Report No. R-44

SELF-HELP MAINTENANCE ACTIVITIES BY THE WATER USERS FEDERATION OF HAKRA 4-R DISTRIBUTARY

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ACKNOWLEDGEMENTS

The five-day maintenance campaign by the Water Users Federation (WUF) of the Hakra 4-R Distributary was one of the biggest organized efforts on a self-help basis in the history of distributary maintenance in Pakistan. The grass-root level membership of the WUF deserves special appreciation for mobilizing considerable resources comprising machinery, equipment and manpower for this effort. The personal interest and commitment of office bearers of water course level WUAs, subsystem level WUOs and the distributary WUF to motivate farmers for this campaign is greatly appreciated.

This campaign was facilitated by the nine members of the IIMI field team based at Haroonabad. Special thanks should go to M/s Muhammad Nasir, Bilal Asghar, Muhammad Amjad, Khalid Rashid, Abdul Hamid, Anwar Iqbal, Tipu Naveed and Muhammad Asghar for their tireless efforts in providing the technical assistance to the execution of maintenance operations. All of us who participated in this event would like to thank Mr. Zafar Iqbal Mirza and Mr. Mehmood-ul-Hassan for their active facilitating roles during the WUF maintenance planning meetings, and their valuable guidance given to us.

The identification and prioritization of maintenance work was undertaken by the five-member maintenance committee of the WUF. The work of these committee members have to be specially appreciated for spending considerable time in the field for this purpose.

Mr. Anwar, President of WUA, Watercourse No. 51 of Subsystem 3, participated in all of the five days during the campaign. He inspected all of the repaired sites as the chairman of a WUF Evaluation Committee. His attention to detail and spending long hours to evaluate the maintenance work is gratefully appreciated.

Mian Imtiaz Ali Lalika, Member Provincial Assembly; Mr. Asghar Raza, Extra Assistant Commissioner, Haroonabad; Mr Shafi-uz-Zaman, Assistant Commissioner, Haroonabad; Mr. Ali Sher Zahid, Project Director, OFWMD FESS Team, Ch. Abdul Ghafoor, Member National Assembly and Chairman Federal Inspection Team, inaugurated maintenance operations on each of the five days of the maintenance program, respectively. Their presence provided encouragement to the participants for this collective effort, and their gesture in attending this event is gratefully acknowledged.

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Finally, the author wishes to acknowledge the untiring work in formatting the report and incorporating changes and corrections in the final report carried out by Mr. Muhammad Akram, Mr. Manzoor Hussain, Executive Secretary and Secretary of IIMI Pakistan, respectively.

FOREWORD

For the Haroonabad area, this was a historic event. The newly formed Water Users Federation of Hakra 4-R Distributary proved that unity was strength, when they mobilized resources in an unprecedented manner to undertake a maintenance program in the distributary during the 1998 canal closure period. They were able to organize 120 tractors and 794 persons to do this work in the upper part of the distributary. All of the watercourse command areas of the distributary were equally represented in this activity

The report gives much more information to construct a valid story about the ability and willingness of grassroot level people for collective action aimed at managing common resources. The five-day event in January 1998 augurs well for a prosperous future for the Hakra 4-R Distributary.

Waheed uz Zaman, IIMI's Field Team Leader at Haroonabad, has documented this story for the benefit of those who may still doubt the potential of this new organization. We in IIMI are indebted to the members of the WUF for giving us this opportunity to share their moment of achievement.

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SUMMARY

The Water Users Federation (WUF) of the Hakra 4-R Distributary undertook a five-day maintenance campaign with technical assistance from IIMI-Pakistan, from January 18 to 22, 1998. The main objectives of the campaign were:

1. To repair the damaged banks, berms and service road;
2. To put to the test WUF credibility among lower tier organizations; and
3. To ascertain the extent that the WUF could mobilize resources for distributary maintenance.

The Hakra 4-R Distributary WUF comprises five subsystem level water users organizations (WUOs), each of which participated separately in each day of the maintenance campaign. A total of 794 farmers, their leaders, and 120 tractors, mostly with rear-mounted-scrapers from all five subsystems, indulged in the activity. The subsystem-wise participation of workforce and machinery is given below. *(See Table 1.)*

Table 1: Participation of farmers and tractors.

Item	SS 5	SS 1	SS 4	SS 2	SS 3	Total
Watercourses	33	23	15	23	27	123
Participating farmers	260	95	117	107	215	794
Tractors	42	10	11	19	38	120

Maintenance efforts were concentrated in the head reach ranging from RD 0+000 to 46+000, normally more prone to breaches. A total of 93 damaged points, related to banks, berms and the service road, were repaired. The dominant reason for not undertaking maintenance operations in the remaining reaches is because these are either currently being lined, or repair contracts have been awarded through PID.

Mian Imtiaz Ali Lalika, Member of the Provincial Assembly, Mr. Asher Raza, Extra Assistant Commissioner, Mr. Shafi-uz-Zaman, Assistant Commissioner, Mr. Ali Sher Zahid, OFWMD FESS Project Director and Ch. Abdul Ghafoor, Member of the National Assembly and Chairman of Federal Inspection, inaugurated maintenance operations on respective days of the campaign. *(See Annex 1.)*

The main features of this maintenance campaign incorporated:

- Mobilization of manpower;
- Machinery and equipment (without assistance from government agencies);
- Undertaking maintenance operations on a basis of self-help in its entirety;

- Direct identification of maintenance problems by farmers and their leaders;
- Formation of the WUF maintenance committee to execute maintenance operations; and
- Reaches already prioritized for maintenance (with the help of the IIMI field team *See Annex 2.)*

The financial analysis for this five-day maintenance operation displays that the total cost of resources, including tractor traveling costs, man hours and tractor hours at the site, is worth Rs 124,000/= (or US$ 2,800/=).

The Hakra 4-R WUF mobilized resources from the grassroots level. Three subsystems of the distributary are being lined, but the farmers of these subsystems have no direct interest with the maintenance activity. Very high participation from these three subsystems to maintain upstream reaches, however, shows the farmers' commitment to organization. Implementing six *Flow Measurement Training Courses* in September 1997, followed by this five-day *Maintenance Campaign* in January 1998 on a self-help basis entirely, once again proves the effect ireness and impact that the WUF has for undertaking operations and maintenance activities.

1. INTRODUCTION AND BACKGROUND TO MAINTENANCE PROBLEMS

1.1 HAKRA 4-R DISTRIBUTARY

This distributary is part of the Fordwah Eastern Sadqia (South) FESS Irrigation and Drainage Project, and has five drop structures along the whole length of its main canal. Located from the right side of Head Ghulab Ali at the Hakra Branch Canal at offtake RD 89750, it serves 75 watercourse command areas directly, and another 48 indirectly, through its two minors. Inclusive of these two minors, the distributary's approximate length is 60 km, with the Gross Command Area (GCA) and the Culturable Command Area (CCA) equivalent to 48,649 and 43,801 acres, respectively. The distributary's existing and design discharges are 225 ad 193 cusecs, respectively.

The average natural slope is 0.71 ft. (22 cm) per km (say 0.0002) from north to south, with a greater elevation difference on each of four drop structures varying between 2.50 and 7.50 ft. Offtake crests at head and tail outlet clusters are elevated at 525.011 and 500.641 ft above sea level, respectively. Irrigated fields (Natural Surface Level or NSL) are situated between 526.606 and 498.666 ft above sea level, between the head and tail areas ***(Waheed-uz-Zaman, 1998).***

1.2 ORGANIZATIONAL STRUCTURE AND WUO NOMENCLATURE

The Hakra 4-R Water Users Federation (WUF) is a three-tier system, whereby 4,500 of the system's water users are organized (at first tier) into 121 Water Users Associations (WUAs). WUAs could not be formed for two of the watercourses, as water users influenced by PID field staff propaganda were unwilling to cooperate.

Each WUA comprises all of the farmers along a watercourse. Depending on the number of factions (baradaris, number of potential leaders), membership varies between 5 and 7 for each watercourse, except for one or two watercourses where one or two office bearers own the entire watercourse command areas. WUA members were nominated by participating water users at watercourse levels. These 121 WUAs nominated 121 watercourse representatives, who, in most of cases, were nominated by WUA executives. In certain other related cases, they were, however, selected by the general body of water users.

The Hakra 4-R Distributary system was grouped into 5 subsystems and divided on the basis of social and physical elements. Depending on the size of its hydrological unit, watercourses vary in number from 15 to 33. These WUAs were then organized into five WUOs at second tier. The electoral body of each WUO was also comprised of 15 to 33 watercourse representatives.

The executive body of each WUO has 7 to 10 members, also dependent on social and hydrological units (villages, baradaris and watercourses). Each subsystem WUO has

nominated 5 members to the WUF General Assembly at the third tier. In most instances, the subsystem WUO's President and general Secretary were also co-opted for the federation general assembly, and the remaining three WUO members, as watercourse representatives.

The WUF general assembly thus comprises 25 members. On March 5, 1997, these members selected a 5-member executive body for the Water Users Federation for the entire distributary command.

1.3 MAINTENANCE DEFICIENCIES

The analyses of technical and walk-through surveys conducted in the 1996 - 97 closure, by an IIMI technical team accompanied by farmers and their leaders, identified five major maintenance issues which help the WUF to prioritize maintenance work. Among these are:

1. widened X-sections;
2. scour the distributary bed;
3. damaged structures;
4. sedimentation in the lower part of the channel; and
5. damaged banks and service road.

The necessity for construction materials such as kila bushing, bricks and cement, demanding a hefty investment, rendered the first three maintenance problems financially out of reach. The fourth maintenance problem had lost its relevance because the lower part of the channel had already been lined. The WUF could, however, address the repair of damaged banks, berms and the service road.

Official data pertaining to estimated costs and actual spending reveals that PID has spent on almost every part and portion of the channel over the last 41 years. Routine funds had been allocated for a total of 42 construction, maintenance and repair items, all broadly classified into 7 main categories:

1. construction work;
2. repair and maintenance of banks and berms;
3. repair and maintenance of outlets;
4. repair and maintenance of other structures;
5. remodeling of distributary structures;
6. desilting and cleaning the distributary; and
7. patrolling for maintenance.

The official record for the 1997- 98 annual closure displays that Rs 0.70 million had been allocated for the repair and maintenance of berms, banks and structures. The details of this official allocation is given in *Table 2*.

Table 2. PID funds allocated for the Hakra 4-R Distributary in the 1997 - 98 Annual Closure.

S. No.	RD	Type of work	Amount allocated
1.	Head regulator D/S Hakra 3- & 4-R Distributaries	Checking site erosion	2,00,000
2.	D/S bridges and falls (RD 0+000 to 46+000)	Repair and protection wall	2,00,000
3	RD (46+000 to 58+000)	Strengthening of banks	3,00,000
		TOTAL	7,00,000
Repair of canal rest house			1,00,000
Repair of SDO office			10,000
		GRAND TOTAL	8,10,000

Despite this heavy allocation of funds, water users express their reservations about the actual spending of these funds. With past experience firmly in mind, the WUF knew that the current allocation for the channel's improvement would not be utilized properly, and it is this knowledge that prompted them to undertake the maintenance work on a self-help basis.

2. IMPETUS

2.1 ENCOURAGING FACTORS

Numerous supportive factors contributed towards the ability to mobilize the huge resources of manpower, machinery and equipment to enable undertaking this five-day maintenance campaign.

1. Farmers and their leaders themselves identified maintenance problems by participating in the walk-through survey. They formed a WUF maintenance committee to conduct the maintenance survey, which ultimately led to social approval for the correction of maintenance deficiencies.

2. The WUF general assembly's unanimous decision to undertake the maintenance campaign.

3. With the assistance of the IIMI field team, reaches had already been identified and prioritized for maintenance.

4. The WUF leadership's commitment to contact general farmers door-to-door, allowing all three tiers of the WUF to remain actively involved in organizing the campaign.

5. The enthusiasm to prove the WUF's ability to mobilize resources for maintenance at the distributary level.

6. The willingness to undertake activities to carve a niche of their own in the absence of legal recognition.

7. The farmers' common "maintenance" interest as a source of motivation.

8. Organizing maintenance operations separately for each of the five subsystems created a healthy sense of competition.

9. The active involvement of IIMI social organizers and other field team members in contacting farmers and supervising maintenance work.

10. Contacting farmers personally, by letter and announcements from village mosques.

2.2 PLANNING MAINTENANCE ACTIVITIES

An important agenda item for the WUF's regular monthly meeting on December 22, 1997, was to discuss the implementation of the maintenance plan for the 1997 - 98 annual closure.

Several options came under discussion, one of which suggested that tractors be engaged and fuel paid for from the WUF's common fund, but members expressed their reluctance to burden the WUF with financial encumbrances at this stage. The suggestion to acquire PID funds already allocated for the strengthening and repair of banks and structures was also abandoned, as no legal provision for transferring funds to the WUF existed, even up to the stage of implementation.

Albeit the PID's commitment, prioritizing maintenance work already approved for this distributary had not been in consultation with the WUF. One WUF member advised his compatriots to explore cost-effective solutions to maintenance problems.

Eventually it was agreed to implement the maintenance plan in the distributary's initial and middle sections (RD 0+00 to 65+000) by engaging the help of watercourse level WUAs.

The organization of the work was discussed in the January 12, 1998 WUF meeting. Initially, it was suggested that all five subsystems undertake maintenance operations on the same day, but was as soon rejected because it is argued that one-day maintenance activities would have neither the desired impact, nor quality of work. Participants later unanimously agreed that maintenance operations be spread over five days instead of one. Each subsystem WUO would participate separately in each of five days, translating into more people being mobilized and more maintenance work done.

One-hundred-and-twenty-one watercourse representatives were requested to bring along 2 to 5 farmers possessing spades or tractors to execute maintenance activities. Subsystem level WUOs brought farmers from their respective subsystems along.

2.3 OBJECTIVES

The four main objectives of this maintenance campaign were:

1. To repair damaged banks, berms and the service road;
2. To remove humps and ditches from the distributary bed;
3. To ascertain the WUF's impact among lower tier organizations; and
4. To test the WUF's ability to mobilize necessary resources for distributary maintenance.

2.4 PID AND WUOS - COMMITMENTS AND ACTIONS

The Secretary of Irrigation and Power (I & P) agreed that the WUF could prioritize maintenance operations on a self-help basis in two separate meetings, one conducted on November 10, 1997 between himself and the International Irrigation Management Institute's (IIMI's) senior officials, and the other on December 24, 1997 with WUF leaders. Unfortunately though, despite the handsome allocation for maintenance detailed in the 1998 annual closure, the department had not as yet consulted the WUF.

On the other hand, after the decision to undertake self-help maintenance activities, the WUF sent correspondence to all the Irrigation Department's relevant senior officers (e.g. Secretary, Chief Engineer, SE and XEN), requesting liaison for technical assistance to implement the maintenance program effectively. Neither did senior PID officers attend, nor were local staff formally directed to liaise with the WUF.

It was perceived that a sub-engineer who *did* visit the sites had done so half-heartedly, and that his attitude towards farmers had been intentionally discouraging. The role of local PID staff is described in the following section.

2.5 DISCOURAGING FACTORS

Discouraging factors, as detailed below, did not deter the campaign's success.

1. Without the WUF's involvement in prioritizing work, large sums of money were being spent for repair and maintenance work. At one stage, WUF members threatened not to undertake the campaign if work done by them would be credited to PID staff.

2. Subsystems 3, 4 and 5 are currently being lined, and three-fifths (75 out of 123) of the watercourses are in these subsystems. Naturally, repair and maintenance of the upper sections held little interest for these water users, but an incredibly high participation of labor, machinery and equipment came from these subsystems.

3. PID non-cooperation; i.e. a) participation of senior PID staff was zero; and b) in the absence of farmer leaders and IIMI staff, the PID sub-engineer visiting sites sneered discouragingly and sarcastically at ordinary participants.

4. In addition to some civil work being under way in Hakra 4-R Distributary, the PID also issued some water although there was very little flow.

5. An imbalance in the resources mobilized and the campaign's overall effectiveness; longer distances covered to reach maintenance points, coupled with short daylight hours and fasting during the holy month of Ramzan.

6. Contrary to government fuel grants for tractors participating in maintenance activities in other parts of the Punjab, this benefit was not provided to farmers at the Hakra 4-R Distributary.

7. A PID sub-engineer tried influencing WUF leaders in various locations to carry earthloads from adjacent cropped fields for strengthening banks and berms. WUF leaders, however, decided against this "*sincere advice*", deemed for use as negative propaganda against the WUF. Maintenance groups (MGs) did manage to acquire earthloads from barren fields.

8. The PID initiated the modification of 22 of the distributary's outlets only a month before the maintenance campaign commenced. PID field staff propagated that the WUF was responsible for the reduction of outlet sizes.

9. The non-arrival of PID staff, whom 260 farmers participating in the first day's maintenance activities had waited for endlessly, was discouraging and caused a delay in executing maintenance work.

10. The official list of sites approved for maintenance and those actually being repaired were inconsistent, resulting in the WUF being forced to repair reaches also of least importance.

3. PLANNING AND EXECUTION

3.1 ORGANIZATION OF MAINTENANCE WORK

Heavy maintenance work is necessary between RD 0+000 and RD 65+000 of the Hakra 4-R Distributary. The WUF maintenance operation intended to cover this entire reach, but the PID approved earthwork for several stretches of this section in the 1997 - 98 annual closure. WUF members decided that stretches awarded to repair contractors would be excluded from its campaign, particularly the middle section, RD 46+000 to RD 65+000, the focus of the PID repair work.

In view of reducing participants' traveling time, the WUF maintenance committee allotted stretches for repair and maintenance on both sides of the distributary to each of five subsystems as shown in *Table 3.*

Table 3. Subsystem-wise allocation of reaches for earthfilling.

Allotted Reach	Subsystem	Sides	Type of work
RD 0+000 to 10+000	Subsystem 1	Right and left sides	Earthfilling
RD 10+000 to 15+000	Subsystem 4	Right and left sides	Earthfilling
RD 15+000 to 21+000	Subsystem 2	Right and left sides	Earthfilling
RD 21+000 to 31+000	Subsystem 3	Right and left sides	Earthfilling
RD 31+000 to 46+000	Subsystem 5	Right and left sides	Earthfilling

For the effective field implementation of maintenance work, six maintenance groups (MGs) were formed, each comprising of an IIMI field member and a WUO office bearer from that subsystem. These MGs were flexible, sometimes merging to accommodate the supervision of various maintenance activities. In Subsystem 1, for example, these six committees merged into two groups; one to work on the left and the other on the right side of the distributary.

3.2 THE SUBSYSTEM APPROACH

Implementing the maintenance operation on a subsystem basis proved to be both efficient and effective. The approach facilitated the mobilization of subsystem level WUO leadership, practically impossible to motivate otherwise.

Seventy-nine of the 121 watercourse level WUA Presidents actively participated in mobilizing manpower and equipment, most extending door-to-door invitations. A

distinct advantage of mobilizing people on five different days on a subsystem basis, is the sense of competition it instills:

- first, in mobilizing more labor, machinery and equipment; and
- second, to challenge the amount and quality of work done.

This was, of course, healthy competition. Even though IIMI social organizers had regularly visited farmers during the organizational process, another advantage was that this had been the first time that WUO leaders had personally contacted farmers at the grassroots level.

There were also some instances during the maintenance campaign when, also for the first time, watercourse level WUAs performed different formal roles, such as organizing watercourse level meetings to mobilize the general water users for maintenance work. Finally, participants were also more easily managed when organized on a subsystem basis.

3.3 FORMATION OF THE WUF MAINTENANCE COMMITTEE

A five-member maintenance committee was elected at the meeting of December 22, 1997. With the view of providing an equal opportunity to each subsystem, a person from each was nominated. Abdul Shakoor Aakooka (VP WUF) was elected Chairman as his subsystem was the target of maintenance work. The other members included Ashiq Hussain, Rashid Gill Fiaz, Mumtaz Joia and an IIMI field team member. They checked the channel from a maintenance perspective on December 27, 1997.

3.4 THE WUF MAINTENANCE COMMITTEE SURVEY

Traveling from upstream to downstream, and engaging assistance from members with technical backgrounds and the IIMI field Field Team Leader, the maintenance committee surveyed the distributary from RD 0+000 to 65+000. Locations identified for heavy repair and maintenance work are detailed in *Table 4*.

Table 4. Potential maintenance points identified by the WUF Maintenance Committee.

Location	Reference	Type of work
RD 0+000	Immediate D/S from Head regulator (right bank)	Earth filling and strengthening
RD 4+000 - 6+000	Livestock point (right bank)	Earth filling and strengthening
RD 10+000 - 13+000	Breach and livestock points (right bank)	Earth filling and strengthening

RD 14+000 - 16+000	Breach and livestock points (right and left banks), service road damage	Earth filling and strengthening
RD 21+000	Livestock points (right bank)	Earth filling and strengthening
RD 25+000	Livestock points (right bank)	Earth filling and strengthening
RD 27+500 - 28+500	Livestock points (right & left banks), service road damage	Earth filling and strengthening
RD 31+000	Breach and livestock points (right and left banks), service road damage	Earth filling and strengthening
RD 32+000	Livestock points (right bank)	Earth filling and strengthening
RD 33+500	Livestock points (right bank)	Earth filling and strengthening
RD 43+000	Bed ditch	Earth filling

3.5 THE MAINTENANCE COMMITTEE'S REPORT

The maintenance committee of the Hakra 4-R Distributary WUF presented its report in the next meeting, January 12, 1998. Besides discussing the response of the Secretary of Irrigation regarding the sharing of responsibility, one of the important agenda items was the presentation of the maintenance survey report by the Maintenance Committee. Rashid Gill, a maintenance committee member as well as WUF member, presented the report to the general assembly, highlighting the main reaches in need of repair and maintenance. The five-day maintenance operation evolved from the result of this survey. Participants unanimously agreed on the program listed in *Table 5.*

Table 5. Schedule for the maintenance program.

Date	Subsystem	Place of inauguration
January 18, 1998	Subsystem 5	Drop structure RD 46+000
January 19, 1998	Subsystem 1	Off-take head of Hakra 4-R (RD 0+00)
January 20, 1998	Subsystem 4	RD 12+600 at the distributary bank
January 21, 1998	Subsystem 2	RD 18+200 at the distributary bank
January 22, 1998	Subsystem 3	Bridge RD 30+900

3.6 ORGANIZATION OF THE EXECUTION PROCESS

After each day's inauguration, stretches covered for repair were allotted to each individual Maintenance Groups (MG). All IIMI field team members and some WUF and WUO members also actively supervised work in various locations within allotted stretches. The four basic types of maintenance work required on the right and left sides of the distributary were:

1. Filling of rain cuts and livestock entry points;
2. Repair of potential breach points;
3. Raising the service road and eroded banks; and
4. Berm cutting.

Each MG was manned with anywhere between 5 and 15 farmers with spades, and between 4 and 6 tractors with rear-mounted blades. Work allotted to MGs was in consideration of the amount of manpower and equipment at its disposal.

Earthloads were removed from within a 50 to 300 ft distance of repair points and then dumped along weak stretches, before being leveled and trimmed by spade-farmers. Groups with rear-mounted cultivator tractors first pulverized the soil to facilitate easier execution of earth work for tractors with rear-mounted blades. Each repair point was then manually smoothed and leveled by spade workers.

4. FACILITATION BY WUOs LEADERS

4.1 FACILITATION BY WUO LEADERS, SUBSYSTEM 5

Accompanied by two IIMI social organizers, the WUF General Secretary and a general body member visited Subsystem 5 on different days to invite farmers to participate in this campaign. Similarly, three separate days were allocated for three subsytem level WUO office bearers (who used their own motorbikes) to contact farmers.

This subsystem's watercourse level WUA Presidents also personally contacted water users to convey the program's schedule. The WUO delivered letters intimating details about the program to 185 WUA executive members. Of 33, 8 watercourse Presidents personally delivered letters to executive members. In some cases, the IIMI Social Organizer (SO) undertook the task.

One-hundred-and-fifty water users were verbally informed. Some WUA Presidents organized meetings at the watercourse level to discuss the maintenance program. Announcements were also made from village mosques.

4.2 FACILITATION BY WUO LEADERS, SUBSYSTEM 2

The President, Information Secretary and WUF member, accompanied by IIMI SOs, spent 3 days inviting Subsystem 2 water users to participate. In addition, several individual meetings between farmers and the WUF President, who also used his own motorbike, were conducted. Even though letters had not been sent to members of this subsystem, they were all personally contacted. Three watercourse level associations met at separate times to plan activities for the campaign.

4.3 FACILITATION BY WUO LEADERS, SUBSYSTEM 4

This subsystem's WUF Treasurer and five WUO office bearers energetically mobilized water users, the President and Treasurer each devoting a day to accompany the IIMI SO to extend invitations to water users. The WUO Advisor and Secretary of Information also spent one day each to contact farmers personally, in addition to yet another two watercourse representatives, who delivered letters to 35 farmers and personally invited 50 others.

The WUO Joint Secretary and IIMI SO mainly focused their efforts on inviting watercourse representatives and farmers owning tractors. An IIMI-owned vehicle and a motorbike were the only means of transport available with which to contact farmers.

4.4 FACILITATION BY WUO LEADERS, SUBSYSTEM 3

With IIMI SOs in tow, five of this subsystem's WUO leaders, a WUF Treasurer accompanied by one member, and a WUA President, dedicated three, two and four days, respectively, to contact and mobilize farmers. Rafiq Bajwa and Anwar Fouji, a WUF

member and a WUO Secretary of Information, respectively, were among the chief motivators in Chak #56/4-R, where a complement of 15 tractors were pledged.

Subsystem 3's farmers were invited through meetings organized to assign roles to its members. Furthermore, out of 27 WUAs, 10 held meetings at the watercourse level. WUO office bearers also made loudspeaker announcements. Some Social Organization Volunteers (SOVs) were also requested to mobilize farmers.

4.5 FACILITATION BY WUO LEADERS, SUBSYSTEM 1

Three farmer leaders enthusiastically mobilized this subsystem's members. Abdul Shakoor Aakooka and Mr. Jamshed, Vice President and a WUF member, respectively, spent a day with an IIMI Field Assistant to gather support from farmers. Abdul Khaliq, a WUO advisor, also devoted one day for this purpose.

The campaign to mobilize farmers in this subsystem was not as vigorous as it had been in the other subsystems, mainly because the IIMI SO assigned there had been on leave during the initial days of the campaign. Another reason was that WUO office bearers at the subsystem level were not actively involved in mobilizing water users.

5. IMPLEMENTATION

5.1 REACH RD 31+000 TO 46+000, SUBSYSTEM 5 (DAY 1-Jan 18, 1998)

Subsystem 5's farmers gathered near the main vegetable market outside Haroonabad, commencing a tractor-trolley procession headed by Mian Wahid and Sufi Iqbal, WUF President and Secretary of Information, respectively, at about 10:45, and reaching the maintenance site at about 12:30 hours. Mr. Imtiaz Ali Lalika, Member of the Provincial Assembly, inaugurated the campaign at RD 46+000 by removing silt from the distributary bed.

Prior to this, Mian Wahid, Sufi Iqbal and IIMI Field Team Leaders addressed the farmers, highlighting benefits of collective action, the WUF organizational structure and water-related problems confronting the Hakra 4-R Distributary water users. The chief guest promised to pursue the issue of the restructuring of responsibilities with the Chief Minister. A total of 260 farmers participated in this first day of the maintenance campaign.

Participant-details are given in *Table 6.*

Table 6. Participating farmers and farmer-leaders, Subsystem 5.

Total SS 5 WUA Presidents	Total other office bearers	Ordinary WUA members	Total WUA water users
23	103	134	260

The first day was not as effective as expected when compared to the participation of farmers, machinery and equipment. One group headed by the IIMI leader worked until 15:00 hours at RD 30+900, while another filled the bed ditch at RD 43+300. The third, a spade labor group, occupied themselves with berm cutting. Other participants were unable to execute work as formerly planned.

The three main reasons contributing to this state of affairs were:

- The PID issued a small flow in the distributary, to wet the bed, merely one day before maintenance activity commenced. A large group of farmers with tractors returned home when they saw water in the distributary bed.

- Another reason was to conduct the inauguration ceremony too far from the starting point, which created disorganization.

- The site was also too far for the farmers of Subsystem 5. Many farmers came from distances ranging between 20 to 25 km away. They wanted to return home a bit earlier in order to prepare fodder for their livestock.

Photograph A. Maintenance procession organized by the WUO (Subsystem 5, first day).

Photograph B. The President of the WUF delivering a speech (Subsystem 5, first day).

Photograph C. Chief Guest, Mian Imtiaz Ali Laleka inaugurating the first day maintenance operation by removing silt from the distributary bed (Subsystem 5, first day).

Photograph D. Bank strengthening and earth filling operation by tractors with rear-mounted blade (Subsystem 5, first day).

Participants undertook three major repair and maintenance operations:

- the repair and raising of the left bank and service road downstream from bridge RD 30+900;
- the filling of the bed ditch downstream from foot bridge RD 43+300; and
- berm cutting from RD 45+000 to 46+000.

All sites were supervised by the WUF President and the IIMI Field Team Leader, as well as by other team members. A total of 42 tractors participated, the detail of which is given in *Table 7.*

Table 7. Tractor and equipment participation, Subsystem 5.

Rear-mounted scrapers	Front mounted scrapers	Cultivator-tractors	Tractor-trolleys	Total tractors	Total spades
30	0	0	12	42	115

5.2 REACH RD 0+00 TO 10+000, SUBSYSTEM 1 (DAY 2-Jan 19, 1998)

Farmers assembled directly at Head Ghulab Ali (RD 0+00), the starting point, where the chief guest, Extra Assistant Commissioner, Haroonabad, Mr. Asher Raza, accompanied by the WUF President and IIMI Field Team Leader, inaugurated the day's maintenance activities by removing silt from the distributary bed, by about 11:00 hours. Prior to the formal cutting of the inaugural ribbon, Mian Wahid and Mansoor Shah, the WUF President and the SS 1 WUO General Secretary, respectively, highlighted the benefit of collective action, the WUF organizational structure and water-related problems, such as the modification of outlets confronting the Hakra 4-R Distributary water users. A total of 95 farmers participated in the second day's operations. *(See Table 8)*

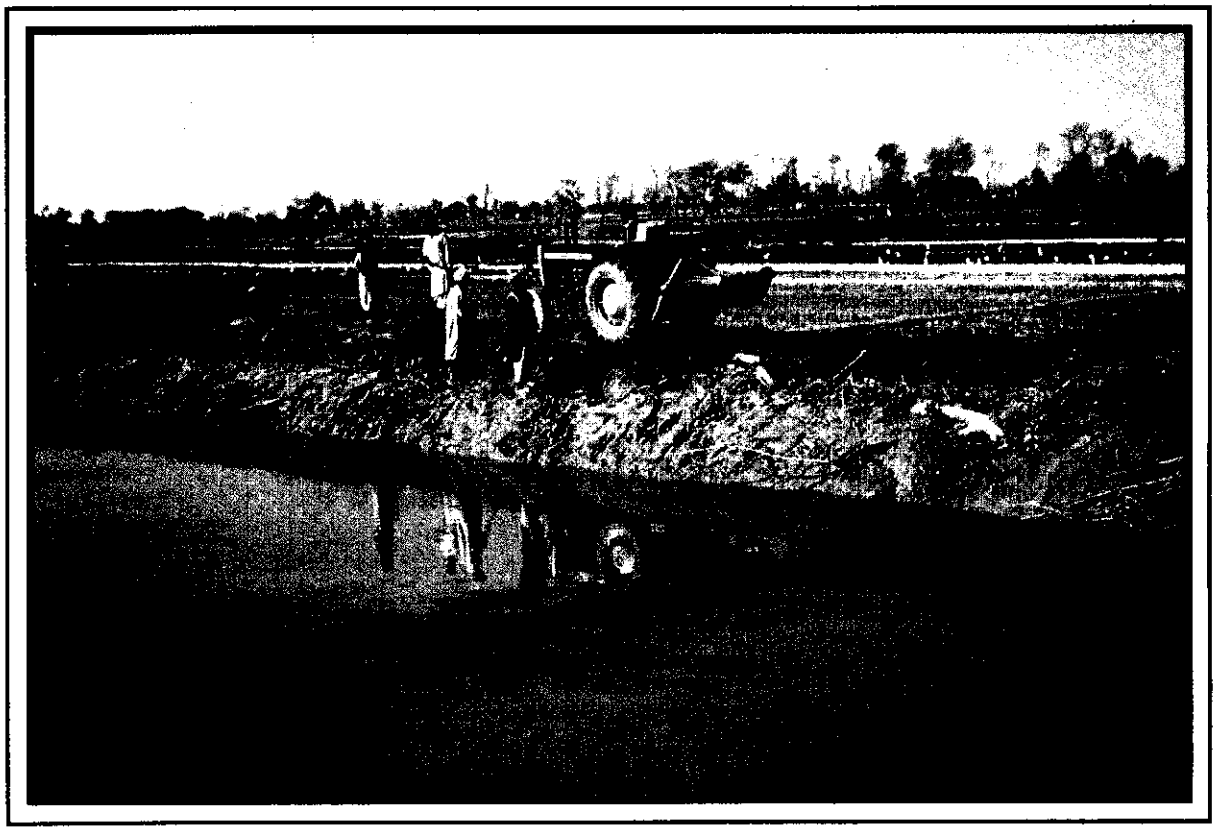
Table 8. Participating farmers and farmer-leaders, Subsystem 1.

Total SS 1 WUA Presidents	Total other office bearers	Ordinary WUA members	Total WUA water users
10	8	78	96

Executing and monitoring the quality of work were entrusted to two supervisory groups, each comprising of two farmers and three IIMI team members. One group executed work on the right side of the distributary, while the other monitored work on the left side. The PID Sub-engineer remained at one of the sites for one-and-a-half-hours.

Photograph E. The Chief Guest, Ashar Raza, for the 2nd day maintenance operation by cutting the inaugural ribbon (Subsystem 1, Second day).

Photograph F. Maintenance procession organized by the WUO (Subsystem 1, Second day).



Photograph G. Bank strengthening and earth filling operation by tractors with rear-mounted blade (Subsystem 1, Second day).

Photograph H. Bank strengthening and earth filling operation by spade laborers (Subsystem 1, Second day).

The main stumbling block presenting itself on the second day was that there were no fallow fields nearby and adjacent fields were occupied by crops. The earthload had to be scraped at a distance of 300 to 400 ft from where the bank needed repair. One federation member did volunteer his cropped fields adjacent to the site for the purpose, but WUF office bearers decided against this, even with the farmers' permission. Tractor and equipment participation is detailed in *Table 9.*

Table 9. Tractor and equipment participation, Subsystem 1

Rear-mounted scrapers	Front mounted scrapers	Cultivator-tractors	Tractor-trolleys	Total tractors	Total spades
7	0	1	1	9	60

Participants undertook four major repair and maintenance operations:

- the repair and raising of both banks in selected stretches;
- the repair of rain cuts and livestock entry points;
- the repair of the service road; and
- berm cutting.

The WUF President and the IIMI Field Team Leader supervised all sites while work was in progress, which halted at 15:00 hours. *see Table 10*

Table 10. Earthwork completed on the second day, Subsystem 1.

Location (RD)	Size / length of stretch repaired (Ft)	Type of work	Remarks
6000/L	12*2*3	Earth filling	Berm repair
6000/L	10*2*3	Earth filling	Berm repair
6000/L	7*2*3	Earth filling	Berm repair
6000/L	5*2*3	Earth filling	Berm repair
6431/L	12*2*3	Earth filling	Berm repair
6800/L	12*2*3	Earth filling	Berm repair
7000/L	8*2*3	Earth filling	Berm repair
7800/L	5*3*3	Earth filling	Berm repair

7900/L	4*3*3	Earth filling	Berm repair
8000/L	3*3*3	Earth filling	Berm repair
8000/L	8*2*3	Earth filling	Berm repair
8000/L	10*2*3	Earth filling	Berm repair
8100/L	10*2*3	Earth filling	Berm repair
8100/L	8*2*3	Earth filling	Berm repair
4500/R	125*7*0.33	Earth filling	Breach point repair
5000/R	150*7*0.50	Earth filling	Bank strengthening
6000/R	300*7*0.25	Earth filling	Bank strengthening
4000/R (D/S)	2000 Rft.	Berm cutting	Right berm
4162/L	15*5*2	Earth filling	Bank repair
4200/L	2*2*2	Earth filling	Bank repair
4280/L	5*3*3	Earth filling	Bank repair
4350/R	4*2*2	Earth filling	Bank repair
4500/R	7*5*2	Earth filling	Bank repair
4800/L	4*1*2	Earth filling	Bank repair
4900/L	5*2*2	Earth filling	Bank repair

5.3 REACH RD 10+000 TO 15+000, SUBSYSTEM 4 (DAY 3-Jan 20, 1998)

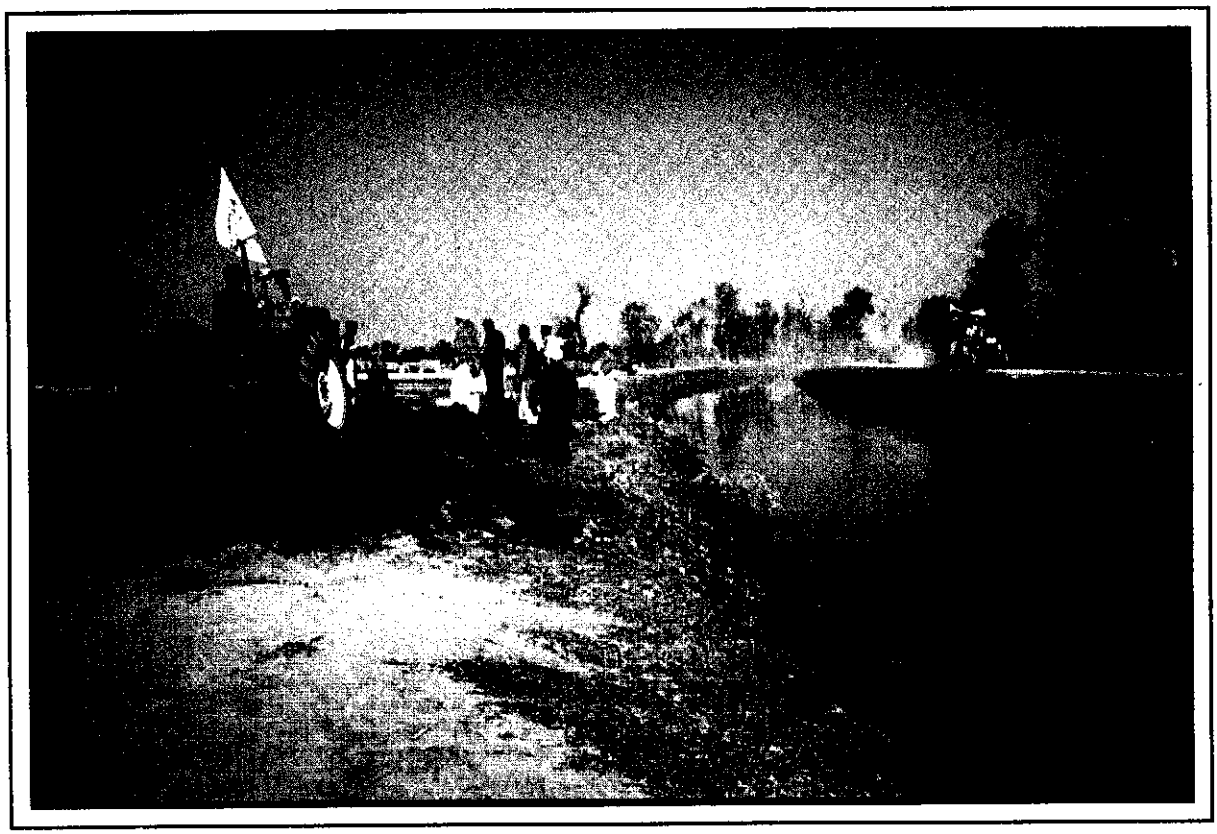
RD 5+000 at 1A Minor was the meeting point for farmers of Subsystem 1, where their tractor-trolley maintenance procession, headed by Mian Muhammad Khan Sukhaira and Mr. Fiaz, the WUO President and the Secretary of Information, respectively, set off from for the maintenance site at 12:00 hours. Some participants wore clothing items bearing the WUO's logo, and most were dancing to the accompaniment of a drumbeater upon arrival at the maintenance site.

The inaugural ceremony took place the moment the procession reached RD 12+600. In his inaugural speech, the Assistant Commissioner, Haroonabad, Mr. Shafi-uz-Zaman, strongly advised farmers to remain united, encouraging the WUF's undertaking of the maintenance campaign, especially as it was devoid of support from the PID.

Photograph I. Maintenance procession organized by WUO (Subsystem 4, third day).

Photograph J. The Chief Guest, Shafi-uz-Zaman, inaugurating the third day of maintenance operation by cutting the inaugural ribbon (Subsystem 4, third day).

Next >>



Photograph K. Bank strengthening and earth filling operation by tractors with rear-mounted blade (Subsystem 4, third day).

Photograph L. Bank strengthening and earth filling operation by tractors and laborers (Subsystem 4, third day).

Mian Wahid, Muhammad Asghar and Fiaz Ahmed, President, General Secretary and Secretary of Information, respectively, addressed farmers about the WUF's performance, the benefits of collective action, the WUF organizational structure and water-related problems confronting the water users of the Hakra 4-R Distributary.

A total of 117 farmers turned up at the inaugural site (*see Table 11).*

Table 11. Participating farmers and farmer-leaders, Subsystem 4.

Total SS 4 WUA Presidents	Total other office bearers	Ordinary WUA members	Total WUA water users
14	51	52	117

The details about tractors, machinery and equipment participation is given in *Table 12.*

Table 12. Tractor and equipment participation, Subsystem 4.

Rear-mounted scrapers	Front mounted scrapers	Cultivator-tractors	Tractor-trolleys	Total tractors	Total spades
7	0	0	4	11	50

Participants undertook three major repair and maintenance operations:

- the repair of a breach point;
- the raising of the left bank; and
- the repair of a livestock point.

The WUF President and the IIMI Field Team Leader supervised all of the work sites. The detail of the earthwork is given in *Table 13.*

Table 13. Earthwork Completed on the third day, Subsystem 4.

Location (RD)	Size / length of stretch repaired (Ft)	Type of work	Remarks
12000/R	120*2*5	Earth filling	Breach point repair
12900/L	5*2*3	Earth filling	Bank strengthening

13000/L	5*6*3	Earth filling	Bank strengthening
13000/L	6*6*3	Earth filling	Bank strengthening
14000/L	5*3*3	Earth filling	Bank strengthening
14000/L	3*3*3	Earth filling	Bank strengthening
14000/L	3*3*3	Earth filling	Bank strengthening

5.4 REACH RD 15+000 TO 31+000, SUBSYSTEM 2 (DAY 4-Jan 21, 1998)

The inaugural ceremony was held at 11:30 hours when the farmer-procession reached the maintenance site. The chief guest, Mr. Ali Sher Zahid, the project director of OFWMD for the FESS area, described the prospects being realized by WUOs in Pakistan. He also shared his experience of a WUO study tour to Italy on Participatory Irrigation Management. During his speech he remarked that:

> "I have some reservations about other WUO pilot sites. However, the farmer-participation in this maintenance activity seems as though Hakra 4-R WUF will definitely succeed. Had there been no time constraint, I would have brought the Executive Body of the Bahadarwah Minor WUF along to show them this maintenance campaign."

Prior to this, the WUF President, Mian Abdul Wahid, delivered a speech highlighting the size, structure and performance of the WUF, as well as current water-related issues.

Details of the participants are given in *Table 14.*

Table 14. Participating farmers and farmer-leaders, Subsystem 2.

Total SS 2 WUA Presidents	Total other office bearers	Ordinary WUA members	Total WUA water users
8	9	95	107

Four groups executed work at this site. Tractors were allotted to each group on a per/village basis. Respective village watercourse Presidents and one IIMI team member performed the roles of group leaders. The details about tractors, machinery and equipment participation is given in *Table 15.*

Photograph M. The President WUF delivering a speech (Subsystem 2, fourth day).

Photograph N. Bank strengthening and earth filling operation by tractors with rear-mounted blade (Subsystem 2, fourth day).

Photograph O. Bank strengthening and earth filling operation by spade laborers (Subsystem 2, fourth day).

Photograph P. Bank strengthening and earth filling operation by spade laborers (Subsystem 2, fourth day).

Table 15. Tractor and equipment participation, Subsystem 2.

Rear-mounted scrapers	Front mounted scrapers	Cultivator-tractors	Tractor-trolleys	Total tractors	Total spades
13	1	3	3	20	64

Repair and maintenance operations at Subsystem 2 included:

- the repair and raising of both banks in selected stretches;
- the repair of a breach point and livestock entry points;
- the repair of the service road; and
- berm cutting.

In addition to site supervision by the WUF President and the IIMI Field Team Leader, work was also inspected by the PID SDO and sub-engineer. They expressed little satisfaction, criticizing most of the work. A total of 16 points were repaired on this day *(see Table 16)*

Table 16. Earthwork completed on the fourth day, Subsystem 2.

Location (RD)	Size / length of stretch repaired (Ft)	Type of work	Remarks
13200/R	70*2*7	Earth filling	Breach point repair
16290/R	20*2*5	Earth filling	Breach point repair
17000/L	100*1*120	Earth filling	Service road repair
17100/L	25*3*4	Earth filling	Berm repair
17200/L	3*3*3	Earth filling	Berm repair
17500/L	4*3*3	Earth filling	Berm repair
17500/R	4*2*3	Earth filling	Berm repair
17800/L	12*3*3	Earth filling	Berm repair
18100/R	4*3*3	Earth filling	Berm repair
18100/L (D/S)	4*2*4	Earth filling	Berm repair

18100/L (D/S)	7*3*3	Earth filling	Berm repair
18100/L (D/S)	6*2*3	Earth filling	Berm repair
18100/L (D/S)	6*2*3	Earth filling	Berm repair
18100/L (D/S)	70*3*3	Earth filling	Breach point repair
18100/L (D/S)	5*2*3	Earth filling	Berm repair
18100/L (D/S)	4*2*3	Earth filling	Berm repair
18100/L	3*3*3	Earth filling	Berm repair
21000/R	30*6*4	Earth filling	Berm repair
21000/L	12*4*3	Earth filling	Berm repair
31000/R	20*3*2	Earth filling	Berm repair
31000/R	40*4*0.50	Earth filling	Bank strengthening

5.5 REACH RD 31+000 TO 46+000, SUBSYSTEM 3 (DAY 5-Jan 22, 1998)

The tractor-trolley procession, led by Mian Wahid and Sufi Iqbal, the WUF President and Secretary of Information, respectively, reached the maintenance site at about 11:00 hours. Ch. Abdul Ghafoor, Chairman of the Federal PM Inspection Team and Member of the National Assembly, inaugurated the maintenance campaign by cutting the inaugural ribbon and removing silt from the distributary bed.

In his inaugural address, the chief guest voiced his strong opposition to the PIDA Act during formative days of the participatory movement, expressing his belief that government agencies could not solve the farmers' problems as effectively as WUOs could. Agency staff, he said, are not accountable to farmers, while federation representatives would always remain responsible and accountable to farmers. Furthermore, he said that when a farmer leader became involved in any offense, he would immediately be discredited, while. on the other hand, agency staff remained accountable to nobody.

He also assured participants that he would pursue the issue of restructuring the Hakra 4-R WUF responsibilities with the Chief Minister and the Irrigation Minister, Punjab.

Photograph Q. Maintenance procession organized by WUO (Subsystem 3, fifth day).

Photograph R. The Chief Guest, Ch. Abdul Ghafoor, inaugurating the fifth day maintenance operation by cutting the inaugural ribbon (Subsystem 3).

Photograph S. Earth filling operation by tractors with rear-mounted blade (Subsystem 3, fifth day).

Photograph T. Bank strengthening and earth filling operation by spade laborers (Subsystem 3, fifth day).

Mian Wahid and Sufi Iqbal highlighted the benefits of collective action, the WUF organizational structure and water-related problems confronting water users. The WUF President also tackled the negative role that PID staff played in defaming the WUF unfairly.

A total of 215 farmers with 38 tractors participated in the fifth day's maintenance operations *(see Tables 17 and 18).*

Table 17. Participating farmers and farmer-leaders, Subsystem 3.

Total SS 3 WUA Presidents	Total other office bearers	Ordinary WUA members	Total WUA water users
24	81	110	215

Table 18. Tractor and equipment participation, Subsystem 3.

Rear-mounted scrapers	Front mounted scrapers	Cultivator-tractors	Tractor-trolleys	Total tractors	Total spades
24	1	3	10	38	105

The three major repair and maintenance operations undertaken by farmers were:

- the repair and raising of the left bank and the service road, downstream from drop structure RD 25+000;
- berm cutting; and
- the strengthening of livestock entry points.

A total of 39 points were repaired on that day, as detailed in *Table 19.*

Table 19. Earthwork completed on the fifth day, Subsystem 3.

Location (RD)	Size / length of stretch repaired (Ft)	Type of work	Remarks
25000/R	5*4*3	Earth filling	Bank strengthening
25000/R	20*2*4	Earth filling	Bank strengthening

25000/R	20*5*2	Earth filling	Bank strengthening
25000/R	8*6*1.75	Earth filling	Bank strengthening
25000/R	20*5*1.5	Earth filling	Bank strengthening
25000/R	20*1*3	Earth filling	Bank strengthening
25000/R	10*5*1.5	Earth filling	Bank strengthening
25000/R	75*1*0.50	Earth filling	Bank strengthening
25000/R	10*2*3	Earth filling	Bank strengthening
25000/R	8*2*1	Earth filling	Berm repair
25000/L	15*3*1.5	Earth filling	Berm repair
25000/L	15*7*0.33	Earth filling	Service road repair
25000/L	15*3*2	Earth filling	Berm repair
25000/L	7*7*0.33	Earth filling	Service road repair
25000/L	8*2*2	Earth filling	Berm repair
25000/L	5*6*0.33	Earth filling	Service road repair
25000/L	18*1*1	Earth filling	Berm repair
25000/L	58*2*2	Earth filling	Bank strengthening
25000/L	58*6*0.58	Earth filling	Service road repair
25000/L	10*10*0.33	Earth filling	Service road repair
25000/L	20*3*0.50	Earth filling	Service road repair
28270/L (D/S bridge)	50*3*1.5	Earth filling	Service road repair
28270/L (D/S bridge)	50*5*0.50	Earth filling	Service Road repair
28270/L (D/S bridge)	50*2*2	Earth filling	Service road repair
28270/L (U/S bridge)	115*4*1.25	Earth filling	Service road repair

28270/L (U/S bridge)	115*6*0.50	Earth filling	Service road repair
28270/L (U/S bridge)	100*2*2	Earth filling	Service road repair
28270/R (U/S bridge)	15*3*3	Earth filling	Bank strengthening
28270/R (U/S bridge)	15*5*4	Earth filling	Bank strengthening
28270/R (U/S bridge)	15*10*1	Earth filling	Bank strengthening
(U/S Bridge)	25*5*2	Earth filling	Bank strengthening
(U/S Bridge)	30*3*1	Earth filling	Bank strengthening
(U/S Bridge)	10*3*3	Earth filling	Bank strengthening
(U/S Bridge)	10*6*0.75	Earth filling	Bank strengthening
32000/R	200*4*1.5	Earth filling	Bank strengthening
32000/R	150*4*0.50	Earth filling	Bank strengthening
33500/R (U/S Ghat)	20*5*2	Earth filling	Bank strengthening
(D/S Ghat)	100*3*2	Earth filling	Bank strengthening
(D/S Ghat)	100*3*0.25	Earth filling	Bank strengthening

6. WUO MAINTENANCE CAMPAIGN PERFORMANCES

6.1 EVALUATION

The WUF formed a six-member Evaluation Committee *(Annex 3)*, comprising of a watercourse representative from Subsystem 3, Mr. Anwar, as chairman, and five social organizers as members, to assess the performance of each WUO separately. Mr. Anwar had attended maintenance operations on each day to evaluate the work. The participation of IIMI social organizers served a similar purpose.

The evaluation committee agreed that each WUO's performance would be assessed using seven key indicators, even though the last two were ignored due to certain complexities in available information. Each indicator has equal point values, given in the following section.

6.2 INDICATORS FOR EVALUATION

Indicator	Total value
1. Participation by ordinary farmers	20
2. Participation of the machinery (tractors)	20
3. Discipline during the execution of work	20
Volume of the work	20
5. Quality of the work	20
6. Participation by WUA Presidents	Ignored
7. Participation by other WUA office bearers	Ignored

Each indicator was assigned a relative weight.

6.3. DEFINITIONS OF THE INDICATORS

1. Participation by ordinary farmers:

- Considered with respect to the total number of water users in the subsystem;
- After every range of 20%, the point value was 8; and
- Participating subsystems from distant locations were given extra points ranging from 1 to 3.

2. Participation of the Machinery (Tractors)

- In consideration of the number of participating tractors against watercourses.

3. Discipline During the Execution of Work

- Time observance;
- Effectiveness of supervision; and
- Farmers' compliance to supervisors.

4. Quality of the Work

Giving the relative weight as:

- Low 6;
- Medium 12; and
- High 18.

5. Volume of the Work

Similar to the above, giving the relative weight as:

- Low 6;
- Medium 12; and
- High 18.

6.4. RATING ON EACH INDICATOR

The committee evaluated each indicator independently *(see Annex 4)*

6.5. THE FINAL RATING

According to the Evaluation Committee's ratings, Subsystem 2 performed best by scoring 85 out of 100, followed by Subsystem 3 and 4, with 83 and 56, respectively. Subsystems 5 and 1 scored 52 and 49, respectively. The final result of the evaluation is presented in *Table 20.*

Table 20. Evaluation Committee's Rating

	Indicators	SS5	SS4	SS3	SS2	SS1
1.	Participation by ordinary farmers	14	8	9	18	13
2.	Participation of the machinery	18	16	5	12	12
3.	Discipline during the work execution	6	8	12	18	18
4.	Volume of the work	6	14	12	19	17
5.	Quality of the work	10	14	14	19	17
	Total rating	**52**	**49**	**56**	**85**	**83**

6.6 PRIZES AND AWARDS

The Evaluation Committee intends to use this rating for internal evaluations, therefore, it will not be announced, *per se*. In order to sustain encouragement, however, the committee awarded one prize to each subsystem for its most strong point of participation.

- Subsystem 5: high participation of farmers and tractors;
- Subsystem 1: interest in maintenance activities, as it is commonly believed that headenders are disinterested in maintenance activities at the distributary level;
- Subsystem 4: well-organized maintenance procession;
- Subsystem 2: high quality work at sites; and
- Subsystem 3: high volume of work.

7. FINANCIAL ANALYSIS OF MAINTENANCE RESOURCES

7.1. TRAVELING COSTS OF TRACTORS TO REACH MAINTENANCE SITES

This five-day maintenance operation was undertaken on a self-help basis. Contrary to the custom in other areas of the Punjab, fuel costs for participating tractors were not paid to farmers. In order to reach maintenance sites, 120 tractors covered approximately 4000 km in distance, consuming 574 liters of fuel costing Rs 5,740/= (or US$ 125/=).

7.2. COST OF MAN HOURS

Similarly, in consideration of the rate for daily-waged labor, which is Rs 100 per day or per 8 hours, the labor cost of 674 farmers (794 minus 120 tractor drivers) is Rs 67,400/= (or US $ 1,500/=) for 5392 man hours. The subsystem-wise financial analysis of resources used in the five-day maintenance campaign is presented in *Tables 21 and 22.*

Table 21. Traveling cost of tractors to reach sites.

Subsystem	No. of tractors	Avg. distance covered by tractors (both sides)	Total distance covered by all	Fuel consumed (liters)	Cost of fuel (Rs)
SS 5	42	38	1596	228	2280
SS 1	9	16	144	21	210
SS 4	11	20	220	32	320
SS 2	20	26	520	75	750
SS 3	38	40	1520	218	2118
TOTAL	120		4000	574	5740

Note. Fuel consumption by a tractor, on average, is considered to be 4 liters per hour.

Table 22. Man hours and cost of labor.

Subsystem	Total farmers	Time spent by each farmer(hur)	Total man hrs of labor	Total cost
SS 5	260	8 hours	2080	2600
SS 1	95	8 hours	760	9500
SS 4	117	8 hours	936	11700
SS 2	107	8 hours	856	10700
SS 3	215	8 hours	1720	21500
TOTAL	794		6352	79400
			say	79000
Total participants excluding tractor drivers	674		5392	67400

Note: Labor cost is calculated in terms of existing daily-waged rates, i.e. Rs 100 per day or per 8 hours.

7.3. COST OF TRACTORS (Work at Site)

A total of 120 tractors participated in the maintenance operation. Each, on average, worked 3 hours at respective sites. A locally-hired tractor would normally cost Rs 100 per hour, the rate at which the total cost of work done by tractors has been calculated, i.e.

Total Tractors x Average Working Hours x Charges per Hour
120 x 3 x 100 = Rs 36,000

Each of 120 tractors, on average, worked three hours at site and consumed 4 liters of fuel per hour. The calculation for the total cost of fuel consumed by 120 tractors becomes.

Total Tractors x Working Hours X Fuel Consumed in an Hour x Cost for 1 liter of Fuel

120 x 3 x 4 x 10 = Rs 14,400

Table 23. Total Cost of Resources, in Terms of Fuel Consumed by Tractors

S. No.	Item		Cost (Rs)
1.	Traveling cost of tractors to reach maintenance sites	5,740	
2.	Cost of man hours		67,400
3.	Cost of tractor hours (work at sites)	36,000	
4.	Cost of tractor hours (fuel consumption at sites)		14,400
	TOTAL COST		123,540
		say	124,000

The estimated value of the resources utilized in this five-day maintenance campaign is listed in Table 23, where the total value amounts to Rs. 124,000 (U.S. $ 2,800).

8. LESSONS LEARNED

The massive mobilization of resources for this five-day maintenance campaign has proved that the Hakra 4-R Distributary WUF possesses the capacity to undertake management responsibilities. It is now clear that:

1. The WUF leadership is able to mobilize manpower, machinery and equipment; and
2. Lower-tier organizations are willing to participate in the distributary's management.

After this enormous effort, the WUF's credibility and impact at the grassroots level has also become more evident. The campaign has lent more confidence to the WUF leadership, even of their ability to muster financial resources to manage the distributary if responsibilities so demanded.

The PID staff's role during this maintenance campaign was very passive, or rather discouraging for participants. Another important lesson, therefore, learned from this experience, is that maintenance campaigns such as these are worthless with regard to building user-confidence in the system. A long-term institutional impact would, thus, also be worthless, unless the Irrigation Department's roles and responsibilities towards the WUF become clearly defined.

Following short on the heels of the *Flow Measurement Training* for 132 WUF farmer-leaders in September 1997, the Hakra 4-R Distributary's water users have once again proved its effect among farmers. Farmer participation to maintain upstream reaches, particularly those from the three subsystems which have been lined, indicates that a sense of ownership for the entire system prevails among water users.

This campaign has been the first "high-aiming" event of its kind, achieving very significant milestones towards awareness-building at grassroots levels in the process. Moreover, the WUO member accountability criteria has strengthened, especially for those WUO / WUA office bearers who contribute actively to routine meetings, but were unable to provide labor and equipment, and did not even show up at the maintenance sites.

Farmers came face-to-face with various constraints during the application of maintenance operations, as listed below:

- The lack of appropriate machinery and equipment was frustrating for farmers; as 95 % of farmers own rear-mounted tractors, while the nature of the work, in most cases, required front-mounted-blades. Had the reverse been the case, work would have been completed with much more efficiency.

- As most stretches being repaired were adjacent to cropped fields, earthloads were acquired either quite a distance away from the site, or from very narrow ridges close by. Some repair points proved relatively difficult to fix, resulting in tractors getting stuck and malfunctioning, as the wet distributary bed hindered work.

- Most locations in need of repair have been neglected for decades, therefore, farmers were presented with difficulties in undertaking operations for deferred maintenance.

REFERENCES

Waheed-uz-Zaman, 1998. Application of operation and maintenance activities to support Participatory Irrigation Management at distributary level. M.Phil Dissertation in Water Resources Management (forthcoming).

ANNEX 1

Dignitaries and Officials who Inaugurated Maintenance Operations

S.No.	Name and Designation	Remarks
1.	Mian Imtiaz Ali Lalika, Member Provincial Assembly, Haroonabad	First day
2.	Mr. Asher Raza, Extra Assistant Commissioner, Haroonabad	Second day
3.	Mr. Shafi-uz-Zaman, Assistant Commissioner, Haroonabad	Third day
4.	Mr. Ali Sher Zahid, Project Director, OFWMD FESS Team	Fourth day
5.	Ch. Abdul Ghafoor, Member National Assembly and Chairman Federal Inspection Team	Fifth day

ANNEX 2

Organization and Supervision by Staff

S. No.	Name and Designation
1.	Muhammad Asghar, Field Officer
2.	Nasir Sultan, Social Organizer
3.	Mr. Bilal, Social Organizer
4.	Mr. Amjad, Social Organizer
5.	Mr. Anwar Iqbal, Senior Field Assistant
6.	Khalid Rashid, Social Organizer
7.	Abdul Hameed, Social Organizer
8.	Tipu Naveed, Field Assistant
9.	Waheed-uz-Zaman, Field Team Leader

Participating Lahore-based IIMI staff

10.	Mirza Zafar Iqbal
11.	Mehmood-ul-Hassan

Occasional participants from the PID

1.	Mr. Abbass, Sub-engineer, Haroonabad
2.	Mr. Bashir Nasir, SDO, Haroonabad

ANNEX 3

Evaluation Committee

S. No.	Name	Designation	Status
1.	Muhammad Anwar	President WUA	Chairman
2.	Nasir Sultan	Social Organizer	Member
3.	Bilal Asghar	Social Organizer	Member
4.	Muhammad Amjid	Social Organizer	Member
5.	Khalid Rashid	Social Organizer	Member
6.	Abdul Hameed	Social Organizer	Member

ANNEX 4

Definitions of Indicators

1. Participation by Ordinary Farmers

In view of:

- Participation of the total number of water users;
- A point value of 8 after every range of 20%; and
- Extra points ranging from 1 to 3 for subsystem members commuting from distant locations.

Ratings for Farmer-participation

Subsystem	Waterusers	Participating Members	% of Participation	Rating
1.	697	95	14	7.6
2.	315	107	34	17.6
3.	860	21	25	13
4.	628	117	19	8.6
5.	929	260	28	14.3

2. Machinery Participation (Tractors)

- In view of participating tractors per watercourse.

Ratings of Tractor-participation

Subsystem	Total W/Cs	Tractors per 25 watercourses	% of Participation	Rating
1.	23	11	14	7.6
2.	23	24	34	17.6
3.	27	18	25	13
4.	15	25	19	8.6
5.	33	32	28	14.3

3. Discipline During the Execution of Work

In view of:

- Punctuality;
- Effectiveness of supervision; and
- Farmers' compliance to supervision.

Ratings for Supervisory-effectiveness

Subsystem	Punctuality	Effectiveness of Supervisors	Farmers' Compliance to Supervisors	Rating
1.	4	2	2	8
2.	6	6	6	18
3.	7	5	5	17
4.	4	2	3	9
5.	3	0	1	4

4. Quality of Work

Giving the relative weight of:

- Low = 6;
- Medium = 12; and
- High = 18.

Rating for Quality of Work

Subsystem	Rating
1.	14
2.	19
3.	17
4.	14
5.	10

5. Volume of Work

Similarly, the relative weight is given as:

- Low = 6;
- Medium = 12; and
- High = 18.

Rating for Volume of Work

Subsystem	Rating
1.	14
2.	19
3.	17
4.	12
5.	6

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