

**REPUBLIC OF YEMEN**  
MINISTRY OF AGRICULTURE AND IRRIGATION

**IRRIGATION IMPROVEMENT PROJECT**  
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**Main Technical Assistance Package for IIP**

**MANUAL  
ON  
PARTICIPATORY PLANNING & DESIGN**

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**Manual**  
**on**  
**Participatory rehabilitation planning & design**

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### Definitions and abbreviations

BoD	Board of Directors of a WUA (the WUA managing board)
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DE	Design Engineer (staff of the main TA team)
FDC	Farmer Design Committee; appointed by the WUG leaders and charged with participatory planning and design for irrigation rehabilitation/improvement works in the working area of a WUA.
IIP	Irrigation Improvement Project
MAI	Ministry of Agriculture and Irrigation
O&M	Operation and maintenance.
PC	Preparatory Committee; appointed by the WUG leaders and charged with the formation of the Water Users' Association.
PIM	Participatory Irrigation Management
PIU	Project Implementation Unit; the IIP project office and staff in Wadi Tuban or Wadi Zabid
PMU	Project Implementation Unit - the IIP project office and staff in Sana'a.
TDA	Tihama Development Authority
WMS	Water Management Specialist (staff of the main TA team)
WTSA	Works, Transfer and Support Agreement; arranges the irrigation management transfer to the WUA, including project support to the WUA (rehabilitation, routine maintenance support, training etc.)
WUA	Water Users' Association; a legally registered organisation formed <i>by</i> the farmers, <i>for</i> the farmers and managed <i>by</i> farmers, who depend on the same main canal for irrigation of their fields.
WUG	Water Users' Group; an informal organisation of farmers, who depend for the irrigation of their fields on the same <i>ma'aqam</i> or intake structure. WUG is formed on the basis of the tertiary hydraulic unit, which is normally one <i>ma'aqam</i> or intake structure.

## FORWORD

This MANUAL attempts to give an overview of the procedures and activities, which have taken place to come to a participatory planning and design of the irrigation infrastructural works, which needed rehabilitation and/or the design of additional required structures in Wadi Tuban and Wadi Zabid (under the first phase of the IIP programme during 2003 -2004).

Although it is related to the organizational set-up in said project, it will serve as a guideline for any other participatory planning and design activity, which may have a different organizational set-up.

The steps, which have been detailed in this MANUAL, have been adjusted according to the experiences gained during the implementation of the participatory design activities.

## 1. Introduction

Over the past years, the approach to investments in rural development has fundamentally changed with the promotion of participatory policies. The Irrigation Improvement Project (IIP) calls for participation of beneficiaries in all phases of the project cycle, namely planning, design, implementation and O&M of irrigation infrastructure. The aim is to ensure that: (i) irrigation rehabilitation and improvement works answer the needs of the farmer beneficiaries and (ii) farmers are willing and able to take responsibility for the O&M afterwards. For the same reason, farmers are required to contribute towards the construction costs.

This manual describes the procedures for participatory planning and designs as used under the IIP, but which are also applicable to other situations.

## 2. Objectives

The WUA will become responsible for operating and maintaining the irrigation canals and structures within their area, which covers the command area of a primary canal, starting just below the primary off-take structure at the Wadi, while the Government or Irrigation Council will be responsible for water management at Wadi level. However, in reality, also free intakes on the Wadi (“ogma”, “mansub”) will come under WUA responsibility, but not the intake structures on the weirs.

To ease the transfer of O&M responsibility to the WUA, the Project will help with making essential repairs. Farmers will be closely involved in the planning process, in particular in:

- Identifying water management problems;
- Identifying the rehabilitation needs;
- Prioritising the rehabilitation needs.

The reasons for involving WUAs in the planning and design are the following:

- It enhances community ownership and sustainability of the rehabilitated infrastructure;
- Technical designs will be better adapted to local conditions and farmers’ needs;
- It will ease the collection of beneficiary contributions;
- It is expected to help the achievement of desired project objectives.

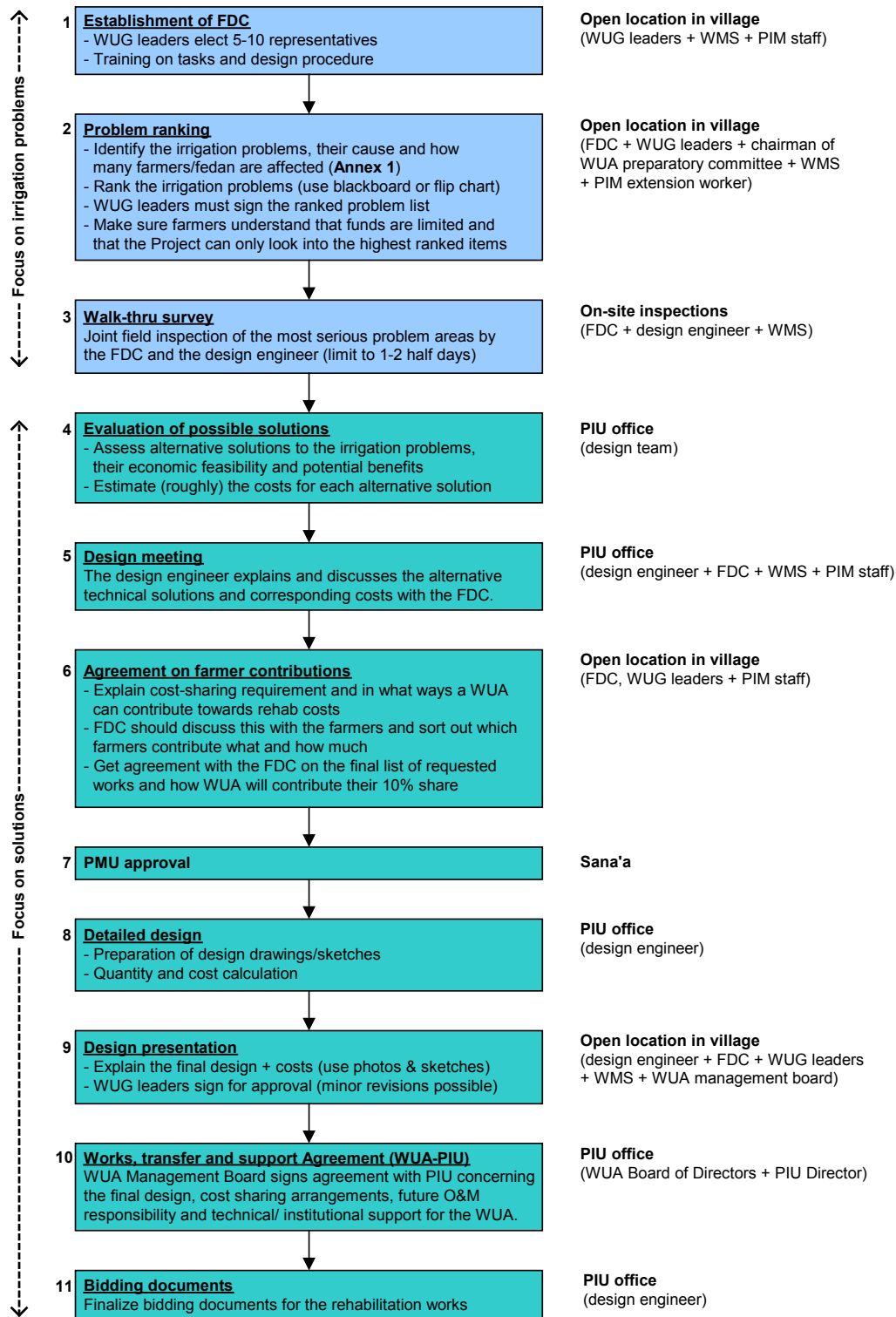
## 3. Principles

- Water users (FDC) define the rehabilitation needs and priorities;
- The Project is responsible for proposing cost-effective solutions and preparing detailed designs, quantity calculation and cost estimation;
- In case water users (FDC) and Project disagree on a proposed technical solution, the project has final decision;
- The Project decides the allocation of rehabilitation funds to the different schemes;
- Detailed design work starts only after the WUA and Project have agreed to a list of rehabilitation works and the cost-sharing arrangement;
- Water users (WUA) will have to contribute towards construction costs and agree to maintain these works afterwards. The IIP Terms of Reference state: *“Prior to starting construction works, IIP and WUA must have written agreement for the proposed works, with clauses relating to O&M responsibilities and required farmer contributions to construction activities.”*

#### 4. Planning procedure

The procedure is shown graphically in the flow chart in **Figure 1** overleaf. It comprises 11 steps, which are explained in more detail in the next sections.

**Figure 1 Procedure for participatory design**



## 5. Tasks and responsibilities

The following persons are involved in this participatory process:

### Farmers:

- Farmers Design Committee (FDC);
- WUG leaders;
- WUA Preparatory Committee and/or Board of Directors.

### Project:

- Irrigation design engineer(s);
- Water management specialist;
- PIM staff;
- PIU Engineer and Director.

A general overview of tasks of the involved people is given in **Table 1** on page 3-41. Specific tasks for the PIM extension workers include:

- Arranging meetings, sending invitations for meeting;
- Attending all meetings on planning and design;
- Assisting the FDC and WUA Board of Directors in problem identification and ranking, walk-thru survey, design meetings and any other meetings on planning/design for rehabilitation works;
- Assisting in explaining principles, concepts and procedures to farmers;
- Assisting the FDC and WUA Board of Directors in preparing required minutes of meeting and other documentation.

The Project (in this case the Consultant) shall keep separate files for each WUA area, containing all documentation (English + Arabic) relating to the planning and design for the WUA.

## 6. Time required for participatory planning & design

The time and/or number of meetings required for the different steps in the participatory planning and design process is given in **Table 2** below. The data are based on experience gained with the activities in Wadi Tuban and Zabid during 2003 - 2004.

**Table 2 Planned and actual duration of activities**

Activity	Number of events	Duration			Remarks
		Planned	Average	Range	
Establish FDC	1 meeting	1 day	1 day	1 day	
Problem ranking	1-3 meetings	10 days	3 days	1-8 days	
Walk-thru survey	1-5 surveys	2 days	3 days	1-5 days	
Preliminary design	1-4 design meetings	10 days	26 days	7-68 days	Tuban, Zabid 21/31 days
Cost-sharing agreement	3-8 meetings	14 days	65 days	38-101 days	Average 5 meetings
PMU approval		10 days	38 days	13-63 days	
Detailed design	N/a	40 days	N/a	N/a	
WTSA	N/a	5 days	N/a	N/a	

The above table shows that especially the preliminary design and negotiation of the final list of works and cost-sharing agreement took much longer than anticipated. The reason is that once farmers



Table 1 Task allocation matrix

Activity (step <sup>1</sup> )	Farmers			Project		
	FDC	WUG leaders	PC / WUA BoD	DE	WMS	PIM staff
1. Establishment of FDC	-	Elect 5-10 representatives	-	-	Explain participatory design procedure (steps), FDC tasks, responsibilities and required profile of FDC members.	Ensure that election is done in transparent manner and that each village/canal reach is duly represented in the FDC.
2. Problem ranking	Identify irrigation problems, their cause and effect; Rank problems according to priority; Consult the WUG leaders	Assist the FDC	-	-	Lead the meeting(s); focus on collective (not individual) problems; submit ranked problem list to the DE.	Provide the WMS with any relevant info collected; The PIM extension worker sends invitations and attends the meeting.
3. Walk-thru survey (WTS)	Ensure that at each site someone is present who can fully explain the problem.	Assist the FDC	-	Bring map/satellite image; Make notes, take photos, record GPS location, take measurements; Try to fully understand the irrigation problems and their cause; Ask questions.	Check the existing water rights and manner of water distribution at each location.	PIM extension worker arranges the date/time of the WTS and assists the FDC.
4. Evaluation of possible solutions	-	-	-	Analyse the irrigation problems, identify cost-effective solutions, make sketches and rough cost estimate. Make sure to involve the PIU Engineer	Inform the DE about local water rights and manner of water distribution	-
5. Design meeting	Verify that the proposed solutions will effectively solve the problems and signs for approval.	After the meeting discuss and (if agreed) approve the proposed solutions.	It is recommended that the Head of the WUA attends the meeting	Discuss proposed solutions with the FDC; give the FDC copies of the sketches and cost estimate	Assist in the meeting	PIM extension worker sends invitations and attends the meeting
6. Agreement of cost-sharing	Discuss cost sharing with the relevant farmers; Get their agreement on list of proposed works and <u>who</u> will contribute <u>what</u> and	Assist the FDC	Assist the FDC	Assist the PIM staff in the second meeting because farmers may want to discuss cheaper options	-	Explain the cost-sharing obligation and possible ways how WUA could contribute. Seek FDC agreement on list of works

<sup>1</sup> Numbers correspond to the steps in Figure 1.

Table 1 Task allocation matrix

Activity (step <sup>1</sup> )	Farmers			Project		
	FDC	WUG leaders	PC / WUA BoD	DE	WMS	PIM staff
	how much.					and cost sharing.
7. PMU approval	-	-	-	-	-	Submit list of proposed works and cost-sharing arrangements to the PIU Director with copies to the TA Team Leader, DE and WMS.
8. Detailed design	-	-	-	Make design calculations, drawings/sketches, prepare design report.	-	-
9. Design presentation	Verify that final design and cost estimate is consistent with information given at the 'Design Meeting'; sign for approval of the detailed design and cost estimate.	Attend the meeting; sign for approval of the detailed design and cost estimate.	Attend the meeting	Present the detailed design drawings/sketches and cost calculation to the FDC.	Attend the meeting	PIM extension worker sends invitations and attends the meeting.
10. Works and Support Agreement (WSA)	Wrap up the assignment, hand-over results and advise/assist the WUA Board of Directors.	Advise positively to the WUA Board of Directors.	Sign the Agreement with the PIU director containing the agreed list of works, the implementation method, cost-sharing arrangement, and future responsibility for water distribution & O&M.	Advise/assist the PIU director.	Advise/assist the PIU director.	Advise/assist the PIU director.
11. Bidding documents	-	-	-	Finalize bidding document, BOQ and cost estimate.	-	-

understood that they have to contribute towards construction costs, they started reconsidering the priorities and often asked for simpler and cheaper engineering solutions.

## 7. Step-wise approach

The steps involved are described in detail here below:

### 7.1 Step-1: Establishment of FDC

As the IIP programme was effectively compressed from 5 into 3 years, hence the methodology used was simplified where possible without sacrificing quality or principles i.e. the participatory design activities were done in parallel with the formation of the WUA. **However, preferably the participatory planning and design activities should not start before establishment of the WUA.**

As soon as all WUGs are formed, a meeting is called for the leaders of the WUGs, and the WUG leaders appoint two Committees:

1. A Preparatory Committee (PC), comprising 5-10 members<sup>2</sup>, who will create the WUA, and
2. A Farmer Design Committee (FDC), comprising 5-10 members, who will participate in the construction planning and design process.

The WUG leaders (WUG chairman and WUG secretary) shall agree upon the size and composition of the PC and FDC and ensure that each village and the upstream, middle and downstream reaches of the system are duly represented.

The PIM Specialist and/or PIM extension worker should lead the WUG leaders meeting to ensure that the formation of the PC and FDC is conducted in a responsible and transparent manner.

Before WUG leaders elect the FDC members, the PIM Specialist or Water Management Specialist explains:

- The participatory planning and design process (see Figure 1);
- The tasks and responsibilities of FDC (see box below);
- Desired qualifications of FDC members (see box below).

#### ***Tasks, responsibilities of FDC:***

- Identify irrigation problems, their cause and importance in the view of farmers;
- Identify area and number of farmers affected by each problem;
- Communicate with the design engineer + other project staff involved in the participatory design;
- Define the list of proposed works together with the Project's design engineer(s);
- Regularly inform and consult the WUG leaders and affected farmers;
- Explain the proposed technical solutions to the farmers and get their approval (and comment);
- Explain cost-sharing obligation to the farmers and ensure that farmers agree to contribute.

#### ***Criteria for selecting FDC members:***

- ✓ Must have good general knowledge, understanding and judgement;
- ✓ Must have local knowledge of irrigation and water rights in the area;
- ✓ Must be able and willing to represent the collective interests of farmers in the upstream, middle or tail-end of the WUA area (not just motivated by self-interest);
- ✓ Must have time to attend meetings and discuss issues with the farmers.

<sup>2</sup> The Ministry of Social Affairs will register not more than 5 members of the PC.

## 7.2 Step-2: Problem ranking

### *Background*

**A good understanding of the irrigation problems is essential for the preparation of the detailed designs.** If a design engineer has poor or wrong information about a problem, he/she will likely come up with an inappropriate (wrong) solution. Therefore it is good practice to start off with asking the water users for first-hand information about problems with the irrigation infrastructure.

However, one should not be satisfied too easily with the information given by farmers because, when asked about irrigation problems, farmers are likely to give 'solutions' rather than describe 'problems'. For example, they will say: "we want a gate in this structure", or "the canal needs desilting". To get to the source or cause of the problem, project staff must ask probing questions, such as for example:

- "Why do you need a gate?"
- "How did it get damaged?"
- "How are the existing water rights here?"
- "Is there conflict of interest between upstream and downstream water users?"

When looking into the cause of damages or irrigation problems, indirect factors also need to be identified, such as:

- Upstream/downstream user interests (or conflicts);
- Conformity of irrigation infrastructure with local water rights;
- Maintenance requirements/costs.

### *Priority ranking*

**Farmers should be advised that project funds are limited, so probably not all deficiencies in the irrigation system can be repaired.** Therefore, farmers (FDC) should rank the problems according to priority. The higher a problem shows on the list, the more likely that it will get repaired.

Project staff should be alert that the priority ranking reflects the collective needs of the water users, and not the individual self-interest of FDC members. Therefore, the FDC must be obliged to involve give feed-back to the WUG leaders and to involve WUG-leaders in the collection of information on the relative importance of problems in water supply and distribution of irrigation water.

For the setting of priorities, the following considerations may be used:

- How many hectares/farmers are affected by the problem?
- How severe are the consequences to the people affected (minor/major)?
- Are the affected farmers willing to contribute towards rehabilitation costs?

The list of water management problems can be numbered (from 1 to xx) starting with the most important and ending with the least important problem.

### *Procedure*

**The FDC is responsible for preparing a ranked list of irrigation problems.** The Water Management Specialist (WMS) and PIM extension workers assist the FDC in this activity. They bring together relevant data on irrigation deficiencies collected earlier by the PIM staff from the WUGs and hand this to the FDC. The WMS explains the background and purpose of the problem ranking and ensures that it is carried out properly. The problem ranking lists should be made according to the standard format provided in **Annex-1** and, when completed, should be submitted to the PIU and the Design Section.

The problem-ranking meeting(s) with the FDC should preferably take place in one of the villages. The WMS should bring the following items:

1. Maps, satellite images (1:5,000);

2. List of irrigation problems collected from the WUGs by the PIM extension worker;
3. Flipchart and markers;
4. Notebook;
5. Attendance sheet + problem ranking form (see **Annex-1**).

During the meeting, the WMS should:

- Explain:
  - Purpose of the problem ranking;
  - Limitation of project funds, so probably only the most important deficiencies can be repaired;
  - Task of FDC to consult WUG leaders and affected farmers.
- Ask probing questions to better understand the problems, such as:
  - Why is this a problem?
  - Who are affected by it (and how much)?
  - How big/important is this problem (compared with other reported problems)?
  - Ask what problem(s) farmers expect to be solved.
- If farmers suggest a solution:
  - Ask them why they prefer this solution;
  - What they think would be the benefit of this solution;
  - Ask whether they have thought about other solutions.
- Ask FDC to rank the problems according to priority, using the format given in **Annex-1**.
- Ask FDC members to sign the completed ranking list.
- Make written notes (to be expanded after the meeting).

In case the FDC is divided in their opinion, or has difficulty in ranking the problems according to priority, one of the following tools may be used:

1. Matrix/grid method

In a matrix table the irrigation problems are compared with each other, two at a time, and the most serious or important of the two is chosen. The ranking follows from counting the number of times a problem was chosen. For an example see **Annex-2**.

2. Pebbles on card method

Write each irrigation problem on a separate card (sheet) and then lay out the sheets on a table. Give the discussion leader at least 20 pebbles (small stones) and let the FDC members discuss how many pebbles they would put on each sheet. The more pebbles they put on a sheet, the more important (or serious) the corresponding irrigation problem.

Back to office: After the meeting, work out (expand) the notes of the meeting, translate the problem list into English - in this case (using the standard format given in **Annex-1**) and send it to the PIU Director and Design Engineers with copy to the Team Leader (the Consultant).

### 7.3 Step-3: Walk thru survey

The walk thru survey is a joint field inspection by the farmers (FDC), WMS, design engineer and PIM extension worker to look into the irrigation problems/damages in the field. The farmers show the way to the problem locations and explain the consequences of the problem or damages. They may give suggestions about solutions, but the focus should be on understanding the problem and its underlying cause(s).

Preparation: the design engineer should bring the following items:

1. Copy of the list of irrigation problems prepared by the FDC and WMS;

2. Maps, satellite images (1:5,000);
3. Copy of previous notes (for example: those made at the design meeting-1);
4. Measuring tape (5 m);
5. Notebook (and clipboard);
6. Camera;
7. GPS.

Before going to the field, the task distribution for the walk-thru-survey should be discussed among the team members who participate in the walk-thru. For example, the design engineer may lead the discussion with the farmers, while a second person takes photo's and GPS coordinates, and a third person takes rough measurements.

During the walk thru survey, the design engineer (and other project staff) should:

- Try to see understand the farmers' viewpoint of the reported problems;
- Ask why this is a problem, who are affected by it (and how much);
- Ask what problem(s) farmers expect to be solved;
- If it concerns a division box or intake structure, ask how water is distributed
  - If water is distributed by turn, ask about the sequence;
  - If water is distributed by share, ask for the proportions.
- Ask farmers if they have any suggestions for a solution;
- Refrain from giving opinion, but encourage discussion and seek clarification;
- If farmers suggest a solution:
  - Ask them why they prefer this solution;
  - What benefits they expect from this solution;
  - Ask if they have thought about other solutions.
- Make written notes, take photos and record the GPS location;
- After seeing each location, summarize the problem for the FDC in order to check whether it has been properly understood (give feedback!).

When going to the field, try to look at the problems in a logical sequence (upstream to downstream). Do not try to do too much in one day. Stop when people get tired and agree on another day to continue the walk thru survey. Take many photographs, but do not spent much time on detailed measurements. If needed more measurements can be taken on a return visit at a later date. Give priority to discussion with the farmers.

Back to office: after the walk through survey, work out (expand) the notes and update the ranked problem list (format in **Annex-1**).

#### **7.4 Step-4: Evaluation of possible solutions**

After the walk-thru survey, the design engineer and senior design engineer analyse the cause of the irrigation problems reported by the farmers. Together they then formulate appropriate solutions, make sketches and roughly estimate the costs of the proposed solutions. It is important to involve the PIU Engineer at this stage and discuss the proposed options with him. Some brief guidelines are given below:

1. Analysis of irrigation problems:  
 Critically analyse the problems reported by the farmers, aiming to understand the situation and try to identify the real cause.  
 If necessary, additional field observations or measurements should be made at this stage.

2. Formulate solutions:

Once the problem is fully understood, the design engineers formulate technical solutions taking into consideration:

- Their effectiveness to solve the problem
- Robustness
- Life expectancy
- Most economical solution (low-cost solutions are preferred because farmers must contribute)
- How these can be operated by farmers (in future)
- Possible ways how farmers may contribute towards construction

3. Sketches:

Indicative (rough) sketches should be made of the technical solutions, which can be used (a) as a basis to roughly compute quantities and costs, and (b) to explain the proposed solutions to the FDC at the design meeting (step 5).

4. Rough cost estimation:

The main purpose is to get indicative figures for the costs of the proposed works, which are accurate enough for discussion with the FDC (at the design meeting, step-5). Try to make a breakdown into separate cost items. Keep in mind that the available budget is on average US\$ 200-300 per hectare (in IIP).

*Involve PIU's Engineer - discuss the proposed options with him before the Design Meeting.*

Make an overview table of proposed solutions and their costs in order to facilitate discussion with the farmers on cost sharing (step 6). An example is given in **Annex-3**.

### 7.5 Step-5: Design meeting

The design engineer meets with the FDC at the PIU office to explain the proposed solutions and estimated costs to the FDC.

Preparation:

The design engineer should prepare transparency sheets (for overhead projection) and photocopies for handout to the FDC and PIU of the following:

- An overview table, listing the reported problems, the proposed solutions and estimated costs (see format in **Annex-3**);
- Sketches of the proposed solutions;
- Photographs of location and/or similar solutions elsewhere.

***Tips:** 1. Put explanatory notes on the sketches and photos;  
2. Indicate on each sketch and photo to which item on the list it refers;  
3. In the list of proposed solutions, indicate clearly where FDC has made a choice between alternative solutions.*

***Distribution of photocopies** (original master goes into the Engineer's file):*

- FDC (5 copies );
- PIU (2 copies);
- WMS (1 copy).

During the meeting:

Discuss the problems/solutions one-by-one, starting with the highest priority item on the problem list. Show photos and sketches on the overhead projector screen to illustrate the problem analysis and the proposed solution. Explain:

- a) Engineer's analysis of the problem reported by the farmers;
- b) The technical solution proposed;
- c) Reason(s) why this solution is preferred over other solutions;
- d) Estimated costs (and potential benefits, if possible);
- e) Budget limitations of the Project;
- f) Required farmer contribution (indicate which items in the list do not require farmer contributions and which items do).

If possible, present the information using the overhead projector to facilitate discussion with the FDC.

After the Engineer's explanation, the FDC should be given the opportunity to ask questions about the solutions proposed by the design engineer and a discussion may follow. In case the FDC and Engineer disagree on the most cost-effective solution, try to arrange another site visit to better understand FDC's point of view.

Ask the FDC to follow-up as follows:

- a) Discuss the proposed solutions and options with all WUG leaders and interested farmers;
- b) In case alternative solutions are given, choose the preferred option;
- c) If questions arise, delegate 1-2 person(s) to seek clarification from the Design Engineer;
- d) If farmers propose modifications or new works (requiring additional walk-thru survey), FDC must send a written request to the Design Engineer, signed by all FDC members.

Make notes during the meeting of comments and suggestions made by the farmers. Explain that the next step for the FDC will be (a) to finalize the list of proposed works and (b) to discuss and reach agreement on beneficiary contributions (cost-sharing) with the PIM staff.

### **7.6 Step-6: Agreement on farmer contributions**

The Project requires that a WUA must contribute 10% of the total value of the rehabilitation and improvement works of canals and structures within its working area. This requirement may influence the final list of works requested by the farmers.

Preparation:

- a) Convert the list of proposed works, which was produced for the Design Meeting (step-5) into the format given in **Annex-4**;
- b) Bring a meeting attendance sheet;
- c) Bring 20 copies of the leaflet concerning "farmer contribution".

The expected result of this step is:

- a) A final list of requested works;
- b) Basic agreement on how farmers will provide their 10% contribution.

At least three meetings are foreseen with the FDC:

1<sup>st</sup> meeting

- Confirm the list of proposed works (where options are given in the list, farmers must indicate their preference/choice)
- Explain Project requirement for farmer contributions
- Explain alternative ways how farmers can contribute



- Handout copies of the folder on “farmer contribution”
- Ask FDC to:
  - Consult/discuss with WUG leaders and other interested farmers;
  - Formulate a cost-sharing proposal for the next meeting.

#### 2<sup>nd</sup> meeting

- Finalize the list of proposed works (if necessary);
- Discuss Fad’s cost-sharing proposal;
- Calculate the value of farmer contributions.

#### 3<sup>rd</sup> meeting

- Finalize the list of works, implementation mode and farmer contributions;
- Sign the cost-sharing proposal and minutes of meeting.

The result (final list of works + cost-sharing proposal) should be sent to the PIU Director, who will forward it to the PMU for review and approval. The approval by PMU is required because the Project is expected to the remaining 90% of the construction costs.

**Annex-5** provides background information on common questions from farmers, such as for example:

- What works require farmer contribution and what kind of works do not?
- Alternative ways how farmers can contribute their 10% share?
- What is a WUA contract?
- How many WUA contracts can an Association do?

### **7.7 Step-7: PMU approval**

As mentioned in the previous Section, the approval by PMU is required because the Project is expected to the remaining 90% of the construction costs.

PMU approval will normally be granted if:

- The proposed works do not cost more than US\$ 200/ha (Wadi Zabid) or US\$ 300/ha (Wadi Tuban);
- The farmer contributions cover at least 10% of the construction costs.

If the proposed works are more expensive than US\$ 200-300/ha, a justification for the higher-than-average costs must be provided. The justification should include information about (i) expected benefits of the investments, (ii) frequency of spates at the Wadi off takes and (iii) willingness of beneficiary farmers to contribute towards the construction costs.

### **7.8 Step-8: Detailed design**

The final design should incorporate the comments of the FDC on the preliminary design and comprise the following steps:

1. Topographic surveys:  
Topographic surveys will be made, as needed, including levels of benchmarks and structures, level of particular structures, cross-sections and longitudinal slope of canals and elevation of fields that need to be irrigated.
2. Detailed design drawings:  
Finalize the drawings or sketches, incorporating the comments and suggestions of the FDC. Design calculations are made as needed, including hydraulic properties, strength and/or structural stability.

3. Quantity calculation

Volumes/quantities are computed from the finished detailed design drawings.

4. Cost estimation:

The cost estimates of the proposed works are made using standard unit rates for materials, labour and equipment.

### 7.9 Step-9: Design presentation

The design engineer presents the detailed design during a meeting held in the PIU office with the FDC and Board of Directors of the WUA. The office is chosen as meeting location as it has facilities for overhead projection and tables to lie out maps and drawings. During this meeting the design engineer explains the final design to the FDC as well as the adjustments made to the preliminary design. To ensure that the design is fully understood, the design engineer may use 3-dimensional sketches and, if necessary, arrange field visit for on-site explanation.

**In the end, the FDC should agree with the final design**, and should be willing to explain and defend it towards the WUA Board of Directors, WUG leaders and other farmers.

### 7.10 Step-10: Works, transfer & support agreement (WTSA)

When the WUA Board of Directors has accepted the detailed design, the WUA and Project enter into an agreement specifying:

- The agreed rehabilitation works;
- Implementation method; and
- Cost-sharing arrangement.

By signing this “Works, Transfer and Support Agreement” (WTSA) the WUA commits itself to take over the responsibility for operation and maintenance (O&M) and the Project commits itself to support the WUA with training, guidance and support in routine maintenance during a ‘transition period’.

The Consultant prepares the draft agreements in English language and submits it to the PIU, together with a standard Arabic version. The PIU prepares Arabic versions of the WTSA and conducts final negotiations with each WUA. **Final negotiation may be required, because the final cost estimates may be somewhat different from the (rough) preliminary cost estimates.**

Once final agreement is reached, the PIU director and the Chairman of the WUA BoD sign the WTSA, witnessed by the General Director of Agriculture and Irrigation (Wadi Tuban) or the Chairman of the TDA (Wadi Zabid). The signed WTSA is then send to the Governor for endorsement.

The model “Works, Transfer & Support Agreement” is presented in **Annex-6**. A summary of the contents is given below.

By signing the WTSA, the WUA becomes responsible for water distribution and maintenance within their area. However, the Project commits itself to help further develop the WUA and to assist the WUA with routine maintenance till the end of the project.

Aims of the WTSA:

- Transfer O&M to the WUA (legal ownership of irrigation infrastructure remains with GoY)
- Strengthen WUA capability to carry out O&M
- Provide a binding commitment for rehabilitation works and cost-sharing

## **7.11 Step-11: Bidding documents**

The design engineers prepare bidding documents as part of the detailed design. However, the bidding documents are not presented to the WUA and these are thus prepared after the Design Presentation, in parallel with the activities for the WTSA.

# **Annex-1**

## **Sample form Problem ranking**

## Ranked irrigation problems BAGR

## Wadi Zabid

Rank	Location	Frequency of spate at location	Problem	Cause of the problem	Suggested solution	Affected area (Maad)	Affected number of farmers
1a	Canal embankment next to Mahal Al Sheikh village	3 - 4 during time period	Risk of failure of embankment prevents water being taken from free wadi offtake. Water received from Bagr canal is not enough.	People of Mahal Al Sheikh village preventing farmers from opening free wadi offtake	Protect Mahal Al Sheikh village along Bagr canal	4,000	1,200
1b	Ras Al Sharig. Problem as above	3 - 4 during time period	As above	As above	Protect village and open free wadi offtake.	4,000	1,200
2	Bifurcation Al Iqadah.	No water for long time	Water not reaching land d/s of structure. Problem between farmers over distribution of water.	Distribution structure is old and cracked on north side.	Rehabilitate / reconstruct distribution structure according to old arrangement	3,000	750
3	Al Makhlaf traditional drop structure	1 per year	Leakage from drop structure.	Structure has become old and cracked.	Structure needs rehabilitation and walls to be raised.	60	20
4	Al Gharief offtake	1 per year	Pipe is blocked by sand. Lower land affected by sand.	Inlet of pipe is too low.	Raise elevation of pipe entrance.	40	22
5	3 locations: Tighara Al Grief Al Shaed	No water for long time	Water discharge not enough to irrigate land.	Small size of offtakes.	Enlarge / replace offtakes by bigger size.	30 50 300	10 25 70

## **Annex-2**

### **Alternative method for problem ranking**

## Matrix (grid) method for problem ranking

Instruction: In each cell put the most important irrigation problem  
(choose between the two problems in the concerned row and column)

Irrigation problems	Problem A	Problem B	Problem C	Problem D	Problem E	Problem F	Problem G	Problem H
Problem A		B	A	A	A	F	G	1
Problem B			B	D	E	F	G	B
Problem C				C	E	F	G	C
Problem D					E	F	G	H
Problem E						F	G	E
Problem F							F	F
Problem G								G
Problem H								

Irrigation problem	Score	Ranking
Problem A	4x	<b>3</b>
Problem B	3x	<b>5</b>
Problem C	2x	<b>6</b>
Problem D	1x	<b>8</b>
Problem E	4x	<b>4</b>
Problem F	7x	<b>1</b>
Problem G	6x	<b>2</b>
Problem H	1x	<b>7</b>
Total	28	

Scoring is done by counting the number of times a certain problem has been mentioned.

## **Annex-3**

### **Sample form**

### **Proposed solutions for irrigation problems**



## IRRIGATION IMPROVEMENT PROJECT - WADI TUBAN

### Proposed solutions for Al-Sa'deen WUA problem list

Priority	Name of site	Proposed solutions	Location		Affected area (ha)	Cost estimate (US\$)	Cost/ha
			N	E			
1-	Ober Al-Sadeen	Construct a concrete structure for head of Ober Al Sa'deen.	1452651	482019			
		Option-1: (guide wall of masonry + protection work + intake +sluice)	1452651	482019	338	102,000	302
		Option-2: (guide wall of masonry + protection work + intake + sluice + bedbar)	1452651	482019	338	128,000	379
		Option-3: (guide wall of R.C.C + protection work + intake + sluice)	1452651	482019	338	110,000	325
		Option-4: (bed bar + R.C.C guide wall + intake + sluice + earth embankment)	1452651	482019	338	136,000	402
		Option-5: (gabion guide wall + protection work + intake + sluice)	1452651	482019	338	98,000	290
		Option-6: (gabion guide wall + protection work + intake + sluice + bed bar)	1452651	482019	338	124,000	367
2-	Ras Al-Wadi Canal	Maintenance of gates: a) In main canals and branch canals from P12 to P16; b) Replacement of gates to irrigate the fields and rehabilitation of the intake structures at the following sites:					
		1. P12 land of farmer yehia fadel Saleh	1446671	482789	3	1,500	455
		2. P14 land of farmer Mohmed Saleh Al-Ehdel	1446305	483390	2	1,500	750
		3. P16 land of farmer Mohmed Saleh Al-Doukah	1445141	483634	2	1,700	850
3-	Taha Atood intake	Required is a cross gate and intake structure in the main canal to irrigate the land for Taha	1447084	483098			
		Option-1			15	7,000	455
		Option-2			6	2,000	320
4-	D/s of Ober Al-Sadeen	Construct a dissipater structure at the end of the obar to raise the bed level.	1444501	484441		10,000	
5-	Neglecting Land	Construct a branch canal from P12 to irrigate the neglected land, of which the area is about 35 feddan.	1446174	482800	17	10,000	588
6-	khalif Mahdi	Construct a concrete structure inside Ober Al Sa'dain to divert water to Khalif Machdi.	1447789	483061	6	600	103
7-	Land Hasan Abdulla Al-Doukah	Construct a concrete structure inside Ober Al Sa'dain to divert water to the land of Hassan Abdullah Al Dokhah.	1448517	483238	2	600	300
8-	Land Mohamed Gahwary	Construct a concrete division structure in branch canal to divert water to the land of Al-Radooh (for farmer named Ali Mohamed Gahwary and others).	1444811	484230	3	4,000	1,333
					<b>Total Cost</b>		

SR. ENGINEER: FAZAL

ENGINEER: FATHEYA HASAN HABIB

## **Annex-4**

### **Sample form Cost-sharing proposal**

**IRRIGATION IMPROVEMENT PROJECT - WADI TUBAN**  
**Proposed list of works & cost-sharing arrangement**

Al-Sadain (338 ha)

Priority	Name of site	Proposed solution	Affected area (ha)	Affected farmers	Cost estimate (US\$)	Option chosen (US\$)	Proposed implementation method			Cost-sharing		
							Farmers themselves	WUA Contract	Contractor	Project	WUA	
1-	Ober Al-Sadain	Construct a concrete structure for head of Ober Al Sa'dain.	338	365	136,000							
		- Bed bar			26,000	p.m.			Yes	p.m.		
		- Head regulator structure			25,000	p.m.			Yes	p.m.		
		- Head of Obar			55,000	55,000			Yes	55,000	-	
		- Earthworks and protection works			30,000	30,000	-	-	Yes	30,000	-	
2-	Ras Al-Wadi Canal	Maintenance of gates										
		a) In main canals and branch canals from P12 to P16;			11,460							
		-condition 2			3,330	3,330		yes		2,331	999	Labour, 72 gates
		-condition 3+4			8,130	8,130			yes	8,130	-	
		b) Replacement of field offtakes and rehabilitation of other intake structures at the following sites:			4,700							
		1- P12 land of farmer Yehia Fadel Saleh	3	3	1,500	1,500	Yes	-	-	0	1,500	Labour, materials
		2- P14 land of farmer Mohmed Saleh Al-ehdel	2	2	1,500	1,500	Yes	-	-	0	1,500	Labour, materials
3- P16 land of farmer Mohmed Saleh Al-Doukah	2	3	1,700	1,700	Yes	-	-	0	1,700	Labour, materials		
3-	Taha Atood intake	Build a check structure with stoplogs in the main canal to raise the water level for irrigation of the land of Taha Atood (before canal P12).										
		- Construct a stoplog check structure in the main canal	6	3	2,000	2,000	-	Yes	-	1,400	600	Labour, materials
4-	D/s of Ober Al-Sadeen	Construct a dissipater structure at the end of the obar to prevent canal bed erosion.			10,000	10,000	-	Yes		7,000	3,000	Labour, materials
5-	Neglecting Land	Construct a branch canal from P12 to irrigate the neglected land, of which the area is about 35 feddan.	17	13	10,000	10,000	-	Yes	-	7,000	3,000	Labour, materials
6-	Khalif Mahdi	Construct a concrete check structure with stoplogs in Ober Al Sa'dain to divert water to Khalif Machdi.	6	8	600	600	Yes	-	-	0	600	Labour, materials
7-	Land Hasan Abdulla Al-Doukah	Construct a concrete check structure stoplogs in Ober Al Sa'dain to divert water to the land of Hassan Abdullah Al Dokhah.	2	4	600	600	Yes	-	-	0	600	Labour, materials
8-	Land Mohamed Gahwary	Construct a concrete division structure in branch canal to divert water to the land of Al Radooh (for farmer Ali Mohamed Gahwary and others).	3	4	4,000	4,000	-	Yes	-	2,800	1,200	Labour, materials
					<b>Total</b>	<b>179,360</b>	<b>128,360</b>			<b>113,661</b>	<b>14,699</b>	

Sr. Design Engineer      Fazal  
 Design Engineer        Fatheya Hasan Habib  
 PIM Specialist          Dr. Kamel Al-Rashahi  
 PIU Engineer            Abdul Walli

Contributory part	\$128,360	51,000
WUA Contribution (10%)	\$12,836	
Cost/ha	\$531	

89%	11%
-----	-----

Total farmer contribution through WUA Contracts	8,799
Total farmer contribution through works done by WUA itself	5,900
Total farmer contribution in-cash	-
<b>Total</b>	<b>14,699</b>

Total value of WUA Contracts	29,330
------------------------------	--------

## **Annex-5**

### **Background information on farmer contribution**

## Background information on farmer contribution

### 1) What works require beneficiary contribution, and what kind of works do not?

Type of works	Farmer contribution	Responsibility for O&M
Priority works:		
- Village protection works	0%	Government
Rehabilitation of existing weirs	0%	Government
- Repair of head works & weir gates	0%	Government
- Feeder roads (including culverts)	0%	Government
Repair of canals and canal structures	10%	WUA
Other civil works	10%	WUA

### 2) Alternative ways how farmers can contribute their 10% share:

- By executing the work themselves (small, simple works);
- By executing one or more "Community Contracts" (see example below);
- By paying an up-front contribution in cash (the percentage is variable, depending on how much contributions are made through community contracts and by farmers executing works by themselves);
- By donating land (right-of-way).

Example:

<u>Item</u>	<u>Costs</u>	<u>Implementation method</u>	<u>Project share</u>	<u>Farmers share</u>
Work-1	\$ 1,000	Farmers themselves	\$ -	\$ 1,000 (100%)
Work-2	\$ 10,000	WUA contract	\$ 7,000	\$ 3,000 (30%)
Work-3	\$ 89,000	Contractor (NCB)	\$ 83,000	\$ 6,000 (balance)
-----				
Total	\$ 100,000		\$ 90,000	\$ 10,000 (10%)

### 3) What does "farmer works" mean?

Small works, which farmers think they can do themselves by their own means. If farmers execute some works by themselves, then the full value of these items will be recorded as farmer contribution towards the overall agreed list of works.

### 4) What is a "WUA contract"?

The Project can contract rehabilitation works (costing up-to \$10,000) to a WUA. The WUA then acts as a contractor for the Project, but gets paid 30% less than standard contractor rates. The reason is that a WUA has fewer costs than commercial contractors and does not need to make profit.

### 5) What are the expected benefits of Community Contracts for the WUA?

- WUA has total control over the implementation of the works;
- WUA gets paid for the physical inputs (materials, machinery, labour);
- Employment/income opportunity for farmers;
- WUA gains contracting experience, which will be of great use in future when small repairs or rehabilitation works must be executed.

**6) How many WUA Contracts can an association do?**

Project funds for WUA Contracting is limited to US\$ 1.2 million, which allows for approximately 120 WUA contracts: 60 in Wadi Tuban and 60 in Wadi Zabid. As all WUAs have right to benefit from this arrangement, the project can award on average:

- In Tuban: 1 WUA Contract per 160 ha (9,500 ha divided by 60);
- In Zabid: 1 WUA Contract per 200 ha (12,500 ha divided by 60).

The Project encourages all WUAs to implement at least one WUA contract. However, if funds for WUA contracts are not utilized fully, the Project may award additional WUA contracts to those WUAs who show interest.

**7) What if farmers (say they) are too poor to contribute?**

Farmers who cannot contribute in-cash may provide their contributions in labour and/or materials. They can do so either by carrying out works by themselves, or by implementing WUA contracts.

If farmers are not able/willing to do so, then the scope of works must be reduced to a value not more than 10x the amount of the farmer contributions.

**8) What to do when farmers want further clarification or wish to change the list of works?**

- a. Farmers do not (fully) understand the solution proposed by the design engineer  
FDC should send 1-2 delegates to the Project office to ask further clarification from the design engineer;
- b. Farmers think that the design engineer has not proposed the right solution  
FDC should send letter to the Project indicating their opinion and request for modification. All FDC members must sign the letter;
- c. Farmers want to change the priorities on the list of works  
FDC should send letter to the Project indicating the change in priorities. All FDC members must sign the letter;
- d. Farmers want to add new items to the list  
This normally requires additional walk-thru survey, problem analysis, proposal of solutions and cost estimation. The FDC should send written request to the Project, signed by all FDC members.

Request for changes to the list of works must be put in writing and must be signed by all FDC members. Requests made by individual FDC members shall not be taken into consideration.

## **Annex-6**

### **Model Works, Transfer and Support Agreement**

# Works, Transfer and Support Agreement

Between

**The Al-Sa'dain WUA**

And

**Project Implementation Unit (PIU) of Wadi Tuban**

## Agreement

I. This AGREEMENT is made the \_\_\_ day of \_\_\_(month)\_\_\_ 2004 between:

The Irrigation Improvement Project (IIP), represented by the Director of the Project Implementation Unit (PIU) in Wadi Tuban (hereinafter called the "Project"), and the **Al-Sa'dain Water Users' Association** in Wadi Tuban (hereinafter called the "WUA") and witnessed by the Irrigation Department.

II. WHEREAS

- (a) The Government wishes to promote the development of Water Users' Associations and the transfer of responsibility for operation and maintenance (O&M) of irrigation facilities to these Water Users' Associations.
- (b) The Project has received a loan from the IDA to help finance the rehabilitation and improvement of irrigation networks in the Wadi Tuban project area in support of the transfer of O&M to Water Users' Associations.
- (c) The Project has prepared detailed designs and cost estimates for canal rehabilitation and improvement works within the working area of the WUA in a participatory manner with the Farmers' Design Committee, and has reached agreement on these designs, the implementation mode and cost-sharing arrangements with the WUA Board of Directors on behalf of all water users within the working area of the WUA.
- (d) The farmers have formed a WUA, which has been registered / applied for registration under the Cooperative Law; they have opened a bank account for the sole and specific use of the WUA; and have deposited share capital into the account.
- (e) The WUA represents 56 farmers in the Al-Sa'dain main canal area. Together these members cover 49 ha, which represents 17% of the working area of the WUA.

III. OBJECTIVE

The main objectives of this Agreement are: (i) the transfer of management, operation and maintenance responsibility for irrigation and drainage facilities to the WUA, (ii) the strengthening of the WUA's capability to carry out O&M through the provision of training and support by the Project, (iii) the repair and improvement of the Head Works to be undertaken by a Contractor under a contract with the Project, (iv) the rehabilitation and/or improvement of irrigation canals and structures to be undertaken either by a Contractor or by the WUA under a contract with the Project, (v) the financing schedule for the construction works, and (vi) the future water allocation arrangements.



IV. NOW IT IS HEREBY AGREED AS FOLLOWS:

- Article 1 The Ministry of Irrigation and Agriculture (MAI) will, subject to the Conditions of Agreement, transfer the responsibility for operation and maintenance (O&M) of the irrigation facilities listed in **Appendix-A** to the WUA. Legal ownership of these irrigation facilities will remain with the Government.
- Article 2 The Project will, subject to the Conditions of Agreement, assist in the financing and implementation of the Construction Works listed in **Appendix-B** and provide training and support to the WUA.
- Article 3 The WUA will, subject to the Conditions of Agreement, share in the costs of these Construction Works by executing Farmers' Works, implementing WUA Contracts, and making financial contributions towards Construction Works executed by the Project as set out in **Appendix-C**.
- Article 4 The WUA will take full responsibility for ensuring that the operation and maintenance of the transferred irrigation facilities is undertaken in a correct and satisfactory manner.
- Article 5 The Ministry of Agriculture and Irrigation, represented by \_\_\_\_\_ will, in accordance with the Conditions of Agreement, transfer the O&M responsibility from the Government to the WUA.
- Article 6 The following documents jointly form this Works and Support Agreement:
- (i) Agreement;
  - (ii) Conditions of Agreement;
  - (iii) Appendix-A Schedule of transferred irrigation facilities;
  - (iv) Appendix-B Schedule of agreed rehabilitation works;
  - (v) Appendix-C Financing Schedule **for WUA contributions**;
  - (vi) Appendix-D Agreed minutes indicating acceptance by the WUA Board of Directors of the rehabilitation designs and WUA contribution towards the construction costs as agreed between the Project and Farmer Design Committee (FDC);
  - (vii) Appendix-E Copy of registration certificate / application for registration;
  - (viii) Appendix-F List of members of the WUA Board of Directors, WUA internal Audit Committee **and WUA members**;
  - (ix) Detailed design report (not annexed to this Agreement).

V. AS WITNESS the hands of the parties hereto:

Signed for and on behalf of the Project \_\_\_\_\_

Signed for and on behalf of the \_\_\_\_\_ WUA:

Chairman of Board of Directors: \_\_\_\_\_

Secretary of Board of Directors: \_\_\_\_\_

In the presence of: \_\_\_\_\_ (General Director Agriculture and Irrigation Department Lahej)

Ratified by: \_\_\_\_\_ (Governor of Lahej)

## Conditions of Agreement

### 1. Definitions

- |             |   |
|-------------|---|
| Definitions | <p>1.1 “<u>Construction Works</u>” means the physical infrastructure being repaired, improved or constructed by the Project.</p> <p>1.2 “<u>Contractor</u>” means the firm or person whose tender has been accepted by the Project to undertake the Main Contract.</p> <p>1.3 “<u>Main Works</u>” means the component of the Construction Works to be undertaken by a Contractor.</p> <p>1.4 “<u>WUA Works</u>” means the discrete component of the Construction Works to be undertaken by the WUA, under its own initiative or under a WUA Contract.</p> <p>1.5 “<u>Main Contract</u>” means the contract with the Project under which the Contractor executes the Main Works.</p> <p>1.6 “<u>WUA Contract</u>” means the agreement with the Project under which the WUA executes the Farmers’ Works.</p> <p>1.7 “<u>Headworks</u>” means any structure constructed in or adjacent to the Wadi channel to store and/or divert water for irrigation purposes, including any associated riverbank protection and/or water control works.</p> <p>1.8 “<u>Capital Cost</u>” means the estimated cost of the Construction Works, based on Contractor’s rates and including an allowance for physical contingencies.</p> <p>1.9 “<u>Engineer</u>” means the designated representative of the Project who is supervising the Main Works.</p> <p>1.10 “<u>WUA Assembly</u>” means the highest decision-taking body of a WUA, comprising the WUA’s full membership or delegates elected in accordance with the stipulations in the WUA Statute.</p> |
|-------------|---|

### 2. Transfer of O&M Responsibility

- |                                      |  |
|--------------------------------------|--|
| Timing                               | By signing this Agreement, the Project transfers the management, operation and maintenance of the irrigation facilities listed in <b>Appendix-A</b> to WUA, and WUA accepts the full responsibility for the management, operation and maintenance (O&M) of these transferred irrigation facilities.  |
| Project assistance during transition | During the first <span style="background-color: yellow; border: 1px solid black; padding: 0 5px;">  </span> ( <i>two?</i> ) years after transfer of O&M, the Project will assist the WUA in carrying out routine maintenance works by (i) providing technical advise and (ii) by deploying it’s earth moving equipment on favourable terms and conditions. |

### 3. Water Allocation/Distribution

- Along the Wadi      The [redacted] or its legal successor will be responsible for the water allocation/distribution along the Wadi, including setting rules for the operation of spate diversion structures. The WUA and its members shall respect the water allocation/distribution imposed by this [redacted].
- Inside the scheme      Upon signing of this Agreement, the WUA will become fully responsible for the fair distribution of water along the main and secondary canals, in accordance with existing water rights and the decisions taken by the WUA Assembly.

### 4. Rehabilitation/Improvement Works

- Rehabilitation and improvement      As part of the transfer of O&M responsibility, Project agrees to support the WUA by undertaking the rehabilitation and improvement of irrigation facilities listed in **Appendix-B**.
- Changes to the detailed design      After approving the detailed design, if the WUA subsequently requests modifications, then the Project would consider such changes only if they are technically viable and where they can be incorporated without increasing the capital cost of the Construction Works. Where the changes would increase the Capital Costs, then the WUA would have to finance, in advance, the full cost of implementing such changes.
- The Project and the WUA shall inform each other in writing of any modification to the agreed layout of the irrigation system which may prove necessary during construction due to unforeseen conditions or obstructions and obtain their respective written approval for such changes.
- Nomination of contact persons      The WUA and the Project shall nominate at least two responsible individuals, who shall act as contact persons during the execution of the Main and WUA Contracts.
- Access to the site      The WUA shall grant full and free access to the site to the Contractor and Project employees. Where this involves access across property belonging to a third party, the WUA shall obtain the necessary permission and approval of the landowner and land user. If the WUA fails to provide the necessary access after been given 28 days written notice, the Project shall use its legal powers to get the necessary access and recover the costs from the WUA.
- Construction quality      The Project, through the Contractor, shall implement the Main Works using satisfactory quality materials and workmanship to appropriate national standards.
- The WUA shall implement the Farmers' Works using satisfactory quality materials and workmanship to appropriate national standards. The WUA shall have the authority to have the Farmers' Works carried out partly or entirely by one or more contractors.
- The Project shall assist WUA by providing technical guidance, administrative support, quantity and quality monitoring, site survey for

progress measurement and setting out of works.

Bank account	The WUA shall open, at a bank approved by the Project, a separate bank account for each WUA Contract. The WUA Board of Directors shall provide the bank with a mandate, which shall be signed by all members of the Board detailing the names of those persons who are empowered to sign withdrawal notices and other documents on behalf of the WUA.
Failure to complete the WUA Works	If the WUA cannot complete a WUA Contract, the WUA shall reimburse to the Project all funds, which have not been used for the execution of the corresponding WUA Works, within 28 days from the date of cancellation of the WUA Contract.
Participation	At least once a month, the WUA, Project and Contractor shall have a meeting to review the progress of the Construction Works in accordance with the time schedules specified in the Main Contract and WUA Contract respectively and discuss any problem encountered during the execution of the works in order to find an appropriate solution.
Compensation	<p>The WUA shall compensate members and third parties for loss or damage to standing crops and any other negative impact resulting from the execution of the Farmers' Works. The WUA shall not be responsible for damage caused by negligence on the part of the Contractor.</p> <p>The Contractor shall compensate WUA members and third parties for loss or damage to standing crops and any other negative impact resulting from the execution of the Main Works, but shall not be responsible for damage caused by negligence on the part of the WUA.</p>
Inspection	<p>The Project and the WUA shall inspect the quality of the Main Works and WUA Works at regular intervals. Following the issue of the notices of completion of each Main Work by the Contractor and each WUA Work by the WUA, a team comprising representatives from the WUA and the Project shall conduct an inspection within 14 days from the date of the issue of the notices, to assess if all the Construction Works have been completed in accordance with the drawings and specifications in the Main Contract and WUA Contract respectively and to appropriate national standards.</p> <p>If it is found that the works are not completed in accordance with the drawings and specifications in the Contract and to appropriate national standards, the Contractor or WUA responsible for implementing the works shall, at it's own expense, amend the works as instructed by the Engineer.</p>

## 5. Farmer Contributions

**Contributions** The WUA is required to contribute towards the Capital Cost of the Construction Works listed in **Appendix-B** in accordance with the Financing Schedule given in **Appendix-C**.

The WUA shall deposit its contribution towards the Capital Costs of the

Main Works in the designated Project account (*specify the account*) within      days from the date of signing of this Agreement.

**Failure to contribute** If the WUA fails to contribute to the costs of the Main Works in accordance with the Financing Schedule in **Appendix-C** of this Agreement, then the Project shall inform the WUA that unless the outstanding contributions are made within 28 days, action will be taken to suspend and eventually terminate the execution of the Main Works.

If after the 28-day period, the WUA has failed to make the outstanding contributions towards the costs of the Main Works, the Project shall issue a written notice of intent to cancel Main Works after a period of 14 days.

## 6. Training and Technical Assistance

**General support** The Project will provide or organize the provision of training and support to the WUA in the following fields:

- Managerial aspects of the WUA;
- Advise on the operation and maintenance of irrigation infrastructure;
- Advise on water management;
- Extension advise for irrigated agriculture;
- Integration of women development issues.

**Support for WUA Works** Wherever required, the Project will provide technical assistance and training to the WUA to ensure that the WUA will be able to carry out the WUA Works in an effective and timely manner.

In particular, the Project will assist the WUA with:

- Preparation of the work plan and budget for the execution of the envisaged works;
- Quantity and quality control, including survey works;
- Contract administration.

During the implementation of the WUA Contract, the Project would supervise the construction work and where necessary provide practical training in construction techniques and advise on the day-to-day management and organization of the Construction Works.

**Support for routine maintenance** During the first      (*number*) years from signing of this Agreement, the Project will assist the WUA in carrying out routine maintenance works by sending PIU's earth moving equipment on favourable terms.

## 7. Settlement of Disputes

**General approach** If a dispute or difference of any kind whatsoever arises, every effort shall be made to reach an amicable settlement between the parties concerned without involving a third party. Where such a settlement cannot be reached, the use of a conciliator shall be considered.

**Internal disputes** Internal disputes involving land and water rights or other matters directly related to the irrigation scheme shall be in the first instance be

handled by the WUA with the possible introduction of a conciliator acceptable to both parties. If the matter cannot be resolved, it shall be referred to the                      and his decision shall be considered final and binding on both parties.

Dispute between WUA and Project      If a dispute arises between the WUA and the Project then every effort shall be made to resolve the matter without reference to a third party. Where an amicable settlement cannot be found, the two parties shall proceed for arbitration in accordance with current custom in Yemen.

Dispute between WUA and Contractor      If a dispute arises between the WUA and the Main Works Contractor, the WUA shall refer the matter to the designated Engineer in writing. On receipt of such notice, the Engineer shall within a period of 28 days decide on the course of action, which shall be in accordance with the terms and conditions of the contract between the Contractor and the Project. The decision of the Engineer shall be binding on the WUA. Under no circumstances shall the WUA or any of its members attempt to disrupt the execution of the Construction Works and any attempts to do so may result in the termination of this Agreement.

Disputes involving third parties      Disputes arising between the WUA and third parties are outside the scope of this Agreement and would be resolved in accordance with traditional procedures.

## 8. Termination of Agreement

Failure to comply      If the Project, WUA and/or Contractor fail to comply with the terms and conditions in this Agreement, and efforts to settle disputes in accordance with Article 7 above have failed to bring a solution, then this Agreement may be eventually terminated by the WUA and/or Project 60 days after issuing a written notice.

## APPENDIX-A to the Works, Transfer and Support Agreement

### *Irrigation and drainage facilities to be transferred*

The operation and maintenance of all primary and secondary level canals, canal embankments and water regulation/distribution structures downstream of the head regulator structure of the Al-Sa'dain canal and within the boundaries shown on the map below, will be transferred to the WUA Al-Sa'dain.

(Insert satellite image with WUA boundaries)

## APPENDIX-B to the Works, Transfer and Support Agreement

### List of agreed rehabilitation works

Location	Description	Implementation mode
1. Obar Al-Sa'dain	Construct a concrete wadi diversion structure <ul style="list-style-type: none"> <li>- Bed bar</li> <li>- Head regulator structure</li> <li>- Head of obar</li> <li>- Earthworks and protection works</li> </ul>	Contractor
2. Ras Al-Wadi canal	Maintenance of 37 gates (condition 3+4)	Contractor
	Maintenance of 72 gates (condition 2)	WUA contract
	Repair of off take structure P12 land of Yehia Fadel Saleh	Farmers
	Repair of off take structure P14 land of Moh. Saleh Al-Ehdel	Farmers
	Repair of off take structure P16 land of Moh. Saleh Al-Doukah	Farmers
3. Taha Atoot intake	Construct a check structure with stop logs in the main canal	WUA contract
4. Downstream of Obar Al-Sa'dain	Construct a dissipater structure at the end of the Obar to prevent canal bed erosion	WUA contract
5. Neglected land	Construct a branch canal from P12 to irrigate 35 feddan neglected land	WUA contract
6. Khalif Mahdi	Construct a concrete check structure with stop logs to divert water to Khalif Mahdi	Farmers
7. Land Hasan Abdulla Al-Dokhah	Construct a concrete check structure with stop logs to divert water to the land Hassan Abdullah Al-Dokhah	Farmers
8. Land Mohamed Gahwary	Construct a concrete division structure in branch canal to divert water to the land Al-Radooh	WUA contract

## Appendix-C to the Works, Transfer and Support Agreement

### Financing Schedule for WUA contributions

Cost estimate of (participatory + non-participatory) rehabilitation works in Al-Sa'dain is US\$ 153,000. The participatory part of the rehabilitation works amount to US\$ 110,000, and thus the required WUA contribution is at least 10%, or US\$ 11,500

The WUA Al-Sa'dain agrees to provide the value of US\$ 13,776 as contribution as follows (for details see tables below):

- |    |   |            |
|----|---|------------|
| a. | Through works carried out by farmers themselves | US\$ 5,785 |
| b. | Through WUA contracts                           | US\$ 7,991 |
| c. | Cash contribution                               | US\$ -     |

#### Farmer works<sup>1</sup>

Location	Description	Cost estimate	Farmer contribution	
			Value	%
Ras Al-Wadi canal	Repair of off take P12 land of Yehia Fadel Saleh	US\$ 1,125	US\$ 1,125	100%
	Repair of off take P14 land of Moh. Saleh Al-Ehdel	US\$ 1,125	US\$ 1,125	100%
	Repair of off take P16 land of Moh. Saleh Al-Doukah	US\$ 1,125	US\$ 1,125	100%
Khalif Mahdi	Construct a concrete check structure with stop logs to divert water to Khalif Mahdi	US\$ 1,366	US\$ 1,366	100%
Land Hassan Abdullah Al-Dokha	Construct a concrete check structure with stop logs to divert water to Hassan Abdullah Al-Dokhah	US\$ 1,044	US\$ 1,044	100%
	<b>Total</b>	<b>US\$ 5,785</b>	<b>US\$ 5,785</b>	<b>100%</b>

#### WUA Contracts<sup>2</sup>

Location	Description	Cost estimate	Farmer contribution	
			Value	%
Ras Al-Wadi canal	Maintenance of 72 gates (condition 2)	US\$ 3,330	US\$ 999	30%
Taha Atoot intake	Construct a check structure with stop logs in the main canal	US\$ 3,343	US\$ 1,003	30%
Downstream of Obar Al-Sa'dain	Construct a dissipater structure at the end of the Obar to prevent canal bed erosion	US\$ 6,128	US\$ 1,838	30%
Neglected land	Construct a branch canal from P12 to irrigate 35 feddan neglected land	US\$ 9,053	US\$ 2,716	30%
Land Mohamed Gahwary	Construct a concrete division structure in branch canal to divert water to the land Al-Radooh	US\$ 4,783	US\$ 1,435	30%
	<b>Total</b>	<b>US\$ 26,637</b>	<b>US\$ 7,991</b>	<b>30%</b>

#### Contractor works<sup>1</sup>

Location	Description	Cost estimate	Farmer contribution	
			Value	%
Ober Al-Sa'dain	Construct a concrete wadi diversion structure - Bed bar - Head regulator structure - Head of obar - Earthworks and protection works	p.m.	US\$ -	0%
Ras Al-Wadi canal	Maintenance of 37 gates (condition 3+4)	p.m.	US\$ -	0%
	<b>Total</b>	<b>p.m.</b>	<b>US\$ -</b>	<b>0%</b>

Notes <sup>1)</sup> Farmer works and cash contributions must be completed before the start of contractor works.

<sup>2)</sup> WUA contracts can start simultaneously with the contractor works.



## APPENDIX-D to the Works, Transfer and Support Agreement

### Minutes of meeting

**Subject:** Rehabilitation designs and WUA contribution towards the construction costs

**Place of venue:**

**Date:** \_\_\_\_\_ / \_\_\_\_\_ /2004

The Water User Association Al Sa'dain has held an extra-ordinary meeting on the above-mentioned subject, presided by the head of association and attended by the Board of Director members and Head of Farmer Design Committee (FDC).

The objective of the meeting was to discuss the rehabilitation designs, proposed implementation method and WUA contribution for the works located in the working area of the association. After discussing these with the FDC, the Board of Directors on behalf of the farmers of the WUA area has accepted the designs for rehabilitation works as well as the WUA contribution towards the construction cost.

In summary, there are \_\_ listed rehabilitation works for the total value of US\$ \_\_\_\_\_  
The farmer contribution will be provided by the WUA as follows:

No of works	Farmer Contribution agreement	Value of farmer contribution
5	Farmer works	US\$ 5,785
5	WUA works	US\$ 7,991
-	Cash	US\$ -
	<b>Total</b>	<b>US\$ 13,776</b>

The water user association Al Sa'dain is determined to fulfil its obligation to contribute towards the construction costs as specified above.

Signed, date \_\_\_\_/\_\_\_\_/2004

Head of Association (signature) \_\_\_\_\_

Secretary (signature) \_\_\_\_\_

Treasury (signature) \_\_\_\_\_

## **APPENDIX-E to the Works, Transfer and Support Agreement**

### **Copy of registration certificate / application for registration**

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## **APPENDIX-F to the Works, Transfer and Support Agreement**

### **List of members of the WUA Board of Directors**

1. Taha Saeed Hatoot
2. Raduan Ahmed Mohamed
3. Thabit Abdullah Fadl
4. Mohamed Ahmed Abood
5. Gamal Hadi Ahmed
6. Ahmed Mohamed Atoot
7. Hassan Abdullah Al Dofa

### **List of members of the WUA Audit Committee**

1. Saleh Awad Al Qori
2. Moktar Mokbel Al Ood
3. Ali Ahmed Abdullah

### **List of WUA members and size of their land holdings**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.

