

**Managing Irrigation for Environmentally
Sustainable Agriculture in Pakistan**

TRAINING FARMERS TO ORGANIZE FARMERS:

***LESSONS LEARNED IN SOCIAL ORGANIZATION FOR IRRIGATED AGRICULTURE
AT HAKRA 4-R DISTRIBUTARY***



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FOREWORD

The action research program on establishing water users organizations in the Hakra 4-R Distributary command area was based on some major deviations from dogma. Among them, was discovering that the so-called illiterate water users were in fact very intelligent and prudent, and were able and willing to take over management responsibility. Also, the program assumed that there was no need to have physical improvements or any other form of physical incentive to attract the water users attention towards social organization, as was done by many other programs in the past. Both of these assumptions had to be carefully supported by other strategies. One such strategy was to incorporate in the program a continuous stream of training inputs as a motivating influence. This report describes one of these training programs initiated during the initial stages of the social organization process.

The training strategy was closely linked with two main concepts underlying the program. One was the need to follow an essentially participatory approach in planning and implementing the social organization program, whereas, the other concept was the idea of mobilizing community-based social organization volunteers. This linkage can be seen in the contents of this report, as it deals substantially with the selection of these local volunteers, as much as it describes the training program conducted for them. The impact of training depends to a large degree on the absorptive capacity of the trainees. This aspect, which is inherent in almost all awareness and capacity building programs, was evident from the training conducted for the volunteers who had been carefully selected in consultation with the community itself.

The readers of this report are invited to see other training reports generated by this action research program. Details are given in the References section of this report. In an overall social organization strategy for Pakistan, capacity building is highlighted, as one of the most productive ways of mobilizing human resources required for higher responsibilities in water resources management.

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EXECUTIVE SUMMARY

The socio-economic characteristics of a typically Pakistani community in which people consider helping others as “**virtuous**” and are proud to involve themselves in any community work, influenced the decision to identify a number of community-based volunteers to organize farmers along the Hakra 4-R Distributary for participation in the management of parts of the irrigation system. The Social Organization Volunteers (SOVs) were identified with the help of the community using a set of appropriate criteria. The SOVs were to assist the small team of 5 Social Organizers in organizing around 5000 farmers through a complex social organization process at the watercourse and the distributary levels. The team devised and adopted a methodology to select the SOVs through conducting field interviews with the community members for this purpose. The team members were trained in the methodology and selected the SOVs in consultation with the community. By mid-May 1996, the SOVs were identified in all of the 41 villages. In most of the villages, the number of selected SOVs was between 4 and 5. Getting help from farmers as social organizers has been successfully tested in the Philippines and Thailand. However, rendering the services voluntarily by the farmers at Hakra 4-R Distributary was the distinguishing feature of this project.

Almost all the identified SOVs were landowners. The water users preferred SOVs predominantly from one or two major castes. A majority of the selected SOVs was educated. Almost all of the identified SOVs resided either within the village or at hamlets around the village. The water users, indicated that the SOVs had neutral political status. Most of the SOVs were not opposed by most of the persons contacted for identification. In general, the SOVs were initially suspicious about the program as a lot of activities were being undertaken at the distributary by several agencies. The SOVs perceived that though organizing water users was a virtuous job and the farmers needed an organized forum badly, yet there were a number of factors that could prohibit the organizational process such as poverty, illiteracy, skewed land and power distribution, and politicization of the organizational for-a. Besides, farmers can not get organized by themselves, and they needed a catalyst to assist in organizing them. They were also ambiguous about the role and responsibilities of the farmers and the agency by then.

A training course on "Social Organizations for Irrigated Agriculture" was conducted in July 1996 to train all the SOVs as potential social organizers. The foremost purpose of the training was to firstly motivate them to participate and be involved in the process. The training course highlighted the reasons for failure of the past efforts in rural development, and emphasizing the lack of participation by the users and beneficiaries. The farmers already have the experience of collective efforts for collective benefit. The participants were divided into groups to identify irrigation-related problems and their solutions. The problems and the solutions that had been identified by the groups indicated that there were some problems that need to be solved by the government, but there are many problems that could be solved by the community itself. The importance of getting organized was emphasized by several examples. The importance of organizational structures for collective action was highlighted.

The participants also identified a number of hindrances that could impede the process of organization. The contents and essentials of effective communication were discussed. The participants understood the value of analysing a situation if the desired results were not forthcoming. The participants also identified a number of characteristics of a good volunteer leadership.

As a result of the confidence the participants gained during the training, many of the SOVs arranged meetings with the community to build awareness among the masses. A large number of the SOVs played a leading role in these meetings and presented the objectives of the program to their fellow farmers.

The evaluation of the SOVs revealed that while almost half of the selected SOVs met most of the criteria as well as were favored by the community, around one fourth of the selected SOVs were each either favored by the community and did not meet most of the criteria or met most of the criteria but were not favored by the majority of the community. More number of SOVs who met most of the criteria were motivated to organize the community for participation in the irrigation system management compared to those who were favored by the community but met only a few criteria. A very high percentage of the SOVs who met most of the criteria and were also favored by the community was found adequately motivated to participate in the program and assist in organizing the community.

Most of the SOVs participated actively in various programmatic activities. The information asserts that only one out of ten SOVs performed passively. The SOVs who met most of the criteria were more motivated to organize the community for participation in the irrigation system management compared to those who were favored by the community but met only a few criteria. A very high percentage of the SOVs who met most of the criteria and were also favored by the community was found adequately motivated to participate in the program and assist in organizing the community. The proportion of the SOVs who performed excellently is directly related to the interest exhibited while participating in the training. The SOVs who participated more zealously in the training might have understood the need for an organization better than those who took it casually, and therefore worked with more devotedly for the common cause.

the training was much helpful for those SOVs who met the community's choice and the selection criteria because they are community oriented people. Therefore, the personality and nature of the SOV himself becomes much more important than the participation in the training alone. Organizing farmers through community based volunteers is a much more cost effective and efficient approach compared to all other approaches. The training helped in building the confidence of the SOVs as they met their fellow volunteers from various parts of the distributary. The field team learned that the group discussions were as effective as other training tools (audio-visual aids, pictures, diagrams etc.). The farmers enthusiastically learned that their local problems can only be solved by them. Through the training workshops, they had the first learning on how to conduct a meeting of the farmers to discuss common problems and identify the solutions. Many of the trained SOVs, later worked as resource persons during the consultation meetings.

1 BACKGROUND

As a part of the component on institutional development for the overall Dutch-funded project, *Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan*, the International Irrigation Management Institute (IIMI), Pakistan, is conducting an action research program along the Hakra 4-R Distributary. The primary objective is to find ways and means to enhance the existing institutional capacity in the country in order to adopt improved irrigation management strategies while maximizing the water user's participation. One of the stated reasons for the declining and stagnant agricultural productivity is inefficient management, as well as other irrigation inefficiencies. The users' involvement in irrigation system management has proved to be beneficial in many countries. In order to maximize the water users' participation, they have to be organized. In order to adopt these strategies on a sustained basis, these organizational models have to be replicable. Therefore, it becomes important to "learn how to organize water users at different levels of irrigation systems. Current efforts underway, to organize farmers along the Hakra 4-R Distributary as Water Users Organizations at different levels of the hierarchical, but contiguous, irrigation system, are necessarily focused on studying **if organizational work will be accomplished properly**, which leaves the aspect of **whether it is an appropriate strategy to adopt under the present circumstances** towards achieving the final evaluation of the project.

Pakistan has an enormous human resources involvement in irrigated agriculture, which also remains to be the most under-utilized. Over half of the country's labor force is engaged in agriculture. If this human resource is exploited effectively, it may yield enormous dividends to the improvement of the irrigated agriculture and the nation-building process.

In consideration of this under-utilization of human resources, IIMI-Pakistan decided to apply its experiences from other countries in the world to test social organization methodologies and their implementation through involvement of local people and community-based volunteers for social organization in the irrigated agriculture. The IIMI-Pakistan Social Organization Field Team (*SOFTWARE*) based at Haroonabad is responsible for conducting this pilot action research. In view of the socio-economic characteristics of a very Pakistani community, where people consider helping others as being "virtuous" and are proud to be involved in any community work in any form, it was decided to identify a number of community-based volunteers, later called *Samaji Razakaars* or **Social Organization Volunteers (SOVs)**, who are adequately motivated and possess the ability to be trained as social organizers. The SOVs were to be trained to essentially form the extended part of the *SOFTWARE*. The volunteers were to assist the *SOFTWARE* to organize the farming community at the watercourse and distributary levels so that the organized farmers could undertake the operation and maintenance (O&M) of the distributary level irrigation system.

This report intends to document the lessons learnt from the application of the aforementioned methodology of identifying, training and mobilizing farmer volunteers to undertake social organization of farmers for participation in the irrigation system operation and maintenance at secondary level of the vast irrigation system of Pakistan.

A "Social Organizations for Irrigated Agriculture" training course was conducted in July 1996 to train all the SOVs as potential social organizers. Dr. Saeed Ahmad Khan was hired as a consultant from the University of Agriculture, Faisalabad, and was actively assisted by the supervisory staff working on the project. Dr. Khan is the professor and chairman of the Agricultural Extension Department and has a doctoral degree in pedagogy. Extensive years of experience in teaching participatory methodologies are to his credit. A planning meeting at the IIMI-Pakistan Headquarters, Lahore, on July 10, 1996, resulted in finalizing the contents and time distribution of the training. Participants included the consultant, the team leader of the sub-component on institutional development, IIMI-Pakistan's sociologist and irrigation agronomist, and the field team leader. The field team members organized the training course.

1.1 Physical Characteristics of Hakra 4-R Distributary

The Hakra 4-R Distributary along the Hakra Branch Canal of the Fordwah Eastern Sadiqia irrigation system is one of the largest distributaries in the Punjab Province. Some salient features are given in Table 1. The distributary 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. This distributary system has two minors, i.e., 1-RA Labsingh and 1-R Badruwala, each discharging 0.6 cubic meters/sec (22 cusecs) and 1.22 cubic meters/sec (43 cusecs), respectively and with 16 and 33 watercourses, respectively.

The overall canal system for the study area starts at the diversion from the left bank of the river Sutlej at Sulemanki Headworks to the Eastern Sadiqia Canal (**Figure-1**). After a distance of about 74 km it trifurcates into the Hakra and Malik Branch Canals and the Sirajwah Distributary. The Hakra Branch Canal flows from Head Works Jalwala for about 29 km as far as Head Works Gulab Ali, where it forks into three distributaries, i.e., 1-L, 3-R and 4-R. The Hakra Branch proceeds further to serve other distributaries in the downstream region.

The study area, which is located in the southeastern part of the Punjab Province, covers parts of *Tehsils* Haroonabad and Bahawalnagar, of Bahawalnagar district. In the northeast it is bordered by the Hakra 3-R Distributary command area, in the south by lands served by the Hakra 5-R and Hakra 6-R Distributaries, and in 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. A hot and dry climate, low

rainfall and unfit groundwater necessitate 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 km. 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 RDs¹: RD 24, 46, 72, 82 and 107. About 16 culverts/bridges have been constructed along the main distributary at different places to facilitate convenient crossings. 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.

Table 1. Details of the Hakra 4-R Distributary.

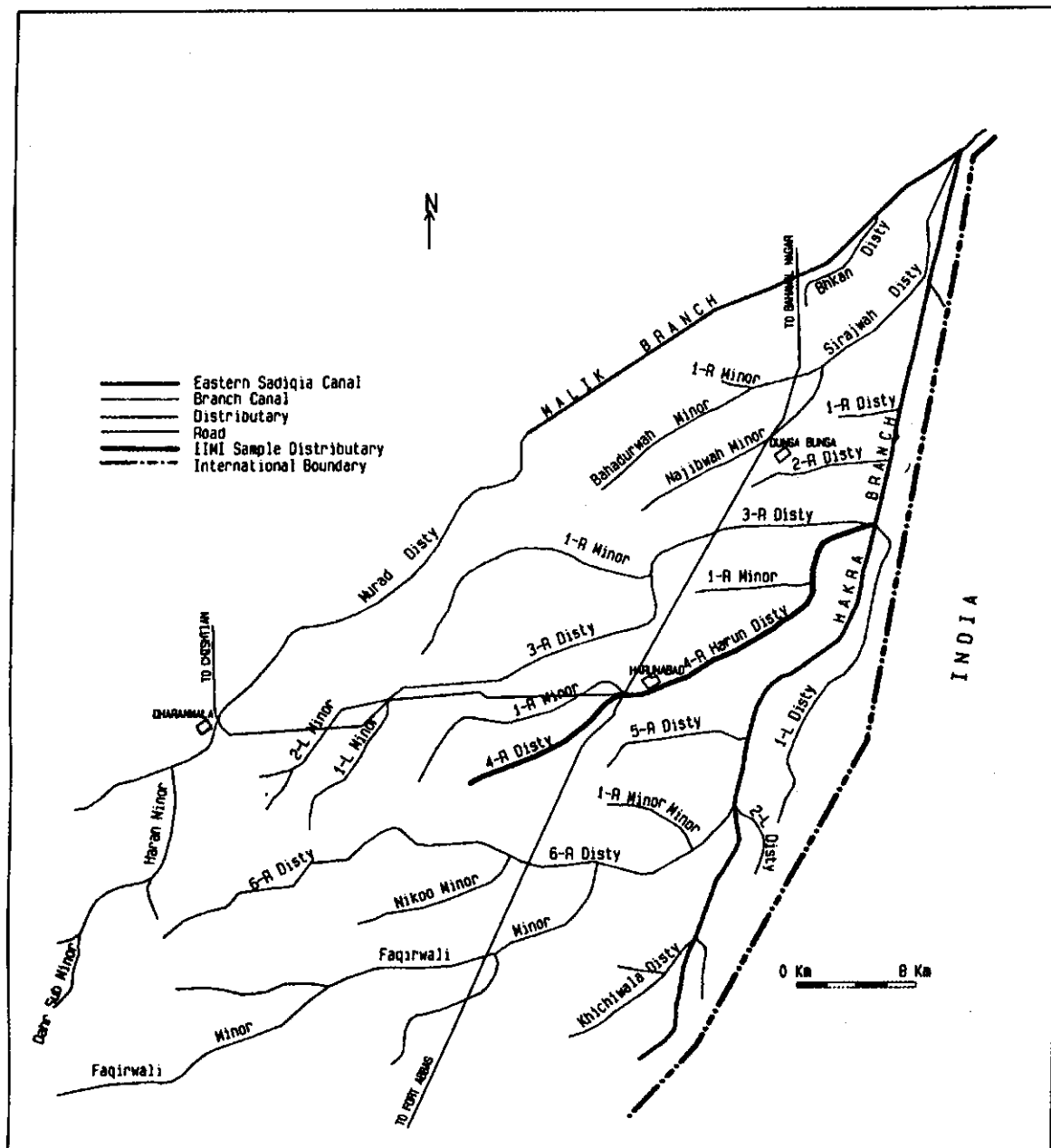
Channel	Length (km)	Design Discharge cumecs (cusecs)	Authorized Withdrawal cumecs (cusecs)*	No. of Outlets	CCA (acres)	No. of Shareholders
Main distributary channel	36	5.6 (193)	3.0 (106)	75	27,100	2,775
1-RA Minor Labsingh	7	0.62 (22)	0.6 (21.8)	15	6,100	565
1-R Minor Badruwala	15	1.22 (43)	1.13 (40)	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.

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

¹ 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).

Figure 1. Location Map of the Study Area.



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

Physical Conditions: The distributary's banks are heavily planted with trees, of which most are as old as the distributary itself. One of the banks is relatively wider to facilitate serving as an inspection path for transportation of Irrigation Department personnel and equipment. The Irrigation Department staff is entrusted with the task of looking after and maintaining the canal, which is also used by the inhabitants of nearby villages and farms as a regular road. The banks are now fast deteriorating in some places due to 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 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, millet, and maize are sown as fodder. Occasionally, vegetables are also sown, but usually for domestic consumption. During winter, or the *Rabi* season, wheat, although less profitable, is the most popular crop, while clovers are the main fodder crops generally sown to feed 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.

The People: The rural life in this part of the Punjab Province is very strenuous, mostly due to scarce canal irrigation resources, unfit groundwater, and vast prevalence of the so-called twin menace of waterlogging and salinity. The distributary's command area comprises about 40 main villages and a number of small *deras* (hamlets), and has a population of about 66,945 according to the 1981 census (the projected population for 1998 for this area is about 111,330). The majority of these people are settlers and migrants. The major castes are Rajput, Arian, Jat, Joya and Wattoo.

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

features identified:

- The average family size was 9, with 2 school-going children.
- Land is the major determinant of farm income and control over land has a strong association with the adoption of new farming techniques. The majority of farmers (55.9%) owned up to 5 acres of land along the Hakra 4-R Distributary, whereas 6 percent 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. Respondents displayed considerable organized behavior; 94 percent had participated in collective action to maintain or construct the village mosque, 90 percent to maintain the watercourse, and 20 percent to desilt the distributary;
- About 69 percent of respondents were dependent on state assistance. They expressed that the agency staff, if they so wished, could solve the situation of unsatisfactory water distribution.
- About 45 percent of respondents reported water inequity among distributaries, of which 23 percent attributed the problem to the "influentials".
- About 80 percent referred to inequity within the distributary, and this number ranged from 67 percent in the head reaches to 84 percent in the tail reaches; most respondents attributed the problem to big landlords and irrigation officials.
- None reported inequity within the watercourse.
- The cropping intensity was 122 percent, higher at the head reaches (147%) when compared to 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 along the Hakra 4-R Distributary were of the view that they missed their water turns during the last *Kharif* season (1994).

2 THE SOCIAL ORGANIZATION VOLUNTEERS (SOVs)

The basic philosophy behind the organizational models used in the project efforts was that it should lead to greater replicability. For this reason, a small field team was deployed to catalyze farmers' interests to organize themselves for distributary management. In this way, the model can be adopted easily by government agencies at a larger scale. However, organizing around 5000 farmers was a big task for a small field team comprising 5 persons. Therefore, the strategy to supplement the work of the team was to use community-based volunteers in social organization work. Using farmers as social organizers has been successfully tested in the Philippines and Thailand. The farmer-organizers were, however, paid for these efforts (Pradhan and Sharples, 1989; Cablayan, 1989). The strategy to use community-based volunteers in the present case sharply contrasts to earlier experiences when farmers were used as social organizers; the services of farmer organizers were completely voluntary and the volunteers were neither promised, nor given, any compensation for their efforts (Bandaragoda, 1995). The social organization approach that necessarily contains community-based volunteers as the central strategy is explained in Figure 2.

Initially, the project reference for these volunteers was "contact farmers" as their roles were pivotal for *contact* between the *SOFTWARE* group and the community. Identifying suitable persons from among the water users' community as "contact farmers" was an important preliminary step in the social organization process along the Hakra 4-R Distributary. As this work progressed, the term "contact farmers" was discovered to be popularly associated with the "influentials", big land owners and farmer leaders of the Training and Visit (T&V) system adopted by the Agricultural Extension Department. Since the use of these contact farmers had not resulted in proper functioning of the T&V system, the term had an unfavorable connotation. The contact farmers used to be the bigger landlords who were deployed to promote dissemination of the agricultural knowledge gained from the agricultural extension agents. However, most of the contact farmers were never seen doing the job. Consequently, the common members of the farming community did not consider the contact farmers to be effective tools for dissemination. In order to avoid mistrust between community and the farmer volunteers from the start, the term "contact farmers" was replaced by the term "**Social Organization Volunteers**" (SOVs).

Organizing people is a socially sensitive and politically vulnerable activity. This is not a task to be undertaken solely by an international institute like IIMI-Pakistan; rather, it should be the responsibility of the local people (i.e., local agencies and water users) themselves. An internally generated demand for social organization has a greater chance of making these organizations productive and sustainable. IIMI-Pakistan, representing an agent for change, or catalyst, and based on its international experience could only provide a facilitation role in this process by helping the organizers to proceed with both, a professional and systematic attitude.

IIMI-Pakistan's decision to look for assistance from among the community itself to reach the community at large was compatible with this strategy. IIMI-Pakistan did not exclusively rely on the water users alone, but identified members from the community, in general, who were adequately informed about the community and its needs, and were prepared to assist IIMI-Pakistan's field team. The members of this extended field team were based in the community, knew the people fairly intimately, and shared their language, beliefs, traditions, rituals, needs and problems.

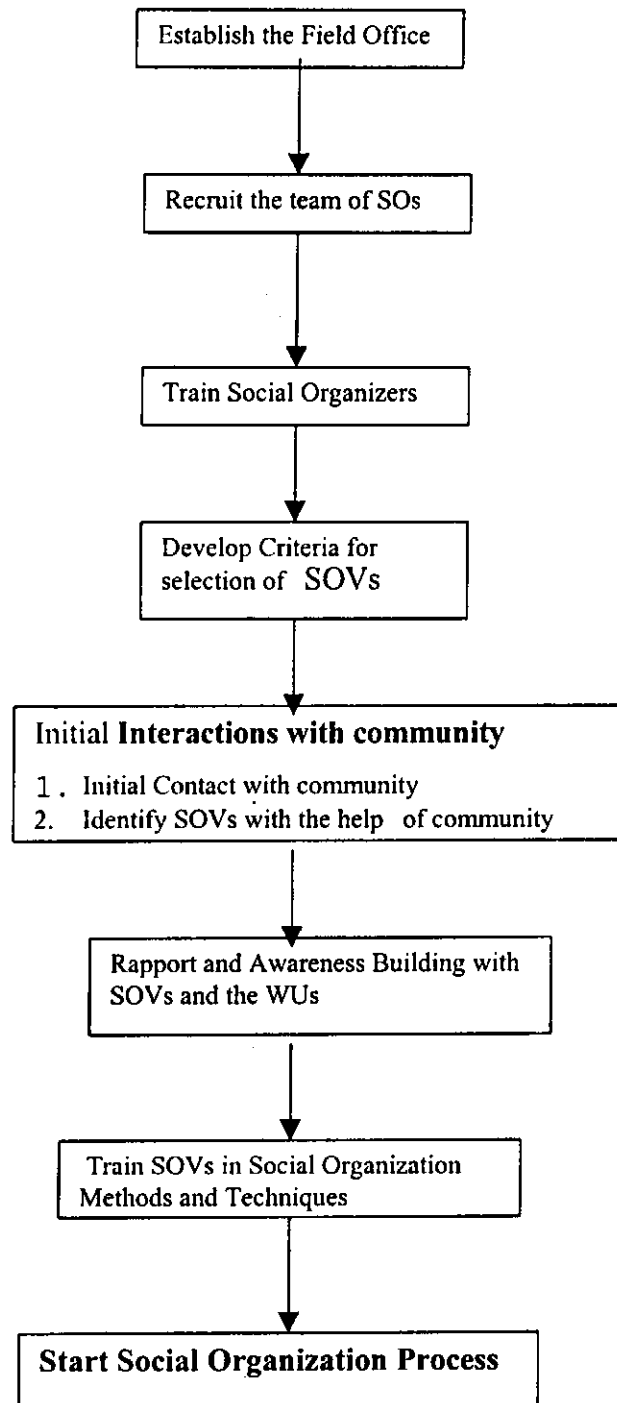
2.1 *Rationale for the Involvement of SOVs*

The rationale behind seeking assistance from community-based volunteers was threefold:

- a) There is always a credibility gap between the farmers and agency staff in socio-political settings as is prevalent in Pakistan, because mistrust between the farmers and the agencies is existent. This stems from the fact that usually government agencies providing services lack community attitudes. They are rather more like “rulers” than “public servants”. There is a prevalence of an “**uppers and lowers**” syndrome, whereby public servants are the uppers and farmers are the lowers. Communities never see agency staff visiting farmers for community benefit. Consequently, mistrust between agencies and farmers have grown to such an extent that farmers disbelieve any outsider who approaches them propagating services for community benefit. Community-based volunteers can abridge the communication gap easily, as colleague-farmers trust them more than the agency staff, or outsiders.

- b) Volunteers can undertake community mobilization much quicker and with almost no monetary cost involved.

Figure 2. Methodological Framework for Mobilization of SOVs.



- c) Even if agencies and other catalysts visit the community quite frequently, a considerable gap between two consecutive visits exists, as staff is limited when compared to the area and population to be serviced. Once an outsider visits the rural areas, explains something to community members, and leaves for a few days, rumor-generating factories start their work, resulting in the community becoming confused between what to believe, and what not to. Since volunteers are based among communities, they can undertake conceptual clarity and encourage the community to accept change.

Thus, the involvement of Social Organization Volunteers was perceived to contain the following added advantages:

- a) Interventions could be routed through local people, leaving little room for mistrust;
- b) SOVs could reach communities along the large pilot distributary command area fairly quickly, partially meeting the project's time, financial and human resource constraints; and
- c) As SOVs were deployed on a voluntary basis, the method was cost-effective and could easily be replicated on a wider scale.

2.2 Selection Criteria for SOVs

As the activity of organizing water users involved a complex social organization process, it was important to select the correct type of persons as SOVs. The central idea was that the community should see SOVs as friends assisting and guiding them to resolve several deep-rooted problems existent among irrigation communities. For this reason, a number of factors had to be considered. The main criteria for selecting SOVs were that SOVs should:

- a) be imbued with an initiative to work with the community, and see the value in collective behavior for common good;
- b) be honest so that water users would trust them;
- c) possess communication skills and a willingness to engage in two-way communication; the SOV could, thus, disseminate *SOFTware* messages to the community, and also be able to

communicate effectively with outsiders who wanted to engage in collaborations with the local people;

- d) be well informed about the area, local languages, castes, traditions, rituals, and other community characteristics, as well as details on water and land resources in the area, and generally, about irrigated agriculture;
- e) be non-controversial and not seen as an anti-social element in any way;
- f) be educated, with the potential and ability to be trained as community-based social organizers;
- g) preferably have experience in speaking at public gatherings (an added advantage);
- h) not necessarily be a farmer, a big land owner, or an influential person; and
- i) not be an aspirant to any WUO office, nor expect any reward from *SOFTWARE* for services rendered.

2.3 Identification of SOVs

The fieldwork, to identify SOVs, was initiated during the fourth week of September 1995. The first task was to train IIMI-Pakistan's field staff to conduct field interviews for this purpose. The staff was trained by conducting a series of ad-hoc "walk-through interviews" along different watercourses. The senior and experienced members of the team explained the purpose of this activity to the team, as well as the content and process of what was to be communicated to the water users, including preliminary information about the purpose of IIMI-Pakistan's pilot project. After each interview, all the members of the field team evaluated the content, methodology, and the style of interviewing and made some necessary modifications. This training exercise continued for two days.

Based on initial field information, the field team members collectively decided that the number of SOVs to be identified could vary along each watercourse. In general, however, two to four SOVs should be selected, depending on the heterogeneity of the characteristics of the water users' community and based on farmer's opinions and the set of criteria mentioned earlier. Field teams consisting of two persons would have informal individual meetings with the farmers to identify a few SOVs along each watercourse.

Since the irrigation communities in the area are concentrated in 41 villages of the command area, and a number of watercourses irrigate the lands of the same villages, it was decided that the SOVs should be identified along social, instead of hydraulic boundaries.

After the new methodology to identify SOVs to help the field team was introduced in December 1995, the process started to take off smoothly. By mid-May, 1996, SOVs had been identified in all 41 villages. The number of identified SOVs, in general, varied between 2 and 6 per village; two in cases where the village was small and homogenous, and more as the heterogeneity within the village increased. In most villages, the number of selected SOVs was between 4 and 5. In two villages, however, only one SOV was considered necessary, as only one or two persons owned the land. However, no strict criteria were followed to decide the number of SOVs per village. The distribution of SOVs, by sub-system², is given in Table 2. The table indicates that a maximum number of SOVs was selected in Sub-system 5, and the minimum in Sub-system 4. These numbers also reflect the relative size of the sub-systems. Almost the entire community resides in two major villages and a number of hamlets in Sub-system 4, which only has 15 watercourses and is the smallest of the 5 sub-systems. The water users of Sub-system 5, which comprises 33 watercourses, reside in 11 villages.

Table 2. Details of Identification Process of the Social Organization Volunteers.

Sub-system	Number of Villages	Number of Watercourses	Number of Water Users Contacted	Number of Persons Referred as SOVs	Number of Persons Selected as SOVs
1	9	25	146	159	29
2	9	23	132	120	30
3	8	27	63	108	32
4	4	15	83	28	13
5	11	33	61	140	54
Total	41 ³	123	486	555	158 ⁴

² The pilot Distributary was sub-divided into five hydrological sub-units. These sub units are called Subsystems. The subsystems 1,2,3,4, and 5 comprise RD 00 to 46, 46 to 72, 73 to tail, Minor IRA and Minor IR, respectively. For details, See Mirza et. al, 1996.

³ Apart from these big villages, there are many small additional settlements called azali basti or tibba (farm houses and hamlets).

⁴ After the initial selection, adjustments were made including some additions and deletions to this number during the awareness building meetings.

2.4 Important Socio-economic Characteristics of SOVs

The important characteristics of SOVs selected are presented in Table 3, which reveals that almost all the SOVs owned some land. Some owned land as well as cultivated land on rent or sharecropping. Only two SOVs belonging to the middle reach did not own any land. Understandably people generally preferred to select SOVs owning some land, as they believed that the persons who did not own land could not understand problems related to irrigated agriculture, or that their interests might be different.

The caste structure indicates that the water users from each of the sub-systems, predominantly, preferred SOVs from one or two castes. At the head reach, Rajputs were mostly referred and selected; at the middle and 1-R Minor, Arains; at the tail reach, a mixture of Arains and Jats; and at Minor 1-RA Wattoos were in the majority. Each village had, to some extent, one major caste, and most farmers tended to prefer SOVs selected from that major caste. These results conform to those of the baseline survey conducted earlier by **Cheema et. al. (1997)**.

A majority of the selected SOVs was educated. Almost half had attained ten years of formal schooling, and above; in no subsystem did this proportion drop below one-third. Perhaps farmers believed that educated SOVs had a better understanding of the common problems and could communicate this better. The *SOFTWARE* also preferred educated persons as they were found to be broad-minded, open and critical, easy to communicate with, and had an ability to absorb training imparted.

2.5 Suitability of SOVs to Program Objectives

Of SOVs selected, 148 were evaluated by respective area Social Organizers. The selection design incorporated two important elements: a) preference should be given to those possessing the majority of traits as defined in the selection criteria; and b) selected SOVs should also be supported by the majority of the water users contacted to assist with their identification. The results of the SOV evaluation are reflected in Table 4, which indicate that almost three of four SOVs fulfil most of the criteria. Similarly, the community had recommended almost a similar proportion of SOVs as contact persons.

Almost all the identified SOVs resided either within the village, hamlets around the village, or at the farmhouse (*dera*). This helped the process of organizing water users, as they were available and easily accessible when compared to those who resided in the town, or elsewhere. Some of those referred as SOVs by communities owned land in the village, but were resident in the town. After some discussion, there was agreement not to select these people as SOVs.

Except for Sub-systems 3 and 4, a majority of the SOVs was known to have some political affiliation. Regardless of their political leanings, the selected SOVs displayed a willingness to work with *SOFTWARE* on this program, and appeared to be unconcerned by the general belief that the government was going to "sell" or privatize the system.

Table 3. Important Socio-economic Characteristics of SOVs by Sub-system.

Characteristics	Subsystems					System Hakra 4-R Distributary
	Head Reach	Middle Reach	Tail Reach	IRA Minor	1R Minor	
SOVs (No.)	29	30	32	13	54	158
Average Size of Holding (Acres)	47.22	39.23	20.42	23.46	35.70	34.38
Owner-Cultivators (%)	100	93	100	100	100	99
Educated (%)	66	80	75	77	80	76
Matric & Above (%)	31	53	41	38	52	45
Resident within Village or at Farm (%)	100	97	100	100	98	99
Politically Neutral (%)	27	33	81	69	11	37
Community/ Collective Workers (%)	86	47	75	69	74	71
Local Leaders (%)	10	20	19	8	7	13
Caste Jat (%)	3	17	34	0	13	15
Caste Arain (%)	3	30	38	0	53	32
Caste Rajput (%)	66	23	6	0	4	19
Others Castes (%)	28	30	22	100	30	34

Other water users, indicating their neutrality and potential to be apolitical did not oppose the majority of SOVs selected. This is further supported by the fact that most of the referred and selected SOVs have, formerly, already played some role in community/collective work. The proportion of local-level leaders, such as members of the Union/District Councils, *Usher* and *Zakat*

Committees⁵, as well as members of the old Basic Democracy system, is very low, and ranges from 7 percent in Sub-system 5 (Minor 1-R) to 20 percent in Sub-system 2. This indicates the water users' preference to avoid such representatives. When questioned, some people openly described such persons as those who, usually, tend to use their powers and status to maximize personal gain, rather than work for common benefit.

Table 4. Community Support and Suitability of SOVs at the Hakra 4-R Distributary.

Criterion	Number	Percent
Favored by majority of water users	106	72
Fulfilled most criteria	108	73
Favored by the majority, but did not fulfil most criteria	39	26
Fulfilled most criteria, but not favored by the majority	39	26
Favored by the majority and fulfilled most criteria	68	46
Did not fulfil most criteria and were not favored by majority*	2	1

* Along two watercourses, the entire land belonged to a single family. The landowners on these two watercourses had to be selected as SOVs because without their consent and support, the organizational work could not be undertaken

Almost half of the selected SOVs fulfilled most of the criteria and were also considered suitable for the job by the community. Around one-fourth of SOVs were not favored by the majority but fitted into most of the criteria. Another one-fourth did not meet most of the criteria but were favored by the majority of the persons met. A small, but interesting, group of selected SOVs comprised people who were neither favored by the majority, nor met most of the criteria, but were still selected by the SOs. The reason for their inclusion was that they were extremely influential. If excluded, they had the potential to sabotage forthcoming organizational activities. They might have considered ignoring them in organizational work indicative of their respect in the community. Thus, the SOs wisely chose to include such persons in the group of selected SOVs.

2.6 Role of the SOVs in Community Mobilisation Before Training

After the selection of SOVs, a series of "rapport-building" meetings were held with these groups at the village level, where the participation of the general water users was also encouraged. This step was perceived as important in the process of organizing water users. The purpose of the first series of informal small group meetings was essentially limited to create awareness about IIMI-Pakistan's international character, its field team and the main objectives of the pilot project among SOVs. The

⁵ These committees refer to the committees that were formed for collection of Islamic taxes on agricultural production (*Ushar*) and family assets (*Zakat*).

SOVs were curious about these matters, which had to be satisfied in the most positive manner possible. Extreme cordiality was extended to the groups, and attempts were made to make everybody feel comfortable. The room was intentionally left for another series of meetings to discuss the water users' water-related problems and possible solutions so that the curiosity of the community builds up.. This set of meetings was ad-hoc, unstructured and informal.

Since Social Organization Volunteers were to act as a core group, or an essential link between *SOFTware* and the community, it was decided that the team should take initiatives from the Social Organization Volunteers only. Team members who identified the Social Organization Volunteers were asked to organize the times and places of meetings in consultation with them. Lahore-based IIMI-Pakistan staff assisted the team to conduct these meetings. The irrigation agronomist led the discussions, drawing on his long years of experience in organizing water users to his credit. Another decision was for meetings to be initiated from the tail end of the distributary, as water shortage here is more acute, and water users would be more interested in solutions to water-related problems. The first of the meetings was held on January 23, 1996, and the last, on July 6, 1996. In some parts of the command area the identification of Social Organization Volunteers was still in progress during that period.

Most meetings were started on an informal note by posing questions about the conditions of crops, situations of water supply and about the general problems experienced by farmers in irrigated agricultural. Farmers displayed a great interest in explaining their problems, especially those related to irrigation water, inputs and marketing the produce. Afterwards, these problems were linked to prevailing individualism among the farmers and the absence of organized behavior. The majority agreed with the team. There used to be exhaustive and hectic discussions about the role of the Irrigation Department, influentials, and in general, about government discrimination related to water and other input distribution among common farmers.

In general, the SOVs were initially suspicious about IIMI-Pakistan's activities, as many activities along the distributary were being undertaken by several agencies. Many attributed this to an earlier socio-economic survey, in which many questions pertaining to crops, production; water charges (*abiana*) and income, etc. were asked. The survey team told them that they were part of the privatization team. An effort was always made to clarify these misconceptions and to introduce IIMI-Pakistan in its true construction as an international institute working in several developing countries for research on irrigation management. 'That IIMI-Pakistan was not striving for privatization rather a joint (decentralized) decision-making among farmers and operating agencies was the main concept for organizing the farmers. Much criticism was still faced when these meetings first started.

When explaining the program, it was made clear to the participants that IIMI-Pakistan's team could not solely organize the water users unless they took an initiative and participated actively themselves. The reasons given were:

- Due to the vastness of the irrigation system and the lean resources of a small IIMI-Pakistan field team; and
- IIMI-Pakistan team members were outsiders, and may not have been able to communicate with the entire water users community along a large distributary effectively.

The output of these meetings was that most of the Social Organization Volunteers had their concepts about IIMI-Pakistan's role clarified, and promised to help disseminate the message among the community. They also expressed a need to organize themselves at the distributary level. Many however, were of the opinion that though they considered the job "virtuous", it was very difficult as the farming community is divided in existent clashes among several classes. Moreover, people may not have accepted the idea, as the possibility that former negative experiences from organizations, such as political governments, cooperative societies, *Zakat* and *Usher* Committees, Fertilizer Committees, etc., which were politicized later. The influentials were already using their positions as opinion leaders for personal benefit and there had been fears that such influentials could hijack the newly formed water users organizations.

In many villages, meetings were arranged at the residence of a Social Organization Volunteer, with other Social Organization Volunteers contentedly participating. In other villages, meetings were arranged in schools or in an open space somewhere in the center of the village, where various Social Organization Volunteers had familial or other clash. In a few villages, certain Social Organization Volunteers did not participate in the meetings because an opponent, another SOV, had also to attend the meeting.

The intention of these meetings was more for clarity of concept about IIMI-Pakistan and its pilot program, and to motivate SOVs to act as an extended part of the team to disseminate the idea of organizing a Water Users Federation (WUF) along the Hakra 4-R Distributary. The impact, at a few places, was only marginal as some SOVs expressed their reluctance to reach common water users as they considered it a time consuming exercise. Some other SOVs feared that their assistance was being sought for imposing a foreign management at the distributary. A few of them did not want to reach disadvantaged classes, such as tenants as they considered them of lower status.

During these meetings, the level of participation was quite satisfactory, with only a few exceptions. In one village, for example, no one was present at the agreed time and place; the Social Organization Volunteer whose residence was the meeting place, was himself not there. Similarly, at some other locations, a delay of a half to one hour was experienced because SOVs did not attend, even after dispatching a special messenger to notify him that the meeting was waiting.

In most of the villages the response was marvelous. Many more water users actively participated, mainly out of curiosity. In one village, someone announced the meeting on a mosque loudspeaker, and consequently, 40 water users participated. At the conclusion of each meeting, the Social Organization Volunteers were requested to discuss the idea with other water users, clarify their misconceptions about IIMI-Pakistan, and convey the message to other water users so that awareness would rapidly be created. Details of participation for various sub-systems are given in Table 5.

Table 5. Participation in Awareness-building Meetings for Social Organization, by Subsystems, along the Hakra 4-R Distributary.

Sub-system	No. of invited SOVs	No. of Participating SOVs	No. of Participating WUs	No. of Villages	No. of Meetings
1	27	18	25	9	4 ¹
2	29	20	62	9	6 ²
3	28	26	59	8	8
4	17	11	17	4	2 ³
5	57	36	57	11	11
4-R	158	111	220	41	31

Notes:

- 1 The populace of several villages overlaps, therefore, 6 villages were covered in 3 meetings. In one village, dominated by an influential, no one was ready to become a Social Organization Volunteer. Therefore meetings were not held.
- 2 Two of the villages are very small and the land belongs to two persons only. Instead of conducting a meeting, they were briefed individually.
- 3 The entire population in this sub-system either lives in the main village *khatan* or *deras*. All the Social Organization Volunteers displayed their interest to attend the same meeting, thus, only two meetings were held.

Participants in these meetings were not passive listeners. Rather, they engaged in long discussions and debates about the program, and water users gave several good proposals. In several meetings, WUs voluntarily offered their services to compile water users lists, which indicated their motivation to do the job. In the head reach, however, participants were reluctant. This area is unique in the sense that several watercourses irrigate lands of different adjoining villages, thus, water users are unaware about other shareholders residing in other villages. They proposed that if the official *warabandi* lists could be acquired, they could indicate the changes.

These meetings also helped to identify other motivated persons who would have served as better Social Organization Volunteers. They were included in the Social Organization Volunteer lists for respective villages in order to exploit their services later during the process.

The desired impact of this set of meetings was for Social Organization Volunteers to start discussing IIMI-Pakistan and its project with other shareholders along the watercourses. Eventually, the community would start to consider the option of becoming organized into WUOs at the sub-system level with a WUF at the distributary level. In March 1996, when Social Organization Volunteer identification was still in progress at the head reach and a round of awareness-building meetings was taking place at other reaches, a follow-up survey was conducted in 7 villages to assess the impact of these meetings. Awareness-building meetings had been conducted there around a month, or longer, before. The methodology followed was similar to that for identification of Social Organization Volunteers, i.e., meeting farmers in the fields, on roads, in hamlets and villages, etc..

The results showed that Social Organization Volunteers had not started discussing it with water users yet. The results of the follow-up are presented in Table 6.

This survey indicated that Social Organization Volunteers had not started their perceived role of informing people and discussing the possibilities of becoming organized yet. Besides these investigations, several informal discussions proved that even for those who were aware, the Social Organization Volunteers were only partly sources, and that the messages communicated were very general, particularly about IIMI-Pakistan and rumors about metered assessment of water charges. In one such villages along the tail reach, for example, a Social Organization Volunteer advocated that IIMI-Pakistan was striving to privatize the irrigation system by installing meters through the users' participation, and that water users were happy about it as privatized systems are more efficient! The team never talked about this.

Table 6. Village-wise Findings of the Follow-up Survey in Selected Villages of the Hakra 4-R Distributary.

Name of the Village	Number of WUs Met	Awareness about the Pilot Program by:		No Awareness about the Pilot Program (Percent)
		SOV (Percent)	Other (Percent)	
53/4-R	6	16	0	84
55/4-R	10	50	40	10
58/4-R	4	0	0	100
62/4-R	10	0	0	100
63/4-R	5	80	0	20
64/4-R	5	20	0	80
65/4-R	9	0	11	89

Social Organization Volunteers had clearly expressed that they understood the program and were eager to cooperate in disseminating the program to ensure full participation of the users for their own benefit. Their low involvement in the basic steps of the organizational work helped the team to decide for training the SOVs first, and then to mobilize them. Therefore, a social organization training course was conducted for the SOVs.

3 SOME INITIAL PERCEPTIONS OF SOVs

Initially, when SOVs were first being recruited and the team started developing a rapport with them, they expressed certain apprehensions about the project, as many had seen team members moving around the distributary.

In the beginning, peoples' general attitudes towards activities related to organizing water users was negative because rumors about the irrigation system's privatization, the installation of meters for water measurement, and increased water charges, were quite common in the area. These rumors had created doubts and confusion among the community.

The social sensitivity and political vulnerability of this action research effort became known immediately after fieldwork for rapport building and identification of SOVs was initiated. Almost every water user interviewed, made reference to a story that people riding around on motorcycles bearing yellow number plates (IIMI-Pakistan's) were part of a team from a "private sector distributary management" contractor, sponsored by America or the World Bank. They thought that the new management was going to install water meters at the outlets to record the amount of water passing through the structures and that this information would be fed into calculators (computers) to prepare water bills. According to rumormongers, these new bills would be enormously high, "about Rs 500 to 1000 per hour", like WAPDA's electricity bills.

Upon further investigation, it was discovered that the causes for such doubts, confusion and fears could be manifold. As informants described the background to their doubts, the following story unfolded:

Firstly, they had seen IIMI-Pakistan field teams working with foreign students: calibrating the outlet structures and distributary with flumes and current meters, and conducting a 36-hour long inflow-outflow test along the tail reach. Later, in October 1995, they had again seen about 50 people, with foreigners, in the vicinity of the distributary. This coincided with when IIMI-Pakistan staff conducted the "Calibration of Irrigation Outlets" training course along the Hakra 4-R Distributary. They had seen foreigners, accompanied by locals, visiting the distributary and meeting villagers in some surrounding villages (IIMI-Pakistan work involving the collection of information to assess community characteristics). Staff from local research institutes (IWASRI, WAPDA's WMED and ISRI) conducted ponding tests and outlet calibrations in different reaches of the distributary during the 1995 closure period. They had also heard that foreigners (possibly several expatriate missions) visiting the Haroonabad area had stayed at WAPDA or PID rest houses.

These stories were talked about in every village, in agro-supply shops and the grain market in Haroonabad. That the Hakra 4-R Distributary had been identified for privatization, or for sale to a foreign company, was commonly believed among the people. One villager remarked, "The country is being sold to foreigners step-by-step, just like the Mughal emperors sold the subcontinent to the East India Company."

These rumors spread like wildfire and were further fuelled by statements from groups with vested interests who were, generally, opposed to social organization among water users. Such rumors had an extremely damaging effect on the fieldwork. The field team had to engage a considerable amount of time to clarify these misunderstandings.

3.1 *Perceptions about Water-related Problems*

The main irrigation problems highlighted through discussions with the water users are:

- A high incidence of waterlogging and salinity in the head reach due to consistent seepage and over-irrigation, breaches, poor maintenance, etc., and a general shortage of water at the tail reach.
- The distributary is silted up and draws less water than the design under normal flow conditions.
- The inclusion of more area (as CCA, and as additional water allowances for orchards) than sanctioned for additional water at many outlets, without altering the outlet designs to draw more water from the distributary, further reduces the per acre time allocation and the amount of irrigation water per acre.
- The authorization and approval for reclamation shoots to cultivate rice is not granted in good time, which further aggravates waterlogging as the rice crop wilts due to water shortages in the crop's early stages. For areas other than the head reach, equity is disturbed, as the sanctioned discharge for these shoots is not accompanied by a corresponding increase in the sanctioned discharge for the distributary.
- High water supplies when the demand is low, and low water supplies when the demand for water is high.
- The unreliability of water supplies for rotation among distributaries is not properly implemented as influentials at other distributaries manipulate rotation schedules.
- Consistent seepage from unlined portions of the watercourses, loss of already scarce water, breaches and overflowing watercourses.
- The timing for the annual closure is inappropriate, as, during this period, water is badly needed for the wheat crop. The maintenance tasks that should be carried out during this period are not attended to. The duration of the closure is also much longer than stated in official documents, or as announced by the Irrigation Department. Water users are not informed about the dates of closure commencements and conclusions.
- Corruption in the Irrigation Department makes free riding possible within the distributary command area and disturbs adequacy, equity, and reliability of water supplies. Corruption

also enables some influentials to usurp other WUs' shares. *Baidars* themselves tamper with the outlets for rent-seeking purposes and cut trees growing along the distributary. They do not perform their duties to maintain the distributary properly, but rather, work at the residences of the PID officials

- Gauges, to indicate the amount of water, are installed deeper so that these can reflect a higher proportion of water in the canals and distributaries.
- The distributary's bed level is lower and the land higher, which creates an improper water flow and thus, outlets draw less water in the head reach.
- Water users are even prepared to pay increased water charges if the adequacy and reliability of water supplies are ensured.
- Canal banks are weak and cannot bear the authorized discharge. Rather, full, or excess, supply may cause breaches.

3.2 Perceptions about Other Agriculture-related Problems

Apart from water-related problems, the water users and farmers in the area indicate several other problems. Some of these are discussed below.

- Agricultural inputs, such as fertilizers, seed, pesticides, etc., are not available at the time and in the quantities needed. Intermediary black-markets, especially for fertilizers, charge prices generally ranging between Rs. 20 to Rs. 50 more per bag for spot selling, and even higher for supplies on credit. They also believe that the local administration is involved in this racket. Moreover, at critical times when the farmers need only DAP they *have* to buy urea as well, and vice versa. Fertilizer dealers say they are helpless to the situation, as factories adopt policies that allow increasing the price without notice.
- As for pesticides, the quarantine is improperly implemented and several complaints about the quality of these (that they do not kill insects) have been forthcoming. One farmer informed that his goat drank some spray material, but did not die; he took it to the dealer to question the presence of lethal substances.
- Fewer farmers are interested in seeds, as the prices charged are very high. Some progressive farmers, however, complain that they do not get what they buy. The seed bag purchased claims something other than it contains.
- Agricultural knowledge is also not available. Extension staff members only visit influentials and big landowners, thus, the demonstration effect does not take place. Several farmers want to cultivate crops other than the traditional crops, but are constrained due to lack of proper information. Agricultural credit is absolutely unavailable. Whatever credit is disbursed by the Agricultural Development Bank (ADBP) is not utilized to raise crops, but to fund social obligations such as marriages and other events.

3.3 Perceptions about Water Users Organisations

Most water users attach strong value to becoming organized in order to solve agriculture-related problems. They believe that the main reason why their problems remain unsolved is because *they do not have a union*. They do, however, have several curiosities, and fears, about unions.

- As a pilot project, no loss, or damage, to anyone will be experienced; in case of failure, water users can revert to the traditional system.
- If water users stand united, they cannot be harmed. The system discriminates against powerless individuals. Collective behavior will ensure that everyone will try to keep the users happy. The water users have to be courageous to overcome their fears attached to influential and corrupt people and the ID, who will be unable to harm the water users when they are united.
- Water users can operate the distributary on the same basis as they do for watercourses; as they are managing the watercourse successfully, the same is applicable to the distributary, i.e., collective desiltation, consultation, joint resources, etc.. When farmers own the distributary, they will care for their own property, even if no immediate benefit is evident.
- If the federation has powers to implement its decisions, economic and social sanctions against free riders and the administration helps to implement its rules and bylaws. This will ensure its success.
- Water stealers and free riders will be punished; influentials and tenants should be equal before the law.
- WUOs should be established under government supervision so that the government will recognize these as corporate bodies. The government should trust that the WUOs are helping them to control the financial implications of bad management. WUOs should engage support from the government, the ID, the administration and the catalyst (IIMI-Pakistan).
- Each watercourse and village should have its own grassroots level WUO; two people from each watercourse are enough. Members should be educated and honest, and should be elected in meetings.
- There should be a complete check and balance system for proper functioning of the WUOs.
- WUOs should also solve other farming problems.
- Sincere powerful persons should also be selected, as the poor and powerless cannot do anything against relatively strong free riders.

3.4 Perceptions about Problems in Organising Water Users

The SOVs perceived that though organizing water users was a virtuous job and the farmers needed an organized forum badly, there were still a number of factors that could prohibit the organizational process. They forwarded a number of constraints and threats, as mentioned below:

- The majority of farmers is poor and illiterate. They do not understand what IIMI-Pakistan propagates. Even if they are able to understand they find it hard to believe that efforts have been launched for the benefit of common people, as their experiences with government policies and administration is negative. They have their doubts and suspicions that efforts like these may cause further inequity and injustice as the big landlords may, and influentials will, lead. They also believe that they have no role to play in decision-making because they are poor. Thus, it will be hard to convince them to become organized for greater participation.
- Almost all the farmers fear that meters are being installed, that “the blond people” have bought the distributary on contract and will install meters and manage water strictly with the help of the local people. Very high water rates will be charged (@ Rs. 500 to Rs 1000 per hour), and that, too, in advance. People who are aware about the country’s history believe that the country is being sold step-by-step, like during Mughal rule in the 18th century, to America or the World Bank.
- Powerful and influential agriculturists dislike such changes as these organizations pose threats to their power status. They will make it impossible, or inhibit the process through illegal means by threatening the water users who show their interest. Another fear is that those who become office bearers will be abducted, and some even fear being killed, as they would have to file complaints against influentials (because they are the free riders) through this organization, or that office bearers would be caught in forged murder cases.
- Landlords have no interest because they receive rent for their land. Such changes would only cause more outlays in the short run, which they do not want. They will kick out their tenants; owner-cultivators will not join an organization that contains non-owners (tenants), as they are not regarded equals in status.
- Also, the rich will outwit the poor residing along the distributary by manipulating these organizations to cater to their own interests. They can influence being elected as office bearers, who will definitely be influenced by MPAs, and MNAs, and party and *baradari* politics will step in. Social reformers such as IIMI-Pakistan are never welcomed by these societies as these try to change the norms and rituals that will result in resistance from the water users, agencies and politicians. Farmers are highly egoist, and generally, are not open to compromise.
- People do not cooperate in collective work. Rather, they maximize personal gains.
- Office bearers may also become corrupt due to powers vested in them; thus, they will

discriminate against others.

- Farmers are relatively simple; they will be defeated in table talk by crook ID employees and influentials.
- This endeavor will only succeed if implemented under ideal conditions, such as honest individuals in office, the PID favors participation, the administration is supportive and justice is maintained, which is less realistic as, in general, people support dishonest, corrupt and powerful people whenever someone has to be elected.
- The question of whether office bearers will have enough spare time for organizational activities when they also have to earn living, also needs consideration. They may lose interest if they feel this takes too much of their time.
- If people do not show up at the request of their representatives, they will be in trouble.
- Farmers cannot become organized themselves, they need a catalyst.

3.5 Perceptions about External Threats and Doubts

- The responsibilities of water users are unclear.
- IIMI-Pakistan vehicles bear American numberplates, therefore, who supports IIMI-Pakistan (Pakistan, America, World Bank or CIA?) also remains a big question for the simple farmers.
- The canal is on contract.
- *Patwaris* are telling water users not to listen to IIMI-Pakistan staff, as no benefit for farmers is involved.
- Can corruption be eliminated?
- Water users have placed their trust in this, but they do not know what to believe.
- If the irrigation system is going to the farmers, there will be a massacre (fights, quarrels etc.).
- People thought that meters were being installed because of the presence of foreigners working along the distributary.
- Changes in governance may affect IIMI-Pakistan's program.

3.6 Perceptions about Water Rates / Costs / Funds

- Will the water rates be drastically increased, like that of electricity by WAPDA; will the water bills be prepared on calculators (computers); if *abiana* increases, farmers will be buried alive; if participation means paying more money, water users cannot afford extra finances because most of the farmers are poor.
- What will the unit of water rates be (per acre / per crop / per minute / per cusec / per year) and will it be collected in advance?
- Who will collect water rates and what will happen if that person does not deposit money with the organization?
- What if free riders do not pay water charges or fines, etc.? If WUO fines someone dominated by those in power, who will have the courage to collect it?
- Those who need and use water will pay, and others will not.
- Who will provide the financial and technical assistance that water users need?

3.7 Perceptions about Water Availability / Supplies

- Everyone will get his right; there will be equity and justice; full water should be received at the head of the distributary.
- If water is short at the head people will say that the system (joint irrigation management) is not good.
- The outlets should be installed in a manner that prevents water stealing through tampering.
- There will be no reclamation shoots.

3.8 Perceptions about the Role of the Irrigation Department

- The PID is corrupt. The rich and influentials breach the distributary with the PID's consent. PID employees seek and earn rent; thus, the PID will never accept this change. PID staff will refuse to negotiate, and even if this happens, technical people will still be needed, as the system is technical (PID will still be corrupt and there will be no change).
- *Patwaris* and *gurdawars* (crop assessors) are leaving, meaning less corruption. If *patwaris* and *gurdawars* are laid off, there will be higher unemployment.

Table 7. Some Initial Perceptions of the SOVs along the Hakra 4-R Distributary.

Statements	Total (n=103)		
	Yes	No	No Comments
Less irrigation water at peak demand and abundance during slack periods	68 (66)	7 (7)	28 (27)
General shortage of irrigation water at the tail	55 (53)	10 (10)	38 (37)
Distributary does not run at designed discharge	17 (17)	2 (2)	84 (81)
Distributary rotation is improper	29 (28)	0	74 (72)
Annual closure timings is inappropriate	10 (10)	1 (1)	92 (91)
Irrigation water is a problem due to corruption	72 (70)	0	31 (30)
Poor maintenance causes irrigation problems	21 (20)	0	82 (80)
Water users can pay more if they get adequate and reliable water supplies	4 (4)	0	99 (96)
Agricultural inputs are black-marketed	40 (39)	0	63 (61)
Agricultural inputs are sub-standard	30 (29)	0	73 (71)
Pilot testing of the Joint Irrigation management is not harmful for farmers	74 (72)	2 (2)	27 (26)
Unity is strength	79 (77)	3 (3)	21 (20)
Water users' participation will improve water distribution and other water problems	79 (77)	8 (8)	16 (15)
WUOs only successful if they have the power to implement decisions	33 (32)	0	70 (68)
WUOs should also solve other agricultural problems	10 (10)	0	93 (90)
Big landlords and influentials will hijack WUOs	11 (11)	0	92 (91)
To organize farmers and to ensure successful implementation of the pilot, a catalyst is continuously needed	13 (13)	0	90 (87)
WUs were suspicious because of foreigners in the team and area	40 (39)	0	63 (61)
Influentials will act as barriers in the way of WUOs	26 (25)	0	77 (75)
Success depends on the education and honesty of the office bearers	33 (32)	0	70 (68)
Those ready to help IIMI to organize people	80 (78)	0	23 (22)
ID's / government's participation is inevitable for success	18 (17)	0	85 (83)
Illiteracy, poverty and lack of awareness are main hindrances in organizing WUs	8 (8)	0	95 (92)
People in WUOs will maximize their personal gains	11 (11)	0	92 (91)
Legislative amendments needed for recognition of organization/joint management	9 (9)	0	94 (91)

Note: Figures in parenthesis are percentages of the total.

4 TRAINING CONTENTS AND ORGANISATION

The total number of potential trainees (154) was considered too big for training in a single group. Besides, the trainees belonged to five different socio-technical sub-systems, which were spatially quite far from each other. Therefore, it was agreed that a one-day session, per sub-system, would be held. Participants were invited individually by respective social organizers through personal contact in addition to a letter of invitation. The training program is presented in Annex I. At the end of each training course the participants were awarded certificates and a souvenir, a wall clock with IIMI-Pakistan's logo and an Urdu inscription. The text of the inscription stated, "*Farmers' participation in managing irrigation at minor / distributary level: need of the hour*"

A few very active SOVs made adequate arrangements for participants at each training site. A recitation from the Holy Qur'an was read at the start of each session. The medium of exchange was in *Punjabi*, the local language.

In the planning meeting between team members and the trainer, the contents of the training were finalized. The ideas discussed during various training sessions are briefly discussed in the following sub-sections.

4.1 Introduction

Since the field team leader and the irrigation agronomist already had interactions with the SOVs, it was considered appropriate for them to introduce the training and the trainer. The field team leader opened the training and requested the irrigation agronomist to introduce the contents to participants.

The introduction comprised an explanation about the step-wise process of the action research, method of identification of SOVs, their potential and expected roles, and finally, an explanation about the training program. The purpose of this training was firstly to motivate the SOVs to participate and be involved in the process. Equally important, was the participants' feeling of being consulted and introduced to each other. In each training session, the trainers were introduced to the participants and the participants were introduced to each other and similarly, to the trainers.

4.2 Community Development

The objective of this session was to open participants' minds to the dismal performance of development efforts implemented in rural parts of the country to date, and to identify the constraints and reasons for its failure, or partial success. This gave them a feeling of importance. The trainer briefly touched the following points:

Development is as old as human history. There are many facets and forms of development, i.e., technical, social, economic, community, etc.. The basic aim of all facets of development is to increase human welfare and minimize suffering. Therefore, human beings are the subject of all types of development efforts.

Community development can be seen as the end of all development efforts. There are several resources that can be used to contribute to community development. Two broad types of development resources, therefore, could be: a) Human Resource Development (HRD), and b) Physical Resource Development

4.2.1 Need for Human Resource Development

Even if physical resources are in abundance and its potential is not exploited by human beings, development will not take place. So, the presence and exploitation of both, human and physical resources, becomes inevitable. Human beings exploit and utilize physical resources. Similarly, an abundance of human resources alone is not sufficient. An optimum combination of both, physical and human resources is necessary to develop any community. For instance, if land is available, but nobody cultivates it, nothing will grow. As an example, barren desert lands, which nobody cultivates, can be seen, but nothing grows.

In simple words, human resource development can be explained as "how to learn to exploit physical resources to its maximum potential for the welfare of human beings or community development". Thus, Human Resource Development is an on-going process. This serves as both, an end and means to achieve human welfare.

The use of the physical resources created by Allah (God) has been given to humans, and they are to exploit these resources for their benefit, and that of others.

4.2.2 Approaches for Development in the Province

Governments initiate several development programs and projects for citizens to learn and benefit from. After the establishment of Pakistan, the first program initiated for rural development was called Village Aid, or "*Dehaat Sudhar*". The aim was for people to participate and utilize their resources for ownership of the project. The physical interventions, unfortunately, became an end instead of a means to achieve goals, because the major emphasis was placed on the hardware and not on the software. Whenever the software side is ignored or planned half-heartedly, efforts tend never to be sustainable. People started grabbing direct benefits without learning that they should also participate financially to develop their area.

During the years 1958 to 1968, another program named the Village Works Program was initiated for agricultural development, but it was not very successful for farmers' welfare. This program was renamed the Peoples' Works Program during the Bhutto era from 1970 to 1977. But, again, problems remained the same. Similarly, there had been a program called the *Tameer-e-Watan* Program from 1985 to 1988, which is now called the Social Action Program (SAP).

Although all these programs intended to develop the community, the major emphasis remained on development of physical resources. An essential missing element is the sense of "ownership" among beneficiaries, which affects the sustainability of benefits.

The International Irrigation Management Institute, Pakistan (IIMI-Pakistan) has devised a program for farmers residing along the Hakra 4-R Distributary to be self-managing, self-supporting and self-reliant, so that irrigated agriculture can be improved. IIMI-Pakistan will only play the role of a catalyst to organize farmers. From that point onwards, farmers should be in and IIMI-Pakistan has to withdraw. The objective of the training is to provide some insights about organized behavior, which is an opportunity to learn how to improve conditions through organized action. Ideally, the result should be that farmers solve problems at their own level, and from their own resources.

There are many problems in organizing farmers for common benefit, but every problem can be solved; some at the local level and others at the government level. Some problems are individual and some are community or collective problems. The community itself can solve problems itself if it possesses the will. For example, villagers can construct their own roads and desilt their watercourses and distributary.

Farmers have already experienced collective efforts for collective benefit. For instance, they formed Water Users' Associations to get their watercourses lined, maintained and desilted. This is a common benefit as well as an individual benefit. God has asked people to cooperate to accomplish virtuous tasks. The Qur'an also stresses human rights (the rights of each other) and those who ignore the rights of God may be forgiven, but for human rights, there is no forgiveness. The hope was that farmers would identify their un-exploited resources and use these to solve the problems they face at the local level.

An example used during training was the state of Health Centers established by the government. Doctors were even appointed. If farmers are organized, they can ask why the doctor does not attend to patients. If an organization interacts with government agencies, farmers' correspondence will be of importance and influence impact. Thus, it is extremely important that farmers are organized.

4.2.3 Group Discussion: Identification Of Irrigation Related Problems and Solutions

Participants from different sub-systems were divided into groups to identify irrigation-related problems and solutions. Various groups selected their leaders, appointed a chart writer and started discussions. These group discussions were aimed at involving them to the maximum extent by discussing the problems and solutions, and preparing an inventory of these on a flip chart. At the end of each discussion, group leaders presented these to the audience. The problems and solutions identified by various groups are presented in the following sub-sections.

Problems and Solutions Identified by the Participants during Group Discussions

a) Design Problems:

Many groups were of the view that the extent of the command area determines the design of the outlet in principle, but practically, a large number of outlets have improper designs. Drop structures are poorly designed and construction material has been of poor quality. For many drop structures, the crests have been washed away, causing inequity. Unlined parts of the distributary and watercourses result in heavy seepage and overflows. For lined watercourses, the lining and

layout of most are sub-standard. In addition, some influential farmers manage by collaborating with the Irrigation Department to alter the design of many watercourses annually, which causes further problems. The bed level of the distributary, especially in the initial eight-kilometer stretch, is deeper than the crests of outlets that foster waterlogging in the vicinity. The outlets in this reach draw comparatively less water. Therefore, the topographic survey of the distributary needs to be conducted afresh. Metallic outlet structures are easily tampered with due to poor material and design. Besides, most times the water supply to the distributary is not according to its designed share.

The most prominent solutions recommended were to re-assess the distributary command area and re-do the slope survey of the distributary and outlets, etc.. Groups concluded that this could be done effectively by involving farmers groups in the work. Another solution to the design problems was sought in lining the distributary along the upper reaches to reduce seepage and breaches in the canal.

b) Maintenance Problems:

Irrigation system performance hinges on the quantity and quality of maintenance of the system. Many participants felt that the department ignores adequate and timely maintenance of both, the distributaries and the upstream system. For many years the main, branch and distributary canals have not been excavated. Whatever maintenance is undertaken, is of poor quality and is not prioritized in a fashion to meet the farmers' water demand. There is a very high incidence of the embezzlement of maintenance funds. Routine maintenance is also ignored, as responsible staff (lower cadre employees) is required to work as private servants of the higher officials. The banks have become weaker. The berms and main canals of the distributary have been cut due to erosion and vehicular activities. In many reaches, free boards have almost disappeared. These problems have reduced the carrying capacity of the canals and there is a general shortage of water. Siltation in some reaches, and scouring in others, has impacted equitable water distribution. The farmers in the tail reaches desilt their distributary and minors to get water. Since there are frequent breaches due to poor banks, PID forces farmers to fill these breach points with their own resources with threats to fine them otherwise. They also get penalized with fine for being accused for making deliberate cuts. The Irrigation Department's neglect of maintenance is shifted to farmers' anarchy, and they are required to refill cuts, etc., but the Irrigation Department claims the funds against these repairs.

The groups felt that effective maintenance is only possible if farmers are consulted and maintenance activities are directed towards those problems, ensuring a high payoff in terms of adequacy, reliability and equity. An effective interface between farmers' organization and the operating agency was considered of much value to prioritize, plan and conduct distributary maintenance. Participants were of the opinion that they were able to undertake maintenance, as they were already involved in performing maintenance tasks, such as repairing breaches and cuts, as well as distributary excavation on a self-help basis. However, they felt their roles need to be clearly defined and formally accepted by the Irrigation Department through their organization.

c) *Water Allocation Problems:*

Water allocation was identified as one of the most problematic areas. Most participants believed that the water allocation among various outlets was improper and did not correspond to the area to be served. One group of participants remarked that the “*flow of water into the watercourses was determined by the flow of money from farmers’ pockets to the Irrigation Department*”. Current allocation rules do not consider the soil type and condition. Provision of more water in the waterlogged areas in the name of *seasonal reclamation outlets* deprives other areas of water and also results in accentuating the groundwater level and salinity. Beside this, the allocation of additional water through seasonal reclamation shoots is not transparent and fosters corruption, inequity and injustice. The current allocation of water only meets one-fourth of the required amount. The water allowance for the orchards has not been amended although orchards no longer exist in the command area. People are misusing the water allowance for fish farms. Only influential landlords are able to acquire this allowance.

Proposed solutions largely focused on the adequacy of irrigation water. One proposal that was highly appreciated by the participants was that the watercourse shareholders could take initiatives for the installation of shallow community tubewells near the outlet structure to augment the water supplies at the time of extreme shortage in the main system. This would not only augment water availability but also help to maintain the groundwater level.

Participants also suggested that all additional allowances, such as seasonal reclamation shoots, water for orchards, etc., should be abolished as these not only induce corruption, but also affect downstream farmers by disturbing equitable distribution. Some groups were also of the opinion that allocation principles should be amended to suit different soil and topographic conditions in the area.

d) *Water Distribution Problems:*

Improper water allocation is further accentuated by improper water distribution. First, the rotation system designed for the southern canals is objectionable. The rotation program comprises a cycle of seven days. When the distributary is closed, one user does not get water for two consecutive irrigation turns. The rotational program is misused to please politicians and influential farmers. This also induces variability in discharges of water. Due to inadequate maintenance, the main canal does not carry the design discharge and resultantly, many distributaries are operated below their design discharges. If the discharge in the distributary is from the 75 to 125 percent regime, design constraints become more pronounced and equity cannot be maintained. The distributaries that are on least priority of the rotational cycle usually get full supply at the cost of others if an influential is located there.

Participants were very enthusiastic to highlight that water availability at peak demand periods is generally low, and abundant during slack seasons. There was a general shortage of water in the tail portions of the distributary. During the slack seasons, head and middle reach farmers managed to close their watercourses. This raises the water level in the tail reach and also causes frequent breaches.

The groups opined that rotational programs should either be abolished altogether, or be framed in consultation with farmers. The length of the rotation should be less than 7 days so that the same farmers are not affected twice. Rotational programs thus framed should be strictly adhered to and should not be changed at the request of influential farmers. Farmers could only manage the water shortage during peak seasons by augmenting it through community tubewells. The Irrigation Department should be responsible for effective regulation of the distributary during the periods of abundance, either by diverting less water from the river into the canal systems or to areas that are not yet commanded. If farmers' organization is granted powers of regulation, it could ensure that member farmers do not plug-off their outlets during water abundance periods.

e) Membership Issues for the WUOs:

While the groups were attempting to identify problems and solutions, especially during the last session, another group of people was idling nearby discussing other things. The stated reason for their non-participation was that others were doing the job. They were then requested to discuss the WUO membership issue among themselves. They concluded that all water users should be members, but that leaders identified should essentially be land owners, as they are regular while the tenants and contractors keep on moving from one place to another.

4.2.4 Facilitation and Group Dynamics

After the trainer's lecture, most SOVs enthusiastically joined the groups and hectic discussions ensued. Some SOVs, however, questioned the need for the exercise as they thought that they had already communicated the problems to their respective *SOFTWARE* members during the identification interview. They were told that the purpose of the exercise was to jointly identify problems and solutions common to all the water users in the area. One SOV in the tail reach objected to participants being divided into groups when the community was already divided into castes, sects and political and religious parties. He suggested that instead of gathering them, subdividing them once more might cause tension among the people. The trainers explained to him that the purpose for divisions was to investigate the situation more deeply. Small groups were manageable and the results of both exercises could be combined later. This answer satisfied him.

Although people participated in discussions quite vigorously, this was actually their first formal participatory experience. Many merely relaxed while others were doing the job. People initially hesitated to come forward to write on the white board. Several others were motivators for others, especially those thought to be more 'literate and educated'. Interest was generated once they had started.

An interesting feature of this exercise was that in many groups, it was felt that participants were focusing on all the solutions to be implemented by the government. The facilitators made it clear that the usual government strategy was to create departments and agencies to address these problems, but that with the passage of time most of these agencies became causes for more problems. Therefore, they needed to decide among themselves whether they still wanted the government to play a major role. The point was well taken and almost all the groups suggested an increased role for the Farmer's Organizations.

Some of the groups confused solutions and problems and started writing these in the same list, but the facilitators explained the difference between problems and solutions. The facilitators exerted exceptional ways to clarify the contents of the solutions, to identify: **who, when, how and the source of funds**, etc. to effect solutions, but some groups did not follow and the solutions recommended were too general.

4.3 Organising People for Community Development

4.3.1 Need to Organize People

The aim of this session was to catalyze their interests towards collective effort. As they had identified collective action as the major solution, they were to be briefed about how important formal organization was.

The problems and solutions identified by the groups indicated that there were some problems that need government solutions, though many problems could be solved by the community itself. For example, if water users feel that a watercourse is not properly maintained and creates wastage of water, they did not have to wait for the government to fix the problem. Rather, they could do it themselves. Similarly, an organized group is in a better position to exert pressure on government functionaries and leadership for solutions to problems.

In erstwhile years *panchayats* used to tackle most problems at the local level. The intention is for users to revise culture and values and start solving their problems with their own resources at the local level. The importance of getting organized was emphasized using several examples.

4.3.2 Importance of Organizational Structures

For everyone in the community to be involved everywhere and with equal contributions and input is not always possible. For instance, people may decide to construct, or to strengthen the village road. One way would be for everyone to dig the land and transport soil to level the road with. But, this is not very efficient, as they would be robbed of the time in which to earn their livelihood. The other way could be to involve appropriate specialists and to pay them through an organization. They may assign the job to someone they have confidence in, and then assess whether it had been done well. Thus, office bearers and leaders would represent them and act on their behalf. Indigenous family structures worked exactly the same. These are good examples of an organizational unit where roles and rules are clear and implemented without any major hindrances.

4.3.3 Scope to Organize People and Possible Hindrances

Here, the trainer explained that he had sensed from the group presentations that participants were ready for an organization that could step forward as their forum to solve their problems. This is very much evident from the solution they identified. Those who were ready to be organized were asked to raise their hands. Participants raised hands to show that they were in favor of an organization. The trainer explained that since the organizational efforts underway by IIMI-Pakistan were for the farmers' own benefit without any physical incentives, they had to help IIMI-Pakistan

to organize people voluntarily.

After they expressed their interest to become organized and help IIMI-Pakistan, they were made aware of the difficulties of the job, along with many problems and hindrances along the way. Participants agreed, and identified the following hindrances that could impede the process of organization:

1. At watercourses which irrigate the lands of shareholders belonging to more than one village, it will be problematic to gather everyone at one place.
2. The criterion for the leadership will vary from watercourse to watercourse and therefore, all the leaders may not be equally competent.
3. People may be less interested and therefore, may be reluctant to invest their time.
4. Polarization among water users due to castes, political affiliation, religious affiliation, etc., may impede the process.
5. Lack of confidence in identified leaders due to past experiences of politicized democracy, etc..

Although hindrances were identified in the tail reach, organizers were requested not to report these as those who oppose organized efforts for irrigation management, such as influential farmers and the Irrigation Department, may prevent the water users from becoming organized. This indicates the level of mistrust between the water users and operating agencies.

In 1-R Minor participants commented that the success of the program depended on the level of support given to the water users. If they were organized but had no powers, this would not work. Therefore, it is imperative that the proposed organization has authority and powers to implement its decisions.

4.4 Effective Communication

The trainer simplified the process of communication in the local language. The objective of communication (*Paigham Rasani*) is not for "one to another" messages, like a postman does his job. Rather, the result, or outcome, should be the objective, and how the target behaves as a result of the communication. The real aim is to achieve an objective using communication as a means. Essential elements of communication are:

- The source
- The target
- The message
- The media

If communication were not taking place, something would be wrong with one, or more, of the above elements. Possible problems could be:

- 1 the source is not doing well as he might have manipulated matters, or could not reach the community, or is not credible for the target;
- 2 the messages communicated are not in accordance with people's beliefs, customs and traditions. This may be anti-social or unrealistic, etc.; and
- 3 the target is unable to catch what the source says, meaning that the type of media is inappropriate. For example, using a brochure to reach an illiterate population, television media for poor communities who cannot afford television sets.

IIMI-Pakistan has identified SOVs as helping hands in consultation with the farmers of individual communities. Expressing the desire to become organized meant that they would have to help IIMI-Pakistan to carry out field exercises, convince, communicate and motivate farmers. The points mentioned above could help in identifying why communication was unsuccessful.

4.5 Voluntary Leadership in Organizing Communities

Since the SOVs were identified in consultation with the community, they were believed to be opinion leaders. The aim of involving them with the team was to fulfil the local responsibility of organizing people through them. Many of them expressed the need to be organized and promised to be helpful in the team's organizational efforts. Nevertheless, there could be a surprising amount of people who might oppose their selection as SOV because not all of them are equally impartial and respected in the community. The objective of this exercise was to help them to identify characteristics and qualities of unbiased and solid leadership based on their own standards of leadership. The SOVs could later help people to identify similar leadership on one hand, and to become credible by adopting some of these principles, on the other.

4.5.1 Group Discussion on the Characteristics of Volunteer Leaders

The trainer explained that a volunteer leader is one "who endeavors to uphold benefit for community welfare without any personal bias, greed or obligation and is accepted by the community". He should not be serving for any personal reasons (fame is an exception). Everyone has his own criterion of good or bad, so this is subjective. But, we can see that those who are good are acknowledged to be being good by the majority. Therefore, the groups were requested to make an inventory of the characteristics of a volunteer leader. This part of the training was very interactive and people's participation was very high. Some of the SOVs also tried to include religious standards, such as the bearded, people who pray regularly, etc. as the criterion for the leadership. A combination of the common characteristics identified by participants during all the five sessions are that a volunteer leader should be:

- 1 honest and impartial
- 2 hardworking, responsible and resourceful

- 3 courageous to listen to criticism from others, and still to remain polite
- 4 educated and well groomed
- 5 possessing confidence and support for people
- 6 self-confident
- 7 ability to speak in public
- 8 time for community work
- 9 diplomatic, tactful
- 10 kind-hearted, but with principles

After arriving at this list of ideals, the trainer asked what the fate of the organization would be if no one possessed all these characteristics. People recognized that this was a list to dream about, but that a person with most of those qualities had to be identified. They understood that this was an iterative list that would be helpful, but not necessarily apt for implementation at all times. They would make a choice considering these, as well as the need of the hour.

4.6 SOV Participation in the Training

There are two ways of viewing participation. One is to assess participation in discussions and other contributions. The second is to consider the numbers. While group dynamics are discussed in Section 4.2.4, this section focuses on the numerical participation only, which is explained in Table 8. The table reveals that the highest participation was in the head reach and along Minor 1-RA (Sub-systems 1 and 4, respectively), where around nine out of every ten invited SOVs participated. Of the remaining three sub-systems, two out of every ten invited SOVs could not make it. Though the invitation was only extended to SOVs, some interested farmers also joined the training. The maximum number of interested persons who joined training sessions was from Subsystem 5. Uninvited persons from the tail reach and Minor 1-RA did not participate in the training.

Table 8. Details of Participation in the SOVs Training, by Sub-system.

Subsystem	No. of Villages	SOVs invited	SOVs Participated	% Participation	No. of other interested farmers participated
1	9	25	22	88	2
2	9	27	21	78	1
3	8	28	22	79	0
4	4	17	15	88	0
5	11	57	45	79	10
Overall	41	154	125	81	13

The reasons for high participation in the head reach are that respective social organizers had established very good rapport with the community. Since the community along Minor 1-RA resided in relative proximity to the venue for training, it was easy for even those SOVs who did not have their own transport to attend.

The reason for the comparatively low participation in the middle reach (Sub-system 2) was that a number of SOVs had other businesses in the nearby town. They could not spare themselves for the training. The villages in Sub-systems 3 (tail reach) are quite distanced from each other. The possibility of acquiring public transport was also low. The training places were spatially inconvenient for some of the SOVs. Though the organizers provided a conveyance for SOVs, they had other engagements. No conveyance could be provided in Sub-system 5, yet each SOV found his own way, despite the vast spatial difference between the villages. An overall participation rate of over 80 percent, however, was very encouraging. Many SOVs who did not participate in the training, later said that they had very personal reasons, such as a marriage or death of a close relative, a court hearing, etc., otherwise they were eager to participate in the training.

4.7 Relationship Between Selection Method and Interest in the Training

The method for the selection of SOVs can be sub-grouped into 4 different categories. SOVs recommended by the majority for identification who met only a few of the criteria are referred to as “community”, and those who met most of the criteria but were recommended by fewer community members are referred to as “criteria”. Those who were recommended by the majority, and who met and fit most of the criteria, are grouped under “community and criteria”, and finally, those who were selected because they were sole landowners along watercourses, or for some other reason, are grouped under “unavoidable”.

The levels of interest among the various groups of SOVs varied greatly. The level of interest exhibited by SOVs during training appears to be closely related to the basis of their selection. The relationship is presented in Table 9.

The table reveals that SOVs who were strongly favored by the community and also met most of the criteria took more interest in the training, and had participated more actively than those who did not meet the criteria but were selected by the majority of the community. SOVs who met most of the criteria but were not favoured by the majority took more interest in the training, compared to those who were favored by the community but met fewer criteria. Thus, the criteria employed for the selection of SOVs appears to be of great importance in the approach used for social organization.

Table 9. Level of SOV Participation during SOV Training on the Basis of Selection.

Selection Basis	Number of SOVs (%)				Total (%)
	Not Participated	Passive	Active	Highly Active	
Community	11 (28)	12(31)	13(33)	3(8)	39(100)
Criteria	4(10)	10 (26)	18(46)	7(18)	39(100)
Community and Criteria	9 (13)	11(16)	35(51)	13(19)	68(100)
Unavoidable	0	0	1(50)	1(50)	2(100)
Total	24 (16)	33(22)	67(45)	24(16)	148(100)

4.8 Winding Up

This session was the crux of the training. Participants were told that the water users would expect the SOVs to possess qualities they identified for leadership (or a credible source), as this would be the group communicating the message to them. The success of the program, which is favored by the participants, depends on these groups. If they wanted it, they would have to help IIMI-Pakistan. The IIMI-Pakistan team could only successfully organize them if they are assisted by the SOVs. This assistance will be especially required in five areas, i.e.:

1. Creating awareness among common water users.
2. Preparation of actual *warabandi* lists.
3. Organizing meetings.
4. Clearing misconceptions created about IIMI-Pakistan and the program.
5. Finally organizing them into WUOs at sub-system level and a WUF at the distributary level.

The response was very positive as almost all stressed that IIMI-Pakistan should continue its work and that they were ready to provide every kind of assistance to organize the water users into WUAs at watercourse level, WUOs at sub-system level and a WUF at the distributary level.

After the short winding-up session, certificates were awarded and souvenirs distributed among the participants. Before doing that, the irrigation agronomist briefly addressed the gathering, indicating that the IIMI-Pakistan team had been working there for almost one year and interacting with farmer friends in the field. Whenever team members met with SOVs, they served the team member, gave him their time and listened to him carefully. IIMI-Pakistan thought of offering something, but the team was uncertain about what to present as an apt gift. This time, the team thought of giving away the gift of realization: the realization of time. The Institute presented the SOVs with wall clocks that would always realize that time slips away, and each of the SOVs could count the hours not utilized for farmer organization. This anecdote created further zeal among the participants and they left happily after the conclusion of the training course.

5 THE ROLE OF THE SOVs IN ORGANIZATIONAL ACTIVITIES:

AN EMPIRICAL ASSESSMENT

After completing the training course, the SOVs' interactions with the social organizers improved to a great extent. Many SOVs arranged meetings with the community to build awareness among the masses at the request of social organizers. A large number of SOVs played leading roles in these meetings and presented the objectives of the program to fellow-farmers. At many locations, when people started doubting the intentions of IIMI-Pakistan, the SOVs came to the rescue and helped to clarify the initial doubts. These SOVs contributed to the participation of the users and the program improved progressively with each step of the organizational process. While only 10 percent of the users participated during awareness building, it jumped to 25 per cent during consultation and 77 percent during selection meetings. Along certain watercourses, almost all the users participated in different sets of meetings.

However, some of the people, especially those not selected as SOVs because they were considered to be anti-social elements, started spreading propaganda against the SOVs. Rumor had it that these people had sold their consciences for a mere wall clock and were working against the farmers. However, the community generally ignored them, as their roles in society had never been positive.

All the social organizers were requested to evaluate SOVs from their respective sub-systems for a performance assessment. Nine organizational activities were employed as role-play for the SOVs. Four different performance levels were identified and scored, as presented below:

	Score
1. Did not participate	0
2. Passive participant	1
3. Active Participant	2
4. Very Active Participant	3

An SOV, thus, could score 27 points at best if he participated very actively in all the activities. Scores were then totaled, and three aggregate levels of performance were identified as follows:

1. Poor performance	Score between 0 and 9
2. Active performance	Score between 10 and 18
3. Very Active performance	Score above 18 points

Using these performance levels, the SOVs' level of motivation, performance in various activities and overall performance was evaluated for various organizational activities, as presented in the following sections.

5.1 SOVs' Level of Personal Motivation on the Basis of Selection

Hypothetically, a volunteer would only work hard for the community if he were himself adequately motivated. For a person to undertake a job with interest unless he believes that he is doing a "virtuous" job is hard. Thus, the SOV's personal motivation is perceived to be an important determinant of performance.

Theoretically, SOVs who met most of the criteria should be willing community workers, educated, and possess a relatively broader vision. Thus, it can be assumed that such SOVs should be more motivated than those who did not meet the criteria but were favored by the community merely because of kinship or other similar considerations. This assumption is tested through the information presented in Table 10.

An interesting feature observed among SOVs selected was that while almost half of them met most of the criteria and were favored by the community, around one-fourth were either favored by the community without meeting most of the criteria, or met most of the criteria but were not favored by the majority of the community.

Table 10. SOVs' Level of Personal Motivation on the Basis of Selection.

Selection Basis	Number of SOVs (%)				Total (%)
	Not motivated	Less Motivated	Motivated	Highly Motivated	
Community	0	24 (62)	15(38)	0	39(100)
Criterion	1(3)	5 (13)	16(40)	17(44)	39(100)
Community and Criteria	0	5(7)	34(50)	29(43)	68(100)
Unavoidable	0	0	1(50)	1(50)	2(100)
Total	1 (1)	34(23)	66(44)	47(32)	148(100)

A higher number of SOVs who met most of the criteria were motivated to organize the community for participation in the irrigation system management, compared to those who were favored by the community but met only a few criteria. A very high percentage of SOVs who met most of the criteria and were also favored by the community was adequately motivated to participate in the program and assist in organizing the community.

5.2 SOVs' Performance in Various Organizational Activities

This section discusses the performance of the SOVs during various organizational activities. The organizational activities comprised:

- a) Awareness-building meetings
- b) SOVs' training
- c) Readiness and willingness to become SOVs
- d) Initiatives for program dissemination
- e) Preparation of users lists
- f) Arranging consultation meetings
- g) Motivating users during consultation meetings
- h) Creation of awareness and program support
- i) Facilitation of selection meetings

Since the farmer volunteers were intended to assist in programmatic activities as volunteers, they accomplished the job in their free time. Therefore, some were unable to participate in a few activities as they had personal business to attend to at the time of the event. The maximum percentage of non-participants was around 30 while preparing the user's list. The reasons why participation was relatively low in this activity were because a few SOVs were not adequately aware of all the users along their respective watercourses, or their part of the job was undertaken by another SOV who was more aware of the users. The SOV participation details in various programmatic activities are given in Table 11.

Table 11. SOV Participation in Various Organizational Activities.

Organizational Activity	Could not Participate (%)	Percentage of SOVs who participated in the activity		
		Passively	Actively	Very Actively
Participation in awareness-building meetings	26	19	43	37
Participation in SOV training	16	26	55	19
Assistance in preparation of users lists	30	26	19	56
Level of self-motivation	1	23	45	32
Initiatives for program dissemination	1	14	50	36
Role in arranging consultation meetings	15	41	27	32
Role in motivating users during consultation meetings	16	36	43	21
Role in creating awareness / program support	0	42	45	13
Role in facilitation of selection meetings	13	18	38	45
Overall performance rating	-	13	54	33

Most SOVs participated actively in various programmatic activities. The percentage of SOVs who participated relatively passively was most noticeable in activities related to arranging consultation meetings, motivation to the participants of consultation meetings and creating

awareness and program support. The reason for a relatively higher percentage of passive participation by SOVs was that in many cases, the social organizers facilitated the meetings and led the discussions and therefore, little room was left for the SOVs to play their parts. The information asserts that only one out of ten SOVs performed passively.

5.3 Relationship between Selection Criteria and SOVs' Performance

The Chi-Square test has been applied to test the degree of linear association between the performance and the method of selection. While the Chi-Square value indicates the probability of the values in different cells for being close to the expected value, the value of the Gamma statistics reflects the degree of predictability of the dependant variable with that of the independent variable (selection method).

Overall Performance: The influence of the selection method on the overall performance of the SOVs is tested in Table 12. Like personal motivation, it can be seen that SOVs selected according to criteria, in addition to the recommendation of the majority, performed best. The value of the Gamma is 0.7, indicating a 70 percent linear association between the two variables.

Table 12. SOVs' Level of Overall Performance on the Basis of Selection.

Selection Basis	Number of SOVs (%)			Total (%)
	Poor	Moderate	High	
Community	13 (33)	25 (64)	1 (3)	39(100)
Criterion	4 (10)	24(62)	11 (28)	39(100)
Community and Criteria	2 (3)	30(44)	36(53)	68(100)
Unavoidable	0	1 (50)	1(50)	2(100)
Total	19(13)	80 (54)	49(33)	148(100)

Pearson's Chi-Square 40.31 (Highly significant) Gamma 0.70

Training and Overall Performance: The basic assumption behind selecting those most suitable as SOVs was that they would be motivated, trained and mobilized in the community to assist in organizing farmers. Whether the training helped to motivate them, or not, is tested in Table 13, which presents the relationship between the SOVs' level of participation in the training and their overall performance.

The information presented in the table asserts that the proportion of SOVs with excellent performance is directly related to the interest exhibited while participating in the training. The SOVs who participated more zealously in the training might have understood the need for an organization better than those taking the exercise casually, and therefore worked with more devotion for the common cause. The value of the Chi-Square test is highly significant. The Gamma statistic shows that there had been a 60 percent linear relationship between the level of participation in the training and the overall performance scores of the SOVs. However, we have already seen that the level of interest shown in the training was dependent on how the SOV was

chosen (see Section 4.6). Therefore, it can be argued that the training was overly helpful for those SOVs who met the community's choice and the selection criteria because they are community-oriented people. Therefore, the personality and nature of the SOV himself becomes much more important than the participation in the training alone.

Table 13. Impact of Training on the SOVs' Overall Performance.

Level of Participation in the Training	Number of SOVs who Performed			Percent of Total
	Poorly (0-9 points)	Moderately (10-18 points)	Excellent (Above 18 points)	
Could not participate in the SOV training	9	11	4	16.2
Passive participants	7	20	6	22.3
Active participants	2	44	21	45.3
Very active participants	1	5	18	16.2
Total	19	80	49	100.0

Pearsons Chi-Square 43.75 (Highly significant) Gamma 0.59

6. CONCLUSIONS

The rural communities in South Asia, especially in India and Pakistan, have a very special attribute of benevolence, which culminates into an attitude of voluntarism among the members for community work. IIMI-Pakistan's pilot project on the social organization of farmers for participation in distributary management was designed to organize farmers through the involvement of community-based volunteers. Past efforts to organize farmers in Pakistan have only focused on the capacity building and training of agency staff. This social organization pilot project for irrigated agriculture currently underway at the Hakra 4-R Distributary was planned to identify, train and involve community-based volunteers as an extended part of the organizing team. Organizing farmers through community-based volunteers is a much more cost-effective and efficient approach when compared to all other approaches. Results indicate that once the volunteers have their concepts clear, they exhibit a great deal of enthusiasm to participate in organizing their own people for common benefit.

Concept clearance for volunteers takes place much quicker in group discussions than in individual meetings. Training workshops were conducted in a participatory environment, in which participants had many group discussions. Training helped to build confidence among SOVs as, with the passage of time, they met their fellow volunteers from various parts of the distributary. This created confidence among them, as they did not feel isolated in taking responsibility for a difficult task. Participants shared information about problems inherent in irrigated agriculture and thus, learned from each other. This was a joint learning exercise whereby both, volunteers and IIMI-Pakistan's Social Organization Team learned from each other. The field team learned that the group discussions were as effective as other training tools (audio-visual aids, pictures, diagrams, etc.). Instead of using training materials and modules that appear alien to village residents, the majority of whom is formally not literate; using indigenized modules serves the purpose better. The farmers are prudent and intelligent. They discuss the practical realities and arrive at conclusions quickly, if facilitated properly. The farmers enthusiastically learned that local problems can only be solved by themselves. They need not to wait for help from elsewhere. They understood the need for their own organizations that should necessarily be made through very homegrown models. Through the training workshops, they had the first learning experience of how to conduct farmers' meetings to discuss common problems and identify the solutions.

Many of the trained SOVs later worked as resource persons during the consultation meetings. They also approached their fellow farmers to collect much-needed basic information during the identification of leadership. In a nutshell, the training served the purposes of motivating them and

transforming their attitudes from that of passive observers to active and ardent advocates of organized efforts at community level for their own benefit. The selection criterion is one of the most important elements of the selected approach. The selection criteria and the community's choice should go hand in hand for better results. However, the community's choice and the selection criteria are not always compatible.

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ANNEX 1: PROGRAM OF TRAINING WORKSHOPS AT VARIOUS SUB-SYSTEMS

- DAY 1 SUNDAY, JULY 14, 1996
 HEAD REACH
 RURAL HEALTH CENTER, GULAB ALI
 AT 1500 HOURS
- DAY 2 MONDAY, JULY 15, 1996
 MIDDLE REACH
 TRAINING HALL, AGRICULTURAL EXTENSION, HAROONABAD
 AT 1500 HOURS
- DAY 3 TUESDAY, JULY 16, 1996
 TAIL REACH
 GOVERNMENT HIGH SCHOOL, CHAK 69/4-R
 AT 0900 HOURS
- DAY 4 WEDNESDAY, JULY 17, 1996
 MINOR 1-RA
 GOVERNMENT GIRLS MIDDLE SCHOOL, KHATAN
 AT 0900 HOURS
- DAY 5 THURSDAY, JULY 18, 1996
 MINOR 1-R
 FOOD GODOWN, CHAK 58/4-R
 AT 0900 HOURS

ANNEX 2: OUTLINE FOR ONE-DAY TRAINING WORKSHOP FOR SOCIAL ORGANIZATION VOLUNTEERS AT THE HAKRA 4-R DISTRIBUTARY

- 1 **COMMUNITY DEVELOPMENT (60 MINUTES)**
 - 1.1 Need for Human Resource Development
 - 1.2 Approaches for community development in Punjab and brief critical overview
 - 1.3 Group Discussion (Participants will identify irrigation related problems and suggest solutions)

- 2 **ORGANIZING PEOPLE FOR COMMUNITY DEVELOPMENT (40 MINUTES)**
 - 2.1 Why organize people?
 - 2.2 Need for organizational structures
 - 2.3 Group Discussion (Scope of organizing people in irrigated agriculture and possible hindrances)

- 3 **VOLUNTEER LEADERSHIP IN COLLECTIVE WORK (30 MINUTES)**
 - 3.1 Group Discussion (Identification of characteristics of volunteers by the participants)

- 4 **EFFECTIVE COMMUNICATION (75 MINUTES)**
 - 4.1 What is communication?
 - 4.2 Need for communication
 - 4.3 Major components of communication process
 - 4.4 Barriers in effective communication

- 5 **CONCLUSION AND DISTRIBUTION OF CERTIFICATES (20 minutes)**

ANNEX 3 : LIST OF PARTICIPANTS BY SUB-SYSTEMS

A: Subsystem 1(Head Reach)

SOVs invited 25, participated 22, uninvited participants 2

- 1 Subedar Muhammad Ramzan s/o Muhammad Habib
- 2 Syed Baqir Hussain Shah s/o Zahoor Hussain
- 3 Master Bagh Ali s/o Khan Muhammad
- 4 Syed Manzoor Hussain Shah s/o Haider Hassan (Extra)
- 5 Mian Muhammad Muzammil Watto s/o Shah Muhammad
- 6 Haji Suleman Bhatti s/o Noor Muhammad
- 7 Ghulam farid Bhatti s/o Muhammad Shabaan
- 8 Muhammad Ramzan s/o Ghulam Ali
- 9 Anwar Ali s/o Islaam Din
- 10 Muhammad Siddique s/o Haji Muhammad (Extra)
- 11 Noor Hassan s/o Muhammad Asghar
- 12 Nawab Ali s/o Munshi
- 13 Abdul Majeed s/o Barkat Ali
- 14 Muhammad Bilal s/o Wali Muhammad
- 15 Rao Muhammad Ramzan s/o Imam Din
- 16 Rao Abdul Majeed s/o Rao Abdul Hafiz
- 17 Mubarak Ali s/o Ranjha
- 18 Muhammad Asghar Joya s/o Shan Muhammad
- 19 Abdul Maalik (Alias Pervaiz) s/o Muhammad Zaman
- 20 Haji Faiz Muhammad s/o Ghulam Rasool
- 21 Rana Shaukat Ali s/o Abdul Waheed
- 22 Amdul Majeed s/o Noor Jahanian
- 23 Muhammad Afzal s/o Ali Muhammad
- 24 Mian Muhammad Jahagir Khan s/o Gome Khan

B: Subsystem 2(Middle Reach)

SOVs invited 27, participated 21, uninvited participants 1

- 1 Raja Ghazanfar Ali s/o Sultan Ahmad
- 2 Raja Muhammad Saeed (Extra)
- 3 Abdur Rauf s/o Sultan Sukhera
- 4 Abdul Khaliq s/o Muhammad Siddique Arain
- 5 Haji Tanvir s/o Sharif Sukhera
- 6 Muhammad Sharif s/o Ghulam Rasool Arain
- 7 Talib Hussain s/o Ghulam Qadir
- 8 Rana Haji Munawwar
- 9 Sain Muhammad Arain s/o Muhammad Hussain
- 10 Rao Abdul Maalik s/o Abdur Razzaq
- 11 Rao Abdur Rab s/o Abdul Majid
- 12 Chaudhry Abdul Wahid s/o Abdul Ghani
- 13 Master Haji Muhammad Hanif s/o Haji Ali Muhammad
- 14 Hidayat Muhammad s/o Qaim Din Chukhia
- 15 Chaudry Muhammad Aslam s/o Haji Ismail
- 16 Saifullah Khan Joya (Numberdar)
- 17 Rao Abdul Jabbar s/o M. Saleem Khan
- 18 Rao Jaffer s/o Imdad Ali
- 19 Rao Zakir s/o Imdad Ali
- 20 Muhammad Asghar Ali s/o Haji Ali Muhammad
- 21 Rao Abdul Sami s/o Sagheer Ahmad
- 22 Haji Muhammad Nawaz Gill s/o Fazal Din

C: Subsystem 3 (Tail Reach)

SOVs invited 28, participated 22

- 1 Muhammad Rafique Fauji s/o Khair Din Arain
- 2 Chaudhry Noor Muhamamd s/o Khushi Muhammad Warraich
- 3 Chaudry Ghulam Rasool Bajwa s/o Muhammad Bukhsh
- 4 Muhammad Anwar Bajwa s/o Hakeem Din
- 5 Chaudry Nawab Ali s/o Sardar Muhammad
- 6 Muhammad Zaman Numberdar s/o Badar Din
- 7 Master Abdul Hameed s/o Ata Muhammad Jat
- 8 Master Sabir Ali s/o Fazal Muhammad Jat
- 9 Muhammad Jaffer s/o Ghulam Haider Jat
- 10 Madaar Ali s/o Gaimda Jat
- 11 Master Jameel s/o Maula Bukhsh Jat
- 12 Iftikhar Ahmad Numberdar s/o Bashir Ahmad Arain
- 13 Muhammad Yasin Numberdar s/o Jamal Din Arain
- 14 Chaudhry Muhammad Anwar s/o Muhammad Ali
- 15 Chaudhry Muhammad Aslam s/o Yusuf Ali
- 16 Sufi Muhammad Iqbal s/o Sufi Ali Muhammad
- 17 Ikram-ul-Haq Javed s/o Wali Muhammad Arain
- 18 Master Shaukat Ali s/o Sardar Ali Arain
- 19 Muhammad Mumtaz s/o Sardar Khan Joya
- 20 Muhammad Yaqoob s/o Karim Din Jat
- 21 Muhammad Hassan s/o Fazal Din Jat
- 22 Fazal Karim s/o Lala Din

D: Subsystem 4 (Minor IRA)

SOVs invited 17, participated 15

- 1 Noor Muhammad s/o Nawab Joya
- 2 Mian Manzoor Ahmad Mamuka s/o Khushi Muhammad
- 3 Rao Muhammad Iqbal s/o Muhammad Sharif
- 4 Muhammad Asghar Wattoo s/o Haji Allah Yar
- 5 Subah Sadiq s/o Muhammad Siddique
- 6 Barkat Ali Numberdar s/o Alawal Khan
- 7 Ahmad Khan Numberdar s/o Ali Muhammad
- 8 Muhammad Hanif s/o Wali Muhammad
- 9 Hafiz Muhammad Yar s/o Pir Bukhsh
- 10 Abdul Shakoor s/o Ghulam Qadir
- 11 Mian Muhammad Khan Sukhera s/o Ilahi Bukhsh
- 12 Muhammad Din Chohan s/o Muhammad Sadiq
- 13 Shah Muhammad Numberdar s/o Ghulam Qadir
- 14 MAster Asghar Ali s/o Muhammad Usman
- 15 Balia Bhatti s/o Kamman

E: Subsystem 5(Minor 1R)

SOVs invited 57, participated 45, extra 10

- 1 Noor Muhammad s/o Chughatta
- 2 Abdul Ghafoor s/o Faqir Muhammad
- 3 Haji Muhammad Aalam s/o Ghulam Nabi
- 4 Sher Muhammad Wattoo s/o Muhammad Ishaque
- 5 Rashid Ahmad Gill s/o Ch. Jalal Din
- 6 Javed Iqbal s/o Jalal Din Gujjar
- 7 Akhtar Ali s/o Din Muhammad
- 8 Niaz Ahmad s/o Noor Din (Extra)
- 9 Chaudry Nazir Ahmad s/o Noor Muhammad
- 10 Chaudhry Jaan Muhammad s/o Laal Din
- 11 Hafeez-ur-Rehman s/o Haji Abdur Rehman
- 12 Chaudhry Muhammad Akram s/o Nizam Din
- 13 Muhammad Sarwar s/o Taj Muhammad
- 14 Ata Muhammad s/o Alam Din
- 15 Mukhtar Ahmad s/o Umar Din (Extra)
- 16 Muhammad Aslam s/o Sardar Muhammad (Extra)
- 17 Khalid Mehmood s/o Shafqat Hussain (Extra)
- 18 Zaheer Yunus s/o M. Yunus (Extra)
- 19 Abdur Rehamn s/o Qutab Din (Extra)
- 20 Muhammad Afzal s/o Nizam Din (Extra)
- 21 Mazhar Hussain Chatha s/o Muhammad Saeed
- 22 Muhammad Akram s/o Noor Muhammad
- 23 Hafiz SanaUllah s/o Haji Barkat Ali
- 24 Master Subah Sadiq s/o Budhay Khan
- 25 Master naeem s/o Muhammad Hussain
- 26 Peer Muhammad s/o Muhammad Hussain
- 27 Anwaar-ul-Haq s/o Mian Muhammad Iqbal
- 28 Muhammad Yusuf s/o Haji Abdul Aziz
- 29 Muhammad Aslam s/o Abdul Karim (Extra)
- 30 Abdus Sattar s/o Muhammad Sarwar
- 31 Fazal Muhammad s/o Rehmat Ali
- 32 Muhammad Ashraf s/o Fazal Fazal Muhammad
- 33 Muhammad Ismail Numberdar s/o Ali Muhammad

- 34 Allah Daad s/o Muhammad Yusuf
- 35 Zubaid Rasool s/o Ali Muhammad
- 36 Mian Munir Ahmad s/o Sardar Muhammad
- 37 Raja Ghulam Sarwar s/o Muhammad Aslam
- 38 Abdul Qayyoom s/o Abdul Haq
- 39 Javed Iqbal s/o Muhammad Azim (Extra)
- 40 Hashmat Ali s/o Muhammad Ismail
- 41 Muhammad Anwar s/o Niaz Muhammad
- 42 Master Abdul Hameed s/o Rehmat Ali
- 43 Abdul Nabi s/o Ghulam Nabi
- 44 Muhammad Siddique s/o Khair Din
- 45 Inayat s/o Muhammad Bukhsh (Extra)
- 46 Muhammad Aashiq s/o Raja Bhatti
- 47 Ghulam Qadir s/o Noor Muhammad
- 48 Muhammad Saif s/o Muhammad Sharif
- 49 Chaudhry Muhammad Aslam s/o Sultan Ali
- 50 Rana Zulfiqar Ali s/o Muhammad Iqbal
- 51 Muhammad Aslam s/o Badar Din
- 52 Muhammad Sadiq s/o Bahawal
- 53 Bashir Ahmad s/o Noor Muhammad Bhatti
- 54 Ghulam Muhammad s/o Umar Din
- 55 Nazar Hussain s/o Ismail

IIMI-PAKISTAN PUBLICATIONS

RESEARCH REPORTS

Report No.	Title	Author	Year
R-1	Crop-Based Irrigation Operations Study in the North West Frontier Province of Pakistan Volume I: Synthesis of Findings and Recommendations	Carlos Garces-R D.J. Bandaragoda Pierre Strosser	June 1994
	Volume II: Research Approach and Interpretation	Carlos Garces-R Ms. Zaigham Habib Pierre Strosser Tissa Bandaragoda Rana M. Afaq Saeed ur Rehman Abdul Hakim Khan	June 1994
	Volume III: Data Collection Procedures and Data Sets	Rana M. Afaq Pierre Strosser Saeed ur Rehman Abdul Hakim Khan Carlos Garces-R	June 1994
R-2	Salinity and Sodicity Research in Pakistan - Proceedings of a one-day Workshop	J.W. Kijne Marcel Kuper Muhammad Aslam	Mar 1995
R-3	Farmers' Perceptions on Salinity and Sodicity: A case study into farmers' knowledge of salinity and sodicity, and their strategies and practices to deal with salinity and sodicity in their farming systems	Neeltje Kielen	May 1996
R-4	Modelling the Effects of Irrigation Management on Soil Salinity and Crop Transpiration at the Field Level (M.Sc Thesis - published as Research Report)	S.M.P. Smets	June 1996
R-5	Water Distribution at the Secondary Level in the Chishtian Sub-division	M. Amin K. Tareen Khalid Mahmood Anwar Iqbal Mushtaq Khan Marcel Kuper	July 1996
R-6	Farmers Ability to Cope with Salinity and Sodicity: Farmers' perceptions, strategies and practices for dealing with salinity and sodicity in their farming systems	Neeltje Kielen	Aug 1996
R-7	Salinity and Sodicity Effects on Soils and Crops in the Chishtian Sub-Division: Documentation of a Restitution Process	Neeltje Kielen Muhammad Aslam Rafique Khan Marcel Kuper	Sept 1996
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R-9	Mobilizing Social Organization Volunteers: An Initial Methodological Step Towards Establishing Effective Water Users Organization	Mehmoodul Hassan Zafar Iqbal Mirza D.J. Bandaragoda	Oct 1996
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R-13	Methodologies for Design, Operation and Maintenance of Irrigation Canals subject to Sediment Problems: Application to Pakistan (M.Sc Thesis published as Research Report)	Alexandre Vabre	Oct 1996

Report No.	Title	Author	Year
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R-17	Hydraulic Characteristics of Irrigation Channels in the Malik Sub-Division, Sadiqia Division, Fordwah Eastern Sadiqia Irrigation and Drainage Project	Khalid Mahmood	Nov 1996
R-18	Proceedings of National Conference on Managing Irrigation for Environmentally Sustainable Agriculture in Pakistan	M. Badruddin Gaylord V. Skogerboe M.S. Shafique (Editors for all volumes)	Nov 1996
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