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INTEGRATED WATER RESOURCES MANAGEMENT IN FERGHANA VALLEY

Social Mobilization and Institutional Development Approach and Strategy

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1. INTRODUCTION

This document is aimed at presenting the elements of the social mobilization and organization development approach for SDC-supported project “Integrated Water Resources Management in the Fergana Valley” (IWRM-Fergana) for the pilot sites located in the three republics sharing the Fergana Valley (Uzbekistan, Tajikistan and Kyrgyzstan). Since three different republics with varying stage of the agricultural reforms are involved in the project, the strategy and approach will vary amongst the three countries. The approach necessarily builds the capacities of the project staff to interact with water users and water managers to assist them in formation of Water Users Associations (WUAs) and Water Users Federations (FWUAs) to manage their respective hydro-systems in the framework of partnership and co-determination. For this purpose a detailed strategy is presented here.

The report is organized into four sections. Section 2 describes some key concepts in the social mobilization and institutional development (SMID) strategy; section 3 highlights the SMID strategy for Kyrgyzstan and Uzbekistan and Tajikistan, and final section 4 presents the social mobilization and organization development methodology.

2. KEY CONCEPTS IN MOBILIZATION STRATEGY

This strategy hinges upon a few fundamental concepts for developing, improving, consolidating and sustaining appropriate organizations for different levels of the system for improved system management.

2.1 Stakeholders and Key Stakeholders

Stakeholders are individuals and groups of individuals having vested interest in the water resources. These can be agricultural users, managers, inspectors, legislators, or others who in one way or the other benefit or are harmed by the way in which water is managed. However, the social mobilization strategy presented here only focuses on key or primary stakeholders. These key stakeholders are the water managers and the water users. For example, the water managers could be the section in-charges, staff of the hydrometric services, Raivodkhoz staff, Oblvodkhoz staff, etc. On the other hand, water users could be the private and family farmers, shirkat and cooperative farms growing crops or raising livestock and using water, and the members of the shirkat and cooperative farms, as well as the families having home gardens for farming.

2.2 Collective Action for Water Management

Collective action is aimed at both controlling and restraining individual actions. It is the measure that a group collectively takes relating to individual action for the purpose of improving the group’s overall benefit. For example, while individual action of the farmers sharing a watercourse or a distributary canal has to be expanded for undertaking

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maintenance work collectively, and liberated for realizing individual rights and effectively interacting with officials, it has to be restrained for reducing anti-social and “free-rider” behavior among the users.

Effective collective action for water management is defined here as a “joint effort” of one group of individuals, several groups of individuals, or organizations to share and distribute, and transparently manage the water resources with a view to provide fair and judicious access to all those who need water. This seems the best choice for maximizing the gains from water use as a whole. The access to water is provided based on fairness, equity, and transparency. In times of water scarcity, the scarcity is shared as equitably as possible. The resources required for efficient management are fairly and equitably mobilized through proportionate shares and contributed for better management of water resources.

The individuals only join group efforts if they see that they will individually benefit from a joint effort. Therefore, it is very likely that the people, or the groups of people, benefiting from prevalent inequities in water distribution, might even oppose the collective action. Several sections of the water users and managers will have apprehensions and concerns. While the users might be concerned about increasing costs of irrigation service, the canal managers might be concerned about losing jobs, or control and power. These concerns and apprehensions need to be addressed in the most positive ways during the social mobilization processes.

2.3 Social Mobilization for Water Management

Social mobilization is a process, with no definite end and start. It is a process through which the stakeholders are involved as key decision-makers for water management. As a result of social mobilization work, the stakeholders should understand that they are creating participatory organizations for their own collective benefit, and that such organizations will work for them on their decided rules and procedures, and are mainly accountable to them.

Social mobilization is undertaken through understanding the stakeholders’ needs and problems in water management and assisting them through trained staff to engage in a dialogue to agree on collective action for improving water resources management. It builds an internal demand among the key stakeholders for participatory organizations (such as water users associations (WUAs), federations of water users associations (FWUAs), and canal water committees (CWCs) managing water along hydrologic boundaries at their level. The participatory organizations crafted through such a process should be self-governing (the organizations are accountable to their members), partially or fully self managing (stakeholders define the rules of business and follow these rules, e.g. by-laws/internal rules), and as much as self-sustaining as possible (the members finance full or the major part of the costs involved in managing the organization and have full control over the finances and the resources it manages).

Usually, the WUAs are driven by construction and rehabilitation projects, where users organize into WUAs for having access to the subsidies and grants meant for irrigation system improvements and rehabilitation. Experience in several countries shows that as soon as such projects are over, the WUAs become weaker or even dysfunctional.

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Therefore, use of external resources to motivate stakeholders to join such organizations should be designed in such a way that these stimulate local investments and provide additional motivation for water users to support the WUAs, pay their fees and raise reserve funds. For example, in events where the irrigation systems are in dire need of improvement and rehabilitation, such incentives could come as matching grants requiring the communities to mobilize part of resources from their own efforts. This creates partnership and a sense of ownership for the system.

Social mobilization is not a one-time activity, where the mobilization staff meets the community, explains the role that community has to perform, explain the organizational structures and procedures for registration etc. In essence, social mobilization is a continuous, complex process of two-way dialogue, where new ideas from the stakeholders are well received, examples from elsewhere are presented to communities and the communities are encouraged to think and put forth ideas that will generate truly users owned, managed and governed organizations, which are self-sustaining to the maximum possible extent.

2.4 Capacity-Building and Empowerment

Capacity-building has several dimensions and interpretations. For example, provision of additional equipment to an organization can be considered as a capacity-building. However, if the organization does not know “how” to use this equipment, or it needs that equipment only occasionally, the capacity is really not built.

In the context of IWRM-Fergana Project, the capacity building is seen both with “hardware” and “software” dimensions. The hardware dimension focuses on provision of, for example, measurement devices and equipment etc.; the software dimension focuses on provision of information, knowledge, procedures, concepts and methodologies, training, that create the capacity within the organization to perform its tasks and roles in a professional way.

Many of the roles and tasks for these organizations will be new. For example convening, holding, and reporting the results of the farmer meetings, measuring and managing water, resolving conflicts, keeping record, dealing with the state officials, tax administration, etc. The capacity for performance of these new roles and tasks needs to be created by a series of practical trainings.

2.5 Internal Demand

Unless the stakeholders themselves see a benefit of engaging in collective action, they will neither join the organizations willingly, nor participate in activities organized by the organizations. Thus, it is very important that an internal need and demand for collective action is generated. Externally imposed structures and organizations often tend to weaken and die with the passage of time. Likewise, external conditions (such as governments regulations on production quotas, legally defined role of WUAs etc., conditional provision of support services, better accountability of governmental officials to farmers through service agreements etc.) and incentives for collective action play an important role in motivating the farmers. This is the role of the Social Organizers to help

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the individuals understand that if they will form such organizations, they will be better off than now and then persuade them with providing information about such incentives, and presenting examples from elsewhere through participatory techniques of adult learning. Creating an internal demand for collective action is extremely important in creating sustainable WUAs.

2.6 Participation

There are several types and levels of participation. While passive participation, the lowest type of participation is where the project staff informs the stakeholders about what the project is about and what is farmer's role in it, self-motivation, the highest type of participation, is where the stakeholders are themselves motivated and take all actions themselves. There are several other types of participation which lie somewhere in between.

While the project will try to achieve maximum participation by stakeholders, participation will gradually need to be improved. It is understandable that initially, the stakeholders would like to listen from the project staff about the project ideas, strategies etc., and the likely benefits that the users will have by participating in the collective action. The staff should attempt to proceed in a way that gradually increases the interest of the stakeholders and they become more and more involved and ultimately take over the activities themselves with some assistance from the project staff.

2.7 Democratic Management

State managed organizations are usually top-down bureaucracies, where the role of the farmers is often seen as "beneficiaries" of the service. The general definition of "democracy" is "government of the people, by the people, and for the people". Seen in this context, the water management organizations, at all levels, need to be tailored in such a fashion that these represent the interests of at least the key stakeholders and users, by their representatives at all levels of the system hierarchy. At the lower level of the system (for example watercourses), the informal users groups themselves can handle simpler tasks like resource mobilization, conflict resolution and information dissemination. As we go up the system, the tasks become more complicated and time consuming. The organizations can engage specialist staff to assist them, but the policy formulation and regulation and control of staff performance is carried out by the users' representatives.

2.8 Accountability

In most state managed systems, usually there is only upward accountability, whereby the states provide the budget to the water managing organizations and the users receive the service. However, the users can/do not control the quality of the service.

The essence of participation and democratic management is to introduce both, internal and external, accountability. Such organizations treat the users as partners and clients and not only the beneficiaries. The relations between the service providers and the users

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are based on the service contracts, whereby the service providers are accountable to the users also. If the quality and quantity of the service falls below the agreed standards, the users can, for example, hold part of the service fee payment as a fine.

In democratic and participatory organizations, the members of the organizations are accountable to each other as well, as they agree to certain internal rules (by-laws) for managing the resource and carrying out related business. Such organizations are also accountable upwards for judicious use of the resource under their management. The state may, for example, specify standards for financial business management, transparency, and equitable resource sharing.

So the crux of the discussion is that the participatory democratic organizations are horizontally and vertically accountable.

2.9 Social Mobilization and Institutional Development Teams

For the IWRM-Fergana Project, this team includes:

- a) Institutional Development Team, comprising of the project managers of IWMI and SIC and their assisting staff;
- b) Social Mobilization and Institutional Development Field Teams (Community Mobilizers) comprising the Provincial WUA supervisor, a hydrologist/ water resources engineer and an agronomist for each of the three pilot sites; and
- c) Community-Based Volunteers

The role of the institutional development team is more of conceptual guidance and leadership, as they possess more knowledge on the subject from elsewhere in the world through their exposure to conferences, seminars, literature, and overseas visits. The supervisors of the field teams (Provincial WUA Supervisors) are well experienced in dealing with the local communities as well as with WMOs, and most of them already have participated in organizing WUAs at some scale. Their knowledge and experience will further be enriched through training on social mobilization, field visits to farmer-managed irrigation systems, and discussions with the guiding and supervisory staff, and they would be able to apply this knowledge in their respective site-specific situation. The field teams are the key staff responsible for motivating the farmers to form the WUAs, impart training to WUA office bearers and staff, and interact as the channels of communication. They will also be responsible for recording the proceedings of the meetings, events, and carry out special observations, and providing the feedback to the institutional development team.

For building the capacity of the field teams, a week-long training will be organized, where a number of case studies and experiences from the region and elsewhere will be discussed. The social mobilization process will be explained in detail and then on-job retraining will be carried out. The Institutional development teams will frequently follow-up the process by carrying out field visits to polish and further refine the skills of the community mobilizers.

The community-based volunteers are of special value. These are the discernible selfless people from the local areas, who want to change the situation, believe in collective

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action, and want to benefit their communities without expectation of a direct personal gain. Such people are imbued with natural leadership qualities and can assist the project staff in discussing and refining ideas, carrying such ideas through to the community, and help in the community organizing efforts of the project.

While organizing water users is the responsibility of SMID field teams, the project staff can benefit from identifying such people with assistance from the local communities, take them along, and count on their assistance in organizing the communities, wherever feasible and possible.

3. SOCIAL MOBILIZATION AND ORGANIZATION DEVELOPMENT STRATEGY

Social mobilization needs a series of building-block dialogic processes described in section 4 of this report, whereby each step leads to the next step and the results of the earlier steps are carefully evaluated and course corrections are taken for the next steps. In communities where collective action for natural resource management is a relatively new arena, community organizers or social mobilizers are needed greatly.

The **social mobilization process** would typically involve several phases:

In the **rapport and knowledge building phase** (sub-section 4.1) the mobilization and institutional development teams become familiarized with and accepted by the stakeholders in the pilot sites and develop a detailed understanding of the conditions in the irrigation and farming systems in which they work. In the **problem analysis and service identification phase** (sub-section 4.2), the field teams carry out group exercises with the farmers and assist them to analyze the nature of problems related to agriculture and irrigation management and develop a draft irrigation service plan for each site including the irrigation service objectives and functional requirements for meeting those objectives, and the methodology to monitor latter whether or not those objectives are met. During the **organization building phase** (sub-section 4.3), a series of stakeholder consultations and group meetings are carried out during which the participants discuss and develop the new institutions based on information provided by the social mobilizers and institutional development specialists. During the **capacity building phase** (sub-section 4.4), the water managers and users, as well as other stakeholders, participate in training activities, which prepare them for their roles and tasks in water resource management. The training methodology should be practical and involve many on-the-job components, as during this phase the stakeholders would be carrying out their new tasks and practicing their new skills. Emphasis should be placed on solving the real problems arising in the context of irrigation management with the support of trainers and mobilizers. Training can be provided by the project staff, as well as by partner organizations, such as NRMP, TEFAP2 and Farmers' Associations. Finally, during the **management transfer phase** (sub-section 4.5), the management responsibilities would be legally transferred to the WUAs / FWUAs and Canal Water Committees (either fully or partially) and post-transfer support services provided, as suggested above. The project has already built a monitoring, evaluation and feedback component in its social mobilization strategy.

3.1 Social Mobilization Strategy for Uzbek and Tajik Pilot Sites

Though there are some recent initiatives in developing legislation for WUAs and formation of WUAs in **Uzbekistan and Tajikistan**, the **social mobilization** activities are developed from scratch, as there is little professional experience with the specialized skills required. Social mobilization in the water resources sector is a specialized task, which requires a unique combination of technical and sociological skills. If the institutional reform piloted in this and other projects would become generalized throughout the region, a well-organized and established capacity among professional social organizers needs to be available. The IWRM-Fergana will initiate this process, by developing the social mobilization process suggested and establishing a core team of organizers. These will initially be carried out as project activities, and latter integrated into existing organizations, such as Canal Councils, NGOs and other civil society associations, with a potential to ultimately emerge as a new NGO. The mobilizers will work closely with the WMOs, but not under their authority.

The field teams will start by preparing lists of the individual farmers and water users by plots along each of the outlets of the pilot secondary canals. The local farmers, mirobs, and shirkats, etc., would be of good assistance here. In addition, the data about important variables of irrigated agriculture (individual farm types, area operated by individual water users, cropping patterns, intensities, water availability and use, extent of water logging and salinity, productivity and areas under various crops, etc.) will be collected. These lists will then serve as the interaction tools for the field team to make sure that during various sets of meetings and discussions, all users are invited, and are able to air their views about the situation and problems. The detailed steps as outlined in section 4 will then be followed accordingly.

3.2 Social Mobilization Strategy for the Kyrgyz Pilot Site

In **Kyrgyzstan**, since the WUAs have already been created but along administrative boundaries in most part of the pilot canal, the IWRM-Fergana activities would capitalize on the work of the WUA Support Units of the On-Farm Irrigation Project. Instead of duplicating the WUA mobilization activities already underway in Kyrgyzstan, the project will support the WUAs to reorganize along hydrologic boundaries and establish WUA(s)/Water Users Groups (WUGs) on the balance areas where these have yet not been established and in partnerships with the OFIP and its WUA Support Services Units, as well as Mercy Corps would provide **capacity building** to the existing WUAs. The IWRM-Fergana can thereby complement the WUA development already underway in Kyrgyzstan with the integrated hydro-systems management setup. More specifically, the IWRM-Fergana would federate the three existing WUAs and the forthcoming WUAs/WUGs along the Aravan-Akbura Canal into a Federation of Water Users Associations (FWUA). The FWUA will be assisted in developing its capacity and entering into a service agreement with appropriate authorities to take charge of the entire main canal system. The field teams will encourage the WUAs to reorganize themselves along hydrologic units (watercourses) as informal users groups. In principle, the General Assembly of the FWUA will comprise of the representatives from each of the constituent WUAs. The existing WUA Councils should be encouraged to participate in initial discussions on federating the WUAs and decide the objectives of such a federation. The project staff should facilitate the process by building awareness, bringing in information

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(for example about legal procedures to be followed while federating, defining the objectives of service delivery, development of FWUA by-laws, defining areas of responsibility for WUAs and FWUAs, etc.). In that way, the basic target group for the Field Team in Kyrgyzstan would be the WUA Councils and the water users. Naturally, not all the WUAs are equally good at the moment. It will be the task of the field teams to assess the weaknesses of these associations while holding participatory discussions with WUA Councils and assisting in bringing the knowledge to build the capacity of weaker WUAs. Experience sharing with other WUAs would itself be helpful for learning.

In addition, based on its experiences with the social mobilization and institution building process, the IWRM-Fergana will make recommendations for the refinement of the existing **legal framework** for WUAs/FWUAs and the hydro-system Canal Water Committees. A more comprehensive legal framework for integrated water resources management by autonomous WMOs under the regulatory authority of the relevant ministries would eventually be desirable and would benefit tremendously from the experiences of the IWRM-Fergana Project.

Wherever useful and possible the IWRM-Fergana shall seek partnerships with compatible projects and organizations, in order to pool resources and benefit from the synergy of complementary and mutually supportive arrangements. Partnerships require careful negotiation of agreements about tasks, powers, responsibilities and rights.

4. SOCIAL MOBILIZATION AND ORGANIZATION DEVELOPMENT METHODOLOGY

As indicated earlier, social mobilization will be carried out in a number of phases. These phases and sub-phases are outlined below.

4.1 Rapport and Knowledge Building Phase

4.1.1 Knowledge and Rapport-Building

The task of creating functional WUAs can not be completed without the support from the local authorities (Mahalla, Ayil-Okmotu, Hukumat, Hokimiyat). This is the task of the activity leader and the field teams to interact with the respective authorities and secure their support. As this document is being written, this step has already been completed whereby the project staff has visited all relevant authorities and the authorities have pledged not only their moral support, but some material assistance (provision of office, agreement on providing some measurement equipment or funds for repairs, etc.).

From here on, the field teams will count on the support of the authorities and interact with community for building rapport with farmers and then understanding the situation at grassroots level. Without understanding the ground situation, it would be physically difficult, socially unacceptable and politically vulnerable to intervene in a community.

There is no fixed approach or best solution for undertaking communication with the farmers in an irrigation system. The suggested approach is to first conduct a series of community characteristics assessments (social, ethnic, cultural political, economic, etc.) at irrigation sub-system or village level and creating an understanding of the socio-economic situation of the area. It will also help in developing initial contact with the farmers for awareness

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building and consequently they will start talking about the water-related problems and options for resolution of such problems.

a) Collection of Baseline Data

The communities differ in terms of their irrigated agriculture problems. To understand these relations and other complexities, the field teams should start with preparation of lists of water users based on farm units (actual tillers of the land), visiting these farmers and collecting information from them about their land size, crops grown, yields, prices, situation with regard to water logging and salinity, and other problems. It is important to understand that our target group is not the representatives of the farms, but the actual farmers (for example a Shirkat might have hundreds of farmers operating smaller plots). To begin with, the teams should introduce themselves, and introduce the project objectives, specifically with regard to establishment of WUAs. It is also important that the teams should first build a confidence between them and farmers and not start first asking questions. Utmost attempt should be made to elaborate on the purpose of collecting needed information that it will be required to interact with the farmers and measure the impacts of the changes associated with the project.

Information on operation and maintenance problems, outputs, prices, incomes, and likely costs that the farmers might be capable and willing to bear and the proposed procedures for solution of such problems by farmers may then follow. Also the existing cropping pattern, intensities, availability of non-water inputs, average crop yields, cost of production and marketing facilities should be studied. Identification of areas of collective action already prevailing in the community and linkage with government agencies are other areas that need to be explored. All these information will provide a good indication of the previously existing environment before an intervention. During the implementation period such an information will also be useful for monitoring, reviewing and feedback program and refining the process for future programs.

After gathering all this information, the survey data should be analyzed and the results shared with the farmers who will be curious to know what happened to the information gathered from them. This will make them understand where they stand with their surrounding communities in terms of socio-economic conditions. They will also be able to understand their irrigation water related issues such as water distribution, maintenance of irrigation at tertiary, secondary and primary level, water thefts and disputes. The sharing of information will build trust among farmers and mobilization staff and will be a good source of initial positive interaction.

b) Identification of Social Organizer Volunteers (SOVs)

Only an internally generated demand for social organization can make WUAs and other such organizations productive and sustainable. Nevertheless, there is a fear of farmers' hesitation to report problems to the staff due to the command and control system. In order to avoid farmers mistrust from the start, intervening and entering into the farming community through the local rural people, as much as possible, who are based in the community, know the people fairly intimately, share their language, beliefs, traditions, rituals, needs and concerns would be helpful. The main advantage of involvement of these local community based volunteers called here Social Organizer Volunteers (SOVs) is that the water users will not regard them as outsiders, who are usually treated with some

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degree of mistrust. Suggested strategy, therefore, is to identify, with active involvement of farmers and local people, a number of SOVs from local community, discuss the project objectives and potential benefits in detail and request their assistance as extended part of the mobilization team. This does not mean that the SOVs will be the ones responsible for organizing water users, they will only assist the field teams in carrying out the difficult job in some ways depending on the local conditions. These volunteers can then be involved during various sets of dialogic processes to clarify any misconceptions emerging among the water users. Involvement of appropriately selected volunteers may have following benefits:

- Interventions can be routed through local people causing little or no room for mistrust;
- Large community can be reached fairly quickly;
- As the SOVs are deployed on a voluntary basis, the approach is cost-effective; and
- Interaction with water users through the community-based SOVs is more effective than the attempts by external change agents.

c) Criteria for Selection of SOVs

As the activity of organizing water users involves a complex social organization process, it is important to select the correct type of persons as SOVs. While identifying SOVs, let the local communities identify and nominate the potential SOVs. The field teams should meet the nominees, explain them the project objectives and strategy, and request their assistance and involve them if they are willing. There are a number of factors that would need to be considered for selection of SOVs, keeping in view the socio-economic and cultural milieu of the society. Some of the important criteria for selecting SOVs are that an SOV should be:

- imbued with an initiative for working with the community, and understand the value in collective action for common good;
- honest so that water users would believe him/her;
- possessing communication skills and also able to communicate effectively with the outsiders and local people;
- willing to become an SOV and spare time for community development work;
- well informed about the area, local languages, traditions, rituals and other community characteristics;
- knowing details on water and land resources of the area and also about irrigated agriculture;
- non-controversial person and not anti-social in any way;
- having potential and ability to be trained to become a community-based social organizer; and
- not necessarily be a farmer, a big land owner or an influential person

4.1.2 Familiarization Meetings

Experience elsewhere has shown that one of the essential elements of organizing people is that the social organizers should be based in the community itself (Pradhan and Sharples, 1990). While the field team members will be based close to the communities, the SOVs

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identified will be the people based in the community itself, selected by the community, and the people whom community believes and trusts.

During identification process, the Field Teams will have initial contact with SOVs and some basic information from them as well. This initial contact with Field Teams and in response their interaction with community might have aroused curiosity in the rural community to know more about the project and newly identified SOVs might not be able to answer questions raised by different segments of community or individuals. In such a situation they will be in an embarrassing position.

To help understand more about the project and provide an insight, the respective Field Team members should conduct familiarization meetings with SOVs and interested farmers in groups at village level. To initiate the discussion, the farmers and SOVs should be provided with a brief overview of the project in as simple words as possible. After the explanation of the project, the Field Team should talk less and listen more, and answer their questions or queries. The Field Team members should make the audience feel that they are from amongst them and not the outsiders. This will build farmer's confidence and trust on visitors. At the end of such concept clearance meetings the participants should be requested to go back to their community, discuss with people, individually and in informal groups, the idea of participatory irrigation management for improved and sustainable irrigated agriculture.

4.1.3 Training of SOVs

The main idea of selecting and mobilizing these SOVs is basically to train and involve them as Social Organizers so that they could act as catalysts and extended part of the field teams. For this, SOVs need to be confident about the project purposes. Therefore, after having a series of small group meetings with SOVs at suitable levels, conduct a training workshop for them at irrigation sub-system or system level depending on the number of participants. In general, participants should not be more than thirty, which will be a manageable group.

The training content should focus on: 1) the need for community involvement in development process; 2) why organize people for community development; 3) problem identification for irrigated agriculture and irrigation management and defining objectives of irrigation service; 4) leadership qualities in collective work; 5) and possible solutions through collective action.

Training should not be restricted to lecturing only; rather, it should be participatory in nature and conducted through group discussions.

4.1.4 Rapport-Building Meetings

Field Teams with the active involvement and participation of Volunteers should convene group meetings with water users at the watercourse or village level for comprehensive farmer awareness covering clusters of watercourse commands. SOVs and Field Teams should lead the discussion. The purpose of such meetings will be building rapport with farming community, sharing information on the project, WUAs, their roles and

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responsibilities, benefits and authority, etc, concept clearance, diffusing misconceptions, doubts and rumors, if any, prevalent in the area or among the water users. Such a direct contact with masses in rural area will help in diluting fears and misconceptions of the people, while the presence of WMO staff will also help in reducing environment of mistrust among farmers and agency staff. The participants will have a number of questions about the WUAs, from the purpose to the functioning, authority, responsibilities etc. All such questions need to be approached in the most positive manner. The field teams should address such queries with utmost patience.

4.2 Problem Analysis and Service Identification Phase

Before entering into the area of organizational work, the process of SOVs identification, selection, familiarization meetings and training workshops must have generated interest as well as many misconceptions and apprehensions about the project. Therefore, a step-wise approach, which is cautious and slow, but gradually building on trust and confidence with each step, is recommended and more likely to be eventually successful.

The Field Teams together with SOVs should hold group meetings with the maximum participation of farmers to carry out a diagnostic analysis. Such meetings should start with a brief overview of the project after which the farmers should be requested to identify problems related to irrigated agriculture and specifically to irrigation water management. Depending on the number of participants, they should split into groups of 6-10 people in each to identify and list all their problems. Then each group should be requested to present the problem analysis and possible solutions with identifying the “who should do that”. After the presentation, the discussion should lead to “how the irrigation service should look like” under a WUA management”. The questions to be addressed here might be as follows: “What are the essential tasks? Who should perform those tasks and to whom should those performing the tasks be accountable to? Who would pay for that? How to monitor that the objectives are achieved?” addressed. This in a way would lead to definition of the objectives of the irrigation service and identification of a draft irrigation service plan.

4.3 Organization Building Phase

4.3.1 Consultation Meetings

Social organization should not be followed by a blue-print approach, enforced from top (top-down approach); rather, it should be carried out through a consultative approach. Each and every step should be carefully planned and discussed amongst different directly involved actors i.e. the field teams, WMOs and farmers. During this stage, decisions about the structure, membership, tenure, (s)election procedure, rules and by-laws for effective functioning of the WUAs at different level of the system should be discussed. Different examples of structures, by-laws, and membership systems should be presented by the field team to the consultation meetings. This might be done by reviewing the available legal framework and differentiating between “what can be done under existing legal framework” and “what should be done considering the irrigation service plan” defined by the farmers.

For that Field Teams should hold meetings in each village/ watercourse, as appropriate, to consult water users on tentative plans for establishing water users organizations.

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Arrangements of the meeting will be made by the SOVs. All water users served by the system and residing in that village should be notified and invited to attend by sending hand written messages, announcing in mosques or through other communication means. The teams should target to inform all users/ farmers. After a brief overview of the program by the SOV and clarification by the field team members, if needed, the water users should be consulted about organizational structure, membership pattern, selection procedure, tenure of the executives and any other relevant issue they like to discuss or feel important. The SOVs document the process and note down the suggestions made by the water users in their field notebooks. The field teams should note down the important processes as well.

Organizational Structure:

After conducting comprehensive farmer awareness and consultation meetings covering clusters of watercourse commands at village level, Field Teams should be able to identify the appropriate organizational structure for WUAs for each of the pilot site. All field staff should meet and discuss about appropriate size (number of tiers) of organizational structure based on the suggestions made by farmers earlier. The main objective should be to ensure maximum participation of water users in irrigation management decision-making and implementation. Nevertheless, consideration should be given to: 1) farmers suggestion in this regard during consultation meetings; 2) size (number of outlet levels and area) of the system; 3) hydraulic structures present in the physical system.

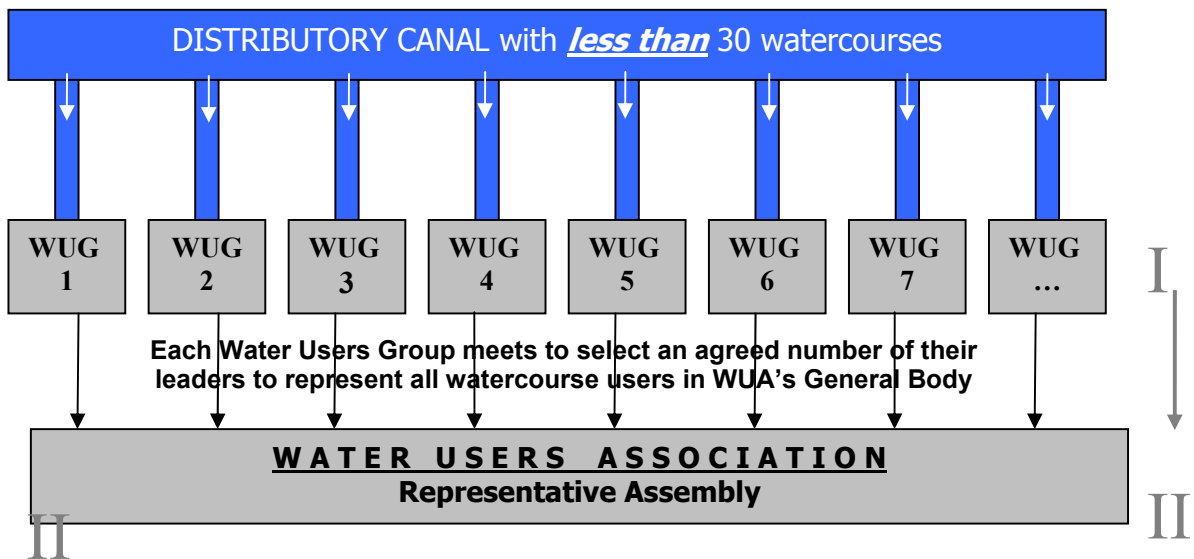
There could be no fixed approach for deciding the size or type of organization structure to be followed, however, depending upon the situation, two structures are recommended, a) Two-Tiered Structure (figure 1); and b) Three-Tier Structure (figure 2), which can be adapted to the local conditions. It is important to note that these are only governance structures. After a WUA/FWUA Council is formed, the Council will elect a Chairman, decide on the number and type of staff as well as those to whom the staff reports. Since the intention here is to create user owned organizations, it is important that all the decisions are made by the WUA / FWUA Councils and General/Representative Assembly with consultation and facilitation from the field teams and other project staff. The project staff's role here should only be of advisory nature.

a) Two-Tier Structure

Where the number of watercourses is less than thirty on a distributory canal or proposed WUA command, a two-tier structure is suggested (figure 1). Because small group will be quite manageable, every shareholder will have an equal opportunity in decision-making. Ideally, in a two-tier structure, informal Water Users Groups (WUG) shall be established at each watercourse command. Based on the consultation meetings an equal number of elected representative from each of the watercourses (WUG presidents for example) or any other selected member for the purpose will constitute a general/representative assembly of the Water Users Association (WUA) at the secondary canal system level.

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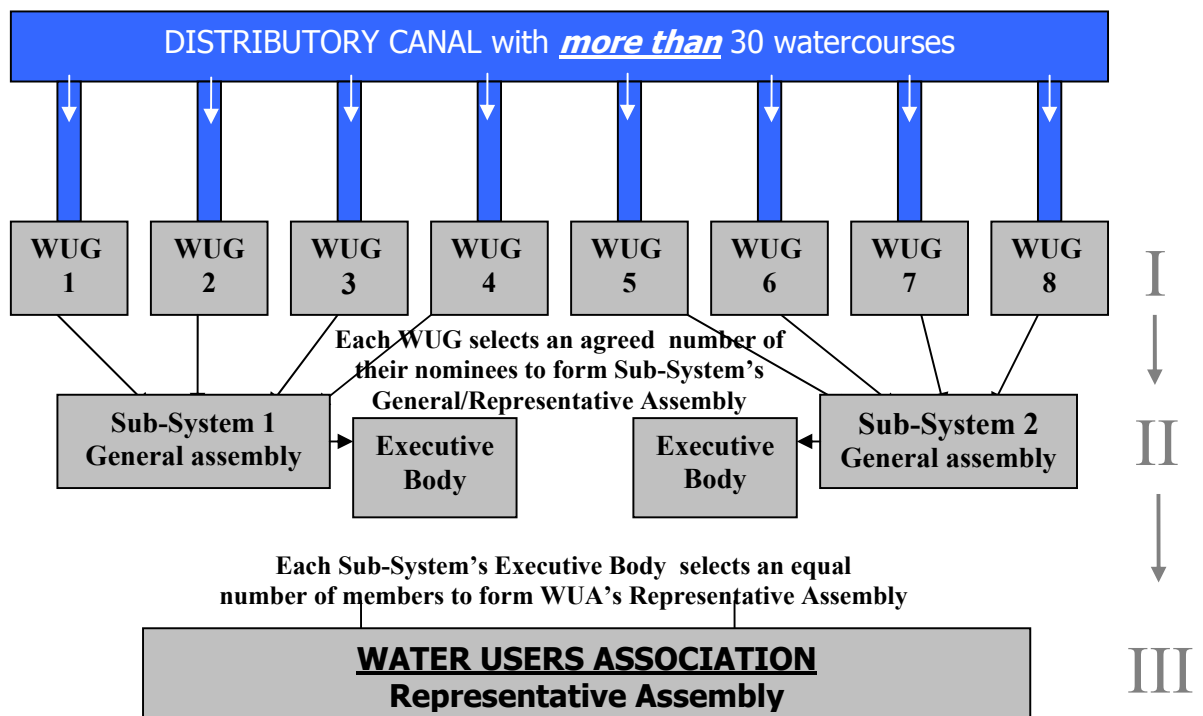
Figure 1: Two-Tier Structure (with less than 30 watercourses)



b) Three-Tier Structure

In the context of medium to large size system or distributary, having more than thirty watercourses, three tier organizational structure (figure 2) is suggested and for this division of system into sub-system is recommended. The number of divisions will largely depend on length of the system, number of irrigation outlets, and presence of hydraulic or drop structures, existence of distributary branches etc.

Figure 2: Three-Tier Structure (with more than 30 watercourses)



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Identification and division of these logical sub-units or sub-systems would help in providing equal opportunity to each water user in decision-making. Greater user participation, in turn, would contribute to improve the efficiency, equity, reliability, productivity and sustainability associated with the use of irrigation water. Aside from these additional benefits would be:

1. The organizational division on the basis of hydraulic/drop structures would help in calibrating the structures for discharge measurement at each inlet and outlet point;
2. The division of the system on the basis of hydraulic structures would help in monitoring the discharge in terms of time and space;
3. Medium sized groups would be more suitable for effective social organization.
4. Representation at the intermediary sub-system level would enable an equality of opportunity to be achieved by the water users in gaining membership in executive bodies for participation and decision making;
5. Each water users group can be identified in terms of each tertiary canal in any sub-system, which would help in arranging meetings, discussing problems and resolving disputes more effectively; and
6. The initial identification of these sub-systems may help to generate common interests on common problems.

Under the three-tier organizational structure, WUGs shall be established at each watercourse command. The representative/general assembly of a WUG will (s)elect an appropriate number of nominees, either President or any other member to represent them in the Representative/General Assembly of the sub-system organization. The Representative/General Assembly of the sub-system will choose their executive body to run the sub-system affairs. They should also (s)elect an agreed number of members (same numbers from each sub-system as agreed in consultation meetings) from the Representative/General Assembly members of the sub-system to constitute the Representative Assembly of the Water Users Association at the distributory canal/ WUA command level.

4.3.2 Selection Meetings

a) Selection of the Tertiary Level Representatives from the WUG General Assembly

The field teams with the active involvement of SOVs should conduct a series of meetings at the watercourse level. Meeting dates, times and venues should be fixed in such a way that suit water users' convenience. For example, several water users might like to hold meetings in the evening to let their routine work not suffer. The field teams should widely publicize the selection meeting to provide equal opportunity for all eligible water users to come forward for representation. In this regard, announcements in the village two to three days ahead of the meetings and written messages to all water users would be highly useful. The teams should try to ensure maximum participation. If the participation is less

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than criteria set (for example 60-70% of all the water users), the selection meeting should be re-scheduled. Water users present in the meeting should announce the schedule of the next meeting on the spot by consensus.

At the selection meetings, before proceeding for (s)election of watercourse representatives, it would be highly important to give a brief description of the project, functions, tasks, and authority of the WUA, qualities of good representatives and the need for selecting the best representatives. Depending upon the size of a watercourse, the number of shareholders, ethnic and interest groups, the water users may select an agreed number of members to represent them in the WUA Representative/General Assembly (for the secondary canal) and one or more representatives to oversee the internal affairs within the WUG of that watercourse (for example, to resolve disputes, motivate people for maintenance etc.).

Introductory Meetings at the Sub-System/ System Level:

After the watercourse representatives are selected, groups of these watercourse nominees, identified for the respective sub-system level organizations should then be invited to attend an introductory meeting. This will give them an opportunity to meet and get to know one another well. The agenda for discussion at these introductory meetings should be to refresh the minds of the nominees about the project, to consult on the organizational structure, selection procedure and date, time and venue of the selection meeting.

The participants of introductory meetings should also be briefed again about the basic objectives of: 1) an organized and participatory effort in irrigation management, 2) decentralization of management responsibilities and authority, 3) greater equity in distribution of irrigation water, 4) reliable water supply, 5) better access to government and private sector facilities/inputs and other services as an organized group, 6) self governance, and 7) self-reliance.

Afterwards, the Representative/General Assembly members should decide on the date, time and place for the next selection meeting. Ideally, the selection meeting should take place at some community center, local governmental office, school, a training hall or any common place in village where no individual or group has any reservation to participate.

b) Selection of Sub-system Office Bearers and WUA Members

On the meeting date to select Council members for a sub-system water users organization, all the field team members should participate in and facilitate the process. It is always useful to start with a brief presentation on characteristics of good leadership, identified by most of water users during SOVs training, and consultation meetings. Also should be discussed the importance of selection that will affect the quality of the services they intend to receive from the WUA. Then sufficient opportunity for negotiation, consensus and coming up with a list of proposed office bearers should be provided. Someone from them should present this proposed list to the Representative/General Assembly for approval. If a consensus is not reached, the meeting is postponed with the next date, time and venue to be agreed upon and set. Then the process is repeated and, if again, on the next meeting there is no consensus, preferably the General/Representative Assembly members should elect the office bearers through secret balloting.

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In the selection meetings the General/Representative Assembly of a sub-system organization should also select an agreed number of their representatives to the WUA General/Representative Assembly. Preferably, these members should be equal in numbers for each sub-system, keeping aside the number of watercourses in each sub-system. The overall size of the WUA's General/Representative Assembly is another important aspect to be considered. It should be a manageable group. The suggested size for good manageable group would be in the range of 20 to 30 members in total.

A similar process should be followed to elect the WUA Council.

c) Selection of the Water Users Association Council

Introductory Meeting:

The field teams and SOVs would play a pivotal role in organizing and conducting this meeting. All the members of the field teams should also participate in the WUA meeting facilitating where and whenever needed. After the participants introduced, the process of briefing as explained for the sub-system level introductory meetings should be repeated. The WUA General/Representative Assembly should decide on the date, time and appropriate place for the selection meeting.

Then the members of the WUA General/Representative Assembly should be assisted to carry out a group analysis of agriculture and irrigation related problems and identify the suggested solutions for the irrigation system for which the WUA is meant. Also should be identified the essential management functions associated with the solutions. This will serve as a definition of irrigation services and an identification of an irrigation service plan.

Selection of WUA Council Members:

This will be an important event of the organizational process. An enthusiasm among the farmers will be quite visible. Interference from political corners could be possible. Therefore, the field teams again should brief the participants about the basic objectives of participatory irrigation management and highlight the envisaged benefits of organized behavior. The field team should provide to the farmers with sufficient time for negotiation to select their representatives by consensus. The important point here to be considered is the sustainability of the organization, which will largely depend upon 1) the degree of political interference, 2) selection through consensus, 3) provision of equal opportunity for all in decision-making, and 4) equal representation of all sub-system organizations in the WUA Council.

Preferably, WUA Council members should be selected with the consensus of all the General/Representative Assembly members without any external interference. The General/Representative Assembly members should choose the representatives for various positions on a secret ballot basis. However, the General/Representative Assembly may also decide to elect the candidates using open voting or consensus.

4.4 Capacity-Building Phase (for Management Transfer)

The main objective of this phase is to prepare the WUA/FWUA for essential tasks that it has to carry out as an independent self-managing autonomous organization. Most of the

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capacity will be built through an on-the-job training, and learning while doing. Though the elected WUA representatives might not have to perform these tasks themselves, it is useful to know the broader principles so that they can supervise the staff better.

4.4.1 Visit to a Farmer Managed Irrigation System

Though the majority of the farming community in Central Asia is used to manage their irrigation system at the tertiary level, they don't have any experience to manage the secondary level irrigation system. One of the good ways to build water users confidence to take the O&M responsibilities is to show them a successfully farmer managed irrigation system.

For this an appropriate site inside or outside the country should be selected and a manageable group of the WUA representatives will pay a visit to that site, where farmers themselves are managing part of the irrigation system. It is important to select a site with some similarities in the context of physical features of the system and socio-economic and cultural milieu. During the visit, the farmers will be briefed about the ways the system, organizational matters, rules, by-laws, fund raising and irrigation service fee assessment, collection procedures, and use are managed. This will help in building WUA's confidence as "seeing is believing".

4.4.2 WUA Representatives' Training

After the formation of WUAs, representatives of the WUAs should be trained in related activities to be undertaken for irrigation system management. The training program should be focused on subjects like flow measurement, organizational management, financial management, record keeping, framing of by-laws, and methods of mobilizing resources for the system operation and maintenance. The important aspect here to be considered is provision of competent and experienced trainer. For this, appropriate resource persons should be identified (such as Raiselvodkhoz hydro-technicians, staff of other successful WUAs etc.) or contracted from local consultants. This training should be a continuous process and be conducted up to grassroots level organizations. The farmers' representatives and WUA staff trained at higher-level organizations should be used as resource persons for lower tiers organizations, because farmers learn more from their fellow farmers.

4.4.3 Formulation of By-laws

The by-laws of an organization are dynamic instruments used to enforce, regulate and promote disciplined action in an organization. They are referred to as a dynamic instrument because the by-laws are not static or permanent, and can be changed by the General Assembly when deemed necessary with a specified majority vote of General Assembly members, depending upon a WUA Charter approved by the relevant government. No organization can function properly or be sustained for longer time unless the organization has some basic and clearly defined set of rules to abide by.

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Thus, at this point in time, WUAs should be encouraged to proceed to develop and establish initial draft by-laws for the proper functioning of the WUAs under the rules framed by government. The field teams or project staff will give technical assistance in this regard by providing some certain model by-laws already farmed by the state legislation or arranging appropriate consultation and advice. The main areas to be covered are: 1) duties and function of different office bearers, 2) meeting time and procedures, 3) eligibility for membership, 4) termination of membership or from office, 5) membership fee, 6) fund raising, 7) water allocation, acquisition, distribution and disposal, and maintenance of the system, 8) dispute resolution, 9) sanctions; and 10) any other.

4.4.4 Develop Irrigation Service (Water Use and Drainage) Plan

The most important aspect of this activity is that the farmer representatives, field teams and agency staff initially undertake most of the activities jointly. For activities undertaken independently by the field team staff (for example collection of initial data, maps etc.) the information shall be shared with farmers. This is not only important for building trust and developing more effective communication between the two partners, but also for providing much more valuable learning experience for both, agency staff and farmers. Aside from these joint field activities, data collection and its analysis will help in the preparation of a management agreement between the WUA and an agency concerned for sharing of future O&M responsibilities.

There are five major components: a) a "Walk-Thru" survey, b) a Profile survey, c) an assessment of maintenance and operation (O&M) needs, d) Prioritizing O&M needs; and e) Monitoring and Feedback program. To develop an irrigation service plan the farmer representatives and the field teams, and the agency staff should carry out most of the activities jointly. These components would be carried out as a part of a training program where farmers are trained in how to conduct a "Walk-Thru" survey, document observations, identify needs, translate those needs into maintenance and repairs needs and cost them. Likewise, for the profile survey and assessment of O&M needs, etc. the farmer representatives and the field teams do the job together. This will not only provide training to farmers and agency staff, but also has an added advantage of completing this process relatively in a short time period.

a) "Walk-Thru" Survey

Presently in government managed irrigation systems, the governmental agencies (Raivodhkozoes, etc.) receive funds annually for O&M of irrigation systems. These maintenance funds are used to undertake a part of the routine maintenance works only. Unfortunately, majority of the canals, distributaries, minors and water control structures are deteriorating under a combination of unavailability of sufficient funds for maintenance, increased political interference, lack of interest and motivation of government officials, and poor reward system for good work performance. Water users are also not in a habit of walking along the irrigation system beyond the outlet, because they don't own it and consider it as government's property.

Therefore, the most important and first step after the formation of Water Users Associations is to conduct a detailed "walk -thru" survey that lists all type of infrastructure (inventory of

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essential and non-essential hydraulic structures), and maintenance needs on the distributary or branch canals including outlet structures which preclude efficient management of the irrigation system. The survey should jointly be conducted by a team of farmer representatives, technical persons from the project, and the Field Teams.

Involving the farmers in the "walk - thru" survey of the secondary level irrigation system is very essential. Because, sometime they know problems better than the field staff. Some minor problems, which may not be noticed by the technical group in survey, can sometime be identified through the farmers.

Generally, maintenance needs arise from some minor problem, which when neglected for longer time give birth to major problem and accumulation of such major maintenance problems ultimately needs costly rehabilitation. Unfortunately, on many irrigation systems throughout the world, only major maintenance problems are corrected and minor problems are overlooked until they grow into major expensive problems. "Nip the evil in the bud" could be a good strategy for making any irrigation system sustainable and cost effective.

"Walk-thru" is a good tool to help identify these minor problems which can easily be observed in the field while walking along the channels. Therefore, it is imperative that the group holds a meeting at each strategic point, especially the outlets and all other water control structures delivering water to each water user groups. It is important to take detailed notes of all observed minor and major problems, farmers' perception about the causes of that damage and possible cost effective solutions. The identification of maintenance needs should be focused on 1) strengthening of banks, 2) desiltation, 3) removal of shrub and trees, 4) repair of gate structures, 5) maintenance need of open channel constructions, 6) outlets, 7) bridges and crossovers, 8) service roads, 9) structures for calibration to monitor the flow; and 10) condition of gauges.

Flow monitoring is an important activity that needs to be started at this point in time. Therefore, technical staff in consultation with and effective involvement of farmers should start flow monitoring at all strategic points in the distribution system - for example, inflow at the head and outflow at the tail of the system. Similarly, all inflow - outflow positions where each WUG is receiving and delivering water to other WUG etc. This flow monitoring will give a good indication of flow conditions, equity position and overall reliability of water supply in the system with respect to time and space.

b) Profile Survey

The "walk-thru" survey provides general first hand information regarding deficiencies, problems and farmers' perceptions about damages and deficiencies precluding efficient system operation. To have a good insight and extent of the damages and estimated cost for bringing back the system to optimum standard, technical staff needs to conduct different technical surveys like profile, operation control maintenance, hydraulic and diagnostic 'walk-thru' maintenance survey.

Profile survey, especially in unlined channels, is important to determine the extent of siltation problem and damages like bed siltation or scouring, weakened banks, widening of distributary or minor banks due to vehicle and animal crossings or animal bathing. It is pertinent to note that while conducting all technical surveys, the "walk-thru" notes should always be retrieved and consulted.

Establishment of Benchmarks:

The first and most important step to conduct any type of engineering survey is to establish benchmarks at different locations along the distributary, minor or watercourses which will help in checking, closing and starting the survey on any day. While establishing benchmarks, there should be put also upstream and downstream white marks on water control structures. These white marks should especially be established on all outlets and inflow - outflow structures where each WUA will get its share of water and release others' share at outflow structure. These benchmarks and white marks will be used in the profile survey as well as for developing discharge ratings for flow measurements.

Implementing Profile Survey:

After establishing permanent or temporary benchmarks along the irrigation network, a detailed profile survey should be conducted. Elevation readings from the bed and banks of the distributary / minor as well as adjoining fields at both sides of the system should be taken. Irrigation channels should be surveyed and marked with stations at least every 100 meters. All of the important structures should also be accurately determined and listed. Necessary drawings and sketches should be made while conducting profile survey. The data should be analyzed to draw the existing position of the distributary / minor bed and banks. Cross section / L-section maps should be obtained from relevant authority and be compared with prevailing situation. The deviations should be identified and work required for changes to be carried out should be calculated and cost estimates prepared to bring back the system to desired standards. The farmer representatives should participate in the survey.

c) Assessment of Operation and Maintenance needs

- **Operation**

Develop Discharge Rating:

After completing the essential structure maintenance plan, all flow control structures where each WUG or WUA will receive their share of irrigation water need to be calibrated to develop discharge ratings. For calibration of these essential flow control structures and water diversion structures for each organization, network of benchmarks and white marks that has been already established should be used. For large channels i.e. distributary and minors where the discharge is more than 150 liters per second, a current meter should be used to calibrate each structure or for flow measurement. For smaller channels (watercourses) having less discharge, a Cut throat or Broad Crested Weir (BCW) flume can be used to calibrate the structure or measure the flow passing through that structure. It will also be appropriate to use a "current meter" for flow measurement in lined watercourses.

In order to develop a reliable discharge rating for essential flow control structures, at least four to five readings should be taken from each site. Each reading should contain upstream, or upstream and downstream flow depth measurements and the corresponding discharge (depending on the flow behavior of the device). Gauges should be installed at essential flow control structures in the irrigation system. Farmers' representatives and

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agency staff should be encouraged to participate in the process of structure calibration and development of discharge ratings. The participation of the relevant mirops as trainees from farming community will help in providing an understanding of importance of essential structure maintenance for calibration or flow measurement. It is pertinent to keep in mind that discharge rating can change with time, because any minor change in the outlet or essential flow control structure will affect the flow. Therefore, periodic checking and readjustment of discharge rating is highly important for continual equitable water distribution to each WUG or WUA.

Calculate Water Duties:

After the successful completion of social organization process and farmers participation in "walk-thru" survey, farmers' curiosity must have been at its highest to know how much water actually they are getting against their fair share in the subsystem and in the watercourses. One of the good ways will be to measure inflow and outflow of water at strategic points in each reach, deduct seepage losses and calculate water duties for each reach and for each watercourse command area. This part of the exercise can be completed as a part of the training provided to the farmer representatives. The involvement of the farmer representatives alongside the technical staff during this exercise will provide the former with a valuable insight and an excellent opportunity to learn, 1) what is a gauge and how to read it, 2) how to correlate gauge reading to determine discharge rate at a flow control structure, 3) use of simplified discharge rating tables to know the flow rate in the distributary or watercourse; and 4) the importance of maintaining an essential flow control structure to minimize the chances of change in discharge rating with time. Aside from these benefits, it will help in building farmers' confidence on their capabilities to share O&M responsibilities.

Measure Channel Losses:

To calculate the duty of water for each command area, measurement of losses in the main system i.e. distributary and its branch canals is a prerequisite. The most important technique for measuring channel losses in an irrigation system is the inflow - outflow method. To do this test effectively, technical staff should provide necessary training to field team staff and farmer representatives in gauge reading, development of discharge rating, use of discharge rating tables and calculation of water duties. It is important to involve as many farmer representatives as possible especially in flow measurement and inflow - outflow test exercise. Such a test will also enable the teams and farmers to understand where "the water loss is happening".

Technical staff should arrange a classroom training and some practical exercises at site then divide the participants into groups of five to eight persons. Each group should note down the inflow at each essential water control structure and outflow from each irrigation outlet as well as those outlet delivering water for other purposes in the command area.

The data should be analyzed and seepage losses in each reach between two strategic structures evaluated. Also should be evaluated the seepage losses for the entire length of the distributary and its branch canals. Based on actual water delivered (after deducting seepage losses and water delivered for other than agricultural purposes) to each subsystem and watercourse, duty of water i.e. cubic meters of water delivered per hectare

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of culturable command area should be calculated. Normally in case of equitable water distribution, it should almost be the same for all the reaches.

Prepare Operations and Water Use Plan (including disposal of drainage):

As mentioned earlier, farmers must have curiosity about what is happening in their irrigation system in respect of water losses and equity in distribution of water. Most of the farmers will be very keenly observing data collection procedure, data analysis and results obtained. The field teams should share the results with farmers. Field teams must be very careful while presenting the results, because, if there is a big inequity gap between different reaches or outlets a hot and sensitive discussion among farmers can take place. Field teams should tackle it sensibly.

This information-sharing step should lead to develop an initial appropriate operational plan to achieve equitable water distribution in the irrigation system. The input from the farmer representatives will be crucial to develop this plan. Farmers should discuss openly, suggest how to incorporate channel losses, improve equity by remodeling the oversized or undersized outlets, devise irrigation turns, and other water control structures and how to implement this plan. The field team and agency staff role will be to provide necessary technical assistance.

- **Maintenance**

Essential Structure Maintenance (ESM):

ESM is the required maintenance for those flow control structures where WUAs will receive their due share of irrigation water. Adequate maintenance will allow those structures to be used as flow measuring devices after calibration. To assess the needs an operational control maintenance survey of these flow control structures should be conducted.

Operations Control Maintenance Survey:

This is another important activity for developing a plan of action in the joint system management process wherein field teams and farmers need to work together in the field. During the process of social organization sub-system level WUAs have already been established on the basis of hydraulic boundaries. Therefore, up until now each WUA should have a defined hydraulic boundary like weir structure, fall or drop structure and flow regulating structures (bifurcations, diversions) in case of sub-system and an outlet in case of a WUG, where water would be received by relevant organization and distributed equitably amongst their members. It is important to keep in consideration all such inlet points, which could be used to both regulate and measure the amount of water inflowing and outflowing the organizational boundary.

An operations control maintenance survey of all required Essential Structure Maintenance (ESM) for flow control and water measurement should be conducted. Among the things to be identified here are the extent of damages, causes, maintenance needs (quantity of material required and cost estimate); if required, new flow measuring devices or gauges should also be installed. The field inspection results for each structure should be recorded with sufficient details. Necessary drawings and sketches should also be made so that afterwards a good cost estimate can be prepared. The operations control maintenance

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survey should be conducted at least twice, once during the canal closure to inspect visible damages and once when the system is in operation to inspect actual problems such as leakage and other operational and flow regulating difficulties in gate structures and open channel constrictions.

Essential Structure Maintenance Plan:

After conducting the operations control maintenance survey, a detailed ESM plan should be prepared. Preparing the ESM plan requires consultation with original drawings & maps obtained from the agency concerned and notes recorded in the field notebook during the "walk-thru" survey, wherein farmers' perceptions about damages, causes and possible cost effective solutions were noted. The ESM plan should include: 1) physical description of the system, 2) list of ESM, 3) cost estimates of ESM, 4) proposed program for measuring flow and seepage losses in the channels to maintain better equity in water distribution, 5) field notes, sketches and drawings; and 6) tentative implementation plan. For further details, an outline suggested by Skogerboe (1990) can be consulted.

d) Monitoring Evaluation and Feedback (ME&F)

The monitoring, evaluation and feedback program should also be a part of the operations plan developed for improved water distribution under joint irrigation management program. This ME&F program will help in developing both communication and credibility amongst the farmers themselves as well as between the farmers and the agency staff, responsible for O&M of the main system and delivering water to the WUA at the head of the secondary level irrigation system.

In this regard (ME&F), a detailed program should be prepared covering data collection on daily discharge rates at each inflow and outflow point, analysis of the data to check hydraulic performance of the system and communication of evaluation results to the farmers to get proper feedback. Because the implementation of this aspect (operations plan) of action plan will be very sensitive both socially and technically and may have implications on organizational sustainability, therefore, a strong and transparent mechanism of ME&F needs to be evolved. It is suggested that for initial two to four crop seasons, daily discharge monitoring and weekly, monthly and seasonal hydraulic performance evaluation should be carried out jointly by the field teams and farmer representatives, while at the head regulator of secondary canal the same has to be done by the representatives of farmers and agency concerned.

To improve the hydraulic performance of the irrigation system, it will be highly important to make the process transparent, do the seasonal evaluation of the data monitored, discuss with farmers representatives, and incorporate their suggestions for improvement. The operations plan has to be accordingly revised and implemented with this process to be continued for at least two to four crop seasons or till the hydraulic performance of the system attains the desired level, i.e. with each WUG and WUA receiving their due share of irrigation water, when canal is flowing.

e) Prioritize O&M Needs

Based on the information gathered so far through the "walk-thru", profile, operations control and other relevant surveys with the cost estimates prepared, the maintenance needs have to be prioritized. Generally, these needs will be prioritized on the basis of their importance and their impact on the hydraulic performance. Three important maintenance needs which have immediate impact on equitable water distribution and efficient system hydraulic performance are: 1) essential structure maintenance, 2) deferred maintenance; and 3) rehabilitation of the system, if the latter has deteriorated badly due to accumulation of deferred maintenance for longer time resulting in very poor hydraulic performance of the system. Therefore, if the system is performing badly and it needs rehabilitation then it is time to plan accordingly, being subject to availability of funds, because it is a costly process. Maintenance funds can be tracked from the relevant ministries, as they have promised for the pilot sites. But if the system's condition is not hampering its operation so badly then the farmers should be assisted in giving priority to the maintenance of essential flow control structures, because these structures will be used as flow measuring devices for monitoring the daily discharge and evaluation of hydraulic performance of the system.

Deferred maintenance is the accumulation of maintenance needs, generally deferred due to the shortage of funds. The main criteria for prioritizing deferred maintenance needs would be on the basis of an impact of deferred maintenance on the hydraulic performance of the irrigation system. Thus, the maintenance needs which have severe negative effect on system's operations would normally be given the highest priority, keeping in view the resources availability. As soon as sufficient funds are available, the remaining maintenance needs should be completed.

In all this process, the main decision makers in priority setting should be the farmer representatives. The field teams should only help them understand the benefits and costs of their decisions.

At this point of time, the WUA office bearers prepare a comprehensive annual irrigation service plan and a medium term action plan for O&M needs covering all necessary details, drawings, sketches, cost estimates, human and financial resources required and priorities made. This document will be highly important and needed for the preparation of an agreement on joint management responsibilities.

4.5 Management Transfer Phase

4.5.1 Agreement on Joint Management Responsibilities

By now WUAs/ FWUAs have 1) an annual irrigation service plan defining the objective and standard of their irrigation services and 2) a midterm O&M action plan ready with all necessary details. The representatives should convene a General Assembly meeting to discuss the proposed plan of action and decide their terms and conditions before entering into negotiation process for joint management responsibilities with the government. During the initial years, the WUAs/FWUAs may only want to "govern" the implementation of the plan, i.e. the decision-making lies with farmer representatives and the actual implementation is done by the agency staff.

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The field teams staff should also attend the meetings as observers and provide necessary technical assistance wherever required by the farmers. After finalizing their terms and conditions, WUA/FWUA executives start negotiations with relevant authority for the sharing of responsibilities between the agency and farmers organization (WUA/FWUA) in future. A good way for the WUA/FWUA General Assembly would be to constitute a negotiation committee, send them to negotiate with relevant authority after deciding on the date, time and venue of the meeting. After the first meeting, if both parties manage to reach some certain agreement, the WUA/FWUA negotiation committee goes back and puts the draft agreement before the General Assembly, get their approval and then WUA/FWUA representatives sign the agreement with the agency concerned or any other authorized body. Likewise, if there is a disagreement, the WUA/FWUA negotiation committee should go back, convene a General Assembly meeting and discuss the issue again with the members. There might be a need for some amendments to be made in the light of discussions held with the agency staff if so agreed by WUA/FWUA members. Then it can come to another round of negotiations with the agency staff with the process to be continued till consensus is reached. Before signing the agreement with the relevant authority, the WUA/FWUA representatives must get approval from their General Assembly. The implementation phase will require some resources for an action plan to be implemented after the joint management agreement signed, therefore, the negotiation process should be held at a level which is quite competent to arrange the required resources or can ensure firm commitment from higher authority / government to make the resources committed available. Apart from other necessary details, the joint management agreement for sharing responsibilities should include the following.

a) Define Role, Rules and Responsibilities

Without strong legal protection, the implementation of the joint management agreement signed between the farmers and the agency as on sharing O&M responsibilities will be of no use and ineffective. The agreement should clearly define the role to be played and responsibilities to be born by the farmers' organization, the agency and any higher authority concerned. The rules for effective governance and implementation of the joint management agreement should also be explicitly formulated and enacted.

b) Implementation of Schedule

Subject to available human and financial resources, a schedule to implement essential structure maintenance, operations, prioritized deferred maintenance, rehabilitation, if required, and monitoring, evaluation and feedback program should be clearly chalked out and made part of the agreement. It is suggested that initially the agreement should be signed at least for a period of three to five years, which will be required for the farmers organization to learn O&M activities, implement the plan, revise it as per needs, refine it and sustain the organization.

c) Resource Management

This is another important area to be clearly defined in the agreement, i.e. who will provide what, when and how much. For example, it implies the allocation of water at the head regulator, reliability in water supply, contribution in labor, tractors, tools, cash, etc. on the farmers part and in technical assistance, personnel, budget, equipment, management of

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trees at canal banks and property rights to use government facilities like office buildings, service roads etc. on the part of a government agency. The most important decision to be made under the joint management agreement will be sharing water supply charges (irrigation service fee-ISF), which at the moment fully go to the government. After signing the joint management agreement, since the WUAs will be responsible for O&M of a part of the irrigation system, i.e. secondary and tertiary level, so they (WUAs) will need funds to carry out the functions transferred to them. For this, an appropriate ratio for sharing ISF collected between the WUA/FWUA and the agency should be decided and made a part of the agreement. An appropriate procedure should be followed to cost out the realistic financial share of the WUA/FWUA and the government to run their respective affairs at the secondary and tertiary level of the system and the main system, respectively.

d) Training

To build capacity of the members of farmers organizations (FWUA, WUAs & WUGs) and for them to perform their O&M responsibilities effectively and efficiently, they will necessarily be in need of training in organizational and financial matters and system management affairs. In order to develop their capabilities, the field teams should organize short training courses on organizational, financial and system management aspects.

For developing their capabilities in organizational matters, farmers representatives should be trained in convening meetings, taking minutes of the meetings, presenting and getting approval of the minutes during the next meeting, following up the decisions made and actions taken and so on.

In order to develop farmers skills to manage their financial resources they should be trained in keeping records of their financial matters like membership fees, share funds, fines, contributions from their members for O&M activities, assessment & collection of water supply charges, land-related data and rotation of irrigation turns to individual farmers.

To build farmers confidence in their capability and further enhance their capacity, the field teams should also conduct training courses on system management. Normally, two to three-day course for this purpose will be sufficient. Nevertheless, it would be better if the duration of such a training be decided jointly by the WUA representatives and the field teams. Initially training in irrigation system management should primarily focus on that the farmer representatives be able to measure the flow at the essential flow control structures using discharge rating tables, flumes, current meters etc. Training in assessment and collection of water supply charges will be yet another event to be organized.

The ultimate goal of involving water users in the operation and management of irrigation system is to improve the system's hydraulic performance, ensure equity in water distribution and reliability in water supply and increase agricultural productivity for the uplift of the rural community. However, increased agricultural productivity does not only depend on improved hydraulic performance of the system, but also on efficient use of every drop of irrigation water delivered to the farmer's field. Therefore, to improve application efficiency and water use efficiency at the farmers field, the agency staff should impart training to farmers in advanced irrigation and agronomic techniques such as precision land leveling, field layout, sowing methods, when to irrigate a crop, how much water to apply, how to apply, time and dose of fertilizer application, plant protection measures etc.

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All the above-mentioned training should be a continuous process until the farmers are able to handle their affairs effectively on a sustainable basis. Trainers and training materials such as notes, flip charts, boards and equipment for field exercises will be provided by the agency staff. Trained farmer representatives should be used as resource persons in subsequent training courses.

4.5.2 Management Implementation

Management implementation is a very important part of the social organization process for a farmer-managed system.

- **Implement Plan of Action**

The WUAs and FWUAs with support from field teams have already developed a plan of actions regarding maintenance, operations and prioritizing O&M needs. At this point of time, both the agency staff and the farmers must have known that the system needs major rehabilitation or regular maintenance. Since rehabilitation is an expensive activity and the farmers will not be able and willing to afford this, it is, therefore, suggested that, if the system needs rehabilitation, it should be undertaken either prior to the implementation of action plan under the joint management agreement as on sharing O&M responsibilities or it should be tailored in a way that stimulates local investments. The farmers should take the lead in implementing rehabilitation activities effectively and transparently. In case there is a need for rehabilitation of the irrigation system, maintenance needs of the essential flow control structures and priority deferred maintenance should be addressed, in the first instance; as for the implementation of an action plan, only operational plan has to be carried out. However, if that is not the case (no rehabilitation is required) then the process should be as follows.

- a) Maintenance Plan**

There will be two major maintenance needs, i.e. Essential Structure Maintenance (ESM) and Priority Deferred Maintenance Needs (PDMN) to be carried out under the maintenance plan of action. This needs to be done, first, because maintenance has direct effect on operations.

- Essential Structure Maintenance:**

The first priority should be given to maintain the essential flow control structures, because these structure will be used as flow measuring devices after their calibration. That will in turn ensure better management of irrigation water and help improve equity within the system. The maintenance of most essential flow control structures will be difficult to carry out when the system is flowing with water. Therefore, these maintenance activities should be completed during the first non-vegetation period after JMA between the farmers' organization and the agency signed. If the agreement is reached in a part (month) of the year when non-vegetation period is still far ahead, it will provide a good opportunity for the agency to arrange funds and for the farmers to mobilize their resources as agreed in JMA. Because this activity generally demands minor repairs, replacements or remodeling of essential flow control structures, therefore, it can be completed in one or two months of non-vegetation period. All relevant records of actual expenditures should be maintained to compare with estimated costs; in future, it will help the agency people to prepare more

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realistic and cost effective estimates. Such a record keeping will also help in building trust between the farmers and the agency staff, enhancing the farmers' confidence to share O&M responsibilities as well as bringing transparency in financial matters.

Priority Deferred Maintenance Needs (PDMN):

Generally, this will be an expensive activity as compared to ESM. Its implementation will be purely dependent upon availability of required funds. However, if funds are available, it will be undoubtedly highly important to complete PDMN in the first year of JMA, because accumulation of the delayed maintenance needs will further deteriorate the system and enhance the maintenance cost.

In case funds are short and it is difficult to complete all PDMN, keeping in view the budget constraints, first completed has to be the work, which more hampers the hydraulic performance of the system. In such circumstances, it is also important to prepare annual maintenance plan for deferred maintenance needs for each coming budget year (such as five-year plan) and forward it to an authority concerned for approval and arranging necessary funds. Because PDMN was part of the action plan prepared for JMA, therefore, it should have been covered in JMA but it could be revised annually considering the availability of resources, actual costs incurred, price escalation cost etc.

As already mentioned, transparency and accountability will be the key for success of the management transfer, therefore, the agency staff should keep records of all activities and the costs incurred and then share this information with WUAs and senior officials to develop credibility. A strong accountability mechanism and transparency in transactions will help in timely provision of human and financial resources from WUAs and a higher authority and the turnover plan will be completed within scheduled time.

b) Irrigation Services Plan (including disposal of drainage)

The main purpose to implement the irrigation service plan is to bring equity in water distribution and reliability in water service delivery as much as possible. Based on the water duties calculated during the preparation of the operation plan in previous phase, all the essential flow control structures where each WUGs and WUAs will receive their share of water should be repaired or remodeled (as the case may be) to remove or minimize the discrepancies in water distribution. Since the purpose of the operation plan and JMIS is to ensure equity in water distribution to each organization at lower tier of the system, the farmers of these organizations should decide how to incorporate seepage losses in the system, keep checking on free riders, take remedial measures for unauthorized water deliveries and outlets tempering etc. It should be implemented as per their own decision with the agency staff to provide technical assistance

Normally, repairs or remodeling of essential flow control structures will be carried out during the non-vegetation period and it would not be possible to confirm the accuracy in water delivery. Therefore, there is a chance that repairs or remodeling of these structures might not yet ensure that water delivery is as equitable as envisaged when operated after canal closure. It is, therefore, suggested that the farmers and the agency staff should continue to strictly monitor daily discharge rates with the operation plan to be revised as early as possible. This process should be continued until an optimum level of equity is achieved.

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Reliability in water supply: Farmers tend to over-irrigate their fields due to the fear of unreliable water supply and because they don't know when water supply will be cut down either partially or completely due to one or another reason. This tendency of over-irrigating the fields and seepage from the system itself causes twin menace of water logging and salinity which, in turn, precludes increased agricultural productivity.

An effective communication mechanism should be developed here and adhered to. Therefore, a quarterly water supply schedule should be prepared and circulated by the agency staff to the FWUA, WUAs and WUGs well ahead, so that the farmers can plan crop sowing and subsequent irrigations. Water users should also prepare their seasonal crop plans and submit them to the agency staff before the start of the crop season, so that they can arrange irrigation water delivery at the head regulator where WUAs will receive their agreed share.

c) Assessment and Collection of Water Supply Charges

As per the Agreement on joint management of irrigation system and devolution of responsibilities to the WUA regarding O&M of a part of the system, the WUA will need financial resources to: 1) pay an amount agreed to the agency concerned for the supply of water to the distributary head and for the maintenance of the main system, and 2) to operate and maintain the secondary and tertiary level irrigation system they are responsible for. The main financial source will be the water supply charges collected from the water users. So the WUA needs to collect water supply charges from the users of that distributary system.

After responsibilities taken on by the WUAs/FWUAs at the distributary level they will need to assess and collect water supply charges from the water users. In the Fergana Valley context, there are two broad options for the assessment and collection of water supply charges: 1) Stick to the existing arrangements (charging by volume) with necessary checks to be exercised on water volumes delivered to water users; or 2) Set water charges on a area basis, i.e. a fixed volume of water supplied per area unit.

The water charges will generally have two components: a) the amount to be paid to the service provider; and b) the amount needed to operate and maintain the irrigation and drainage infrastructure located within the jurisdiction of the WUA/FWUA.

d) Improved Irrigation Agronomic Practices

The purpose of JMIS is not to transfer responsibilities from the government agency to the water users but instead to improve agricultural productivity through improving conveyance efficiency of the irrigation system, equity in water distribution and bringing reliability in water supply. Nevertheless, only these improvements cannot enhance agricultural productivity, until and unless every drop of saved irrigation water is not used efficiently at the farm or field level (improved application efficiency), besides judicious use of other non- water inputs. Both over-irrigation and under-irrigation have negative effects on soil health, environment and crop productivity.

The efficient utilization of irrigation water at the field level, therefore, should not be overlooked. WUAs should start educating their farmers about simpler, low cost and area-specific irrigation and agronomic techniques to enhance crop productivity through efficient

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utilization of all reliable resources. The main focus in this regard should be: 1) precision land leveling, 2) proper field designing and layout, 3) when to apply water, 4) how much water to apply, 5) how to apply, 6) minimizing volume of drainage 7) use of healthy seeds, 8) balanced fertilizers dose and proper time of application, 9) effective plant protection measures, 10) timely harvesting of crops, 11) storage of produce; and 12) collective marketing of agricultural produce.

The collective action in this regard by the WUAs would be helpful in enhancing agricultural productivity and increasing profitability of their inputs. The field teams should provide necessary training and technical assistance to the water users to enhance their capabilities, link the WUAs to input providers, sources of knowledge etc. The field teams should also monitor the irrigation practices adopted, quantity of water and non-water inputs applied and yields obtained.

- **Monitoring, Evaluation and Feed-back Program**

- a) Seasonal Monitoring of O&M**

The primary purpose of monitoring operations activities is to monitor incoming flow to the WUAs/ WUGs at the head regulator of the system, at inlet and outlet boundaries of each WUA and WUG and also to evaluate these deliveries in comparison with due shares of each level. This will be an important activity to achieve the ultimate goal of equitable water distribution amongst the different WUGs and WUAs. This monitoring and evaluation program will be helpful in introducing strong accountability mechanism and transparency at all strategic water distribution points, i.e. the head regulator at the FWUA/WUA level, at hydraulic boundary of each WUG. Daily discharges at each essential flow control structure should be monitored jointly by a representative of the agency staff and the WUA members. The data should be evaluated on a weekly, monthly and seasonal basis.

To monitor and evaluate the maintenance of general hydraulic structures, essential flow control structures, distributary banks, service roads and siltation problems, a seasonal walk-thru survey should be carried out to monitor the operational deficiencies caused by maintenance problem. This survey should be conducted jointly by the farmer representatives and the agency staff, adjoining farmers could also participate and inform about their observations and feelings. An informal meeting and discussion should be held at each essential flow control structure and detailed notes in this regard should be taken in the field notebooks. Besides, all the farmers met on the way should also be consulted as regards their O&M problems encountered during the season. This will improve the credibility and communication between WUAs members and their representatives as well as between the agency staff and common water users.

Based on the data collected and evaluated in the context of daily discharges at each essential flow control structure and walk-thru operation survey conducted, a hydraulic performance report should be prepared covering improvements, deficiencies, difficulties, maintenance needs to further improve the hydraulic performance, cost estimates, design drawings etc.

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b) ISF Assessment and Collection

At the end of each crop season, ISF assessment and collection procedure, improvements made, difficulties faced and modification needed for improvement if any should be reviewed. WUA representatives with technical assistance from the field team and relevant agency staff should prepare a draft report on assessment and collection of ISF; the ISF collection performance should be compared against the assessment made and the funds needed for the next year should be specified. If there is any shortfall, WUA representatives should make necessary suggestions for improvement and get approval from the General Assembly .

c) Impact of Improved Agronomic Practices

After each season it is also important to evaluate the impact of implementation of improved irrigation and agronomic practices on crop production. For this, data collected during the crop season should be evaluated. Crop productivity is compared with respect to improved and traditional ways of crop sowing, water and non-water inputs used, cost-benefit analysis, and farmers' perceptions about improved practices. The results then should be discussed with the farmers to get their feedback and prepare report.

d) Revise Plan and Feedback

The information gathered through seasonal monitoring of O&M activities (hydraulic performance and walk-thru operation survey), ISF assessment and collection, impact of improved irrigation and agronomic practices and report prepared in this context by the agency staff and farmers representatives should be presented to the WUA members. The results should be discussed with the farmers to obtain their feedback and incorporate their valid suggestions for improvement. Accordingly the O&M plan and ME&F program are revised and implemented during the next crop season. ME&F program should be continued during the season. This process of revising O&M plan and ME&F program should continue in each season until an acceptable level of equitable water distribution and reliable water supply as a primary objective is achieved. This may require two to four season depending upon the size of the system and the farmers' capacity to learn and handle the O&M. However, to achieve ultimate objectives of increased crop productivity, environmentally sustainable irrigated agriculture, and poverty alleviation (to some extent) in rural areas, continuous strong institutional support in the areas related to the efficient use of irrigation water, adoption of advanced agronomic practices, collective marketing, etc. should continue. An effective monitoring and feedback mechanism will be highly important to move towards the right direction.

Generally, within two to four crop seasons WUA representatives would have sufficient experience and confidence to take over the responsibilities related to the operation and maintenance of the distributary, provided there is a strong legal, technical and institutional support available. At this point of time, O&M responsibilities are transferred to the WUA at the secondary and tertiary level of the irrigation system, however, the property rights may still remain with the state (for example for secondary canals). Initially the management transfer agreement for the secondary canal level should be made at least for a couple of years with technical assistance to be continuously provided to WUAs as long as they need it.