REPORT NO. R-25

ORGANIZING WATER USERS FOR DISTRIBUTARY MANAGEMENT

PRELIMINARY RESULTS FROM A PILOT STUDY IN THE HAKRA 4-R DISTRIBUTARY OF THE EASTERN SADIQIA CANAL SYSTEM OF PAKISTAN'S PUNJAB PROVINCE

ACTION RESEARCH PROJECT ON MANAGING IRRIGATION FOR ENVIRONMENTALLY SUSTAINABLE AGRICULTURE IN PAKISTAN
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INTERIM REPORT

OF THE WATER USERS ORGANIZATIONS SUB-COMPONENT

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FOREWORD

For the past three years, the top research priority in the Pakistan National Program of IIMI has been "learning how to organize farmers at the secondary canal level". This effort has been particularly difficult because there are no distributary command areas in Pakistan where a Water Users Federation has been established and made functional so that farmers could visit and learn from the experience of organized farmers.

During December 1996, IIMI staff working in the Province of Sindh completed the establishment of a Water Users Federation on each of three pilot distributaries within the Left Bank Outfall Drain Stage-I Project area. Then, on 5 March 1997, the 25 members of the Water Users Federation for Hakra 4-R Distributary in Southeastern Punjab Province selected their leaders. This was a momentous occasion!

A field station was established at each of the pilot distributaries; the sincere efforts and long hours displayed by the IIMI field staff is greatly appreciated. The IIMI program leaders in both the Punjab and Sindh provinces are highly commended for their continued redirection as new obstacles occurred.

There has been extreme skepticism about being able to organize farmers at the distributary level because of the lack of success in organizing Water Users Associations at the tertiary watercourse level over the past twenty years. But, we have learned during these exercises that farmers want to be organized. Unfortunately, they are "at risk". At this time, they lack appropriate legal authority in terms of managing their portion of the system, a joint management agreement with the Provincial Irrigation Department, and the sharing of the irrigated crop land taxes (abiyana). Without these legal authorities, farmers are fearful of reprisals by Irrigation Department field staff.

All of us have the greatest respect for the thousands of farmers making their livelihoods from the irrigated croplands commanded by these four pilot distributaries. They have placed themselves at risk, but at the same time, they are the innovators who are leading a more farmer-oriented approach to irrigation management.

We have been asked many times -- why has the Pakistan National Program of IIMI attached so much importance to this particular research effort? The answer is quite simple. Agricultural productivity in the Indus Basin Irrigation System has become stagnant. There are a multitude of causes for this situation, but we cannot perceive being

able to progress further unless farmers play a much greater role. Thus, failure in being able to organize farmers at the distributary level would imply that the agricultural system would remain "stuck". Then, the long-term prognosis would be that many more millions of people would live in poverty, even during the near future.

We recognize that organizing farmers is only a beginning. There is a long journey ahead in making these organizations sustainable. Together with our national partners in the provincial agriculture and irrigation departments, we need to forge stronger supportive mechanisms that will allow these farmer organizations to flourish.

One thing is certain -- we cannot afford to fail!

Gaylord V. Skogerboe
Director, Pakistan National Program
International Irrigation Management Institute

ACKNOWLEDGEMENTS

These action research field activities were part of IIMI's study, "Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan", funded by the Royal Netherlands Government. The authors gratefully acknowledge the support given by the donors.

The authors are also indebted to Mr. Mushtaq Ahmad Gill, Director General Agriculture (Water Management) and Ch. Muhammad Ashraf, Director (Headquarters) of the Punjab OFWM Directorate, Lahore, and their staff located in Bahawalnagar, all of whom provided valuable assistance to the authors during all stages of this action research.

Mr. Mohammad Shafi, Chief Engineer Irrigation, Bahawalpur Zone, and his staff in the project area were all helpful in providing project-related information to our field team. They also persistently drew our attention to the prevailing social and institutional constraints on organizing water users, and made us pursue a determined effort in helping the water users of the Hakra 4-R Distributary command area to form a water users federation. The authors appreciate their assistance.

This research report is based on over two years' of initial field work undertaken in the Hakra 4-R Distributary command area by IIMI's Social Organization Field Team (aptly referred to as ***SOFTware***), located at Haroonabad. The SOFTware, which contributed to this report, included Mehmood Ul Hassan and Waheed-uz-Zaman as team leaders during two different periods, and Muhammad Ishaq (late), Abdul Hameed, Mohammad Amjad, Nasir Sultan, Bilal Asghar and Khalid Rasheed as members. The authors appreciate the hard work accomplished by all of the SOFTware members, and particularly wish to honor the services rendered by Muhammad Ishaq, Field Assistant, who unfortunately met with his tragic death in a road accident on 20 December 1995, while on his way to perform the routine field activities.

The authors wish to gratefully acknowledge the encouragement they received from Professor Gaylord V. Skogerboe, the Director of IIMI's Pakistan National Program and the Project Leader for this action research activity, for preparing this report. Many discussions were held with him on the four-phase process developed for this activity, which helped greatly in clarifying the issues involved in the linkage between social organization and technical information aspects. His persistent inquiries about the initial stages of this action research led to the idea of presenting this interim report focusing on the first two phases of the process.

The authors also acknowledge the valuable secretarial services provided by Mr. Manzoor Hussain and Mr. Mohammad Akram Khan of IIMI, Lahore.

ACTION RESEARCH PROJECT ON MANAGING IRRIGATION FOR ENVIRONMENTALLY SUSTAINABLE AGRICULTURE IN PAKISTAN

OVERALL PROJECT ACTIVITY SCHEDULE

Obj	Activity	1994	1995	1996	1997	1998
Ia	Decision Support System - Punjab					
Ia	Decision Support System - Sindh					
Ib	Watercourse Management					
IIa	Water Users Organizations (WUOs)					
IIb	Institutional Support for WUOs					
IIc	Coordinated Irrigation Agriculture Services					
IIIa	Soil Chemistry and Groundwater Management					
IIIb	Rechna Doab Salinity Management					
IIIc	Sindh Waterlogging and Salinity Management					
	Workshops					
	National Conference					
	Final Report					

1. INTRODUCTION

"Without community involvement and participation, development initiatives in either the economic or the social sector have little chance of success at the grass root level. To operationalize this objective a realistic framework is necessary for collaboration between government and community organizations. The community organization does not mean a small group of influential local representatives. Participation means broad-based, decentralized, homogeneous local organizations at the village or at the neighbourhood level with decision making done by all those members of the community. Common economic interest is best served by working together".

Pakistan's Eighth Five Year Plan (1993-98).

This is an **Interim Report**, which is meant to present an analysis of the project's social organization action research activities conducted so far. The report signifies an important land mark of an arduous and eventful social organization effort covering a period of over two years, which was reached on 5 March 1997, when the Hakra 4-R Distributary Water Users Federation was successfully formed.

These action research activities are part of a research project, "**Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan**", the second phase of a research program funded by the Royal Netherlands Government. In April 1993, a Review Mission reporting on the first phase project activities commented that, "whether or not a productive agriculture can be sustained without any further damage to the environment is a subject that requires further monitoring and continued evaluation of the impact of changes". The second phase project activities address this question to identify management interventions, which would not only try to mitigate the environmental problems, but also would yield increased water use efficiency.

The Phase II **Project Document (August 1994: pp. 5-7)** lists a number of short-term and long-term objectives as derived from an overall appreciation of Phase I findings and Phase II intentions. Basically, they aim to bring about institutional and management improvements in the irrigation systems of Pakistan to sustain irrigated agriculture. The broad purpose of the Phase II project remained the same as for Phase I, to develop and implement, through action research, a set of improved management strategies and techniques which can reduce the aggravating effects of irrigation on waterlogging and salinity; to expand the institutional capacity to effectively manage the solutions; and to

maximize the role of farmers and rural communities in irrigation management for increasing agricultural production.

With these broad objectives in view, the project content was broadly classified into three main components: (1) operational management; (2) institutional development; and (3) salinity management. The focus of this Interim Report is on the "water users organizations," which is a sub-component of the "institutional development" component.

The core material for this Interim Report is derived from a process documentation effort by a small field team located at Haroonabad in the pilot project area, which is the Hakra 4-R Distributary command of the Fordwah-Eastern Sadiqia (FES) Canal System in south-eastern Punjab (**Figure 1 and Figure 2**). The study team not only participated in the action research but also carefully observed and documented in detail on a regular basis a learning process of **"how to organize water users"**. Obviously, this approach implied a focused research perspective of assessing whether the effort in organizing water users would be **"done in the right way"**, leaving aside an evaluation of whether organizing water users is **"the right thing to do"** under the given circumstances as a secondary effort. This initial emphasis on the process is inherent in pilot projects. However, the design of this pilot project includes an opportunity towards the end of the project period to evaluate its short-term effects, which will be covered in the project's Final Report.

In summary, what the pilot project has achieved so far is some empirical evidence to prove that the organizing of water users for distributary level operation and maintenance management is socially viable[1]. The path leading to this stage proceeded through difficult terrain. Many obstacles of misinformation, mischievous rumors and slanders, and misconceptions confronted the project. Had there been a more supportive institutional environment, the task would have been much easier. The project's ability to reach this far without much support from government agencies shows that, given the necessary government support, this work is most likely to be replicable on a wider scale.

[1] A list of reports and publications generated so far from the social organization action research activities of the project is given in Annex-1.

Figure 1

IIMI PROJECT SITES IN PAKISTAN

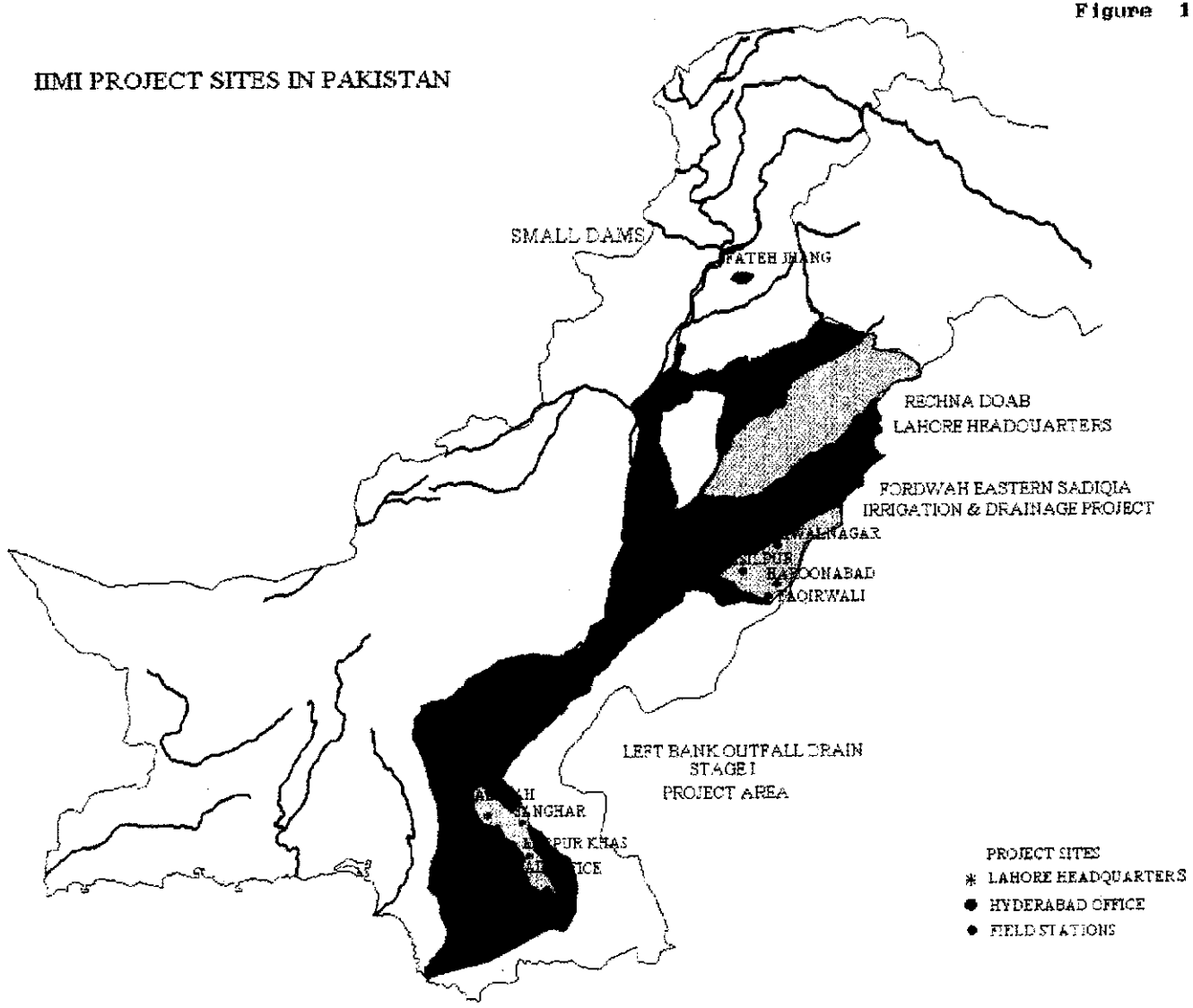
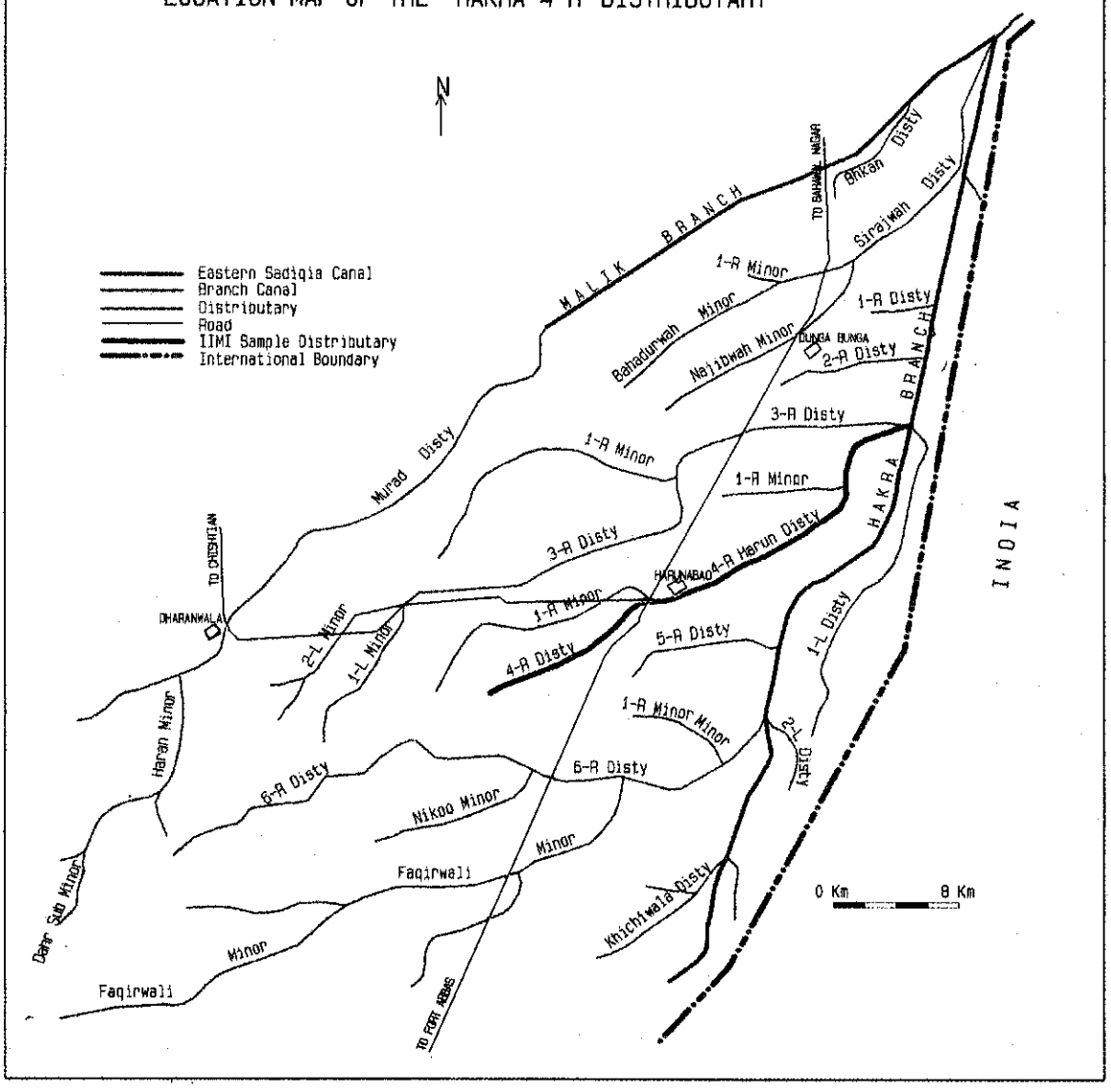


Figure 2

LOCATION MAP OF THE HAKRA 4-R DISTRIBUTARY



2. CONTEXT OF PILOT EFFORTS

2.1 Pakistan's Irrigation

More than a century old, Pakistan's canal irrigation, originally based on the objective of irrigating the maximum area possible with a view to settling the most number of people, is characterized by the following main design features:

* run-of-river water supplies;
* protective irrigation;
* low water allocations of 0.21-0.28 l/s/ha (3-4 cusecs per 1000 acres);
* low cropping intensity (annual average 75%);
* infrastructure design for equity and reliability of supply;
* few gated structures and minimal operational adjustments required; and
* all distributary and minor outlets to draw there design discharge.

As time passed by, many changes occurred in the irrigation scene. Most of the traditional design features became outdated in the context of changed physical and social conditions. The ideas of "protective" irrigation and equitable water distribution embodied in the early design criteria became no longer readily applicable as many environmental conditions changed. Some of the key changes are:

* increase in cropping intensities (over 100% in many systems);
* diversification in cropping patterns;
* increased indiscipline in the operation of the system;
* cumulative effect of poor maintenance;
* advent of groundwater development;
* fragmentation of irrigable land;
* increased seasonal water shortages and fluctuations in water supply; and
* stagnant crop yields.

The physical changes accompanied a corresponding set of social changes. For instance, general deterioration of the physical infrastructure is linked with operational irregularities; the resultant lack of reliability of irrigation water supplies is related to the inequity of water distribution within the system. While the causality between these two sets of changes in physical and social conditions is not clearly discernible, the constant interactions between them seem to have led to the present situation of unsatisfactory

performance. Under-investment, poor maintenance, supply deficiencies, political influence, improper operations and management inefficiencies are some of the features that can be seen as both the causes, as well as the effects, of a process of change.

Viewed from a different perspective, poor performance of an irrigation system can be seen as primarily a problem of social behavior. The physical sub-system is what the social sub-system makes it to be. In this sense, it is important to consider the present social setting of Pakistan's irrigation, which can be outlined by the following main features:

* skewed land ownership pattern;
* increasing number of small landholders;
* majority of water users being illiterate and poor;
* lack of information sharing;
* centralized irrigation administration;
* lack of accountability;
* rent-seeking behavior;
* neglect in operation and maintenance;
* political interference;
* disregard towards operational rules; and
* inequity in water distribution.

2.2 Relevance of the Context In Designing Institutional Solutions

The list of physical and social characteristics, like the Indus River itself, is fairly long. What is mentioned above may be a few of the more important features. Yet, it gives a combination of variables that can be considered, following **Ostrom (1992)**, in the "crafting" of new irrigation institutions to cope with the present performance situation.

Most of the above variables seem to favor an increased involvement of water users in managing the present situation. Decentralizing part of the responsibility for managing this large Indus Basin Irrigation System to its water users seems to be having the best chance of meeting the present challenge. The main reason is that by bringing the management closer to the users, the accountability is most likely to be improved. Additionally, by fostering the maximum participation, the alliances made based on vested interests between some of the water users and the officials are most likely to be minimized. Also, collective action seems to be the best way of reducing irrigation misconduct among the water users themselves.

In the past, many developing countries, such as Pakistan, did not seriously consider the involvement of water users in any stage of irrigation development as an important need. Persistent poor performance has caused the policy makers to think otherwise. Increasingly, many developing countries are looking for strategies in fostering users' participation of managing the irrigation systems. Irrigation management turnover (**IMT**), which is the popular term for "the shift in responsibility and authority for the management of irrigated agriculture from the government to non-government entities" (**Vermillion, 1996**), has become a prominent national policy in more than 20 countries, including those with major irrigated farming systems (**Turral, 1995:7**). Pakistan has only recently embarked on such a policy, despite its two decades of experiences with water users associations at the tertiary level.

2.3 Pakistan's Experience in Water Users Associations

As part of a strategy to improve the country's irrigated agriculture performance, Pakistan initiated its **On-Farm Water Management (OFWM) Program** about two decades ago with financial support from the World Bank and USAID. Following up on its initial progress, and pressure from the donors, Provincial Governments legislated in the early 1980s allowing for the formation of Water Users Associations (WUA) on individual watercourses. Since that time, over twenty thousand WUAs have been organized in the Punjab Province alone with government subsidy and support given under the On-Farm Water Management Program. In two Provinces, Sindh and NWFP, there was provision in their Ordinances for federating these WUAs into distributary level organizations, but there was no attempt to form any WUA federations, as the objective was limited to resource mobilization for watercourse improvement and maintenance.

In some selected canal command areas, a certain degree of institutional coordination was attempted under the **Command Water Management Program (CWMP)**[2]. The CWMP in the Punjab Province was initiated during 1984-85. The Project was an effort to integrate the irrigation and agriculture agencies in an area development mode, as its civil works and other activities were jointly executed by the Irrigation and Power Department and the On Farm Water Management and Agriculture Extension wings of the Agriculture Department. Three national consulting firms, NESPAK, NDC and ACE, provided the supervisory services for irrigation, drainage and on farm water management

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[2] One sub-project of this program in the Punjab was located at 6R Distributary in the Hakra Branch off the Eastern Sadiqia Canal, where IIMI started in February 1994 its preliminary research work on social organization as a prelude to this current action research activity. Results are presented in a separate report (**Waheed uz Zaman and Bandaragoda, 1996**).

components, and the non-water inputs were supplied by the Cooperative Department, the Punjab Agriculture Department, the Supplies Corporation, the Agriculture Development Bank and other commercial banks. With the broad purpose of increasing agricultural production, the CWMP had, as one of its main specific objectives, the need to " strengthen farmers' participation in formal WUAs to improve their overall water and non-water input management" (**Haque, 1988**).

Project documents claim that the CWMP interventions have resulted in a water saving of about 300 million cubic meters (0.247 million acre feet) annually; consequently, the cropping intensity was increased by another 7.2 to 27.4%. Institutionally, there has been an increased awareness among the farmers to build their institutions to fight for their rights and to achieve their common goals (**Directorate CWMP Punjab, Insight & Text, undated**).

Four World Bank-funded projects were launched to address the major issues raised in the 1979 Revised Action Program (RAP) of the Government of Pakistan. All of these four projects (On-Farm Water Management I and II, Irrigation System Rehabilitation Project and Command Water Management Project) were to concentrate on reducing drainage and saving water using existing infrastructure, rather than building new dams, and had a specifically designed institutional component. Details are outlined in Table 1.

Table 1. Four World Bank-Funded Projects.

Project	Total Commitment	Objectives
OFWM I and II (1981-92)	$ 88 million	* Save water through watercourse improvement: * Better water management; * Strengthen OFWM Directorates; * Improve coordination between OFWM and Agriculture Extension Services; * Set up WUAs to provide for maintenance.
Irrigation System Rehabilitation (19882-87)	$ 40 million	* Provide more reliable and more equitable water supply; * Reduce losses from canal breaches; * Strengthen PIDs' O&M capacity.
CWMP (1984-92)	$47 million	* Develop a better organizational model; * Integration of OFWM, Agriculture Extension and PID functions at canal command level; * Set up WUAs for maintenance.

Source: OED Precis, **World Bank (1996)**.

The World Bank's post-project evaluations concluded that the projects achieved their physical components (watercourse water losses reduced from about 40% to 25-30%; and

annual water saving from the four projects amounting to about 2.3 billion cubic meters)[3], but failed in most of their institutional objectives. The evaluations further commented that the OFWM and CWM Projects ignored the traditional watercourse committees and tried to form new WUAs to meet project conditions, but many of these new WUAs were merely token associations or the old committees renamed, making the whole exercise an empty ritual **(World Bank, 1996)**.

Various other evaluations of OFWM projects confirm this common impression that, despite the successful completion of physical work in watercourse improvement, the accompanying program component of institutional development was a disappointment **(Burnes, 1992; Asrar-ul-Haq et al, 1996)**. Attempts to organize farmers for the management of irrigation systems have not led to sustained farmers' participation, or to lasting benefits.

2.4 Recent Initiatives

In recent years, there has been a growing awareness among Pakistan policy makers and academics regarding the necessity for organizing farmers at the level of minors and distributaries, so that farmers will have better control over the distribution of water to each watercourse and farm plot. Farmer control over water is expected to improve tertiary level water management by way of increasing the compatibility between water deliveries and crop water requirements throughout the cropping season, both in terms of quantity, as well as timeliness.

Meanwhile, the World Bank in their report on **"Pakistan, Irrigation and Drainage Issues and Options" (March 1994)** proposed a reorganization of the whole irrigated agriculture sector, including the establishment of autonomous public utilities for the management (including operation and maintenance) of the irrigation water. Many government officials found this approach too radical, but recognized the need for some institutional change in view of many developments that have occurred in the socio-economic background and in the physical infrastructure of the irrigated agriculture sector itself.

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[3] The report alludes that canal rehabilitation and lining work included significant capacity expansion, contrary to the agreed program design, which contributed to increased waterlogging and salinity. Capacity expansion is foremost in the minds of the irrigation policy makers, and eclipses the more urgent, inter-related needs of better water management and institutional strengthening.

An initial government agreement on the need to change was arrived at a seminar on "Participatory Irrigation Management", co-sponsored by Pakistan's Ministry of Water and Power and the World Bank's Economic Development Institute, which was held in Islamabad during 2-6 October 1994. Thus, in the midst of considerable pessimism about participatory irrigation management and its validity in Pakistan's large canal systems, a consensus was being developed, supported by persistent donor interest, on the need to undertake some pilot projects on participatory irrigation management in selected locations. The proposed package of reforms included farmers' organizations and public utilities to undertake the decentralized responsibility for financing and managing irrigation maintenance.

IIMI's preliminary work in policy and institutional analysis in Pakistan coincided with, and would have helped to catalyze, these newly emerging concerns and interests. An increasing obsolescence of formal institutions in the country's irrigated agriculture sector was identified, particularly in view of new demands and the changed scope of irrigation management (**Bandaragoda and Firdousi, 1992**). While there has been a considerable amount of research already conducted on Pakistan's irrigated agriculture, not much of its results was seen as being adequately captured by policy, and consequently, they had not led to any meaningful institutional reforms (**Bandaragoda, 1993**). While the original design of Pakistan's irrigation systems, as well as the institutional arrangements for their operation and maintenance, was characterized by features aimed at equitable water distribution, when design assumptions were no longer valid, water distribution was found to be substantially inequitable (**Bhutta and Vander Velde, 1992**). Both under normal supply and shortage conditions, there was chronic inequity with the upstream water users receiving more water than their due share, while those in the tail reaches of the canal command received less (**Vander Velde and Murray-Rust 1992**).

Some research findings from other locations were found to be relevant in Pakistan's context. Conditions of scarcity and poor reliability of supply normally encourage the individual water user to engage in various malpractices for maximizing personal gain. A long period of this behavior results in a **"syndrome of anarchy" (Hart, 1978)**, which is a product of mutual mistrust between the water users and the operating staff. The users lack the confidence that if they refrain from stealing water, or breaking the structures, they will get their entitled water on time, while the officials lack the confidence that if they apply themselves properly to somehow get water on time, the users will refrain from breaking the rules (**Wade, 1987**).

The problem has been, where and how to break this vicious circle. As long as the offenders were the majority in either group, enforcement was not possible as any law could be effective only when a small minority rather than a majority of the population tended to break it.

The proposition after these initial studies was to answer the question: before enforcing legal sanctions, could social pressure be mobilized to bring down the proportion of anti-social offenders? A strategy most likely to help in this situation was to approach the problem from the demand side of the irrigation management equation by involving the water users first, and then through their organized actions, effecting appropriate institutional changes in the delivery organizations as well. This strategy has not been fully explored so far in Pakistan, where a supply-sided bureaucracy has consistently been playing a dominant role. There was some understanding at this stage that pilot trials should be undertaken to test this proposition.

Independently of the interactions between the World Bank and the Government of Pakistan, IIMI had planned to experiment with a pilot project in the Fordwah Eastern Sadiqia command area, as part of its study project, "Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan", funded by the Royal Netherlands Government. The proposal for this project was a combined effort of both IIMI, as well as the Dutch authorities, and was finalized in May 1994, when a Dutch Formulation Mission visited IIMI at its Lahore office and its headquarters in Colombo and had discussions with relevant IIMI professionals for fine-tuning the project design. However, the donor's interest in an emphasis on institutional solutions to stagnant performance reflected a fairly common feeling among many at that time.

3. PILOT SITE: HAKRA 4-R DISTRIBUTARY

3.1 Criteria for Site Selection

Selecting an appropriate pilot site was one of the most critical steps in the project implementation process. For this purpose, the following selection criteria were developed in consultation with the OFWM Directorate:

(1) Working in a distributary within the World Bank-funded Fordwah Eastern Sadiqia (South) FES(S) Irrigation and Drainage Project area could help IIMI to associate this work closely with the pilot projects undertaken by the OFWM Directorate for similar work under the FES(S) Project;

(2) Preferably, the selected distributary should not be too small or not very large so that the pilot effort will be with average physical and socio-economic conditions;

(3) Selecting a distributary where IIMI or any other agency or research institute had not intervened recently would provide a more receptive farmer group;

(4) The distributary should preferably have farmers of a mixed background - - a mixture of local people as well as old and recent settlers;

(5) A distributary having a number of hydraulic structures would help the water user groups to monitor the discharges in terms of space and time;

(6) A distributary in which watercourses had not been completely improved under the OFWM program would allow the water users to see the need for physical improvement as an incentive for organization as WUAs at the watercourse level; and

(7) A distributary having a sizable minor would allow two secondary systems to be used for pilot experimentation within the same distributary command area.

The pros and cons associated with three distributaries were considered:

(i) Initially, some preliminary investigations had been made at the Hakra 6-R Distributary, which was the site for a Command Water Management Project. Most of the watercourses and a major part of the distributary were already lined, and the water users had experienced an organizational effort in the formation of

watercourse level WUAs. However, the Hakra 6-R was a very large distributary system, and was already being operated on a rotation basis.

(ii) Another option was the Sirajwah Distributary, one of the two distributaries selected by the Punjab's On-Farm Water Management Directorate (OFWM) for their pilot sites as part of the World Bank - funded FES(S) project. For these pilot efforts, IIMI had agreed to give technical advisory assistance to OFWM. As the feeling among some of the OFWM staff was that IIMI should try a different distributary as a pilot, this option was also dropped.

(iii) The third option was the Hakra 4-R Distributary. Located within the FES(S) project area, being in the medium to large category of distributaries in terms of length and command area, this met the most important selection criteria. The people were assessed as a mixture of recent and old settlers; this would give a reasonably balanced situation in the given social context. The distributary and many of its watercourses were yet to be improved, leaving room for meaningful collaborative work with the PID and OFWM. The presence of two minors and a number of hydraulic structures along the main distributary channel made it possible to have monitorable water flow regimes for different sections of the command area.

Finally, the Hakra 4-R Distributary was selected as IIMI's first site for a pilot study on participation of water users organizations in operation and maintenance of the irrigation system. With the background knowledge already gained through an earlier study, the Hakra 6-R Distributary was to be considered as a second pilot project site later[4].

3.2 Physical Characteristics of the Hakra 4-R Distributary

The Distributary No. 4-R in the Hakra Branch Canal of the Fordwah Eastern Sadiqia irrigation system is one of the largest distributaries in the Punjab Province. It has a total discharge of 5.46 cubic meters per second (cumecs), or 193 cusecs, and a total of 123 irrigation outlets (watercourses) serving a command area of nearly 18,000 hectares.

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[4] The effort, however, will be with an emphasis on encouraging the operating agencies to take the initiative in organizing water users, and will be launched after reaching some degree of maturity in the interventions at Hakra 4-R Distributary.

Within this distributary system, there are two minors, 1RA Labsingh with a discharge of 0.6 cubic meters/sec (22 cusecs) and 16 watercourses, and 1R Badruwala with a discharge of 1.22 cubic meters/sec (43 cusecs) with 33 watercourses.

The overall canal system related to the study area begins with the diversion from the left bank of the river Sutlej at Sulemanki Headworks, to the Eastern Sadiqia canal (**Figure-1**), which runs for a distance of some 74 kms and then trifurcates into the Hakra and Malik Branch canals and the Sirajwah Distributary. The Hakra Branch Canal runs from Head Works Jalwala for about 29 kms up to Head Works Gulab Ali, where it again forks into three distributaries i.e. 1-L, 3-R and 4-R then Hakra Branch proceeds further to serve other distributaries in the downstream region.

The study area, which is located in the south-eastern part of the Punjab Province, covers parts of the tehsils Haroonabad and Bahawalnagar of District Bahawalnagar, and is bordered on the northeast by the command area of Hakra 3-R Distributary, on the south by lands served by Hakra 5-R and Hakra 6-R distributaries, and on the east by the Hakra Branch itself. The climate in the study area is arid. The average annual rainfall ranges from 125 mm to 250 mm. Hot and dry climate, low rainfall and unfit underground water necessitates the ensured and regular surface irrigation water supplies.

The main channel of the Hakra 4-R Distributary system has 75 irrigation outlets, serving a total command area of about 10,975 hectares (27,100 acres) with an authorized withdrawal (sum of authorized discharges of the 75 outlets) of 3.0 cumecs (106 cusecs). The length of the main distributary channel is about 36 kms. The watercourse command areas fed by this main channel of the distributary have a total of 2,775 warabandi shareholders. The main distributary channel has five drop structures at places identified by RDs[5]: RD 24, 46, 72, 82 and 107. About 16 culverts/bridges have been constructed on the main distributary at different places to facilitate easy crossing. Two minors 1-RA Labsingh and 1-R Badruwala off-take from the main channel at RDs 23.200/R and 72.100/R respectively.

The 1-RA Labsingh Minor consists of 15 irrigation outlets, and has a design discharge of 0.6 cumecs (22 cusecs), covering a canal command area of 2,460 hectares (6,100 acres). The total length of the minor is about 7 kms and is supplying irrigation water to about 565 shareholders.

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[5] Reduced distance is the distance in measures of 1000 feet of any point on the center line of a canal from the head of the canal (RD 24 = 24,000 ft from the head of the canal).

The 1-R Badruwala Minor is the largest section of the Hakra 4-R Distributary system. The minor is unlined, is about 15 kms (50,620 ft) long, and has 33 irrigation outlets and a design discharge of 1.2 cumecs (43 cusecs), to serve a canal command area of 8,815 hectares (10,200 acres) for about 1,350 shareholders.

Some details of the pilot distributary are given in Table 2.

Table 2. Some Details of the Hakra 4-R Distributary.

Channel	Length (kms)	Design Discharge cumecs (Cusecs)	Authorized Withdrawal cumecs (Cusecs) *	No. of Outlets	CCA (acres)	No. of Shareholders
Main distributary channel	36	5.6 (193)	3.0 (106)	75	27,100	2,775
1-RA Minor Labsingh	7	0.62 (22)	0.6 (21.8)	15	6,100	565
1-R Minor Badruwala	15	1.22 (43)	1.13 (40)	33	10,200	1,350
Total	58		4.73 (168)	123	43,400	4,690

* Authorized withdrawal is the sum of authorized discharges into the watercourses within each secondary channel.

Physical Conditions: The banks of the distributary are heavily planted mainly with *shesham* and *keekar* trees. Most of these trees are as old as the distributary itself. One of the banks is relatively wider to serve as a canal road for transportation of personnel and equipment of the Irrigation Department staff, who are entrusted with the task of looking after and maintaining the canal. This is also used by the inhabitants of the nearby villages and farms as a regular road. The banks are now fast deteriorating in some places due to their frequent use as livestock routes. Erosion due to wind and water can also be witnessed. The freeboard of the distributary has almost disappeared in the head reach of the distributary. This has been the result of continuous deposition of sediment (usually called as silt) especially in the head reach. In the tail reach, however, the freeboard is available because the irrigators desilt the channel more frequently in an attempt to get their due share of water.

Cropping Pattern: The yearly variation in the cropping pattern is generally non-existent. For the *Kharif* or summer season, cotton, sugarcane and rice are the most popular cash crops. Sorghum, Bajra, Maize and Jantar are sown as fodder.

Occasionally, vegetables are also sown. During winter or *Rabi* season, wheat, although less profitable, is the most popular crop, while berseem is the main fodder crop generally sown for feeding the domestic livestock. Some of the farmers also cultivate vegetables and oilseeds, and on a few farms, orchards, especially of the citrus family, can also be seen.

Groundwater: Groundwater in this area is generally considered unfit for irrigation. However, due to a shortage of canal water, and inequity and unreliability of canal water supplies, farmers have been compelled to look for groundwater. About 237 shallow tubewells are located along the distributary.

Canal Water Supplies: In a water measurement test conducted on 26 October 1995, the Hakra 4-R Distributary received a discharge of 6.6 cumecs (232.7 cusecs) as against a sanctioned discharge of 5.48 cumecs (193 cusecs), roughly a 21% increase. All of the outlets were calibrated and discharge measurements were taken. As against the authorized discharges of 3.01 cumecs for the main distributary outlets, 0.62 cumecs in Minor 1RA, 1.14 in Minor 1R, the actual withdrawals were 3.58 cumecs (an increase by 19%), 0.69 cumecs (15% increase), and 1.71 cumecs (50% increase), respectively.

3.3 The People

The rural life in this part of the Punjab Province is very hard indeed, mostly due to scarce canal irrigation resources, unfit underground water, and the so-called twin menace of waterlogging and salinity. The 4-R Distributary command area consists of about 40 villages including small *deras* (hamlets), having a population of about 66,945 according to the census of 1981 (the projected population for 1995 for this area is about 101, 880). The majority of these people are settlers and migrants. The major castes are Rajput, Arian, Jat, Joya and Watto. A list of the villages and related watercourses is shown in Annex-2.

The baseline socio-economic survey conducted during July-August 1995, on a sample of 367 respondents selected from 13 out of the 123 watercourse commands, provided some information about the socio-economic features of the pilot site. The following are some of the main features that could be identified:

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* The average family size was 9, out of which school going children were 2;

* Land is a major determinant of farm income and control over land has a strong association with adoption of new farm techniques. A majority of the farmers (55.9%) owned up to 5 acres of land on the Hakra 4-R Distributary, whereas 6% owned land of 25 acres or above.

* A majority of the respondents (61.6%) were found to be illiterate.

* The organizational behavior of the sample farmers was clearly evident on two issues i.e., the maintenance/construction of mosques and the maintenance of watercourses. The respondents showed considerable organized behavior; 94% had participated in collective action in maintaining or constructing the village mosque, 90% in maintaining the watercourse, and 20% in desilting the distributary;

* About 69% of the respondents were dependent on the state assistance; they felt that the unsatisfactory water distribution situation could be solved by the agency staff, if they wished to do so;

* About 45% of the respondents reported inequity between distributaries, and of this 23% attributed the problem to the "influentials";

* About 80% referred to inequity within the distributary, and this number ranged from 67% in the head reaches to 84% in the tail reaches; most of the respondents attributed the problem to big landlords and irrigation officials;

* None reported inequity within the watercourse;

* The cropping intensity was 122%, higher at the head reaches (147%) compared with the tail reaches (97%);

* The average farm income was Rs. 78,963 for an average operated area of 13.25 acres as reported by the respondents.

* Reliability in water supply means a regular or uninterrupted water supply to the farmers. Data collected indicate that over 98 percent of the sampled farmers at Hakra 4-R Distributary were of the view that they missed their water turns during the last kharif season (1994).

4. MAIN METHODOLOGICAL FEATURES OF THE PILOT PROJECT

Many people, both within and outside the country, asserted that organizing water users for distributary level management in Pakistan was a very difficult task; some believed that it was impossible. Most of the contextual factors described in the earlier sections of this report contributed to this perception. Preliminary field investigations also indicated that organizing water users for a federation at the distributary level was going to be an enormously difficult task. Only some of the watercourses in the pilot area had experienced the formation of WUAs sponsored by the OFWM, and these WUAs were already defunct. The water users in these watercourses were particularly hostile to the idea of yet another attempt to "organize" them. People in the area appeared to be overwhelmed by problems of salinity and unproductive farming, and showed little patience to listen to possible long-term solutions.

A pilot project of this size with a large command area, a large number of people and a large quantity of water to deal with by the water users, offered a great challenge for action research. Yet, it also provided an excellent opportunity to develop appropriate methodologies and field processes aimed at establishing sustainable water users organizers in Pakistan. The large size of the pilot project demanded a strategy to mobilize the widely dispersed water users in the most effective way. At the same time, this enormous task had to be accomplished with the need for future replicability of this work constantly in view. The main features of the methodology outlined below explain how the project endeavored to satisfy these requirements.

4.1 Step-Wise Process

In this scenario, taking some preliminary steps to assess the existing potential for change before embarking on introducing new institutions was considered a prudent strategy. There was a need to first "sense the environment" and assess the pulse of the people regarding institutional change, and then identify the scope and content of possible change, determine the style of interactions with the community, before even deciding on a time-frame for project activities. Most of these steps were to be taken collectively with the water users themselves.

Experiences in other countries also suggested that **"getting the process right" (Uphoff, 1986)** was a valuable initial investment in social organization work. The project, therefore, spent some time in developing an appropriate process before embarking on the actual field work in the pilot project.

Another idea drawn from international experience was the value in **"putting people first" (Cernea, 1985)**. During the reconnaissance surveys in the pilot project area, many water users inquired about the package of physical incentives planned for the project. They were accustomed to the government subsidies on watercourse lining and tubewells, etc. With some difficulty, they were convinced of the need to get organized first so that a form of collective action could benefit more from whatever the government could deliver, or from their own resource mobilization efforts.

4.1.1 Four Phases

In the gradual step-wise approach chosen by the project, the process of organization of water users was designed to be in four phases:

1. Support mobilization;
2. Initial organization;
3. Organization consolidation; and
4. Organizational action.

A flow chart of this four-phase process[6], which was developed during project inception, was a guide to implementing project activities. This flow chart is reproduced in Annex-3 of this report.

By the end of December 1996, the project had just completed the first two phases of this iterative process. The project's experiences prompted some changes to be incorporated into this process, and based on these changes, a revised version of the flow chart will be prepared by the end of the project, as part of the recommendations for possible replication of the methodologies adopted in the pilot project to other distributaries in Pakistan.

The support mobilization phase was a "get set" stage during which the field team was mobilized and trained, initial collaborative arrangements were discussed with PID and OFWM staff, selection of the pilot site was finalized, members for a Field Implementation Coordination Committee (FICC) were identified, and initial baseline information was collected. Some of the items will be discussed further in this report.

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[6] This four-phase process for water users organization activities in Pakistan was adapted from the M & O guidelines given in Skogerboe et al (1993).

The training for the field staff was mostly derived from the experiences of preliminary social organization field research conducted in the Hakra 6-R Distributary. This training included farmer interviews, use of key informants, process documentation, and some exposure to other social organization projects in the country.

In the next **initial organization phase**, some progressively advancing steps in interacting with the community were taken. Unlike many top-down government projects, in this pilot project, a consciously developed participatory approach was adopted. This approach itself made the field team's task so much more difficult than the "handed down" instructions, and the challenge was that each step taken collectively with the people had to be based on the popular agreement on the previous step's results. Gradually, the majority of the water users were convinced that the pilot project was for their own benefit, but something they had to work hard to be built by themselves.

As will be explained later in this report, this effort was not so easy and not without misunderstandings and objections. The challenge itself provided a motivation to the field staff and the participating water users. It was a valuable experience for the field team members to see how some of the water users played the role of promoters of WUOs to argue with and convince their own fellow water users who were showing dissent.

Sometimes, the valiant efforts of the field team in trying to build up some confidence among the people were followed by extremely frustrating negative results. New strategies had to be developed while the work was in progress so that the project staff could meet a new field situation. To that extent, the developed process was not a blue-print that could be followed without many field modifications.