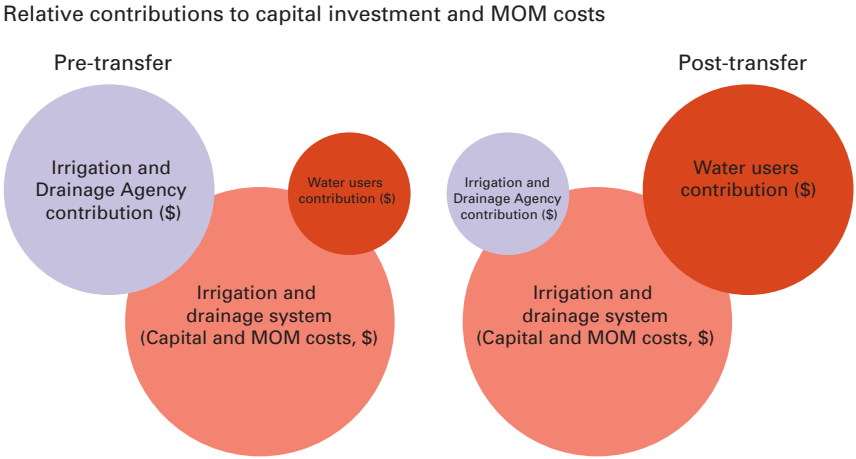
Source: Data provided by Command Area Development and Water Management (CADWM), Ministry of Water Resources, New Delhi, March 2010

- Inadequate WUA organizational structure. The organizational structure of the WUA is according to the law. A WUA President is directly elected by the water users presiding over a Management Committee made up of elected zonal representatives or territorial constituencies (TCs). This structure delegates too much power to the WUA President, who is not accountable to the WUA Management Board;
- Water tax is set and collected by government agencies. In some States some of the revenue collected is returned ("flow back") to the WUAs. Although recovery rates have increased as a result of flow back, these charges are still seen as a tax rather than a service fee payment;
- Lack of entitlement or right to water. There is no entitlement or right to a specified water supply, except for Maharashtra. Under a recent World Bank project Maharashtra established the Maharashtra Water Resources Regulatory Authority (MWRRA) which is responsible for setting tariffs and determining water users' entitlements;
- Lack of reliable irrigation water supply. Unreliable irrigation supply from the main system means that the WUA cannot provide a reasonable level of service to its water users. Effective management of the main system is a key determinant in the success or failure of the WUA;
- Lack of WUA staff. WUAs do not employ staff and management of the system is carried out by the President and the TC members. This is not a sustainable approach as a functioning WUA requires paid staff to manage, operate and maintain the I&D system;
- Insufficient training. There has been little or no training of WUA management committees and water users;
- Lack of commitment and support from the irrigation department. In many locations it is apparent that the Irrigation Department has little commitment to the participatory process. There has been little training of ID staff and relatively little active support is provided to WUAs and water users. The beneficial impact on WUA and system performance is found to be significant where there are active ID officials.

Proposed measures to improve the situation include:

- Allow WUAs to set and collect the service fee. WUAs should be able to set, collect and spend their own service fee (as agreed by the General Assembly of members). The ID should then set the service fee for provision of water to the WUAs, and collect this fee from the WUAs rather than from individual farmers. The WUA service fee to water users would then include the main system service fee;
- Separate governance and management of the WUA. Governance and management should be separated, with elections to appoint 10-12 WUA Committee members who in turn elect a WUA Chairman. The WUA Committee then appoints paid staff to carry out the day-to-day management of the I&D system;
- Grant each WUA an entitlement to water. There should be an entitlement to water, from both surface water and groundwater. This entitlement can be allocated to the WUA rather than individual members, and can be based on allocation of a fair share of the available water supplies in the basin. As mentioned previously procedures for allocating such entitlements have commenced in Maharashtra;
- Create WUA support units. WUA Support Units should be formed, trained and resourced to train and provide support to WUAs over a minimum ten-year time frame;
- Increased awareness and training. A significant awareness raising and training programme should be carried out, followed by ongoing support and hand-holding from WUA Support Units;
- Change attitude and role of the irrigation department. The ID was established over 100 years ago when the environment was very different to that encountered today in modern India. The ID needs to reform and restructure itself to benefit from the opportunities offered by PIM, and work in partnership with WUAs and water users to enhance the productivity of irrigated agriculture in India. An important factor in the changing role of the ID and the water users is their respective contributions to the management of the I&D system. As funding from the ID decreases and funds from the water users increases (Figure 8), the role and importance of the two participants will change, with the water users assuming a far greater role than in the past.

Figure 8: Changing financial contribution of the I&D agency and water users over time



Mexico

The IMT programme in Mexico commenced in 1989 with the formation of the National Water Commission (CNA) following a decision made by the Office of the President. The CNA was charged with developing a national water resources management programme, involving water users (through WUAs) in order to improve water use efficiency and productivity, and ensure financial self-sufficiency.

The I&D system in Mexico had been developed in the 1930s to provide food security and food self-sufficiency. Large irrigation districts were created ranging from 20 ha to 300 000 ha which were operated until 1990 by the government irrigation agency. By this time Mexico had some six million hectares irrigated, with 3.3 million hectares in 81 public irrigation districts.

Initially the public-run I&D systems were nearly self-financing, with 85 percent of the MOM costs being recovered from water users. However, the fee recovery rate gradually declined and by 1989 the recovery rate was only 20 percent. With a major financial crisis in Mexico in the late 1980s drastic measures were required to return the I&D systems to financial self-sufficiency.

The transfer programme was initiated in two phases. Under Phase I the MOM of government-run I&D systems was shifted to WUAs, whilst under Phase II Limited Responsibility Societies (SLRs) were created to enable federations of WUAs within a District to manage the main system. By 2000 some 3.2 million ha had been transferred to 420 WUAs comprising 470 000 members, and 10 SLRs had been formed. This massive change had been brought about through a well organized transfer programme coordinated by the can. This involved significant amounts of awareness raising amongst water users and training of both WUA management and water users. Water tariffs were increased and by 2000 the transferred irrigation districts were recovering 80 percent of their MOM costs direct from water users, up from under 30 percent in 1991. At the same time the CNA O&M staff were reduced from some 8 000 staff to under 2 000.

An important aspect of the transfer programme was the formulation of a new water law in 1992, followed by supporting regulations for implementation in 1994. Despite the fact that the initial reform was initiated under the 1972 law, a more targeted legislation was necessary; this resulted in the 1992 law and associated regulations. The new law set out the principal of water rights and water concessions to WUAs to provide equal water allocation each season to WUAs within a district. The concessions for a proportional right to the available water in the district are granted to WUAs and not individual water users. These are for a period of up to 50 years. When an SLR is formed these concessions remain with the WUAs, and the SLR only has the responsibility to manage these concessions. Involvement in water resources management outside WUAs boundaries has increased, as they have gained in experience, both with the formation of SLRs and with their engagement through river basin councils to ensure that they get a fair share of the available water resource.

During this period the role of the irrigation agency (CNA) has changed from one of being responsible for management of water resources and irrigation water delivery to that of being responsible for management and regulation of water resources. There has been increased focus on the establishment of river basin authorities and the engagement and coordination of stakeholders in management of the available water resources. The CNA has therefore been moved from the Ministry of Agriculture to the newly formed Ministry of

Environment and Natural Resources according to this changed role. As the river basin councils become established, it is intended that they will become self-managing, leaving the CNA to become a national water resources management authority, responsible for setting policy and regulation of the available water resources.

Mexico is held up as one of the most successful examples of IMT. Key factors which contributed to this success include:

- Support from the top. Very strong support from the top, the move was initiated through the Prime Minister's Office;
- Solution to a tangible crisis. There was a major financial crisis in Mexico in the late 1980s. The government and water users did not have many alternatives if the I&D systems were to continue to function;
- Enabling legal framework. Sound legal framework based on allocation of water rights, coupled with a professional water resources agency (CNA) able to quantify and regulate the water allocations;
- Full support and cooperation of the irrigation agency. Strong support from the I&D agency, the CNA, with a professional, well organized country-wide awareness campaign and associated training programme which enable the transfer programme to be implemented over the whole country in a relatively short time frame;
- History of adequate fee collection. Relatively recent history of adequate levels of fee recovery;
- Well informed farming community. Well-educated farming community able to understand and take advantage of the opportunities offered by management transfer;
- Increased transparency and accountability. Increased transparency and accountability to all stakeholders on water resources availability, allocation and use through river basin councils.

Turkey

Turkey began its programme of devolution of department-run irrigation and drainage systems to local districts in the early 1990s. Prior to this the I&D department (DSi, State Hydraulic Works) had designed, built and managed the I&D systems, with water users paying a fee for the services provided. 80 percent of the large-scale irrigation systems had been devolved to management by 2005 by locally controlled districts, and Turkey had emerged as one of the examples of "best practice" for other countries to follow. A new

irrigation law which would move the next step to one of direct governance by water users has been on the drawing board for several years, but has not progressed beyond this stage.

The Turkish model is based on an association of relevant local government organizations, rather than an association of water users per se. Irrigated agriculture is an important and central feature of village life in many locations and local government is elected by the community, many of whom are farmers. Irrigation therefore plays an important part in the electoral process, and something for which farmers hold their elected officials to account. Overall management of the I&D systems is delegated to a five-member executive committee elected by a general assembly of about 50 people, comprising local government officials and farmer representatives. Day-to-day management is carried out by hired personnel, usually consisting of a general secretary, an accountant and field staff. The general secretary is usually a university graduate in agricultural engineering. In some cases former DSi staff have been appointed as the general secretary and staff of the association.

In the early stages of the transfer programme the government provided subsidies to support the new organization, typically with regard to system maintenance. Once established (generally after two to three years) the association is responsible for its own MOM costs. Training and support was also provided by DSi, with a clear mandate from senior DSi management that local DSi staff were to support this initiative. A supporting factor in the programme was that DSi O&M staff on the transferred systems were not made redundant but rather transferred to other duties, or employed by the new management entity.

Now that DSi has withdrawn from the day-to-day management of I&D systems it has taken on a regulatory role and monitors the performance of the transferred systems. It also has responsibility for the bulk supply of water to systems, and continues to manage some systems which are considered too difficult to transfer to local control. Although DSi are involved in water resources planning, particularly in relation to the construction of dams and irrigation systems, they are not yet functioning as a water resources management agency. This is partly due to gaps in the water law and the lack of a system of water rights and licensing for surface water. There is a licensing system for groundwater but it does not appear to be strongly enforced at present.

Turkey can be considered a success to date with regard to increasing the involvement of water users in the management of I&D systems. Key features of the process include:

- Strong leadership. Strong support and leadership from politicians and senior management within the I&D agency;
- Devolution of responsibility to existing local institutions. Staged devolution from central to local government, with participation of farmers in the election of the WUA personnel at the local level;
- Support from I&D agency. There was active support and guidance from the staff of the I&D agency, DSi, in promoting the concept, training and supporting WUAs;
- Non-threatening environment for I&D agency personnel. DSi staff jobs are not threatened. O&M staff were transferred to other duties or joined the WUA;
- Professional and well-paid I&D agency. DSi staff are well paid, there was little or no rent-seeking by I&D agency staff from water users, thus transfer of MOM functions to water users did not result in loss of income.

Summary of lessons learned from studies of PIM

From the above discussion and studies carried out by others[40] the following are the major factors influencing the success of programmes to increase the participation of water users in the management of I&D systems:

Understanding drivers for change, objectives and desired end points

- Clearly identifying the factors that are driving the move towards PIM (need to reduce government expenditure, need to improve water use efficiency and productivity, need to address societal changes);
- Setting clear objectives and end points;
- Being clear about final objectives of the process (greater fee recovery, more efficient and productive use of water, more sustainable systems);
- Structuring transfer programmes with these objectives in mind, ensuring that some of the basic requirements are recognized, principally that water users are given rights as well as responsibilities.

40 Kloezen and Samad, 1995; Geijer et al, 1996; Vermillion, 1997.

Essential conditions

- Committed high level political support;
- Government I&D agency supportive of the programme;
- Politicians aware of the programme who are not resistant to change even if not actively supportive;
- Specific legislation enacted related to establishment of WUAs, with complementary changes made in associated legislation (water law, civil code, tax code, etc.);
- Legal right of WUAs to set, collect and use service charges related to their service area;
- Legal entitlement to irrigation water with clear definition of associated conditions;
- Adequately functioning I&D systems;
- Clearly defined roles and responsibilities of the various stakeholders, including water users, WUA management and I&D agency personnel;
- Provision for a sufficient length of time of specialist personnel to raise awareness, train and support WUAs and water users;
- Well thought out policy and programmes for restructuring of the I&D agency, and measures for any necessary staff cutbacks;
- Adequate time and resources to complete management transfer.

Issues to be recognized and addressed

- Recognition that this is a change management process. Acceptance and use of proven change management approaches and techniques;
- Strength of the potential resistance to change from parties with vested interests, including I&D agency personnel and politicians;
- Recognition of the need to raise awareness and understanding amongst politicians of the role and benefits of management transfer;
- Recognition of the need to raise awareness, understanding and support for the programme amongst I&D agency staff;
- Whilst management transfer might reduce government expenditure over time it requires additional resources in the short-term until WUAs are established and functioning.

Factors contributing to failure

- Lack of high-level support;
- Sabotage of the process by vested interests resisting change;
- Adverse political interference (e.g. politicians advocating the non-payment of service fees);
- Lack of adequate explanation and support for the transfer process (i.e. failure to provide specialist support to form and guide WUAs and water users);
- Inadequate/weak legal framework;
- Failure to devolve adequate levels of responsibility to water users (ability to set, collect and utilize the service fee);
- Perpetuation of the top-down patronising approach to farmers and water users i.e. failure to respect the expertise and capabilities of the farming community;
- Failure to reform and restructure the I&D agency.

Conclusions and recommendations

Improving the efficiency and productivity of irrigation water use is an increasingly important issue in many countries and river basins. Different strategies can be adopted depending on the development stage of the basin. Institutional change affecting how irrigation and drainage systems are managed, operated and maintained comes to the forefront as river basins approach closure.

Engagement of water users in the process of MOM of their I&D systems is a viable option but as has been shown in this paper an holistic view needs to be taken if the participatory or transfer process is to succeed. Lessons can be learned both from both successful and less successful implementation of management transfer programmes, and applied to new or ongoing programmes. It is also important to appreciate that lessons can be learned outside the sector, for example in the application of understandings developed in the business sector on change management. Many of the causes of success or failure of participatory or transfer programmes can be attributed to key elements of change management theory. Leadership, forming a powerful coalition, communication, empowering others to act, short-term wins, consolidating improvements; and institutionalising the new approaches all need to be part of the management transfer package.

The importance of strong leadership, support from the top and full commitment to the management transfer process are highlighted in several of the examples provided as major pre-requisites for success; programmes have failed or stalled when these components were lacking. A failure to fully understand and deal with those elements resisting change also leads to failure, with the I&D agency personnel being a major factor in the equation. It is apparent that reform of the I&D agency becomes an essential component of the management transfer package. A particular feature of the management transfer process in Pakistan and India is the apparent lack of trust in water users by the I&D agency and government in general. This is no doubt a consequence of the nature of the historical development of the I&D systems in the subcontinent, in which government and the I&D agency have played a major role. It is time to have more faith in and give more responsibility to the water users. Institutional change is often more difficult to implement than technical interventions. Forming water users associations and restructuring I&D agencies can face considerable institutional resistance, and be very time consuming. Although rehabilitation of the physical infrastructure might be more straightforward and take less time, it is of little benefit if institutional processes are not in place ensuring that the infrastructure is sustained over time.

There is no doubt that institutional change is required in the water resources and I&D sectors in many countries, and the direction and approach to take have to be decided. It is hoped that the information provided in this section makes a contribution in this regard.

Rural finance

Introduction and context

Agriculture is overwhelmingly the largest contributor to rural employment in Pakistan, including poor and vulnerable households, and fosters local economic growth and social stability in rural areas. Agriculture not only provides food security for farmers but is also the backbone of the national GDP. Agriculture is the source of livelihood of at least 45 percent of the total employed labour force. Although Pakistan is a major producer of several key agricultural commodities (wheat, rice, sugarcane, maize, cotton, among others), the sector continues to suffer from major inefficiencies. Agriculture is underdeveloped with most farms generating very low yields. Pakistan's agriculture sector suffers from a compounded problem of lack of infrastructure and market structure. The resulting inefficiencies impact all market participants and keep the sector from being competitive.

Financial services play an important role in determining the competitiveness and profitability of the agricultural sector and are vital in ensuring that agriculture can generate income for producers and other participants in the value chains that extend from input supplies to retail sales. Access to finance in the rural areas has lagged behind the country's growth and development needs and it appears to be an important constraint for further development of the agriculture sector in general. Despite 20 percent contribution to GDP, outstanding agriculture advances account for only 5 percent of total advances of the banking sector.

This study of the rural financial services sector in Pakistan[41] is one of a number of studies that have been commissioned by the World Bank in order to contribute to the discussions concerning Bank lending priorities to Pakistan over the next few years. The purpose of

41 This study was authored by Ayesha Tayyab (FAO consultant) with contributions and support from Aidan Gulliver (FAO Senior Economist).

the study is to delineate the current status of rural financial services in Pakistan, to identify constraints, capabilities and opportunities in the rural finance sector, and to explore possible initiatives – including public-private partnerships – that might help deepen the ability of the financial sector to prepare financial products that strengthen agricultural lending.

Rural financial sector overview

The current institutional structure of the financial system in Pakistan is elaborate. The formal (legally registered and supervised) financial system of Pakistan comprises the State Bank of Pakistan (SBP), specialized public sector banks, commercial banks, microfinance institutions (MFIs), non-bank financial institutions (NBFIs), insurance companies, government saving institutions and stock exchanges. Pakistan's financial sector has undergone significant reforms in the past 15 years which has resulted in the transfer of a large portion of the sector from public to private hands.

The role of the SBP is to regulate and supervise commercial banks, microfinance banks (MFBs) and the financial services sector in general. SBP has been very active in formulating rules and regulations for microfinance ordinance and in engaging in policy dialogue with other stakeholders through the Consultative Group on Microfinance. In addition to SBP's regulatory and supervisory role, it is also assisting in the transformation of Rural Support Programmes (RSPs) and other MFIs into MFBs.

Specialized public sector institutions involved in rural finance include Zarai Taraqiati Bank (ZTBL) and Punjab Provincial Cooperative Bank Limited (PPCBL). ZTBL, formerly known as the Agricultural Development Bank of Pakistan, primarily caters to the upper and middle segments of the rural financial markets, the rural elite and those farmers with sizeable landholdings, rather than to the small or marginalized farmer or the asset-poor. Similarly, in the cooperative sector, loan terms and delivery methodologies usually preclude access by the poor. Credit components in government sponsored programmes are generally not targeted at small farmers either by size, mode of delivery or terms of credit. The overall impact of these programmes has so far been minimal as the services have been presented, promoted and delivered in a manner that suggests

a politically motivated grant facility, and this is the way it has been understood by those privileged to have access. Interest rates charged by ZTBL during early 2011 were 8 percent per annum (p.a.), a considerable subsidy over commercial bank rates of 18 percent. However, PPCBL (which lends only to cooperatives) charges rates of 17-18 percent p.a. ZTBL and PPCBL provide government sponsored loans only. The entire lending of ZTBL and PPCBL is for the rural sector. ZTBL is compensated by the Government for its losses for such subsidized loans. All losses incurred including write-offs and waivers announced by the Government are compensated by the Ministry of Finance for ZTBL and by the Government of Punjab for PPCBL.

Commercial banks

Commercial banks dominate the financial sector. However, they have traditionally been urban oriented and have generally avoided providing financial services to the rural poor. Commercial banks are neither structured nor geared to extend rural finance exposure beyond experimental efforts. They are not organized to handle a large number of small loans and perceive making loans to small-scale farmers or the rural poor as a high cost/high risk proposition offering uncertain returns. Commercial banks tend to have a national sphere of operations, which usually translates into focusing on urban areas where lending opportunities are viewed as lower risk and better yielding.

Commercial banks and domestic private banks do provide short term production loans in the agricultural sector with interest rates (as of early 2011) typically running at 18 percent p.a. However, they traditionally view agricultural finance as risky and 90 percent or more of their loans in the agricultural sector are for crop production. Banking products (first tier services) are mainly offered to high income clients and the provision of financial services to the under-served rural population is limited. Some banks have provided lines of credit to RSPs/NGOs for on-lending whereas others have tried to extend their own accessibility to the rural sector. Nevertheless, commercial banks are expected to continue to play a limited role in the rural finance sector unless cost-effective and profitable models for outreach to the rural sector can be demonstrated.

Advances of banking sector – on 31 December 2010
(PKR million)

Public sector commercial banks	627727
Local private banks	2 562 263
Foreign banks	65 627
Specialized banks	93 174
Total	3 348 791

Source: State Bank of Pakistan

Agricultural credit outstanding – on 31 December 2010
(PKR million)

5 Big commercial banks	57 634
ZTBL	95 641
PPCBL	8 875
Domestic private banks	26 704
Total	188 854

Source: State Bank of Pakistan

Agricultural credit targets, disbursements, and amount outstanding – on 31 May 2011
(PKR million)

Banks	Target for 2010-2011	Disbursements production loans	Disbursements development loans	Total disbursements July 2010 to 31 May 2011	Outstanding from 31 May 2011
5 Big commercial banks	132 450	119 558	3 542	123 100	60 456
ZTBL	81 800	47 920	6 438	54 358	94 361
PPCBL	6 850	3 809	1 113	4 922	8 939
Domestic private banks	48 900	41 116	1 965	43 081	24 150
Total	270 000	212 403	13 058	225 461	187 906

Source: State Bank of Pakistan

During the first half of financial year (FY) 2011, banks disbursed a total of PKR 101.6 billion (USD 1.19 billion) to the agricultural sector compared to disbursement of PKR 106.3 billion (USD 1.25 billion) in the same period last year. Agricultural credit disbursement showed a decline of 9.6 percent year on year, according to the SBP first quarterly report for FY 2011. This was mainly attributable to very low lending by ZTBL following its large exposure in flood affected areas, as well as cautious lending by the five major commercial banks. SBP issues indicative annual targets to commercial banks. Annual agricultural targets and actual disbursements for FY 2010 to FY 2011 by banks, sectoral targets and disbursements for 2009/2010 and 2008/2009 are given below:

Agricultural credit targets and disbursements (PKR in billions) FY 2009-2011 (July-December)

Banks	Annual target 2010-2011	Disbursement July-Dec 2010	Annual target 2009-2010	Disbursement July-Dec. 2009
5 Big commercial banks	132.4	55.0	124	55.4
ZTBL	81.8	21.7	80	30.4
DPBs	48.9	22.7	50	18.2
PPCBL	6.9	2.9	6	2.3
Total	270	101.6	260	106.3

Source: State Bank of Pakistan

Agricultural credit targets and disbursements (PKR in billions) FY 2008-2010 (Complete Year)

Banks	Target 2009-2010	Disbursement 2009-2010	Target 2008-2009	Disbursement 2008-2009
5 Big commercial banks	124	119.6	119.5	110.7
ZTBL	80	79	72	75.1
DPBs	50	43.8	52.5	41.6
PPCBL	6	5.7	6	5.6
Total	260	248.1	250	233

Source: State Bank of Pakistan

Agricultural credit targets, disbursements, and amount outstanding – at 30 June 2010 (PKR in millions)

Banks	Target for 2009-2010	Disbursements production loans	Disbursements development loans	Total disbursements July 2009 to 30 June 2010	Outstanding as of 30 June 2010
5 Big commercial banks	124 000	115 934	3 675	119 609	54 580
ZTBL	80 000	61 552	17 461	79 013	94 466
PPCBL	6 000	5 388	333	5 721	8 814
Domestic private banks	50 000	42 142	1 635	43 777	25 555
Total	260 000	225 016	23 104	248 120	183 415

Source: State Bank of Pakistan

Non bank financial institutions (NBFIs)

There are a number of NBFIs providing a range of financial services. These include investment banks, leasing companies, mutual funds, housing finance, and Islamic financial institutions such as Modarabas. Like commercial banks, NBFIs do not generally target the lower end of the market and their operations are concentrated in the larger urban centres of the country.

Farms and other rural enterprises often lack access to long-term credit needed to acquire equipment. Most assets that rural enterprises own cannot be used as collateral and titles to land are often non-existent. Leasing is a financial tool that overcomes collateral constraints. Orix Leasing Pakistan is active in the rural sector.

Microfinance providers

Institutional microfinance is a relatively new development in Pakistan. Although the setting up of the Pakistan Poverty Alleviation Fund (PPAF, established in 1997) and the Khushhali Bank (established in 2000) have resulted in a rapid growth in microfinance in the last 15 years, the overall outreach of microfinance in Pakistan is still limited. This is despite the wide recognition of its poverty reduction potential at the policy making level and among the development community. In the economic and social context of Pakistan, microfinance is understood to comprise financial services, particularly

savings and credit for the poor, with a significant degree of social intermediation. The environment for microfinance has improved with the recognition that microfinance is critical to poverty reduction and that organizations such as NGOs can be effective development partners to enhance the quality of service through participatory community based approaches.

The microfinance market is essentially served by MFBs, NGOs and the informal sector. Although the range of specific services that an institution can offer is dependent on its legal status, most microfinance providers are currently providing broadly similar products and targeting similar markets. The NGOs are not regulated under any microfinance legislation and can run credit programmes as part of their development activities. The only financial operation that the NGOs are not allowed to undertake is accepting deposits. Therefore, NGOs that are offering savings programmes use commercial banks for taking deposits. More recently, the private sector has made an entry into the sector and several new for-profit MFBs and leasing companies have been established. At the same time, the publicly owned commercial banks are withdrawing from the sector on the basis that they have not found a cost-effective model to support their outreach to microfinance, particularly in rural

Microfinance providers	No. of borrowers at 30 June 2010	Amount outstanding at 30 June 2010 PKR million	Market share
Microfinance banks licensed and regulated by the State Bank of Pakistan	737 343	10 464	34.5%
Specialized microfinance institutions	524 163	5 906	27.2%
Rural support programs running MF operations	553 993	6 685	31%
Other MFPs/Multi sectoral NGOs	160 321	2 027	7.3%
Total	1 975 820	25 082	100%

Source: PMN and SBP

Rural lending of MFPs	55%
Urban lending	45%

Source: PMN Microwatch and SBP

areas. The fastest growing programmes are those operating in urban and peri-urban areas and comprise a fairly narrow range of financial products. There is a recognized need to expand this coverage in urban areas and particularly, in rural areas and to enhance the product range, as well as to improve the capacity of these institutions to target the poor.

MFIs do not usually provide agricultural lending and their service coverage of marginal and small farmers is restricted as they do not focus much on financing characterized by pronounced agricultural seasonality. The poor therefore have to access micro-credit in order to initiate income earning activities in rural non-farming sectors.

The PPAF wholesales microfinance to RSPs, MFBs, MFI programmes of NGOs and private sector commercial leasing firms working within the sector. As of early 2011, it charged 8 percent p.a. for exposure under PKR 500 million, or the Karachi Interbank Offer Rate (KIBOR) – currently 14-14.5 percent for amounts above this level. PPAF is the main provider of wholesale refinancing to MFBs. In addition, PPAF provides support in capacity building, portfolio management and the provision of community infrastructure grants to its partner organizations in order to enhance the impact of its credit programme. For the half year ending on 31 December 2010, a total of PKR 82 946 million (USD 974 million) in PPAF funding had been disbursed in urban and rural areas of 128 districts of Pakistan through 96 partner organizations. Credit and enterprise development accounted for 56 percent of total disbursements. In June 2010, PPAF's own resources accounted for 45 percent of the market share among active microcredit borrowers, while PPAF's partner organizations provided a further 45 percent share. The remaining portion of the market was accounted for by Orangi Charitable Trust (OCT/OPP) which offers wholesale financing on a limited scale to a number of rather small MFPs in the provinces of Sindh and Punjab, as well as by a number of other small participants.

The Pakistan Microfinance Network (PMN) was established in 1999 as a network for organizations engaged in microfinance and is dedicated to improving the outreach and sustainability of microfinance in Pakistan. PMN has made a significant contribution in helping to make the policy environment friendly for the delivery of microfinance services by engaging policy-makers and highlighting some of the key issues, opportunities and challenges in the sector.

The publication of the annual Performance Indicators Report helps to enhance accountability and transparency of the sector and acts as an instrument of capacity building and improving the long-term sustainability of partners.

MFBs are relatively new players in the microfinance market in Pakistan. All MFBs are established under the Microfinance Institutions Ordinance 2001 and are regulated by the SBP. To date there are eight licensed MFBs in the country; six of them operate nationwide, and the remaining two function only in the Karachi district. Most MFBs are currently using the same group based lending methodology as non-bank microfinance providers. The eight MFBs are Khushhali Bank, First Microfinance Bank, Tameer Microfinance Bank, Pak Oman Microfinance Bank, Network Microfinance Bank, Rozgar Microfinance Bank, Kashf Microfinance Bank and NRSP Microfinance Bank.

In 2008 Khushhali Bank (initially established under a special ordinance) was transformed into a public limited company licensed under the MFI Ordinance 2001. It was re-licensed under the MFI Ordinance in early 2008. SBP also licensed Kashf MFB and NRSP MFB in 2008 and 2009 respectively. Both Kashf and NRSP are pioneer MFIs in Pakistan. The MFB status helps these organizations to scale up their operations rapidly, in particular to rural areas and women. Interest rates on microfinance loans vary by institution, but (as of early 2011) are typically in the range of 28-44 percent p.a.

There are three basic forms of NGOs delivering microfinance:

- RSPs;
- MFIs; and
- Multi-purpose NGOs.

All microfinance service providers generally work with and through community based groups that they have helped to form. The NGOs help improve the leadership, management and credit capacity of these groups before lending.

RSPs dominate the NGO sector. The RSPs and other NGOs constitute a viable channel through which financial resources are provided to grass root entrepreneurs, small farmers and women.

This is because of their intimate knowledge of the community and the capacity to develop a direct relationship with borrowers. Credit methodologies used by RSPs and other NGOs are fundamentally based on the principle of community risk sharing, but specific methods may vary; e.g. variations in the system of collecting savings and borrowings. RSP credit methodologies are inherently flexible, being closely linked to the needs of the target group and based on close client contact. These methodologies maximize convenience for the borrower and reduce the risk of loan failure by limiting application formalities, reducing transaction costs through group lending, using of localized disbursements and collections, and substituting traditional collateral by group guarantees by the use of various peer support systems in order to encourage timely loan repayments.

The sources and channels for institutional credit for the rural poor have expanded significantly in the last 15 years with the emergence of the RSPs as the primary delivery vehicles for microfinance. The development model of the major RSPs is very similar and has been specifically endorsed by the Government of Pakistan and provincial governments as an appropriate vehicle for addressing rural poverty in Pakistan. Most RSPs work within a specific province and a number of the larger RSPs have been provided with substantial endowment funds by the government of the province in which they operate. The core work of RSPs is social mobilization to form village level community based organizations, which is then followed by multisectoral programme activities. The RSPs' mandate is primarily to work in the rural areas. Savings mobilization is generally an integral part of RSP microfinance programmes. Most RSPs require that borrowers save for some time before applying for a loan. Besides providing effective collateral to the lender, this requirement serves to instill confidence in the poor concerning their ability to control their own finances, and gives confidence to the lender that the potential borrower has the ability and determination to make loan repayments.

MFIs are non-bank microfinance providers that specialize in the provision of financial services. These organizations are registered with the Securities and Exchange Commission of Pakistan (SECP) under the Companies Ordinance. They cannot accept deposits, because of their non bank status, although some do mobilize savings. Group lending remains the dominant lending methodology but some are diversifying into larger loan sizes and are beginning to deal with individual clients as well.

The two largest global MFIs, Association for Social Advancement (ASA) and Bangladesh Rural Advancement Committee (BRAC), started their operations in Pakistan in 2008. At present, both MFIs have set up operations across the entire country. The loan portfolio of ASA has now passed 100 000 borrowers. These organizations have helped significantly to bring globally well known cost-effective and gender focused micro-credit practices into Pakistan.

Multipurpose NGOs provide microfinance services along with other interventions such as education, health or infrastructure development to the poor. This group accounts for only a small percentage of total microfinance outreach.

Other financial service providers

Pakistan Post Office. Pakistan Post Office has a wide network throughout the country and is a significant provider of financial services including savings, insurance and remittances. The Pakistan Post Savings Bank serves as an agent of the Ministry of Finance for a range of financial services, including savings mobilization, life insurance, postal giro accounts and money transfers. Pakistan Post acts as an agent to sell government backed savings instruments.

Financial services through community organizations (COs) and local support organizations (LSOs) formed by RSPs**.** Rural finance services are also being provided by COs and LSOs formed by RSPs. Some of the COs are involved in internal lending. One of the main activities of COs is managing members' savings and all COs encourage regular savings by members. Regular saving is a characteristic feature of the periodic meetings that COs organize and saving is mandatory for every member. The contributions of the member depends on his/her capacity. Usually COs allow their members to withdraw savings in case of emergency, but in normal circumstances withdrawal of savings is discouraged.

It has been observed that a number of COs formed through RSPs are using their deposits to advance small loans within the group. These informal credit and savings groups are an emerging feature of the rural finance market in Pakistan. They are operating at the community level only and are very small, but it appears that their numbers are growing and the volume of money they handle is expanding. Presently they are quite unregulated.

An important development has been the emergence of community based umbrella organizations. These umbrella organizations are being encouraged to act as focal points for service delivery and increase the visibility and advocacy of community organizations to mobilize support and funding. These umbrella bodies are generally registered with the Social Welfare Department. In order to address the financial needs of the poor, RSPs, and in particular, the NRSP, have tested a new method of providing financial services to the poor under the name of Community Investment Funds (CIFs). CIFs aim to empower the community and enable them to identify, plan and implement various programmes/projects for their own development. A CIF is normally a grant provided to LSOs functioning as apex bodies for Village Organizations (VOs). The LSO uses the grant to provide microcredit to the poorer members of the VOs for various income generating purposes. Social mobilization processes prepare the basis for proper targeting and the inclusion of women. The poorer members of the VO are identified through a poverty score card survey. RSPs build the capacity of the LSO to manage the CIF. LSOs and VOs, being local institutions, are in a strong position to identify the poorest and suggest local solutions for reducing poverty. Through this mechanism, community activists are encouraged to participate in the management of the fund. CIFs also encourage the VOs/LSOs to generate financial resources to allow long-term sustainability of operations, including adding resources to the core CIF by levying service charges at varying rates on clients or by collecting contributions. An advantage of this approach is that it helps the VO/LSO to leverage CIF resources by using the CIF as collateral for accessing other sources of funds. In addition, this mechanism encourages savings as CIFs promote better management of available financial resources and encourages the VO/LSO to scale up social mobilization by using the CIF as a tool.

The role of the informal financial market

The rural finance market has relied traditionally on informal lending by agricultural traders, input suppliers, money lenders, and landlords. Although reliable data is scarce, informal sources are believed to provide most of the existing credit supply. A World Bank report[42] quotes an estimate that informal borrowing comprises 78 percent of

42 Bringing Finance to Pakistan's Poor (Access to Finance for Small Enterprises and the Underserved). World Bank, 2010.

the total borrowing in Pakistan. The three principal informal sources of credit are:

- Commercially based credit linked with marketing intermediaries, commission agents, village traders, and shop keepers;
- Land based credit arrangements extended by landlords to farmers for inputs and to meet consumption needs; and
- Socially based arrangements relying on friends and family for funds.

Money lending as a specialized occupation appears to be gradually declining. Poor people prefer to borrow from relatives, friends, and other people with whom they have close relationships for consumption smoothing. Although moneylenders operate in the rural areas, they are generally a source of larger amounts of finance or are approached as a last resort. The majority of credit in the rural areas is supplied by arthis (commission agents) and other middlemen at high interest rates through interlinked transactions.

In agricultural settings, like Arthis and other suppliers of seeds, fertilizers and pesticides operate through numerous outlets in the main agricultural markets. These outlets are mostly owned by shopkeepers/ dealers who play an important role in the agricultural supply chain, particularly that of wheat. These shopkeepers/dealers purchase inputs directly from wholesalers or manufacturers and then sell them on to farmers. However, farmers often do not have enough reserves to pay for these materials in cash. The shopkeepers therefore extend credit to the purchasers at interest rates between 6 and 8 percent per month.

Such informal sources mainly supply short-term credit at terms that reflect the weak bargaining power of the borrower, particularly for land based credit arrangements. Informal credit is increasingly tied to input suppliers and agricultural marketing operations, often involving the purchase of low quality inputs and/or the mandatory sale of the underweighted output, and with nominal interest rates currently at a minimum of 25-35 percent per six month season. However, when associated obligations (purchase of inputs and sale of outputs) are taken into account, real interest rates are considerably higher.

Shopkeepers also provide sales support apart from agricultural inputs and supplier credit, by suggesting popular seed grades, or varieties that would suit a specific farmer's needs.

Government policies and programmes in rural finance

The SBP has traditionally played a leadership role in establishing legal frameworks and guidelines for the promotion of microfinance and agricultural finance. One of the main instruments of government policy is that of encouraging commercial banks to improve outreach to rural areas. SBP sets indicative agriculture lending targets for commercial banks. These targets are fixed by the Agricultural Credit Advisory Committee after consultation with the respective banks. These targets are based on each bank's previous year's performance and credit plans for the following year. There are many areas in which a partnership between microfinance practitioners and commercial banks would serve the interests of both, and MFIs are increasingly looking to commercial sources of funds in order to expand.

Despite the setting of annual rural credit targets (see Section B.1), commercial banks and development finance institutions lack an outreach strategy and have played a minimal direct role in the rural sector. The range of financial products offered for the agricultural rural market is limited and many existing products are not well suited for the sector. Available financial products are designed to reduce risk to the lending agency rather than enhancing impact for the borrower. They cater primarily to the upper and middle segments of the rural financial markets, the rural elite and those farmers with sizeable landholdings, rather than to the small or marginalized farmer or the asset poor.

SBP therefore emphasizes the broadening of inclusive financial services, promoting deposit mobilization, encouraging the use of alternative delivery channels, scaling up lending operations, improved governance and transparency, pro-consumer policies, and developing a regulatory mechanism for non-deposit taking MFIs.

SBP is keen to expand its financial services to reach unbanked areas. Building financial infrastructure appears to be a high priority of the Government for improving rural finance. The SBP has taken the leading role in developing regulatory systems and providing incentives for the development of the sector. SBP has recently announced a host of initiatives regarding branchless banking, mobile banking, appointment of agents, service centres, etc. The aim of the policy is to help promote institutional innovations that address the needs of rural areas and address intrinsic market failures.

Indiscriminate subsidies, especially on interest rates, can be detrimental to the expansion of the sector. Directed credit efforts waste valuable public resources that can be deployed more usefully elsewhere and generally distort the market for participants. Challenges to private sector investment in agriculture relate to the regulatory environment, poor infrastructure, lack of information and limited access to finance.

Relief package for flood affected areas. The Government has announced a number of relief packages for affected borrowers owing to the severity of the economic and social impact of the floods of 2010. These are being implemented by the SBP in consultation with relevant ministries. Incentives such as the Scheme for Revival of Small and Medium Enterprises (SMEs) and Agricultural Activities in Flood Affected areas, a higher level of sharing of bona fide losses under the Credit Guarantee Scheme, and relief in provisioning requirements on restructured/rescheduled loans are some of the important measures. Some of the measures for flood affected areas are given below, although no one has disbursed significant amounts of funds to date:

- **Refinance scheme for revival of SMEs and agricultural activities in flood affected areas.** PKR 10 billion (USD 118 million) has been allocated to this scheme through banks and DFIs which receive resources at concessional markup rates for the following purposes:

  (i) Agricultural production/working capital loans shall be given for a period of one year (based on cropping cycle);
  (ii) Short-term loans for working capital requirements of SMEs for a period of up to one year. This facility is valid up to 31 October 2011. Although there are some applications in the pipeline, disbursements under this scheme have so far been insignificant.

- **Concessional financing and guarantee scheme for canola cultivation in flood affected areas.** An amount of PKR 500 million has been allocated under this scheme. It is expected that the Ministry of Food and Agriculture (MINFA) and provincial agricultural departments will ensure timely availability of seeds, fertilizers, pesticides and proper technical guidance. Loans will be covered under the Credit Guarantee Scheme, in which SBP will share bona fide losses of banks to the extent of 30 percent. These production

loans will be given at affordable rates for a maximum period of six months (based on the cropping cycle). There have been no disbursements under this scheme to date.

- Other relief packages. These include:

  (i) Restructuring and rescheduling of overdue loans for two years;
  (ii) Provision of fresh credit through the SBP refinance window for two years at 8 percent p.a. with a permitted bank spread of 3 percent;
  (iii) Exemption from additional provisioning requirement for one year.

In order to provide relief to borrowers in flood affected areas identified by the National Disaster Management Authority (NDMA), MFBs have been encouraged to reschedule/restructure loans to such borrowers where the possibility of recovery exists. Moreover, for all rescheduled/restructured loans and advances, MFBs may defer loan provisioning up to 31 December 2011. However, classification of these loans will be carried out according to criteria laid down in the relevant Prudential Regulations.

Donor initiatives in rural finance

Donors have provided the key impetus to the microfinance sector and have been the principal source of funding, institutional innovation, capacity building and specific training opportunities. The World Bank and Asian Development Bank have provided large lines of credit to PPAF and Khushhali Bank, while the Department for International Development (UK) (DFID) has provided more selective support and grants to PMN and Kashf. Microfinance is a key area of support for DFID under its Financial Inclusion Program. The International Finance Corporation (IFC) has also been involved in a number of operations to facilitate financing of the microfinance sector. It has provided financing to Tameer Microfinance Bank and has an equity stake in First Microfinance Bank and Tameer Microfinance Bank. It has also facilitated financing for Kashf.

IFAD has funded two projects in the microfinance sector which are being implemented through PPAF, the Microfinance Innovation and Outreach Programme (MIOP) and the Programme for Increasing Sustainability in Microfinance (PRISM). The European Union (EU) and the Swiss Agency for Development and Cooperation (SDC)

have provided technical assistance for the sector and support for institutional strengthening. EU funding has focused on developing the capacity of young MFIs by engaging established MFIs. Similarly, the goal of SDC's project was to strengthen the institutional capacities of microfinance actors through experienced service providers.

USAID has provided financing to microfinance providers, and has also extended support to PPAF for microenterprise development and training of partners and entrepreneurs. It also provides consulting, training and technology support for commercial banks and MFIs. USAID's SME activities led to the creation of the Competitiveness Support Fund. The larger donors such as the World Bank and ADB provide loans directly to the Government of Pakistan. The World Bank has been providing assistance to the Microfinance sector through the PPAF. ADB has also been a supporter of microfinance in Pakistan. ADB's last major project, the Microfinance Sector Development Project, concentrated on the establishment of Khushhali Bank. These loans are given on extremely soft terms and for a long period. Some of the donors are restricted by their own rules and regulations which specify that they cannot give lines of credit that will be difficult to monitor at the end of the project period. Consequently, EU and SDC no longer provide lines of credit just focusing their support on capacity building.

In view of the limited financial infrastructure and penetration, access can be increased using a two pronged strategy, via existing agencies with higher accessibility such as Pakistan Post Office, as well as via new technology solutions, such as branchless banking and mobile banking. SBP has been working with the Consultative Group to Assist the Poor (CGAP) by sharing information and communication technology and using new branchless banking models to reach massive numbers of the presently under served poor. Innovative and effective ways of providing small-scale farmers with access to finance are essential, including addressing where financial products should be targeted and which are best suited for different segments of the value chain. Financing for agriculture is viable only if supported by sound risk assessment and risk management at all levels, including at the farm, the financial institution (commercial risk) and the agricultural value chain. SBP has been working with CGAP in developing rules and regulations for branchless banking.

The ADB financed an Agribusiness Development Project in the area of rural/agricultural finance, which was completed on 30 September 2010. The project had five components: agribusiness support service provision, agribusiness finance development, agribusiness capacity building, agribusiness policy, and enabling environment development and project management support. Under the agribusiness finance development component, the project was required to support the development of financial services, particularly credit to agribusiness enterprises that do not have ready access to such services. The International Fund for Agricultural Development (IFAD) approved a Crop Maximization Support Project in late 2009. Most of the USD 18 million provided under this project is targeted at credit lines for 432 village organizations under the supervision of RSPs. However, the implementation of this project has not yet started and it may be cancelled. USAID has provided technical assistance for a study on warehouse receipt systems and is also providing assistance in agribusiness development. IFC is carrying out technical assistance on the establishment of storage facilities in Sindh and Punjab. The Islamic Development Bank (IDB) is working on a Grain Silos Project. Under the Financial Inclusion Programme, DFID has provided seed money for Credit Guarantee Scheme for Small and Rural Enterprises.

Financial inclusion programme (FIP). In order to increase access to finance for the poor and marginalized segments of the population, SBP partnered with DFID to design and implement a comprehensive FIP. The FIP includes two major components:

- A microfinance credit guarantee facility (MCGF). Launched with GBP 10 million in December 2008, was designed to offer an incentive to commercial banks to provide wholesale funds to MFBs and institutions for on-lending to poor and marginalized groups. The MCGF has been able to mobilize PKR 2 billion in private capital from commercial banks for the microfinance sector that will improve outreach considerably.
- An institutional strengthening fund. Worth GBP 10 million, also set up at SBP in December 2008, aims to strengthen the institutional and human resource capacity of MFBs and institutions. So far, grants of PKR 400 million have been approved for eight microfinance providers for ten projects which aim to address institutional strengthening needs of key players.

Improving access to financial services fund (IAFSF). SBP has also launched the IAFSF, aimed at improving financial literacy amongst existing and potential microfinance clients in order to enhance their capability to access and make productive use of financial resources. A nationwide Financial Literacy Programme has been approved in principal. This will soon be launched in various pilot districts countrywide.

Access to financial services in the rural sector

Financial penetration in the rural sector

The World Bank's report on Financial Sector Assessment 2010 states that the commercial banking sector in Pakistan controls an estimated 92 percent of total assets and dominates the financial sector. However, overall financial sector penetration is low. Moreover, the World Bank's report "Bringing Finance to Pakistan's Poor" mentions that only 14 percent of the population use formal financial services and 40 percent do not use either formal or informal financial services. More than half of the population saves, but only 8 percent trust financial institutions with their savings.

The same report estimates that only 15 percent of farmers have access to the formal financial system as a whole (including commercial banks, agricultural banks and other financial institutions), with the few upper income large farmers enjoying almost ten times higher access to formal finance than poor small farmers. Only 6.5 percent of poor farmers receive credit from the formal sector. This uneven distribution of farm credit negatively affects the poverty level of agricultural households and has resulted in most of the benefits of subsidized credit from state owned institutions being appropriated by this group.

The outreach of commercial banks in the rural finance sector is very limited. Most commercial banks have few, if any, rural branches and past smallholder farmer schemes have been closed. This lack of coverage stems partly from high transaction costs in areas of relatively low population density. However, limited operational research and understanding on how to develop effective access strategies for rural areas has also contributed to this poor coverage.

Commercial banks view agricultural finance as risky and therefore limit the size of their loans for crop production. This reluctance to

lend is mainly the result of production risks. Price volatility (around a seasonal pattern) has a negative impact on farmers. Farmers typically lack access to market based mechanisms and storage facilities that would enable them to sell at other times other than post-harvest periods. These limitations extend to small-scale rural traders who must re-sell output immediately to larger aggregators in order to maintain cash flows. Large traders who have access to storage and financing facilities use the seasonal pattern to make profits. Commercial risks in the agricultural sector are often further exacerbated by unpredictable government responses to food surpluses or deficits. There are wide provincial differences in financial services, literacy and access.

The crop sector is particularly exposed to credit shortages. Lack of credit prevents producers from borrowing from the formal system for inputs and prevents traders from investing in more efficient handling, storage and trading operations. The consequences of lack of credit are cyclical. Endemic problems of major agricultural crops include inadequate and insufficient input use causing low yield and resulting in high costs of production as well as significant post-harvest losses due to poor storage facilities. There are also higher transaction costs due to poor infrastructure facilities, weak market information flow and instability in crop quality.

Despite the expansion of microfinance, provision of financial services in rural areas remains a challenge and has not changed significantly; this is especially the case with regard to agricultural financing. There is a general lack of understanding of financial matters in the rural areas which does not usually extend beyond basic terms. The rural population relies more on social networking for information on financial matters rather than electronic and printed media.

Most NGOs lack the financial capacity, management or operating models necessary for the efficient delivery of rural finance, and lack access to wholesale credit or refinancing facilities. NGOs vary widely in their ability to design and deliver microfinance services. Many MFIs and NGOs have expanded their programmes greatly in recent years. Many still run programmes which are not sustainable and need considerable cross-subsidization, although a few have developed sustainable models of delivery. However, the ability of NGOs to expand their programme further is limited by

capacity constraints. The microfinance sector has an outreach of approximately 1.7 million borrowers, against a demand estimated at approximately 10-20 million active borrowers. Some estimates are as high as 35 million, so there is much scope to increase both scale and outreach for the sector. Access to liquidity and institutional capacity remain the two key challenges to sustainable growth and outreach. In order to expand the sector needs to be more capable of managing risks and improve on efficiency. It is also essential to focus on operational sustainability and commercial viability. A key challenge to MFIs is raising the necessary funding to permit growth. MFIs rely considerably on non-commercial funding. In spite of SBP's efforts, and initiatives such as MGCF, commercial banks have shown little appetite for servicing microfinance clients. NGOs have a very limited range of products and generally lack the knowledge to diversify their products. The MFBs have restricted their outreach to urban and peri-urban areas and many of them have yet to develop effective and accessible services for rural areas as well as a diversified set of products for poor households.

Estimated total rural finance demand and provision

Only 25 percent of total bank deposits and 17 percent of total borrowers are from rural areas, according to the World Bank report previously cited. In value terms, the rural share is even smaller, comprising only 10 percent and 7 percent of the total value of deposits and advances respectively. Only 15 percent of farmers are reached by the financial system as a whole (including commercial banks, agriculture banks, and other financial institutions). The few upper income farmers enjoy almost ten times higher access to formal finance than poor farmers (6.5 percent). Big farmers get even more informal credit than poor farmers—82 percent versus 70.2 percent.

In FY 2009-2010, annual agricultural lending by commercial banks and specialized institutions was PKR 248.2 billion (USD 2.93 billion). Although 55 percent of micro credit extended by microfinance providers is in the rural areas, credit extended by MFPs during FY 2009-2010 is estimated at PKR 10 billion (USD 118 million) according to the SBP. Therefore total credit to the agriculture sector from commercial banks, agricultural banks and microfinance providers was PKR 258.2 billion (USD 3 billion), while rural credit demand estimates provided by SBP were more than twice this volume (PKR 680 billion equivalent to USD 8 billion).

Challenges and opportunities

Barriers to access

Government and specialized development banks tend to regard agriculture as a social problem rather than an economic activity. They therefore provide subsidized funding to farmers, rendering commercial banks unable to compete.

The banking environment is distorted. Financial market efficiency is often hampered by government regulation. For example, interest rate caps and other restrictive lending policies typically result in credit being rationed primarily to the largest, wealthiest and most influential farmers. This leaves a reduced availability of credit for small and marginal farmers. These factors combine to limit the supply of rural financial services in general and agricultural finance in particular. Agricultural borrowers in rural areas resort to informal credit, reduction of farm inputs, sub optimal production techniques, and borrowing from family and friends. Low liquidity forces farmers to sell commodities right after harvest when prices are low in order to cover working capital needs. Small traders are unable to pre-finance farmers and are forced to sell on to processors immediately.

Current risk management techniques are generally inadequate to persuade institutions to lend to the agricultural sector. Information on a borrower's credit history is rarely available, resulting in information asymmetries that make credit risk assessment difficult. In addition, while an agricultural client's major assets are production and land, it is often difficult for banks to use these as collateral, and particularly difficult to foreclose on land in case of default.

Access of poor to finance in rural areas

Poverty in Pakistan is largely rural and is intrinsically linked to the performance of the agricultural sector. Asset ownership is one of the principal variables which has an impact on poverty, with land ownership emerging as the critical determinant of rural poverty. It is for this reason that small farmers have been identified as one of the principal target groups. An examination of the prevalence of poverty by sector shows that there is a relatively higher incidence of poverty in agriculture compared to non-agricultural sectors. Lack of access to land, water and other productive resources is also a major factor in limiting the productive potential of the poor.

Access to rural finance among the poor in Pakistan has lagged behind the country's growth and development needs, in spite of active policy support on the part of SBP. Financial policies alone have not proved sufficient to expand access and encourage a wider approach linked to basic poverty reduction; financial awareness building is also necessary. In addition to expanding financial access, the task of strengthening financial provider sustainability, especially in the microfinance sector (of greatest relevance to the poor) is of paramount importance. Competition, efficiency improvements, and exposure of financial institutions to market discipline hold the promise of improved commercial viability and reliability in the microfinance sector. Competition and efficiency improvements are also needed if rural lending is to become more profitable.

In view of the limited financial infrastructure and penetration, access can be increased using a two pronged strategy, via existing agencies with greater access, such as Pakistan Post Office, as well as via new technology solutions, i.e. branchless banking and mobile banking. SBP has been working with CGAP on using information and communication technology as well as new branchless banking models to reach very large numbers of the presently underserved poor population. Innovative and effective ways of providing small-scale farmers with access to finance are essential, including addressing where financial products should be targeted and which are best suited for different segments of the value chain. Financing for agriculture is viable only if supported by sound risk assessment and risk management at all levels, including at farm level, the financial institution (commercial risk) and the agricultural value chain.

Good banking practice combined with an understanding of the agriculture sector and the client is the core of sound institutional management and operations for financing agriculture. Yet lending to small farmers at scale will require non-traditional credit assessment systems and multilevel diversification at the portfolio level. Market based risk management instruments can facilitate access to agriculture credit offering better terms as they increase the credit worthiness of farmers and other agents of the agriculture sector.

Legal and regulatory framework

The SBP has the regulatory and supervisory role for commercial banks, MFIs and the financial services sector.

Despite a sound regulatory framework for microfinance and significant donor funding, there is a lack of strong, sustainable institutions that are able to reach the scale necessary to have significant impact. Although SBP has set up a favourable regulatory framework, few institutions use it, and the Government of Pakistan remains involved in direct provision of credit. In order to achieve greater access to capital on the part of institutions serving the rural poor, there is a need for better protection of people's savings and increased legitimacy and professionalization within the sector. The microfinance sector must be integrated into the financial system at all levels (micro, meso and macro).

In 2010 The Economist Intelligence Unit (EIU) of the Economist magazine, which provides annual rankings and in-depth analysis of the microfinance business environment in 54 countries, ranked Pakistan as having the most microfinance regulations. The EIU evaluates the countries on three distinct microfinance criteria:

- The regulatory framework, including official legal recognition, interest rate restrictions, market distortions, capital requirements and regulatory capacity;
- The general investment climate for microfinance providers, especially accounting standards, governance tendencies and transparency requirements; and
- The level of microfinance institutional development, as measured by market concentration, the range of services provided beyond credit and the quality of borrower information. On the basis of overall microfinance business environment rankings, Pakistan together with the Philippines achieved top ranking in Asia.

The improvement in rankings is the result of the SBP's proactive approach to microfinance regulations. SBP revisited a number of microfinance regulations, amending rules to support MFBs, including lifting regulations that prevented MFBs from accepting foreign currency loans from international investors and relaxing the limits on borrowers annual income upward from PKR 150 000 (USD 1 780) to PKR 300 000 for general loans, and PKR 600 000 for housing loans. Loan classification criteria for MFBs were aligned with international best practices and industry norms.

To facilitate the microfinance industry's growth on a sustainable basis, SBP attempts to maintain an appropriate balance

between sector regulation and allowing space for innovation and experimentation. The SBP has taken a number of further policy initiatives during the last three years to promote microfinance in the country.

Revision of minimum capital requirement. In 2010 the minimum capital requirement for MFBs was revised in order to strengthen the balance sheets and risk absorption capacity of MFBs. MFBs will now maintain a minimum Paid-up Capital (free of losses) of not less than PKR 300 million if licensed to operate in a specified district; PKR 400 million if licensed to operate in a specified region; PKR 500 million if licensed to operate in a specified province; and PKR 1 billion if licensed to operate at national level. SBP has advised MFBs which do not meet the MCR requirements to enhance their Paid-up Capital (free of losses) in several phases.

Record retention to hedge against money laundering. To improve the Anti Money Laundering framework, Prudential Regulation No17 was revised, requiring MFBs to maintain records of transactions and identification data in a systematic manner over a specified period.

Diversification of services. SBP amended its Prudential Regulations to allow MFBs to diversify their product range and to serve a larger market comprising low income and micro- enterprises. MFBs were allowed to provide housing finance and home remittance services.

Innovative delivery channels. These channels are critical. are critical to enable an increase in access to financial services in a cost effective manner. SBP issued branchless banking regulations in 2008 to allow financial institutions to make use of alternate delivery channels such as Point of Sale (PoS) terminals, mobile phones, agents' network etc.

Product diversification. SBP amended its Prudential Regulations to allow MFBs to diversify their product range and serve a larger market comprising of low income and micro-enterprises. MFBs were allowed to provide housing finance and home remittance services.

Governance of financial service providers in rural finance

SBP is the supervisor of the formal banking sector, which includes MFBs. Commercial Banks abide by the 1962 Banking Companies

Ordinance, while MFBs fall under the 2001 Microfinance Ordinance. The SECP prudentially regulates non-banking finance companies and insurance companies. NGOs and RSPs are registered by the SECP as non-profit companies under Section 42 of the 1984 Companies Ordinance or by the provincial registration authorities either as societies under the 1860 Societies Registration Act or as trusts under the 1882 Trusts Act. The degree of regulatory oversight by the provincial registration authorities is negligible.

The government is perceived as a strong supporter of the sector and has put in place a regulatory and legislative framework: that has led to greater private sector participation. The government does not have a strong political mandate or legitimacy and is highly dependent upon donor funds to support the sector. Despite its overall attempts to encourage investment and economic growth, the political instability and lack of security have not encouraged significant investments to fuel economic growth. Nevertheless, a number of new MFBs are entering the arena. The policy environment for microfinance has also undergone rapid change in recent years as a result of the promulgation of the Micro Finance Ordinance in 2001. The enforcement of the MF Ordinance has opened up new opportunities and challenges for the sector in Pakistan.

The SBP is the main regulator of formal sector financial services. It has a clearly defined mandate and strong regulatory authority. The State Bank may consider developing guidelines on corporate governance and internal controls for the institutions regulated and supervised by SBP. Guidelines to improve internal control systems of non-regulated microfinance providers should be developed with the aim to develop minimum regulation supervision for non-regulated MFIs to improve credit discipline in the sector.

There are certain aspects of the rural finance sector that are not fully appreciated by the SBP, which inhibits the participation of the formal commercial banking sector in microfinance such as its policy on interest rates, etc.

Preliminary and pilot interventions under implementation to improve access to rural finance

Branchless banking. Innovative delivery channels are critical to increase access to financial services in a cost-effective manner.

SBP issued branchless banking regulations in 2008 to allow financial institutions to make use of alternate delivery channels such as PoS terminals, mobile phones, agents' network, etc.

The First Microfinance Bank (FMFB) entered into a successful partnership with Pakistan Post Office to expand its lending operations in rural and remote regions using the Office's network. Currently, FMFB is operating through 68 post offices with a total disbursement of PKR 523 million, and more than 40 000 active borrowers as of December 2010.

Tameer Microfinance Bank under its branchless banking model 'EasyPaisa' has been facilitating the payment of bills, domestic/home remittances, and m-wallets. Tameer's retail capacity is expanding rapidly as its network comprises 12 000 retail agents. At the end of December 2010, the volume of payments through EasyPaisa reached 1.7 million transactions, handling fund volumes of up to PKR 5.6 billion per month.

United Bank Limited (UBL), a leading commercial bank, has also launched a branchless banking product by the name of 'Omni.' So far UBL has developed a network of more than 2 000 agents to provide payment services to the financially excluded segment. Importantly, UBL is providing social welfare payments largely to deprived people under G2P mode in flood and war affected regions of the country.

The successful endeavours of FMFBL, Tameer & UBL in their branchless banking ventures have already prompted other financial institutions to explore branchless banking models. With the influx of competition and add-on products and services the expansion of financial services is expected to improve considerably.

Establishment of MF-CIB. SBP joined with the Pakistan Microfinance Network and PPAF to launch a pilot MF CIB. In May 2010, PMN launched a pilot test of the CIB in Lahore. Pakistan is the first country in South Asia to have a specific CIB for MF. This initiative will improve the credit assessment capabilities of microfinance players and also reduce the over-indebtedness of poor clients.

The pilot MF-CIB was established to minimize the incidence of client over-indebtedness. Currently 11 microfinance institutions are participating. They include three MFBs, six MFIs, one RSP and one

other. A further five microfinance institutions are expected to join them shortly. They include one MFB, two MFIs and two CFIs. The pilot duration is for one year and a national roll out was planned for June 2011.

Agri commodities physical trade and market development. Pakistan's agricultural sector suffers from a compounded problem of lack of infrastructure and market organization. Deficiencies on the infrastructure side include a lack of proper warehousing, lack of grading and testing, collateral management, post-harvest financing and trading on the organizational side.

In order to develop storage, marketing and post-harvest financing, SBP led a committee of key stakeholders, including the Karachi Stock Exchange, the National Commodities Exchange, the Pakistan Banks Association, the Competition Support Fund and the Pakistan Farmers' Association. This committee is to develop an initiative which will lead to proper storage, fair and transparent price mechanisms and post-harvest financing systems through the establishment of a National Warehouse and Collateral Management Company under private management and equity participation. This entity would establish and manage a warehouse system and provide testing and standardization services as well as permitting the trading of electronic warehouse receipts. This would be integrated with the trading, clearing and settlements systems of National Commodities Exchange Limited (NCEL). After deliberations with stakeholders a primary framework of commodity operations was finalized and the assignment has been shifted to NCEL for implementation.

USAID had carried out a study that provides a road map to the stakeholders for developing the framework for a Warehouse Receipts financing and trading system.

In view of inadequate storage facilities for wheat, SBP issued a circular in June 2010. This circular confirms that banks have been allowed to provide adequate funds/financing as agricultural loans for a period up to five to seven years to eligible flour mills and farmers for the construction of silos and other structures that can serve as storage areas for the procurement of wheat at a debt/equity ratio of 60:40 and a mark-up rate of 12 percent p.a. The lending rates shall subsequently be made market based through their linkage with the T-bills rate. For this purpose, MINFA will develop standardized

models for the construction of storage facilities. Storage financing would be counted towards achievements of indicative agricultural credit targets on the basis of outstanding stocks every year.

Possible areas for investment consideration

The foregoing assessment of the current status of the rural finance system in Pakistan, and in particular the challenges and opportunities facing the sector, provide the basis for a number of possible initiatives which might be considered by the World Bank in developing its next lending programme in consultation with the Government of Pakistan.

Four possible areas of investment have emerged from these assessments, each of which is discussed in more detail below. They comprise:

- The establishment CIB for microfinance lending;
- The development of mobile phone based financial services;
- The expansion of grain handling and storage facilities linked to the securitization of warehouse receipts; and
- The use of partial guarantees to accelerate commercial bank lending to the rural finance sector.

Establishing a CIB for microfinance

The microfinance sector is now gradually mainstreaming into the formal banking system of Pakistan. The sector's visibility has increased globally due to the launch of transformational branchless banking initiatives which have leveraged postal networks and mobile phone technology to expand cost-efficient financial services to the unbanked population. Nonetheless, the industry is yet to make major breakthroughs in order to become a dynamic participant within the overall financial sector and to reach millions of underserved people. The current outreach of two million borrowers is estimated to comprise no more than 7 percent of the potential market.

In order to expand further, it is necessary for MFIs to strengthen their lending standards, particularly with regard to over-indebtedness among borrowers. In the last two years the microfinance sector in South Asia has found its reputation under attack for a number of

reasons, including growing commercialization and an increased focus on size and profitability. However, the most important weakness of current microfinance management systems has been clearly shown to be that arising from insufficient information on potential borrowers. This lack of information increases the risk faced by lenders, but it can also lead to borrowers availing themselves of the services of multiple lenders, and thus taking on greater debt than they can effectively service or repay.

MFIs are usually weak in the areas of corporate governance, management quality and staffing and increasing access to funding and liquidity may fuel the risk of overlending. MFIs have grown at a faster pace than their back office systems can handle, and this is exposing them to increased credit risk and other dangers. Improved credit information on all borrowers in the sector is therefore of major importance.

A recently commenced pilot microfinance-exclusive CIB is attempting to address this problem through improved risk management practices (see previous section). Despite the clear benefits which may be achievable through an effective CIB, the pilot MF-CIB is still in its infancy and information sharing among lenders needs to be strengthened. Furthermore, a large number of microfinance institutions is not participating. It is necessary to ensure that every institution extending microcredit provides information on all its credit clients on a regular basis to the CIB. A national identity system already exists in Pakistan which helps reduce problems associated with the identification of clients. However, appropriate incentives should be created for all microfinance providers in order to participate in the CIB. The CIB should collect data from both regulated and unregulated microfinance providers.

It has been noted from past experience that when MFIs compete with each other for customers, over-indebtedness and default rise sharply unless the MFIs have access to a common database that captures relevant aspects of their client's borrowing behaviour. Credit reference services offer important benefits for both the financial service providers and customers. By collecting information on the client's status and history, the database will allow lenders to lower their risks and allow borrowers to use their good repayment records with one institution to get access to new credit. Credit information services however raise privacy issues and efforts should

be undertaken to protect fairness and privacy. In the loan contract for instance, there could be a borrower's authorization to the lender to share information on credit performance with other lenders. The MF-CIB should have a database of information about customers including demographics, payment patterns of various types of credit obligations and records of bad debt. Lenders would use this data to screen and evaluate clients to whom they are considering extending credit.

A credit bureau, designed to be able to collect information correctly, comprehensively and in a timely fashion across all sector participants would be a significant step forward in avoiding over lending through multiple loans, if transaction costs can be controlled. A key area for consideration is either improving the effectiveness of an existing credit bureau and expanding nationwide, or building a new one under PPAF after having learned lessons from a pilot initiative.

Development of mobile phone based financial services

There has been an explosion of mobile telephone ownership in Pakistan. Mobile phone based ICT applications can be used in a number of situations, including mobile monitoring, community development, literacy, agriculture extension, agriculture value chain information and access and anti-corruption. Electronic banking is one of the most important opportunities offered on the market. Although the rural population in Pakistan has become increasingly well connected via mobile, they remain much less well connected financially. Most rural households lack access to reliable and affordable finance for agriculture and other livelihood activities. Many small farmers live in remote areas where retail banking is limited and production risks are high. Rural and agricultural finance innovations therefore have significant potential to improve the livelihoods and food security of the rural poor.

Branchless banking is rapidly changing the access to finance landscape. In Pakistan, cell phone based, or m-banking, services have been available for several years. Mobilink has partnered with the post office chain and been in the market for almost a year. However, most branchless banking initiatives are focused on payment services which reduce time, cost and risk of loss associated with moving money over distance, e.g. remittances to families in rural areas or bill payments. These are directed primarily towards middle class users who already hold bank accounts. On the other

hand, low income consumers who do not possess bank accounts are concerned both with moving money over distance, and putting aside money now to use later, or borrowing now and repaying later.

Until now, m-banking has primarily been developed by commercial companies, typically by mobile phone service providers and banks. Yet m-banking service could offer easy access to cost efficient banking services which would appeal especially to the lower income clients and in doing so play a central role in extending formal banking services to the poor who do not hold bank accounts. Experience in East Africa has shown the enormous potential of such services, in which every village in rural areas is served by one or more agents providing both telecommunications and financial services.

A key factor in determining appropriateness and relevance of mobile phone based ICT applications is the extent to which they offer three distinct advantages:

- Lowering the cost of existing services;
- Improving accessibility, timeliness and quality of existing services; and
- Offering innovative new services.

Innovations like branchless banking and mobile banking are providing ways to bring savings to the doorsteps of the rural poor quickly, at low cost and on a very wide scale. Mobile phones can be used to reach many more customers at a lower cost than any existing delivery channel. However, despite this potential, there is not yet an existing m-banking service that MFIs can leverage. M-banking to-date has largely been driven by MNOs and banks.

MFIs have not generally played a significant role in the implementation of m-banking services. Most m-banking deployments provide transfers and payments while MFIs are primarily focused on credit and savings. MFIs could use an m-banking network for loan disbursements, repayments and deposits. However, any m-banking implementation must have a critical mass of agents to attract enough new customers for the business model to be viable.

The traditional need for frequent and direct contact with customers has made rural finance expensive. Costs could be significantly reduced, if loan disbursements and repayments, as well as

monitoring were to be carried out by both the MFI and the customer via a mobile phone already held by the customer. Problem clients could be identified rapidly, and the benefits would be passed on to the customers. It should be noted, however, that the degree of cost savings will depend on factors such as lending methodology and the relative cost of technology. Furthermore, bundling financial services with non-financial services such as marketing and extension services offers new opportunities for small farmers to increase their productivity and incomes. Information technology can also be used to connect them along the supply chain to farmers.

In order to promote the use of branchless banking by rural finance institutions, efficient handling and management of large operations, good network management and the use of technology are fundamental requirements. Although MFBs need to improve and develop management capacity to manage IT applications it is clear that individual institutions generally lack the capacity to develop such systems both on their own and in collaboration with established telecom providers.

There is therefore a strong justification for the development of a common platform which could be used by various rural types of finance institutions, both in microfinance and for low-end commercial banking operations. This network could be linked with the credit bureau proposed above, and benefit from easily accessible links to other forms of rural and agricultural information in such areas as input and output prices, weather forecasts and flood warnings. The network would have to be built upon a partnership with an existing telecommunications provider. This could be a viable and simple option as it would offer the telecommunications company the potential for a major increase in its rural client base.

Establishment of grain handling and storage facilities for wheat and security of warehouse receipts

The growth of staple food markets is key to stimulating agricultural production, broad based income expansion and poverty reduction. Farmers of all sizes grow wheat across the country, as wheat is the major staple food. The wheat distribution system is dominated and influenced by government procurement and price announcements every year. The two major buyers of wheat are private Arthis (traders) and the state-owned Pakistan Agricultural Storage and

Supplies Corporation (PASSCO) which procures wheat directly from the farmers. Wheat flour millers cannot procure the bulk of wheat directly. PASSCO provides farmers with bags based on the area they have under wheat. After procurement of wheat in April/May, the government stores the wheat in godowns or ganjis from May to September. Godowns may be either government owned or rented from the private sector. The Government starts releasing wheat to flour mills in the first week of October and this process goes on until the next harvest in April/May. Flour millers are the major wheat processors and almost sole buyers for government procured wheat. Currently, almost all the wheat is being procured, marketed and stored in bags.

All major crops, namely rice, wheat, maize and sugar cane are purchased ultimately by millers or processors. Traders exist in every district to buy on behalf of millers. Storage is carried out mainly by the millers themselves or in private godowns. There are no independent storage companies in Pakistan providing storage as a service. PASSCO and the provincial governments hold stocks (mainly wheat) in their own structures. Grain storage capacities are well below national requirements, with PASSCO facing an acute shortage of storage capacity. Although some storage capacity exists in the private sector, it is limited and in most cases inappropriate.

The cost of wheat storage and handling in Pakistan is 250 percent higher than the international benchmark, according to a recent IFC report. Apart from high financing costs due to prevailing interest rates, the second biggest cost is wastage through loss in storage. It is estimated that around two million tons of wheat are lost every year due to bad handling. Value losses in the wheat storage and handling system are due to inefficient grain handling mechanisms and transportation systems, improper or lack of suitable storage facilities and quality deterioration of wheat in the existing system. Costs associated with the use of bags include handling costs, storage losses and bag losses. These could be substantially reduced through the use of a bulk handling system.

In order to substantially reduce financial losses in the existing wheat storage and handling system, the World Bank may consider financing the expansion of grain handling and storage facilities for wheat. Improved facilities would reduce quality losses in wheat and save on handling and storage costs currently borne by the Government

of Pakistan. These would also help reduce financial losses in grain storage and handling. However, in addition to establishing grain handling and storage facilities, there is a need to strengthen market infrastructure, including market information systems, commodity exchanges and alternative finance such as warehouse receipt systems.

The lack of access to credit in the post-harvest period is a critical constraint for many farmers. Warehouse receipts can provide an important and effective tool for creating liquidity and easing access to credit, even if not directly used by farmers themselves. Such schemes also offer additional benefits such as smoothing the supply and prices in the market, improving grower incomes, and reducing food losses. A recent study carried out by USAID[43] describes the steps of interaction involved in a warehouse receipt system, sets out the essential questions to be asked regarding critical conditions for its success and illustrates the roles of those responsible for setting up and running such a system.

The warehouse receipts system, also known as inventory credits, can facilitate credit for inventory or products held in storage. These receipts (when backed by legal provisions that guarantee quality) provide a secure system whereby stored agricultural commodities can serve as collateral and be sold, traded or used for delivery against financial instruments including future contracts. These receipts are documents registering ownership of a specific quantity of products with details of characteristics and warehouse storage details.

This warehouse receipt system offers a range of important benefits, including:

- Mobilizing credit for agriculture by creating secure collateral for the farmer, processor, and trader;
- Smoothing market prices by facilitating sales throughout the year rather than just after harvests;
- Reducing risks in the agricultural markets, improving food security and credit access in rural areas;
- Increasing the market power of smallholders by enabling them to choose at what point in the price cycle to sell their crops;

43 Agricultural Commodities Physical Trade and Market Development in Pakistan. 2011, USAID.

- Helping upgrade the standards and transparency of the storage industry since the system requires regulation and inspection;
- Helping create commodity markets which enhance competition, market information and international trade;
- Providing a way to gradually reduce the role of government in agricultural commercialization;
- Contributing to lower post-harvest losses due to better storage conditions (i.e. induce farmers to store in the most appropriate warehouses);
- Lowering transaction costs by guaranteeing quantity and quality; and
- Increasing quality awareness (assuring the quality deposited is the same as the quality withdrawn).

Pre-conditions for the success of a warehouse receipt system include:

- A viable storage industry;
- The presence of agricultural price fluctuations during the year;
- The availability of market information;
- An appropriate legal environment (ideally receipts should be freely transferable by delivery and endorsement);
- An adequate licensing and monitoring system to ensure that warehouses are financially viable and administratively reliable as well as able to meet market determined quality standards during storage;
- Bank trust in the system, particularly the enforceability of the receipts in case of default.

A legal and regulatory environment is crucial for the development of warehouse receipts. The Government must provide an appropriate legal environment with respect to ownership rights, bankruptcy and transferability of title documents. Warehouse receipts can function as collateral if they are transferable and are functionally equivalent to cash.

Since the USAID report was completed, a number of stakeholders, led by the National Commodities Exchange Ltd. (NCEL), have made considerable progress in obtaining commitments from banks and an international collateral management company to participate as equity partners. It is expected that the National Collateral Management Company, recommended in the USAID report, may be established by June to carry out the programme as a purely private sector initiative.

It is suggested that the Government of Pakistan and the World Bank actively consider supporting these efforts drawing upon the Bank's experience in other countries.

Partial guarantees for financing by commercial banks to microfinance institutions

Although it would appear that there is sufficient capital available within the financial sector to fund investments in the rural sector, commercial banks are generally reluctant to lend to rural finance institutions. First, because such institutions are often not financially sustainable and thus present unacceptably high credit risks. Second, banks have lower risk alternatives, such as treasury bills. In order to increase the sustainable flow of credit in the rural sector, the key bottleneck of commercial bank risk in rural financing will need to be addressed.

A pilot initiative is therefore recommended to test and demonstrate an effective method to leverage private sector funding to enhance agriculture sector's contribution to Pakistan's economy. The proposed Risk Sharing Facility (RSF) will partially guarantee a portfolio of newly originated loans to qualified rural finance institutions. The provision of risk sharing facilities would serve both as a risk mitigation tool and as an incentive to get banks involved in lending to the agricultural sector.

The RSF would partially guarantee a portfolio of newly originated loans to the agricultural sector. Under the proposed structure, IDA funds may provide first loss coverage (i.e. 5-10 percent of total portfolio amount) while IFC funds will provide second loss coverage (40-45 percent of total portfolio amounts).

IFC and IDA have collaborated on a number of RSF programmes elsewhere. RSFs have been set up between IDA, IFC and governments, using IDA credits. Well designed RSFs can accomplish important public policy objectives of the financial sector by improving and developing the rural finance sector.

The overall objective of such a scheme would be to enhance access of the rural poor to financial services. The approach would be to test and demonstrate the various types of financing mechanisms that can be targeted at qualifying MFIs and MFBs. This would also apply to

List of microfinance banks

Licensed MFBs in Pakistan

No.	MFBs	Year	Status	Key sponsors
1.	Khushhali Bank Ltd.	2000	Countrywide	Commercial Banks
2.	The First Microfinance Bank	2001	Countrywide	AKAM, & IFC
3.	Rozgar Microfinance Bank	2004	Districtwide	Arif Habib Group
4.	Network Microfinance Bank	2004	Districtwide	JS & KASB Group
5.	Tameer Microfinance Bank	2005	Countrywide	EMCL & IFC
6.	Pak Oman Microfinance Bank	2006	Countrywide	Pak Oman Investment
7.	Kashf Microfinance Bank	2008	Countrywide	Kashf Holding
8.	NRSP Microfinance Bank	2009	Countrywide	NRSP

Performance indicators of microfinance banks in Pakistan, as of end December 2010

MFBs	Branches	Borrowers	Advances (PKR 000)	Deposits (PKR 000)	Depositors
KBL	109	338 068	3 913 377	1 182 701	218 507
FMFB	83	167 193	2 554 827	5 351 541	227046
Tameer	40	111 153	3 045 536	2 939 665	228 634
Pak Oman	14	7 045	84 348	27 724	17 082
Rozgar	4	14	731	24 000	5 379
Network	5	5 734	61 557	29 005	15 216
Kashf	30	17 415	454 130	776 401	89 027
Total	285	646 622	10 114 506	10 331 037	800 891

Assets (PKR 000)	Borrowing (PKR 000)	Equity (PKR 000)	NPL (%)
7 547 877	2 082 984	146 013	3.73
6,353,984	749,884	133,479	5.22
5 297 147	1345349	14 613	0.48
727 558	681 649	7 754	9.19
122 657	95 824	365	49.93
255 141	223 614	32 231	52.36
1 227 596	400 855	14 957	3.29
21 531 960	5 580 159	349 412	3.24

Microfinance industry indicators

Indicators	Dec-07		
	MFBs	MFIs	Total
Number of MFPs	6	24	30
Number of branches	232	870	1 102
Total no. of borrowers	435 407	831 775	1 267182
Gross loan portfolio (KPR. In '000)	4 456 259	8 293 724	12 749 983
Average loan size (KPR)	10 235	9 971	10 062
Total Nno. of depositors	146 258	-	146 258
Deposits (Rs. In '000)	2 822845	-	2 822845

Indicators	Dec-09		
	MFBs	MFIs	Total
Number of MFPs	8	21	29
Number of branches	284	1,159	1 443
Total no. of borrowers	703 044	1 123 001	1 826 045
Gross loan portfolio (KPR. In '000)	9 004 000	12 719 000	21 723 000
Average loan size (KPR)	13 576	11 326	12 131
Total no. of depositors	459 024	-	459 024
Deposits (Rs. In '000)	7 099 206	-	7 099 206

Source: Pakistan Microfinance Network

Dec-08		
MFBs	MFIs	Total
7	20	27
271	1 186	1 457
542 641	1 190 238	1 732 879
6 461 462	11 952 000	18 413 462
11 907	14 940	10 626
254 381	-	254 381
4 115 667	-	4 115 667

Sep-2010		
MFBs	MFIs	Total
8	23	31
289	1 309	1 598
694 249	1 378 062	2 072 311
10 789 543	15 584 457	26 374 000
14 524	12 429	12 727
724 647	-	724 647
8 328 789	-	8 328 789

those institutions that are financially sustainable or are close enough to sustainability to be attractive for commercial investment and interested in working in the rural sector. It is suggested to work with a core group of interested commercial banks and a core group of MFIs and MFBs interested in and capable of rapidly expanding their rural finance operations. This would demonstrate that MFIs could represent a financially sound and profitable business for banks, with considerably lower risk than currently perceived. It is essential for the banks to become 'comfortable' with such institutions, understand them and be able to work with them so that they can address areas of institutional weakness.

The provision of support under an RSF would be contingent on the recipient MFI or MFB entering into an agreement with a commercial bank. The agreement would specify that financing would be made available once the MFI/MFB fulfilled conditions agreed upon by both parties. This would entail reaching operational and financial sustainability or a sufficiently sound financial position to attract commercial financing. The expected outcome is to enable MFIs to operate increasingly as sustainable organizations and help them expand the scope of their rural finance operations on a sustainable basis.

It is envisaged that over a period of time, the MFIs and MFBs would have established stable and regular working relationships with commercial banks and/or other commercial financial partners and thus the demand for the guarantees would progressively reduce for a particular organization.

APPENDIX

Recommended action plan for reforming the extension services in selected districts[1]

Two to three *tehsils* in two or three irrigated districts with high agriculture, horticulture or livestock potential should be selected as a pilot. Preferably this should be in Punjab and Sindh provinces and their extension services fully reformed to serve the extension and training needs of producers. If the new system works more efficiently than the present traditional extension services, it should be expanded to other parts of the country. The following actions will be required to set up the new extension system:

Extension related situation assessment

A rapid assessment of the extension related situation will be done, preferably through contract to a reputable, experienced firm in the selected *tehsils*. It should be done through secondary sources and interviews of relevant officials and a mixed sample of farmers to find out the following information:

- List of villages with individual farming population in each selected *tehsil*;
- Most dominant agricultural activities in selected *tehsils* (crops, fruits, vegetables, livestock, aquaculture, etc.);
- Infrastructure and topography in most villages in each selected *tehsil* (roads; bridges; electricity; communication channels and media including land phone, cell phone, television, radio, internet access, etc.; public and private transportation means such as bus, car, truck, train, bullock cart, etc.; access to the nearest major city; hilly or flat terrain, etc.);

1 This Action Plan was prepared by M. Kalim Qamar, keeping in view the Pakistan context. For further reading on agricultural extension reform, two useful publications are: M. Kalim Qamar (2005). Modernizing National Agricultural Extension Systems: A Practical Guide for Policy-Makers of Developing Countries. Rome: FAO; and Burt E. Swanson and Riikka Rajalahti (2010). Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems. Washington, DC: World Bank.

- Type of farmers/producers in each selected *tehsil* (major crops, vegetables, fruits, livestock, etc.; gender; number of male and female family members helping the head of household in farming; membership of any organization; land holding size; type of farm soil such as sandy, loam, stony, water-logged, saline, etc.; livestock, both small and large animals including poultry; level of farm mechanization for agricultural, livestock and irrigation purposes; farm labour used; literacy level; use of mass media such as television, radio and newspaper; access to the internet; source of farm credit; transportation used for marketing of produce at specific locations; major constraints faced in enhancing production; main sources and channels used for obtaining information and extension advice and the level of satisfaction with them; opinion about the extension advice received from private companies or NGOs; farmers' suggestions regarding improving the farming situation, etc.);
- Extension, training and farm input needs of producers in priority order (precise technical advice and capacity-building needed; farm inputs needed such as seed, fertilizers, pesticides, herbicides, mulch, farmyard manure, farm machinery, animal feed, irrigation equipment, etc.);
- List of government institutions, research institutes and experimental stations, NGOs, private companies, colleges, schools, training centres, hospitals, banks, post offices, police stations, producer organizations, agro-processing and industrial plants, mosques, and other institutions present in or around the villages of the selected *tehsils*;
- Profiles of government funded and donor financed projects or programmes, presently covering the selected *tehsils* (indicating objective, outputs, activities, budget, funding source, technical emphasis, target population group, human resources, physical facilities, etc.);
- Profiles of government, private and civil society institutions presently engaged in providing agricultural extension or advisory services and farm inputs to farmers (indicating mandate, technical staff, funding sources, physical facilities, specific geographical area covered, specific target beneficiary group, etc.).

Organization of farmers' groups

Farmers' groups, either mixed gender or exclusively for men or women, will be needed to prepare village-level demand-for-

services plans. If formal or informal groups of farmers already exist in the selected *tehsils* an assessment needs to be made to see if they are active or weak; in the latter case, they will need to be strengthened. In villages which have a substantial number of farmers but do not yet have farmers' groups, such groups will have to be organized by the extension staff.

Type and number of extension staff needed

The technical specializations of extension subject-matter specialists (SMS) needed for the selected *tehsils* will be determined on the basis of dominant agricultural activities and their intensity in the *tehsils*. For example, if any *tehsil* has a large number of livestock, a livestock specialist will be needed on the extension team. Similarly, if a *tehsil* has abundance of mango growers, a fruit specialist will be a part of the extension team. Certain specializations such as on-farm water management and plant protection are essential for all farmers and need to be present on the extension teams in all *tehsils*.

It will make a big positive difference if the extension staff in selected *tehsils* comprises experienced men and women agriculture graduates, supported by Field Assistants. Special efforts should be made to recruit qualified women at all levels. The number of extension staff needed in each selected *tehsil* will be determined on the basis of the following factors:

- Number of farmers and their geographical spread (the smaller the area the farm families are residing in, the fewer extension staff needed);
- Type and intensity of agricultural and livestock operations (the greater the intensity the higher the number of staff needed);
- Physical terrain and infrastructure (the more difficult the terrain and the poorer the infrastructure the higher the number of staff needed);
- Transportation means for the staff to travel (the more adequate the transportation facilities the fewer staff needed);
- Existence of appropriate communication services and means such as cell phones, television, radio and internet-based communication networks, to reach the farmers personally and/or virtually (the better the communication means the fewer staff needed);

- Existence of well organized groups of producers (the higher the number of groups the lower the number of staff needed).

Subject matter specialists (SMS)

In extension work, SMS means a person who is a specialist in a technical discipline by virtue of his/her high academic qualifications, substantial field experience as well as substantial knowledge of extension philosophy and operations. No extension organization can be efficient and effective without SMS. In Pakistan, devolution has placed several technical line departments under the district administration, which has technical officers in various disciplines. A unified extension service has its own SMS and does not depend on other sources. In Pakistan, however, many line departments are engaged in extension activities without much coordination with one another. Some of the departments do not even have a sufficient number of field staff. In this situation, coordination, joint programme planning, and interactive communication networks, become of great importance for sharing technical expertise in order to give maximum benefit to farmers.

For an extension organization, two big sources of SMS in the country are federal and provincial agricultural research institutes and agricultural universities. In addition, an extension organization should make use of SMS based at various line departments and agricultural training institutions. If specific technical expertise is not available from these public sources, the extension organization should approach private companies and civil society institutions which of course will be at a cost to the organization.

The government may consider the following strategy to make SMS available to the extension organization. Researchers based at research institutes may be seconded as SMS to the extension organization for a period of two to three years. During this period they will work under the extension administration but under the technical supervision of their respective research institutes. Maintaining links with their parent institutes, they will spend about 30 percent of their time on research projects and 70 percent of the time on extension activities. They should be given financial incentives such as a field allowance while based in the field alongside extension staff. At the end of their tenure, they can return to their institutes

without having their seniority and promotion chances affected. Other researchers should take their place to work as SMS with the extension organization. This arrangement will not only enrich the researchers professionally as they will be working directly with farmers, but they will also benefit their colleagues at the research institutes by sharing their field experiences and achievements.

Institutional mechanism

New role of provincial extension offices

The general feeling among extension staff in Pakistan is that after the devolution of extension functions to the district governments, the provincial extension offices (or directorate general) have lost their traditional authority and importance. This is not true because the role of provincial extension offices in the devolved extension system has not diminished but simply changed.

In each province, where districts and *tehsils* within them are selected for introducing the new extension system, the provincial extension offices, in collaboration with relevant provincial offices such as those for on-farm water management, livestock and dairy development, irrigation, etc., should perform the following functions:

- Provision of policy guidance to district governments within the context of the national policy on rural and agricultural development;
- Coordination of inter-district extension activities;
- Inter-district extension staff development through organization of short training programmes, seminars and conferences;
- Keeping track of overseas training opportunities and assisting the extension staff in availing them;
- Inter-district training programmes for farmers;
- Organization of interprovincial events of extension interest such as visits to progressive farmers, agricultural and livestock industries, agricultural and cattle fairs, etc.;
- Publishing of district-specific extension materials for use by district extension offices;
- Preparation of a variety of audiovisual aids to be used by the field staff;
- Organization of interdistrict knowledge competitions for farmers;
- Organization of pre-growing season meetings to be attended by all district extension staff;

- Conducting studies on the evaluation and socio-economic impact assessment of extension programmes;
- Facilitating the establishment of linkages and partnerships between extension and relevant public and private institutions;
- Backstopping and general supervision of extension programmes in the districts to ensure quality;
- Guidance and support to districts in emergencies;
- Maintenance of a database on provincial extension activities including agricultural statistics including farmers, farms, farm inputs, livestock, etc., covering all districts in the province;
- Provision of advice on extension related matters to provincial and national policy-makers;
- Establishment of facilities for farmers such as laboratories for testing soil, water, plant and seed, animal vaccine production, etc.;
- Performance of other functions as needed in the capacity of lead provincial body for extension.

Creation of Coordination Committees

Extension Coordination Committees will be created at district, *tehsil* and Union Council levels in selected districts. They will comprise representatives of public and non-public stakeholders including farmers. These committees will have the following functions:

- Union Council Extension Coordination Committee: (a) to review "village level demand-for-services plans" coming from FOs which are, obviously expected to be a relatively large number depending on the number of villages in that union council; (b) to merge the village level plans into a manageable, smaller number of "union council level demand-for-services plans" based on priority and common demands of most of the FOs; (c) to send the union council level plans with their observations and recommendations to the *tehsil* level Extension Coordination Committees; (d) to participate in the monitoring and later socio-economic impact assessment of the services delivered to farmers by various public and non-public service providers; (e) to address farmer grievances of services received; (f) to maintain records of extension activities;
- *Tehsil* Extension Coordination Committee: (a) to review "Union Council level demand-for-services plans"; (b) to merge the union council level plans into a manageable, smaller number of

"*tehsil* level demand-for-services plans" based on priority and common demands of most of the union councils; (c) to send the *tehsil* level plans with their observations and recommendations to the District level Extension Coordination Committees; (d) to participate in the monitoring and later socio-economic impact assessment of the services delivered to farmers by various public and non-public service-providers; (e) to maintain records of extension activities;

- District Extension Coordination Committee: (a) to review "*tehsil* level demand-for-services plans"; (b) to merge the *tehsil* level plans into a manageable, smaller number of "District demand-for-services plans" based on priority and common demands of most of the *tehsils*; (c) to approve the district demand-for-services plans keeping in view the overall development priorities of the district government; (d) to prepare extension services delivery plans in consultation with various public and private service providers and representatives of farmers and of Union Council Extension Coordination Committee and *Tehsil* Extension Coordination Committee; (e) if the government wants to exercise outsourcing modality, to sign outsourcing contracts with various service providers to deliver extension services in line with the district demand-for-services plan, otherwise just coordinate with the service providers to avoid duplication of services and conflict in extension advice; (f) to maintain records of extension activities.

Establishment of institutional linkages

Functional linkages should be established between extension offices and other institutions along the value chain. Institutions may include offices of line departments, agricultural research institutes, agricultural colleges, agricultural universities and agricultural training institutes, farm input supply companies, marketing companies, agroprocessing companies, farmers associations, relevant NGOs and civil society institutions, etc. Functional linkages could involve joint programmes, exchange of expertise, invitations to attend events of mutual interest, development of common response to emergencies, etc. Establishment of interactive, internet based communication networks to link the various stakeholders can facilitate linkages and improve collaboration. Similar networks, such as the Virtual Extension Research and Communication Network (VERCON) developed by FAO, and others, have been successfully implemented in various countries.

Wider technical mandate. Revision of the present technical mandate of extension organization to include subjects beyond transfer of agricultural production technology, such as natural resources management, disaster preparedness, marketing, household food security, value chain, rural women and youth development, rural leadership, group dynamics, preparation of mixed farming management plans, book-keeping, etc.

Redefinition of staff roles. Modification of existing roles of relevant extension staff and other officials and the preparation of new job descriptions in line with the new extension system making sure that no non-extension tasks are included.

Upgrading extension offices and operations. Upgrade physical facilities of the offices in terms of maintenance of buildings; furnishings; equipping offices with computers with access to the internet; audiovisual aids like PowerPoint projectors; generators; farm machinery; materials for demonstrations; communication equipment such as office and cell phones; provision of transport (cars, motorcycles, mini-buses, pick-up trucks) and other articles as needed. Provide extension tool kits containing materials and tools such as soil pH meters, flip-charts, etc. that field extension workers should carry with them.

Strategy for services delivery. A practical strategy for the new extension organization in selected *tehsils* should be drawn upon the basis of lessons learned from the ways the private sector provides extension support, and which has gained popularity among farmers for good reasons. While extension is not the main mandate of private companies, they use extension support as a "tool" to achieve their own specific objectives. The following two types of companies provide extension support:

- Companies which are looking for quality produce for the purpose of value-addition through agroprocessing and usually enter into contracts with farmers so that they will follow their extension advice to ensure good quality produce. Examples of such produce are corn, tobacco, sugarcane, mangoes and milk;
- Companies which want to promote the sales of their products such as chemical fertilizers, pesticides, herbicides, animal feed, improved seed, veterinary medicines, irrigation equipment, and farm machinery. They provide extension advice on how to use

these products and equipment in terms of quality or dosage, application methodology and operation so that the sales of their products improve.

Extension support provided by the private sector has become popular among Pakistani farmers for the following reasons:

- The extension advice is provided at no cost to farmers;
- The extension support enables farmers to purchase fertilizers, pesticides and herbicides at their doorsteps while it is often difficult to find these products on the open market;
- The extension support involves farm visits by the extension staff on a regular basis;
- The farmers have a guaranteed market to sell their produce at satisfactory prices, something which is a big challenge for farmers when looking for markets in the absence of proper guidance and information.

Keeping the above analysis in mind, extension service delivery under the new strategy to be implemented in each selected *tehsil* will involve the following:

- Each extension officer, supported by SMS, will be assigned a specific area of responsibility to cover a certain number of farmers. The farmers may want to sign an agreement with the extension officer/facilitator that any agreed protocols will be followed. Soil samples of individual farms may also be analysed to find out deficient nutrients and determine the best combination of fertilizers to be applied. Similarly, arrangements may be made for cementing on-farm water channels and for precision laser leveling of the farms to avoid water wastage and to get maximum crop per drop of water. Such actions proved to be extremely effective under an FAO project on food security implemented in Sargodha, Punjab several years ago. The production of wheat was increased threefold and based on the project's achievements the government launched the Crop Maximization Project (CMP) in hundreds of villages with its own resources.[2] The CMP is still active;

2 The CMP, however, did not achieve results as good as the FAO project because of its unsatisfactory design.

- Agreements on service delivery, to ensure coordination and quality control and to avoid duplication and conflict in advice. These will be needed between the district governments and private service providers who are presently running their individual extension services in the selected *tehsils* or who are interested, able and willing to provide services through outsourcing. This will be subject to the government's willingness and ability;
- The delivery of technical advice and services will be based on the demand-for-services plans to be prepared by farmers groups;
- While necessary institutional linkages will be established with the extension organization, it will not be enough. It is imperative that the government enter into agreements aimed at forging partnerships with the private sector for guaranteed and timely provision of farm inputs, equipment, machinery and animal feed to the farmers at reasonable rates as presently done by private companies and farmers under contract;
- At the end of each season, farmers who received extension services based on their request will assess, with the assistance of extension and subject matter specialists, the quality and timely delivery of services by the various service providers. They will also participate in socio-economic impact surveys for those services.

Use of innovative communication methods and tools to support extension. Communication strategies and programmes should be prepared in support of the demand based delivery of extension services. These will use multimedia and ICTs such as radio, television, cell phones, printed material, and internet based communication networks, etc. District extension offices should be connected to a specialized interactive communication network that provides access to key information and knowledge sources and databases, and facilitates their linkages and interaction with all stakeholders. Staff members should be trained in communication for development methods and approaches, as well as in basic computer skills and accessing the Internet. Progressive and commercial farmers who are computer literate should be encouraged to participate in the network.

Establishment of extension database. A comprehensive database containing extension related information should be established, gradually developed and periodically updated. The database should contain information such as technical messages; event announcements; profiles of public and private extension service

providers; a list of SMS with contact information; marketing information including prices of various commodities; weather patterns; soil and water analysis services; information on farm machinery dealers and prices of popular machinery and irrigation equipment; livestock markets prices and markers; veterinary services; aquaculture guidance contacts, etc. All public and non-public stakeholders should have access to the topics relevant to their needs, but not general access to the entire database. Such a database would be linked to and feed into the above-mentioned communication network.

Capacity-building of various extension actors. Groups of stakeholders, and possibly some other parties, will need capacity building in specific subjects indicated in each selected district. Training modules on various aspects of demand-driven extension were produced under an FAO project implemented a few years ago in Azad Jammu and Kashmir. They can be updated and adapted as needed to be used for capacity building purposes. Additional materials can be prepared as needed.

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