

Sana'a University
Water and Environment Center
Community Water Management project



Community Water Management Project

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1 Introduction

The implementation process of CWMP has been according to the General Action Plan of the project. During each quarter and phase there were some modifications occurred depending on the current situations or advices of the WB missions without deviating from the objectives and goals of the project. The project highlights three main components:

I. Planning and Capacity Building

CWMP has successfully assisted beneficiary farmers to organize themselves in water users associations (WUAs) in Hadhramout, Taiz, and Dhamar. The following table lists the dates of formations:

Table (1-1): Dates of establishments of WUAs/WWUAs

Type	Taiz	Hadhramout	Dhamar
WWUAs dates of formation	05/01/2008	12/05/2008	08/04/2008
MWUAs dates of formation	06/01/2008	16/01/2008	09/04/2008

The methodology adapted by starting in the formation of men and women Water Users Groups as an important part from the establishment of WUAs. The WUGs have been formed after sequences of activities lasted for more than one year such as. The formation of groups was a continuous process. According to the Social Participation methodology; as a WUG is formed, another process in conducting in parallel to form more new WUGs executing the steps needed in order to strengthen the formation. The activities fall within two stages as follow:

First Stage: Organize the community on unofficial basis (WUGs/ WWUGs)

1. Conduct several workshop (as required) to introduce the project to the authorities and the communities
2. Meetings on a single or group basis with the community as a first step to arrange an introductory meeting of the project with the local community and to collect basic information about the community
3. Conduct the first introductory meeting to familiarizes them the project aims and objectives
4. Conduct the second introductory meeting to raise their awareness on water, social and agricultural issues

5. The purpose of the third meeting is to organize the community into groups
6. The formed WUGs/ WWUGs are met with to obtain information about the areas in addition to conduct sessions awareness on the water and agricultural issues
7. Another meeting (may take several sessions) is to form the problem tree, recognize the reasons behind the problems and find proper solutions. More emphasis would be targeted on the social agenda on water use, rational water use, increase water efficiency etc.
8. Prepare the final participatory plan, which should cover the following:
 - a. Agricultural issues (new crops with low water consumption, develop irrigation practices)
 - b. On farm water management issues (irrigation according to crops needs, increase soil moisture contents, introduction of modern irrigations, etc...)
 - c. Water harvesting issues (use of dried wells as recharging wells, recharging holes, recharging canals, etc...)
 - d. Groundwater issues (reduce the number of drilling new wells, stop the deepening of wells, limit the agricultural lands, reduce pumping rates, distances between wells, protection of wells, provide drinking water)
 - e. Social issues (increase the enrolments of girls in schools, open illiteracy classes, encourage women participation with decision making)
 - f. The water shortage problem and the role of the communities to take serious collective actions to stop or lessen the future extent of the problem to better manage groundwater
 - g. The cooperation and coordination with other key players and authorities in the area
 - h. Conduct a general workshop with the related authorities to introduce the plans and find out ways for these authorities involvements in the implementation of plans.

Second Stage: The establishment of (WUAs/ WWUAs) as formal entities

1. Increase the capacity of the associations in executing their management plan in relation with the related authorities
2. Coordinate with other associations in the area and with the other pilot areas
3. Monitor the activities of the associations and train them when needed
4. Strengthen their statues for sustainability

Table (1-2): The number of for each area and the % of WWUGs

Pilot Area	Number of WUGS	Number of WWUGs	Total in each Pilot area	% of WWUGs
Taiz	11	11	22	50
Hadhramout	15	8	23	35
Dhamar	39	20	59	34
Total	65	39	104	38

Deliverable Outputs/ indicators

- **Establishment of WUAs in the three pilot areas** ✓
- **Establishment of at least one Women WUA** ✓
- **Development of management plans** ✓
- **At least one set of sustainable water management plans have been tested and ready to be scaled up** ✓

II. Community Water Management and Monitoring

1. Hydrogeological monitoring program has started exactly after the formation of the WUAs who took the responsibility to form the monitoring committees and to supervise them. The committees will be responsible for a long-term planning, monitoring, and evaluation of the water resources in the watershed. The Monitoring committees are taken the responsibility to monitor the groundwater and have been trained extensively by CWMP. Tasks of the monitoring comities are formulated as well as monitoring plans

2. The monitoring committees have trained farmers to take the reading and monitor their groundwater in order to have the feeling on how much water is abstracted and how they can reduce such over irrigation. This has led the WUAs in agreement with the farmers, the local authorities, and NWRA to suggest a water balance criteria of the pilot areas to be implemented within the GWMAP.

3. The WUAs have addressed the issue of overexploitation of the groundwater and accordingly have confirmed their willingness towards changing the attitudes of framers in overusing the groundwater. The WUAs have prepared groundwater management action plans (GWMAP), within which the WUAs have formulated rules to regulate the groundwater resources through reducing water abstraction hours and to irrigate during the cool times, to encourage farmers to obtain conveyance pipes and modern irrigation networks, and to know how to do on farm management

Deliverable outputs/ indicators

- **A log book for pumped water, time, irrigated areas, crop types...etc.. is prepared..** ✓
- **Water savings are estimated** ✓
- **A simple water balance is developed** ✓
- **A methodology for evaluating and monitoring the implementation of the local management plans is developed** ✓

III. Participatory Monitoring and Evaluation and Information Dissemination

This component of the CWMP has proceeded very well according to plans and since the start of the WUAs:

(i) CWMP has prepared training modules for local users including visual material, demonstration fields, extension visits, field days etc.... to enhance dissemination of effective practices in efficient use of irrigation water, reduction of groundwater abstraction, farming practices to improve crop yields and reduce use of irrigation water, use of modern irrigation techniques, use of improved agricultural practices, use of soil, and land conservation techniques. The extension and awareness as well as the irrigation services committees took the lead with the CWMP specialists to do the training and convey the messages to farmers.

(ii) Local study tours have been done either for the three PAs such as visiting each other pilot areas or other WUAs in Zabid and Tuban . Also each WUA has its own program and plans to visit the local WUAs, cooperatives, organizations etc.... visits from other WUAs also done to the PAs such as the visit of Sana'a Basin WUAs to Dhamar and Taiz. A general committee is formed from the three WUAs in the PAs to take the tasks of coordination, exchange information, assistance, marketing, etc...

(iii) Participatory evaluations of the overall project in each area and self-evaluation have been conducted by the WUAs during the annual meetings of the general assembly. During these meetings the board of directors have presented three main reports namely, administrative and technical report, Financial report and auditing and control report. The general assembly has approved all the three reports and provided some advices and comments to the boards of directors. Further evaluation was

done by the members of the board of directors in such a way that they have evaluated the performance of each member and agreed on changing passions amongst them so that to give the chance to capable members to take responsibilities. It is worth mentioning here the smoothness happened in this course without causing problems. The WUAs appreciated the importance of CWMP and are very happy of the stage they have reached.

(iv) Several workshops and meetings were conducted to disseminate the methodology and spirit of the project either via the CWMP team or the WUAs. Propagation of the CWMP as a model has received great appreciation from donors, Ministries, experts and organizations within Yemen and outside. More emphasis in the appreciation stated the necessity of up scaling and replication to counter part and ease the water scarcity problem in Yemen. The WSSP has included CWMP in its program as an important theme for water management that needs to be upscale and replicated elsewhere in Yemen. The WSSP stated “(iii) NWRA will lead an integrated effort, in conjunction with GARWSP and MAI and building on the lessons of CWMP.” p17 of the PAD.

The main issue of Safe Exit Strategy and future sustainability of the WUAs is the concern on all activities being done. More work has been given to the WUAs in the field of monitoring, awareness, implementation of modern irrigation networks and conveyance pipe, water harvesting tanks, networking etc. In order to test their capacity, increase their confidence; introduce them to others as an important body to deal and work with. In addition to that to prove to the community that these WUAs are dependable and able to serve them better.

The report summaries briefly the activities conducted to execute the CWMP project from the beginning.

Deliverable outputs/ indicators

- **A network of practitioners will have been set up and trained** ✓
- **WUGs/WUAs will take part in study tours** ✓
- **Information dissemination workshop will be held** ✓

1.1 The Financial Statuses of the Project

The total disbursement up to the end of April 2009 has reached an amount of US\$ 949,394 which is about 87% of project cost of US\$ 1,087,200 million in about 96 % of time elapsed between signing of agreement on June 2005 and date of closure on June 2009. It is important here to say here that the extension period (for 9 months) had allowed the team the time to implement the activities as planned for this period, with the available resources are. Two WB auditing missions have checked the financial system and disbursements. The first audit conducted on May 2007 and the second was conducted on the 19th of April 2009. The report of the second audit is attached in the annex and a full description of disbursements is listed in the Annex as well.

2 Common Activities

This part lists the common activities conducted in the three pilot areas (PAs). The planning, implementation and results are shared amongst them. The following sections, therefore, lists such activities

2.1 Selection of the Pilot Areas

The selection of the three pilot areas, Taiz, Dhamar and Hadhramout was done after several meetings with NWRA, GSCP and WEC and according to the following agreed criteria:

Poor areas

1. Water is becoming increasingly scarce
2. Community Water Management project such as GSCP is working in the area
3. The selected area is identified as a priority by NWRA.
4. Socio- economic considerations (no major conflicts or disputes)
5. The topography of the selected areas represents three different types
6. To the extent possible representing a distinctive delineated hydrological unit
7. Sufficient information is available on important parameters such as the current water balance, water use, irrigation efficiency, cropping pattern, etc.
8. Willingness of water users to organize themselves into WUGs/ WUAs and to fully cooperate in the implementation of the project
9. Existing informal water user groups can be easily strengthened and will likely agree to transform into water user associations
10. Local water users are interested to undertake joint water planning, monitoring, management and accept project technical guidance

11. Community acceptance to engage women in water user groups
12. To accept reduction in water consumption in the area through various measures and learn how much value added the users would generate per drop of water use

The validity of some of these criteria has been checked through detailed review and preliminary field visits to potential areas which have verified the current selection of the governorates. Items 9-12 have been assessed during the process of implementation and found to be very relevant to the selection. The assessment has led to the further selection of the sub catchments within these governorates through the process of Rapid Assessment. These selected areas and sub-catchments have been agreed upon with GSCP, NWRA and IDA. An important criterion to assess during field visits was the willingness of water users to organize themselves into WUA/WUG and to fully cooperate in the implementation of the project which has been realized.

The community groundwater management has been implemented in the selected sub-catchments within the governorates. Within these three catchments, the boundaries have a combination of hydrological and social integrity, as much as feasible, and had led to manageable units, amenable to local control. Despite the fact that the project is a pilot and learning project and that the precise scope of the Water Users Associations and Water User Groups will become clear during the implementation of the project, the implementation process and results proved that such model can be implemented and furthermore, replicated.

2.2 Preparation Stage

The preparation stage was conducted according to the following mechanism:

- Collect information and relevant data about the area through desk review or field investigations.
- The field investigations were executed using RRA tools including focused group discussions, questionnaires and informant meetings.
- Prepare an introductory information leaflet about the project
- Coordination with the related authorities that have concerns about the water sector and or have influence on the communities in the area from the points of view of legislation, administrative, technical, social, etc.. Such bodies are governmental, non-governmental, local or NGOs.
- Prepare an action plan and a budget plan for the team

2.3 Extension Visits

2.3.1 The First Exchange visit

The WUGs from Hadhramout visited Dhamar and Taiz on (18/6/2007–21/6/2007) while Dhamr WUGs visited Taiz. The total participants are 110 including other authorities. The objectives of the visits are:

- To make the different WUGs familiar with each other and to know different areas where the project is working
- To exchange experiences, ideas and information on agricultural methods (traditional and modern), marketing subjects, planting and harvesting processes, etc...
- To enhance future cooperation between the WUGs

The main results of the exchange visit:

- Understanding the actual benefit of modern irrigation systems when visiting demonstration farms and exchange information with the farmers The huge shortage in water affected visited areas made participants afraid of their future and encouraged them to play an effective role with project plan.
- Participants recognized the important of collective community work
- Related authorities representatives were surprised of such activity that did not happen before and found it more effective in terms of raising awareness and exchange ideas and information
- The visit to the plastic pipes factory in Taiz was an interesting one that exhibited real demonstration of the production process.
- Recognizing new areas not known or visited by farmers.
- Motivating farmers to change their way of thinking, develop and exchange new ideas

2.3.2 The Second Exchange visit

The second visit was for Taiz WUGs and Dhamar WUGs to visits Hadhramout area on the same time Taiz WUGs to visit Dhamr pilot area for the period (8/12/2007 –12/12/2007). The same objectives as listed before were aimed at. The participants in this second visit were 100 in addition to members from GSCP and NWRA. The main results of the visit were:

1. Marketing is a principal problem
2. Seeds types and qualities are very important for good crop products
3. Seeds improvement process and storage are essential for crops
4. Land leveling and usage of machines are needed

5. Crops rotations on soil keeps soil fertile
6. Leavening soils for one season without cropping is also good for enriching its fertility
7. The importance of controlling bad quality pesticides and herbicides
8. The role of extension services is very vital in helping farmers on the different issues they have
9. The important role of WUAs in organizing farmers efforts and protecting their interests

10. The three pilot areas can have future contacts through WUAs in terms of cooperation through:
 - a. marketing different crops products amongst them and regionally
 - b. facilitate the provision of market places for each other
 - c. share information on planting and harvesting of new and old crops
 - d. Dhamar can work as a storage place for seeds of the other areas due to its cooling environment

11. Encourage the use of modern irrigation systems; drip, bubbler and sprinkler according to the topography and environment of each area

2.3.3 The Third Exchange Visit

In addition to the three WUAs in the pilot areas, Sana'a Basin Water Management Project (SBWMP) has participated in this visit (3/11/2008 – 6/11/2008) with several WUAs from the basin. The total numbers of participants were 75 from the five associations. The participants visited two areas namely Wadi Zabid, Alhodhaidah and Wadi Tuban, Lahj. The objectives of the visit are:

- Share the knowledge and experience in community water management with other associations
- Disseminate the experiences of the CWMP
- To enhance coordination and future relationship

The main findings are:

- CWMP representatives presented their experience in a power point presentation explaining the methodology, the training they get and the activities they made
- The participants from SBWMP, Wadi Zabid and Wadi Tuban were very surprised about the accomplishments of the activities in the pilot areas during short period of time.
- The meetings have resulted in establishing a core committee for coordination

- The participants stressed to establish a common market between them to ease up the marketing process between them.

2.4 Importance of the WUAs

The WUA is developing an important strategy; allowing it to be the front dealer for its members needs and the caring of their interests. Agreements have been preliminary drafted with the Company of Improved Potatoes Seeds and the Authority of Agricultural Seeds in Dhamar. In Hdhramout the WUA is working on the field with NWRA to establish WUGs in the district of Tarim under the title of Community Management of Water Resources. An agreement has developed between NWRA and the WUAs for that purpose. The main issues discussed between the WUAs and the relevant parties are:

- The WUAs is working on behalf of the community and looking for its interests.
- Any deal or request should go through the WUA
- The request of the WUA members should go through the board of the WUA
- The WUAs is representing the community.
- The WUAs are an independent body has its power from the community it represents.
- Priorities are to be given to the WUAs to ensure sustainability and credibility

2.5 Management Plans

The WUAs have prepared management plans in relation to:

- Groundwater
- Administrative plans
- General Relations plans
- Water monitoring plans
- Financial plans

The purposes of these plans are to facilitate the work process and activities of the WUAs in order to solve the problems ranked during the participatory workshops. A complete set of plans are documented.

2.6 Documentation

The activities of the project have been documented so as to make them handy and provide easy access for replication and to draw lessons from. The project team has been working very hard in this line. The following documents are available:

1. The Social methodology Adapted

2. Guidelines for the Water Users Associations
3. Social Characteristics of the Pilot Areas
4. Agricultural Characteristics of the Pilot Areas
5. Hydro-geological Characteristics of the Pilot Areas
6. Well Inventory of Dhamar Pilot Area
7. Well Inventory of Hdhramout Pilot Area
8. Well Inventory of Taiz Pilot Area
9. Training Modules
10. Community Water Management Plans of the Pilot Areas
11. Groundwater Management Plans
12. Measures Supporting the Sustainability of WUAs
13. Community Awareness and Communication Manual
14. Brief Notes of Hdhramout Pilot Area
15. Brief Notes of Dhamar Pilot Area
16. Brief Notes of Taiz Pilot Area
17. Broachers
18. Information and Guides leaflets about some crops
19. Awareness drawings
20. GIS maps for the pilot areas:-
 - Base maps
 - Well Depth maps
 - Drainage patterns
 - pH maps
 - Electrical conductivity maps
 - Well location maps
 - Topographical maps
 - Demonstration farms and monitoring wells maps

2.7 Support the Formation of GSCP's WUAs

The CWMP has taken the privilege to form and complete the formation of WUAs of spate structures in GSCP areas according to the recommendation of the November 2008 WB mission. The process started at the middle of December and resulted in forming two WUAs in Hajah after the establishments of preparatory committees, establishments of 4 preparatory committees in Taiz and

one in Lahaj. A follow up was continued with the GSCP FUs to form the WUAs in Taiz and Lahj. Two WUAs already exist in Hodiedaha an Al Dhale'e where the CWMP specialists have conducted training needs assessment for them. Abyan was not possible to perform any activity. A complete package of training modules has been developed to build the capacity and skills of the WUAs according to the methodology of CWMP. An understanding was formulated between the PCU and TTL to allow CWMP to conduct the training" *as far as CWMP's main tasks are not hampered by this*". Therefore it was suggested that CWMP would do the training after the departure of the recent WB mission on the 20th of May.

3 Specific Activities for each Pilot Area

3.1 Taiz Field team

3.1.1 Formation of Water Users Groups (WUGs)

The groups were formed after conducting several steps to ensure readiness for formation, acceptance of the methodology used by CWMP, interests to share in solving the water and agricultural shortcomings. The methodology adapted has been fully described in another document listing all steps and procedures of mobilization. The results were very astonishing in that farmers were very enthusiasm to join water users groups either for the female or male sides. The following table lists the final results of the groups.

Table (2-1): Members of Water Users Groups

Water Users Groups			Members numbers		
Men	Women	Total	Men	Women	Total
11	11	22	384	431	815

3.1.2 Formation of Water Users Associations (WUAs)

Groups' Building is the basic pillar in the project works through which the associations were formed. In January 5th 2008, Al Haiat women water users association was established. On the next day, Al Wahadah association was established. The Associations have started forming the technical committees such as Water Monitoring Committee, Awareness and Extension Committee and Irrigation Services committee. Each committee has 11 members.

3.1.3 Coordination and Networking

Coordinating with rural development support project in animal wealth (BADZAY) to implement the following activities within Alhayat association area with the help of the WWUAs:

Conduct a field visit to national animal fodders cooperation, Zabied with participants of:

- Alhayat association, eight participants.
- Alwahda association, two participants.
- Two female agricultural guides from Albarah area.
- Two agricultural guides from Makba and Moza'a.
- Two participants from BADZAY team project.
- CWMP social organizer

The participants have got familiar with the site of the corporation and known the raw materials used to produce the foddors. The WWUA has bought about 200 bags of foddors to sell them to animal husbandry women.

The WWUA also visited a women association in Zabid to exchange ideas, experiences and to initiate cooperation. The main activity of the association is making handicraft.

The following activities have executed by the WWUA:

- Conduct a training program in the field of animal health for the WWUA groups (Alhayat, Alhaseb, Alsehelya, Zayed Mountain).
- Determine six sites in to be cultivated by legumes to use in the future as animals' fodder.
- Animal's inoculation campaign against smallpox in Alhayat association area.
- A meeting with WB representative Ms. Iftekar ALshami to evaluate and review the association files and general discussion about productive activities and how to take benefit of it through the available resources.
- Coordinating with Altakaful and social care association to implement craft activities in Alhayat residency. (follow up is continuous)
- Coordinating and follow up the charity association for productive families in Taiz to merge trainees from Alhayat association in free craft training courses for the following courses:
 - Sewing and designing.
 - Handicraft.
 - Hair dresser.

3.1.4 Training and Capacity Building

Public relations training course for five days was held for the two WUAs. The participants were board of directors and public relations committees in both Alhayat and Alwehda associations. As well as the extension and awareness training program which was conducted for eight days . The participants were board of directors and public relations committees in both Alhayat and Alwehda associations for water users.

Capacity building training programs were going smoothly according the project's plan for WUAs, the courses were:

- Management capacity for both Alhayat and Alwehda board of directors, inspection committees, participants from four WUAs under NWRA, and three local councils representatives.
- Water monitoring program was attended by water monitoring committees from both Alhayat and Alwehda association.
- Irrigation on farm management program was attended by irrigation committees members in both associations.
- Accountancy program was attendance by members of board of directors of both associations and water monitoring committee.
- Public relations program was attended by public relations committees members, board of directors and monitoring committees.
- Water and environment awareness program was attended by board of directors, monitoring committees and awareness committees.

3.1.5 Extension and Awareness Activities

This program was implemented during August for both Alwahda and Alhayat associations; it was attended by the administration boards, monitoring committees, water and environment awareness committees – three massjed speakers –, teachers and agricultural specialist. Some females send to the committees an electronic story talking about the importance of water reservation.

The training program was held in nine days from 10\8\2008 to 19\8\2008, the last two days were designated to construct a management action plan fro the committee.

The program was attendant by 11 members from each association represented environment and water awareness committees, each member represents one group whilst in the first five days two members of boards of directors attended the training. The total numbers of trainees were 56 participants.

We noticed that one of the important means to strength associations is capacity building of committees and developing human resources in specialized committees by training the other members in the associations to be supporters and qualified.

Some administration points were discussed. The conclusions of these discussions were as follows:

- The board of directors is equal in responsibilities but differ in tasks.
- All association members should work as a team and forget our individual's benefits.
- Differences in points of view should be closed by votes.
- We should know that we may fail in some stages for that we ought to review our mistakes and learn from them.
- The importance of transparency in works and expose outputs for all members.

3.1.6 Monitoring program

The monitoring program agenda was set by the WUA and its Monitoring Committee after being trained. The main objective is monitoring the water level fluctuations and its quality. The committee has prepared a management plan, lists the tasks of the committee, a recorded the outputs. The following briefly describes these parts:

The monitoring plan

Table (3-1): The monitoring plan prepared by the committee

Activity	Implementation period									Responsible	Notes
	4	5	6	7	8	9	10	11	12		
Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings										Members of water monitoring committee	Done and reported
Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings										Members of water monitoring committee	Done and reported
<ul style="list-style-type: none"> – Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings. – Educating wells owners about water type. 										Members of water monitoring committee	Do ne and reported
<ul style="list-style-type: none"> – Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings. – Committee meeting to submit work's report and evaluating. 										Members of water monitoring committee	Done and reported
<ul style="list-style-type: none"> – Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings. – Farmers' training for field measurements of water 										Members of water monitoring committee	Done and reported

Activity	Implementation period										Responsible	Notes
consumption.												
– Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings.											Members of water monitoring committee	Done and reported
– Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings.											Members of water monitoring committee	Done and reported
– Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings.												Done and reported
– Measure water level in wells, EC, PH, wells productivity, actual water quantity by recorders readings.											Members of water monitoring committee	Done and reported

Tasks of the monitoring committee

Water monitoring committee tasks are:

- Measuring water levels in the PA geographical range.
- EC measuring.
- PH measuring.
- Measuring wells productivity.
- Collecting rain data (after station’s installation).
- Guiding wells owners and farmers how to save water from consumption and pollution.
- Train farmers to take measurements

Monitoring the quantity and quality of the wells:

The committee measured 85 wells in different areas of the project region (see annex), the average of well’s production is 6.5 L\S. the following diagram illustrates number of wells and productivity.

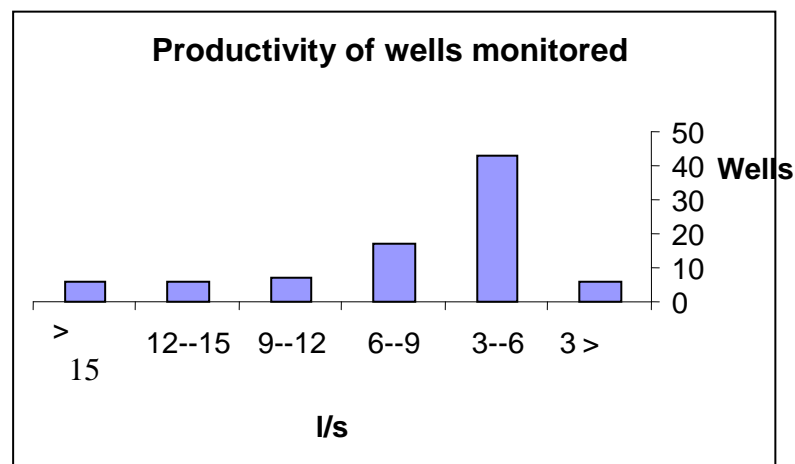


Table (3-2): Monitoring wells in Alwahda and Alhayat association

Nr	Well owner	Geographical site			Well nr.	Position		amsl	Installation date	Illustration fields	
		District	Region (Ozla)	Village		North	East				
1	Moshei Ghaleb Saif	Alma' afer	Alklaebah	Alboiab	156	1486300	389035	1152	2008/04/10	Drip	Delivered
2	Abdulwali Abdullah Noman	Alma' afer	Alklaebah	Alboiab	164	1486415	389161	1136	2008/06/13		
3	Mahmoud Abdulkarem Saif	Alma' afer	Alklaebah	Alboiab	173	1486530	389397	1149	2008/04/13		
4	Ali Ghanem Bardad	Alma' afer	Alklaebah	Alsamka	23	1487771	390701	1196	2008/04/13	Bubbler	Delivered
5	Ahnad Haza'a Ala'agam	Alma' afer	Alklaebah	Aljarjuor	61	1487102	391564	1214	2008/06/13	Drip	Delivered
6	Abdullwahab Saed Kaed	Alma' afer	Alklaebah	Alsoaideah	14	1488472	390243	1191	2008/06/12		
7	Abdullhameed Akaln Ali	Alma' afer	Alklaebah	Alsoaideah	53	1487414	391223	1227	2008/04/13	Drip	
8	Hameed Ali Saif	Alma' afer	Alklaebah	Shebat	75	1486952	392755	1282	2008/06/14		
9	Abdullwahab Kasem Ali	Alma' afer	Alklaebah	Shebat	62	1486773	392005	1243	2008/06/14		
10	Drink water project (Alklaeba)	Alma' afer	Alklaebah	Shebat	73	1486518	391058	1214	2008/06/14		
11	Hameed Homadi Alshameri	Alma' afer	Alklaebah	Althahera		1488643	391756	1263	2008/06/13		
12	Rafeq Abdullghafour Abdullhameed	Alma' afer	Alsawa'a	Alberain	256	1483497	387438	1080	2008/04/10		
13	Abdullah Saed almakdami	Alma' afer	Alsawa'a	Alhaseb	276	1483456	386567	1052	2008/04/13	Bubbler	Not Delivered
14	Abdullmenk Ali Abdo	Alma' afer	Alsawa'a	Alaneni\Jabal zaid	244	1484366	388473	1120	2008/04/11	Drip	Not Deliver
15	Abdullghafour Alhaj Sultan	Alma' afer	Alsawa'a	Almoniaj\almenka	278	1483548	386688	1048	2008/06/10		
16	Mohammed Ali bin Ali Alka'ash	Alma' afer	Alsawa'a	Almoniaj\almenka		1483737	386816	1062	2008/06/09		
17	Abdullrahmn M. Sultan	Jabal Habashi	Bani Khawaln valley	Almarba'a	214					Drip	Delivered
18	Hassan Da'el Hamadi	Jabal Habashi	Bani Khawaln valley	Bani Khawaln valley	226	1485169	386350	1077	2008/06/10		
19	Drink water project (bani Khawlan)	Jabal Habashi	Bani Khawaln valley	Bani Khawaln valley		1485044	386188	1073	2008/06/15		
20	Ahmad Kassem Hassan	Jabal Habashi	Bani Khawaln valley	Almdahef	240	1484668	386081	1056	2008/06/12		
21	Saed Hassan Khawlani	Jabal Habashi	Bani Khawaln valley	-					-		
22	Ahmad Abdo Ahmad Aljonaid	Alma' afer	Alklaebah	Algharbia	33	1488140	391124	1216	-		
23	Mohamed Abdullrahman Jassar sons	Alma' afer	Alklaebah	Alsahelia	83	1487187	390221	1182	-		
24	Hazza'a M. Abdo Hassan	Alma' afer	Alklaebah	Alkedam	185	1488757	389792	1188	-		
25	Ali Hassan Abdo	Alma' afer	Alklaebah	Alkedam	189	1488411	389770	1179	-		
26	Saed Abdullah Saleh	Alma' afer	Alklaebah	Alsahelia	144	1485882	389529	1164	-		
27	Abdullah Mahmoud	Alma' afer	Alklaebah	-					-		
28	Abdulwali Abdu Alhaj	Alma' afer	Alklaebah	-		1485800	389341	1080	-		

Note: wells from 1 – 20 have recorders and from 21 – 28 are additional monitoring wells

3.1.7 Demonstration Farms

Eight demonstration farms with 3.5 ha have been installed. The low quantity of areas is due to the topography of the area and the social aspect in the areas is divided into small ones according to the heritage law.

Table (3-3): Demonstration farms and types of modern irrigation techniques used

Nr	Farmer	Irrigation system	District	Region (Ozla)	Village	Covered area in hectare	Crops	Notes
1	Abdo mahyuop	Drip	Alma' afer	Alklaeba	Alboab	0.25	Tomato	Working
2	Mosheer ghaleb saif	Drip	Alma' afer	Alklaeba	Alboiab	0.4	Tomato	Working
3	Nora ali ghanem	Bubbler	Alma' afer	Alklaeba	Dahrat aljaneed	0.2	Jawafa	Working
4	Abdullrahman Mohamed sultan	Drip	Jabal habashi	Bani khawlan valley	Almarba'a	0.45	Tomato	Working
5	Abdullhameed aqlan	Drip	Alma' afer	Alklaeba	Alsowaidea	1	Tomato	Under installation
6	Jawhara hameed ali alkadi	Drip	Alma' afer	Alklaeba	Aljarjoa	0.5	Tomato	Under installation
7	Nawal saif abdo ahmad	Bubbler	Alma' afer	Alsawa'a	Alhaseb	0.3	Babay	Not received From GSCP
8	Abdullmenk	Drip	Alma' afer	Alsawa'a	Jabal zaid	0.4	Tomato	Not received From GSCP
Total covered area in hectare						3.5		

3.1.8 Conveyance Pipes

Table (3- 4): Farmers from Alhayat and Alwehda association who purchased conveyance pipes

Nr	Farmer	Irrigation system	Village	Area (ha)	crop
1	Hala Ghaleb Naji	PE	Almaktaria	2	Mango+Jawafa
2	Ahmad haza'a ala'jam	PE	Almoa'yteb	0.25	Tomato
3	Saif Abdullah saleh	PE	Alsahelia	2	Sereals
4	Abdullrahman alwajeh	PE	Alghafera	2	Vegetables
5	Amen Mohamed Abdullah senan	PVC	End of the valley	4	Cereals + Vegetables
6	MohamedAssaj Mohamed	PVC	Alsahelia	0.5	Cereals
7	Wadei ali Hassan	PE	Ghafera	3	Tomato
8	Awsan abdullhameed ahmad	PE	Thahrat aljonaid	0.1	vegetables
9	Mesk ahmad abdo	PE	Alsowaida	0.5	vegetables
10	Nea'ama Mohamed abdullah	PVC	Alsowaida	0.2	tomato
11	Fuad Mohd Ahmad	PE	Almaktaria	2	Vegetables
12	Siham Ahmad Sufian	PE	Almaktaria	2	Tomato
13	Tahani Abdullah Ahmad	PE	Al Musalla	0.5	potato
14	Abdul Wahab Ahmad Mufareh	PE	Al Aradh	1.5	Mango+vegetables
15	Ali Hasan Abdo	PE	Al Kalaiba	1.2	Mango+Jawafa
16	MangoAbdo Mohd Naji	PE	Al Kudam	0.2	vegetables
Total areas				21.95	

3.1.9 Modern irrigation networks

Table (3-3): Farmers from Alhayat and Alwehda association adopted modern irrigation net:

Nr	Farmer	Irrigation system	Village	Area (ha)	Crop
1	Abdullwali Abdullah noman	Bubbler	Alboaib	0.5	Mango
2	Abdullwali Abdullah noman	Drip	Alboaib	0.2	Tomato
3	Mahoud abdo mansour	Bubbler	Alboaib	0.2	Mango
4	Mohamed noman ali farei	Dropping	Alboaib	0.3	Tomato
5	Mahmoud abdulkarem saif	Bubbler	Alboaib	0.2	Tomato
6	Mahmoud abdulkarem saif	Drip	Alboaib	0.3	Tomato
7	Borhan mahmoud abdulkarem	Dropping	Alboaib	0.2	Tomato
8	Abdullah ahmad salem	Dropping	Alkambari	1.5	Tomato
9	Belal aqlan Hassan	Dropping	Alkambari	0.2	Tomato
10	Khetam abdo noman	Bubbler	Aljaera	0.2	Mango+Jawafa
11	Jowz ahmad abdo noman	Bubbler	Aljaera	0.2	Mango
12	Rafeka mohamed Abdullah	Bubbler	Aljaera	0.2	Mango
13	Wafa mohamed Abdullah	Bubbler	Aljaera	0.2	Mango
14	Abdo Mohamed alsoaidi	Dropping	Alboaib	0.12	Tomato
15	Abdullwahab saed qaed	Dropping	Alghafera	1	Tomato
16	Hassan ghaleb abdullah	Dropping	Alagshab	0.2	Tomato
17	Hamed hammadi ahmad abbas	Bubbler	Althahr	0.33	Mango
18	Taheya ahmad abdo	Dropping	Alsoaida	0.1	Tomato+Potato
19	Abdullqawi abdo ahmad	Dropping	Thahrat aljaneed	0.1	Tomato
20	Abdul Kaher Noman	Drip	Al sahliah	0.2	Tomato

3.1.10 Water harvesting tanks

The WUAs have succeeded in winning community contract according to the conditions and regulations of the GSCP. They have agreed on 20 tanks and are starting works in the first 10 tanks as listed in the following table.

Table (3-4): Lists tanks and the level of construction

No.	Name of tanks/ Site	Statuses of construction
1	Alamal tank in Alkara'a	60%
2	Jabal Zaid (men)	completed
3	Jabal Zaid (female)	90%
4	Alberain (men)	completed
5	Alberain (female)	75%
6	Alhaseb (men)	75%
7	Alnoor, bani khawlan	completed
8	Alsohaibi	70%
9	Alkedam	30%
10	alboaib	completed

There are extra 10 tanks which amount the number to 20 tanks, are which waiting approval from GSCP for financing. It is important to enhance the capabilities of the WUAS and increase their dependency on themselves by doing such activities. The following are some points in that direction: Strengthen the capacity of the WUAs and give them chances to prove themselves. It is important not to lose credibility with them by adhering to the signed agreement and contracts and provide the

payments on time according to implementation. This part is important to build up an important side of the WUAs for the future when they seek projects for the area.

3.1.11 Agricultural terraces

Five sites were surveyed in relation to terraces and only three sites got the approval from GSCP FU.

They are listed in the following table

Table (3-5): Lists the approved terraces ad their statutes.

No.	Name of site	Statues
1	Al –Higfar/ Al Maktaria	completed
2	Al Sirm/ Al Buaib	completed
3	Al Jaze'e	Under rehabilitation

3.1.12 Land Holdings

The WUA with the help of CWMP teams has conducted an agricultural survey on the size of land holdings PA. the results was expected that only 0.6 % are holding more 5 has whilst the majority of the people (86%) hold less than 1 ha. The below table lists the findings

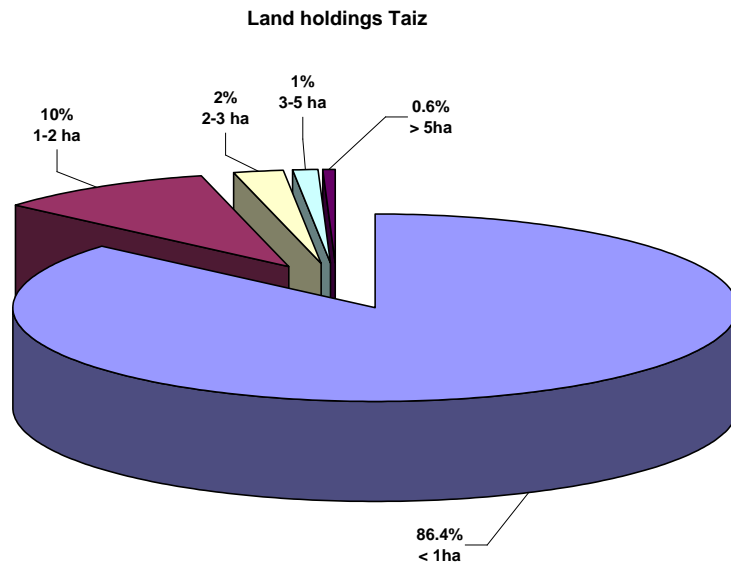
Table (3-5): shows landholding distribution in Taiz

No. of land holders	Percentage of land holdings %	Range of size holdings (ha)	Type of holdings
1840	86.3	< 1	small
210	9.85	1 - 2	small
47	2.2	2 - 3	small
23	1.08	3 - 5	Medium
12	0.56	> 5	Large
2132			

The main reasons of this very wide distribution are:

1. The distribution of the land amongst the different members of the family according to the Sharia'a heritage law
2. Land topography limiting agricultural land sizes
3. No capacity to expand agricultural land
4. low availability of WR especially in the shallow aquifer
5. Most of the people depends mainly in agriculture

The diagram below further explains the distribution.



3.1.13 Silver Filter Pots

The CWMP has initiated an interesting activity by providing families in the pilot area with silver filter pots that are able to clean and purify drinking water and minimize the problems related to water pollution. The project has provided the WWUA with 54 pots to distribute among families according to the following criteria:

- Families are poor
- Families are drinking from open water surfaces or polluted sources
- Families show the interests in using such system and would take care of them
- Families are members of the WWUA or are willing to join

Reports from the pilot areas suggest that there are more families asking for such systems.

3.2 Hadramout Field Team

3.2.1 Formation of Water Users Groups (WUGs)

The groups were formed after conducting several steps to ensure readiness for formation, acceptance of the methodology used by CWMP, interests to share in solving the water and agricultural shortcomings. The methodology adapted has been fully described in another document listing all steps and procedures of mobilization. The results in Hadramout were very astonishing in that farmers were very enthusiasm to join water users groups either for the female or male sides. The following table lists the final results of the groups.

Table (3-6): The groups and number of members

Water Users Groups			Members numbers		
Men	Women	Total	Men	Women	Total
15	8	23	364	115	479

3.2.2 Formation of Water Users Associations (WUAs)

Groups' Building is the basic pillar in the project works through which the associations were formed. In January 2008 Alghaith water users association was established. On 12/5/2008, Alnada female association was established. The Associations have started forming the technical committees such as Water Monitoring Committee, Awareness and Extension Committee and Irrigation Services committee.

3.2.3 Coordination and networking

The WUAs have the potential for such activity. The process entailed the associations to be modules for replication. They have excellent reputation in the area. After the floods disaster, several local and regional organizations approached the WUA to be involved in the rehabilitation works. The WUAs made several agreements with NWRA, Local Councils to coordinate and support each other for the conservation of the groundwater and the supervision of the random drilling. No more drillings of new wells will be in the area without the consent of the WUA. GSCP is a main partner and there an excellent coordination through the provision of hardware, such as pipes and modern irrigation networks.

Coordination and networking was very clear during the workshops and general meetings when several organizations were invited such as Oxfam, SFD, etc.

CAC bank has provided the some members of the WUA with loans fro wheat plantations. AREA has implemented several wheat types in the area and proved successful. Other farmers come from other areas to se the experience of the community and share with them their experience.

Sustainability and exist strategy fro the CWMP is well represented in this part. The WUAs are able to depend on themselves and make good relationships with others in the community to seek support and exchange experiences.

3.2.4 Training and Capacity Building

Training is the most important part to complete the structural building of the working plan either for men or female; from the beginning of May till the end of July 2008 we had finished the training programs for building these associations. The following courses were carried out as shown in the following table:

Table (3-7): Training courses conducted

No	Course	Participants	Nr. Of part.	Details course		
				Date		Venue
				From	To	
1	Water monitoring	Water committee	12	24/8	26/8/2007	Al Qara
2	Simple accountancy	Administration board of (Alghaith association).	9	10/5	15/5/2008	Shebam
3	On farm management	Irrigation services committee of (Alghaith association).	15	25/5	28/5/2008	Shebam
4	Public relationships	Administration board of (Alghaith association).	16	7/6	12/6/2008	Shebam
5	Public relationships	Administration board (Alnada association)	15	8/6	12/6/2008	Goga
6	Awareness	Awareness committee of Alghaith association)	20	14/6	23/6/2008	Shebam
7	Awareness	Awareness committee of (Alnada association)	15	21/6	26/6/2008	Goga
8	Water monitoring refresh	Water monitoring Committe	12	2/12	3/12/2008	Shibam

In addition to the above about 13 trainings conducted for the women association with particular emphasis on the women side such as; tailoring, food proccession, illiteracy, handicraft, etc.

3.2.5 Extension and Awareness Activities

A numbers of Extension and awareness activities were implemented to help spreading some of modern agricultural technologies – using water – and workshops for discussions which give water users great motivation to implement and use. Following are the implemented activities:

Table (3-8): Awareness activities conducted in the area

Nr.	Activity	Group target	Participants	Implementation
1	Field day (Irrigation technology – drops and Bubbler)`	Alghaith WUA	120	CWMP+ AREA
2	Publish awareness brochures: 1. 150 drip irrigation’s brochures for vegetables crop. 2. 150 brochures using bubblers fro Lemon tress	All water users in the project area		AEREA
3	Using treated water + economic impact for onion water.	All water users in the project area (Alghaith association)	30	Agriculture faculty , Aden Univ. +AREA
4	Participating in workshops (the role of the community in water conservation)	Water users in Tarim + Alghaith association members	Administration board of (Alghaith association).	NWRA +CWMP project
5	Participating and implementing workshops (economic motivation to reduce groundwater consumption)	All staff related to water using NWRA, LC, Agric. Offices, GSCP + Alghaith WUA	3 WUA members + field team leader	WEC + FTL
6	Continue activities on extension and awareness using drip irrigation for lemon trees and planting vegetables.	Water users in the area	Lemon farmers + participants from vegetables farm using drip irrigation	AREA + Extension team, Shibam
7	Participation on marketing awareness	Water users	Water users	CWMP+AREA
8	Awareness campaigns at schools	Students, teachers	WUAs	WUAs+CWMP
9	Women Awareness campaigns on water conservation	Women in the area	WWUA	WWUA+ female consultant
10	Awareness campaigns on water conservation	leaders, Imamas and Shiques	WUA members+ FTL	CWMP + WUA

The turn over of being a water user accepting support and training; to a trainer and provider of support has been accomplished in Hadhramout. The WUA board of members has been recruited by NWRA to prepare training program to help establishing new WUAs in Tarim. This is an important result of the CWMP activities which require more support

3.2.6 Monitoring Program

The monitoring process is conducted by the WUA technical committee (monitoring committee) which has been trained and acquainted with necessary skills and tools to pursue the monitoring process. They have proved to be capable of doing this task. They have stated the tasks of the committee, prepared the plan to conducted the tasks and record the results and outputs. The monthly records are sent to the CWMP and the GSCP to be use din the MIS system. The following are describing briefly the three activities:

Table (3-9): Monitoring Committee Action Plan

No	Activities	Time	Implementation Responsibility
1	Monitoring Extractable Water (Reading Flow Meter , Water Level Indicator)	Jan 08 – Oct 09	Monitoring Committee, GSCP
2	Monitoring Water Quality (EC , p H)	Jan 08 – Oct 09	Monitoring Committee ,GSCP
3	Monitoring Rainfall and Surface Water Flow	Oct 08 – Oct 09	Monitoring Committee Cooperation with GSCP
4	Periodic Meeting	Monthly meetings (beginning of each month)	Monitoring Committee
5	Conduct Awareness about monitoring (Water Day)	Mar 09	Monitoring Committee + Board Director of WUA + NWRA
6	Refreshment Training for Monitoring Committee	May 09	Monitoring Committee + NWRA + CWMP
7	Visit to Local Council and NWRA in order to provide them with information about Monitoring Committee ,Objectives , Roles , and Plans	Dec 08	Chairman WUA + Represents of Monitoring Committee
8	Report Preparation	June 09	Monitoring Committee
9	Installation of Peizometer Pipes	Dec 08	Monitoring Committee + CWMP
10	Prepare traditional norms for water control	Dec 08	Monitoring Committee + NWRA + GSCP, Local Council, WUA Etc.
11	Monitor the well digging and deepening	June09	Monitoring Committee + NWRA + Local Council, WUA Etc.

Tasks of the monitoring Committee

The tasks are listed as follows:

- Record the water levels
- Record the quantity of water used by the users
- Assess the water quality:
- Record the EC
- Rerecord the PH
- Observe and report the cases of random drilling
- Share with other stakeholders the preparation of traditional norms
- Record rainfall
- Record the flow of spate in wadis
- follow up and observe any works that might affect the groundwater reserve
- Increase awareness amongst water users on the importance of the monitoring of water quality and quantity
- Observe and record any feature that may pollute water
- Monthly and quarterly reporting to the WUA
- update and develop the monitoring plan when needed
- participation in the selection of monitoring wells
- participation in the installation of monitoring, rainfall, equipment and peizometres
- Do the maintenance required for these equipment
- Any other tasks may be required by the WUA

Monitoring the quantity and quality of the wells:

The process of water monitoring in terms of quantity and quality is continued in the eight monitoring wells. In these wells, two were irrigating vegetables using drip irrigation and two wells using traditional methods. Bubbler irrigation is also used to irrigate lemon with two wells as well as other two wells using traditional methods for the sake of comparison. The following data is recorded as follows:

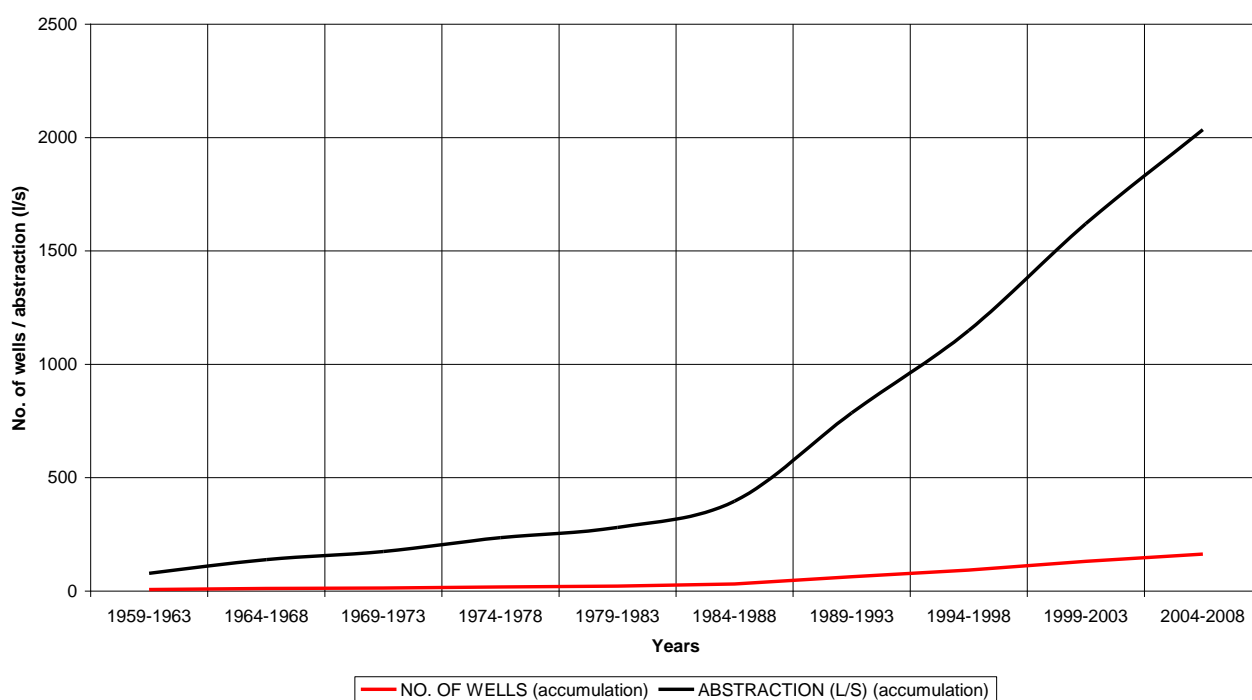
Table (3-10): Monitoring wells quantity and quality recorded by the monitoring committees

Nr.	Name	Location		May 2008			June 2008			July 2008		
		N°	E°	Quality		Records	Quality		Records	Quality		Records
				PH	E.C	m³	E.C	PH	m³	PH	E.C	m³
1	Mahros Ayda Handom	15 56 54.1	4836 33.1	7.4	2.09	92528.8	2.06	7.9	113077.5	8.1	1.80	128326.6
2	Hajlan Brak Alkohm	15 57 42.2	4837 45.3	7.6	1.82	57138.2	1.72	7.2	67777.1	7.7	1.70	80098.7
3	Ahmad Habeb Alsa'adi	15 56 15.0	4835 05.4	8.1	1.37	38091.2	1.38	7.7	50655.4	7.9	1.30	65997.9
4	Azzan Barak Balhasel	15 58 35.4	4836 22.6	7.3	1.60	33158.9	1.60	7.6	39759.2	7.5	1.59	47834.4
5	Saleh Mubarak Bin Abdat	15 58 13.1	4832 47.8	7.3	2.51	18380.8	2.46	7.2	33141.5	6.9	2.37	45762.2
6	Awad Karama Alsa'adi	15 55 44.9	4835 46.8	7.1	6.30	29507.5	6.13	7.3	35237.5	7.2	6.20	41336.6
7	Ali Obeida Bin Kada	15 57 14.2	4838 52.3	6.0	2.60	76724.1	2.56	7.7	88734.7	0.0	2.57	101266.0
8	Abdullhakem Awad Bin Abdullaziz	15 57 16.5	4837 27.8	7.1	4.39	22092.7	4.39	0.0	31074.7	7.4	4.21	40047.1

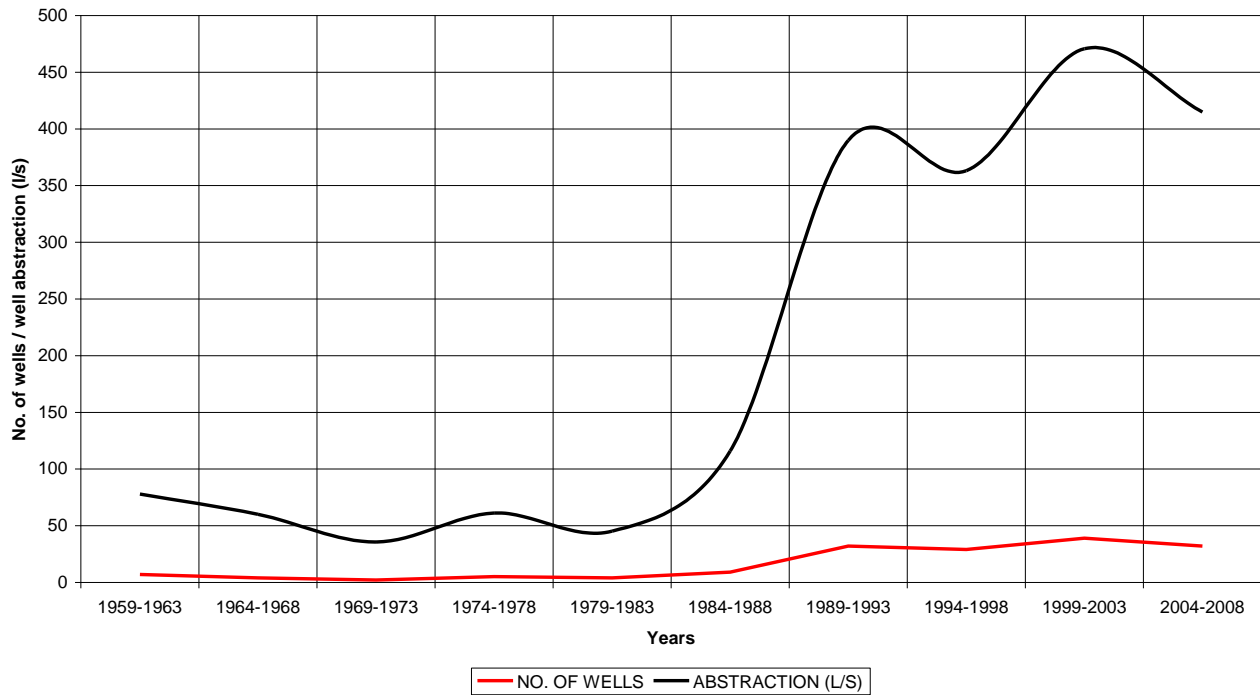
All data in the table is taken and recorded by the monitoring committee of the WUA.

Two graph have been constructed using the data on number of wells and the amount of abstraction to understand the trend of water consumption according to GW Mate criteria

Wells Abstraction (accumulation)



Wells abstraction



The second graph indicates a high rise of abstraction between the years 1983 – 1991 due the extensive use of well drillings amongst farmers. A depression id noticed in the years 1993 – 1995 fro the political unrest reasons in this period.

3.2.7 Demonstration farms

The FTL of the pilot area of Hadhramout along with the GSC FU agreed to install eight demonstration farms according to the MoU with GSCP and the approval of the WB missions. The following table lists the eight farms and is seen from that there is only 2 has completely installed with the modern irrigation networks.

Table (3-11): Demonstration farms in Hdhramout

No.	Name of farmer	Coordinates		Type of irrigation	Area (ha)	statues	Date of installation
		E	N				
1	Ahmad Al Sa'adi	48 35 05.4	15 56 15.0	Drip	1	Installed	27/1/2008
2	Abdullah Abdat	48 38 48.2	15 48 13.6	Publer	1	Installed	18/1/2008
3	Mahrous Handom	48 36 27	15 56 44	Drip	1	NOT	-----
4	Haglan Al Gahm	48 37 37	15 57 40	Sprinkler	1	NOT	
5	Salem Kulaib	48 38 29	15 58 21	Drip	1	NOT	
6	Salem Handum	48 36 05	15 56 28	Publer	1	NOT	
7	Husain Kulaib	48 35 43	15 58 51	Sprinkler	1	NOT	
8	Ali Karur	48 36 27	15 56 52	Drip	1	NOT	
Total area					8		

Summery of Result of Water savings in Hadhramout area

The method of calculation adapted from the GSCP for the purpose consistency since the fields are monitored by CWMP and data submitted to GSCP MIS.

- Governorate: Hadramout
- District: Shibam Location: Oboodeh
- Name of farmer: Jamal Saeed Alsadi (farm 1)
- Cropping season: 2008/2009
- Discharge: 11L /s =39.6m3/hr
- Area: 2500 m2
- Crop: wheat (KILANSONA)
- planting date= 17/11/2008

Table (3-12) Irrigation savings for wheat- farm 1

Saving parameter	Computation method	Saving result (%)
Irrigation water	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	$0.65-0.55/0.65=15\%$
Fuel consumption	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	$0.071-0.056/0.071=21\%$
Operation hours	$A_{\text{oh}} - B_{\text{oh}}/A_{\text{oh}}$	$0.018-0.014/0.018=22\%$
Labor input	$A_{\text{input}} - B_{\text{input}}/A_{\text{input}}$	$0.0022-0.00175/0.0022=20\%$
Grain/veg. production	$B_{\text{yield}} - A_{\text{yield}} /A_{\text{yield}}$	$3600-3168/3168=13.6\%$
Dry matter or fodder	$B_{\text{yield}} - A_{\text{yield}} /A_{\text{yield}}$	$5400-4590/4590=17.6\%$

- District: Shibam Location:
- Name of farmer: Brok Salem Badawi (farm 2)
- Cropping season: 2008/2009
- Crop: wheat
- Discharge: 10.5 L ls = 37.8m2 /hr
- Area:8052 m2
- planting date= 11/11/2008

Table (3-13) Irrigation savings for wheat- farm 2

Saving parameter	Computation method	Saving result (%)
Irrigation water	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	$0.597-0.52/0.597=13\%$
Fuel consumption	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	$0.063-0.055/0.063=12.7\%$
Operation hours	$A_{\text{oh}} - B_{\text{oh}}/A_{\text{oh}}$	$0.016-0.014/0.016=12.5\%$
Labor input	$A_{\text{input}} - B_{\text{input}}/A_{\text{input}}$	$0.002-0.0017/0.002=15\%$
Grain/veg. production	$B_{\text{yield}} - A_{\text{yield}} /A_{\text{yield}}$	$4500-3650/3650=23\%$
Dry matter or fodder	$B_{\text{yield}} - A_{\text{yield}} /A_{\text{yield}}$	$9720-7900/7900=23\%$

The summery results of the demonstration wheat farms 1 &2 are:

- Water saving is 14% because of scheduling according to crop water requirements
- Fuel saving is 16.85%
- Working hours savings are 17.25%
- Labor savings 17.5%
- Increase in wheat yield grains production is 18.3%
- Increase in straws 20.3%

- District: Shibam Location: Oboodeh
- Name of farmer: Ali ObeedBen Kodah (farm 1)
- Cropping season: 2008/2009
- Crop: Onion
- Discharge:15.7 L/s =56.5 m3/hr
- Area: 995 m2
- planting date= 03/12/2008

Table (3-14) irrigation savings for onion- farm 1

Saving parameter	Computation method	Saving result %
Irrigation water	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	$1.14-.84/1.14=26\%$
Fuel consumption	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	$0.034-0.026/0.034=24\%$
Operation hours	$A_{\text{oh}} - B_{\text{oh}}/A_{\text{oh}}$	$0.02-0.015/0.02=25\%$
Labor input	$A_{\text{input}} - B_{\text{input}}/A_{\text{input}}$	$0.0025-0.0019/0.0025=24\%$
Grain/veg. production	$B_{\text{yield}} - A_{\text{yield}} /A_{\text{yield}}$	50%

- District: Shibam Location: Oboodeh
- Name of farmer: Ali Saeed Garor (farm 2)
- Cropping season: 2008/2009
- Crop: Onion
- Discharge: 13.95 l/s =50.22m3 /hr
- Area: 3353 m2
- planting date= 06/12/2008

Table (3-15) irrigation savings for onion- farm 2

Saving parameter	Computation method	Saving result%
Irrigation water	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	0.8-0.67/0.8=16.3%
Fuel consumption	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	0.065-0.053/0.065=18.5%
Operation hours	$A_{\text{oh}} - B_{\text{oh}}/A_{\text{oh}}$	0.016-0.013/0.016=19%
Labor input	$A_{\text{input}} - B_{\text{input}}/A_{\text{input}}$	0.002-0.0017/0.002=15%
Grain/veg. production	$B_{\text{yield}} - A_{\text{yield}} /A_{\text{yield}}$	35%

- District: Shibam Location:
- Name of farmer: Naji Saleh Handoom (farm 3)
- Cropping season: 2008/2009
- Crop: Onion
- Discharge: 11.66L /s =42m³ /hr
- Area:2500 m²
- planting date= 16/11/2008

Table (3-16) irrigation savings for onion- farm 3

Saving parameter	Computation method	Saving result%
Irrigation water	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	0.84-0.64/0.84=24%
Fuel consumption	$(A_{\text{consp rate}} - B_{\text{consp rate}})/A_{\text{consp rate}}$	0.08-0.06/0.08=25%
Operation hours	$A_{\text{oh}} - B_{\text{oh}}/A_{\text{oh}}$	0.02-0.015/0.02=25%
Labor input	$A_{\text{input}} - B_{\text{input}}/A_{\text{input}}$	0.0025-0.002/0.0025=20%
Grain/veg. production	$B_{\text{yield}} - A_{\text{yield}} /A_{\text{yield}}$	30%

The summery results of the demonstration of **onion** 1, 2, & 3:

- Water saving is 22.1% because of scheduling according to crop water requirements
- Fuel saving is 22.5%
- Working hours savings are 23%
- Labor savings 19.66%
- Increase in onion yield grains production is 38%

3.2.8 Conveyance pipes:

50 ha of conveyance pipes were distributed to five groups with the help and enthusiasm of the WUA board of directors. This quantity is second one after distributing 96 ha previously with the cooperation of GSCP the following table lists the groups benefited from the 50 has of pipes.

Table (3-17) Demonstration and no Demonstration farms

Demonstration farms	Area (ha)	No of beneficiaries
Bubbler	1	1
Drip	1	1
PVC	0	
PE	0	
Non-Demonstration farms		
PVC	247	61
PE	0	

Target required from GSCP is **560** ha of conveyance pipes. Received only 247 ha (only 44%) from the targeted quantity since the beginning of the project. According to the MoU with the Bank mission and GSCP last April 2008, GSCP is to provide WUAs as priority with extra 400 has of conveyance pipes to support the increase in the demand in the area. Only 87 ha have been received.

Therefore, a total of 247 hectares of conveyance pipes were installed till now. **A reduction of costs was reached to about 12% of the total gross costs when the WUGs themselves install the system.** This has been done in collaboration with GSCP and the CWMP consultant who provided on job training for the WUGs.

3.2.9 Agriculture Land Holdings

The determination of the sizes of the land holdings for each WUG and indication the quantity of water consumed, would encourage them to make plans and to reduce the high amount of water used.

Table (3-18): The following table list the total area the community holds and amount of water consume:

Group	Nr. Of members	Land holding (ha)	Wells nr.	Water productivity m ³ / year	EC		PH
					From	To	
West Sbakh Alkara	34	266	9	1.415.340	1.37	5.89	7.2
East Sbakh Alkara	26	230	7	607.500	1.8	6.51	7.2
Middle Sbakh Alkara	18	138	6	803.196	1.85	6.28	7.5
West Goga	30	209	7	1.041.012	1.3	7.33	7
East Goga	39	379	16	1.857.276	1.18	7.74	7.4
Alhoria and Sohaiba	20	188	12	1.190.700	1.39	4.67	7.4
Na'am valley	13	107	4	475.416	1.6	4.69	7.4
East Goa'aima	33	334	24	1.839.564	0.91	5.17	7.4
Alkowz	23	171	9	1.352.808	2.52	6.96	7.2
West Goa'aima	26	428	21	2.222.640	1.95	7.01	7.2
Alsaelah and Almaslak	24	1089	7	1.055.700	1.81	5.61	7.2
West Almahjar	18	157	9	1.200.852	1.55	2.91	7
East Almahjar	18	186	7	772.416	1.81	5.89	7
Saheel Alnbaheen	24	194	9	969.192	1.65	6.51	7.4
Alarath	16	231	7	825.984	3.15	4.69	7.3
Total	362	4041	154	17.629.596			

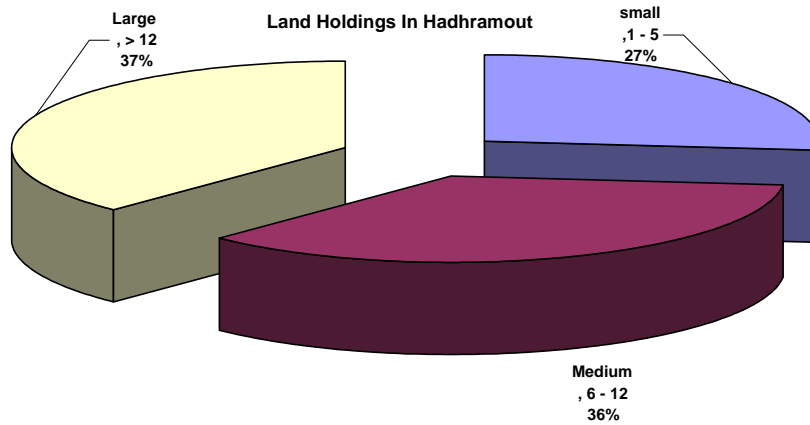
Notice: productivity was measured according the lowest evaluation, 10 hours per day in 300 days per year after installing 146 has of conveyance pipes. The landholdings represent all agricultural lands (irrigated and non-irrigated).

Table (3-19): The following table lists the distribution of land holdings amongst beneficiaries in the WUA.

No. of land holders	Percentage of land holdings %	Range of size holdings (ha)	Type of holdings
97	27	1-5	Small
130	36	6-12	Medium
138	37	> 12	Large
365	100		

The table indicates almost equal distribution amongst farmers of the landholdings due to the following reasons:

1. Awareness and social harmonization exist amongst farmers
2. Availability of water resources
3. Inheritance of land are still within the family represented by the elder person
4. wide spacing of the land
5. population density is small compared to land intensity
6. agricultural activities is another one bedside commercial activities
7. The graphs below also indicates the distribution



3.2.10 Spate Irrigation Structures

The WUAs in Hadhramout have requested the FTL to conduct a study to assess potential sites for spates so that according to the WUAs management plans, they will try to seek support for construction from GSCP and other authorities. The CWMP specialist has investigated the sites and provided the CWMP with a report indicating the potential sites such as off takes, distribution off takes, canals, bonds, diversion works. A complete report is available.

3.3 Dhamar Field Team

3.3.1 Formation of Water Users Groups (WUGs)

The formation of WUGs was conducted according to the methodology adopted by the project. The process has resulted in covering the whole area with members of groups who participated actively in the General assembly of the association, in the selection of the board of directors and in the monitoring their activities according to the internal by laws. The following tables listed groups and total members in total of 21 villages.

Table (3-20): shows the current situation for water users groups:

Water Users Groups			Members numbers		
Men	Women	Total	Men	Women	Total
39	20	59	821	471	1292

3.3.2 Formation of water users associations

Representatives of the groups have met in a general assembly to elect the board of directors for the associations in the presence of the director of the office of Labor and Social affairs who has the mandate to legalize the establishment and make it formal according to Social Law. The results of the meetings were the election of board of directors in both women and men associations. There are two associations established in 18\4\2008 and 19\4\2008 for women (ZamZam association) and men (Ka'a Jahran association) respectively.

3.3.3 Coordination and Networking

The coordination and increase linkage with related stakeholders is continuous namely with the presence of the WUAs board of members and the technical committees. This process follows the objective of providing proper exit strategy and sustainability for the WUAs after the completion of the CWMP. It proved very good and other stakeholders were very enthusiasm to cooperate and support. They agreed on providing easy access to the WUAs when needed and support their activities in the management of the water resources.

The WUAs have the potential for such activity. The process entailed the associations to be modules for replication. They have excellent reputation in the area. The WUAs made several agreements with NWRA, Local Councils to coordinate and support each other for the conservation of the groundwater

and the supervision of the random drilling. No more drillings of new wells will be in the area without the consent of the WUA. GSCP is a main partner and there an excellent coordination through the provision of hardware, such as pipes and modern irrigation networks.

Coordination and networking was very clear during the workshops and general meetings when several organizations were invited such as Oxfam, SFD, office of Agriculture and Extension Services, Office of Ministry of Planning ad International Cooperation, Seeds Company, Potato seed Development Company, Participatory Rural Development Project, Office of Environment Protection Agency, Earthquacj Authority etc.

Several agreements were signed to provide facilities to the WUAs and its members such as the provision of potato seeds with cheap rates and tractors. Farmers are to address their needs through the WUAs.

3.3.4 Extension and Awareness Activities

The awareness campaigns started early during the mobilization of the water users groups which involved:

- Schools
- Imams and Shiqaes
- Local leaders
- Women

Several activities were conducted through the WUAs with the help and support of the project to raise the awareness amongst the water users specifically in the following areas:

- Water conservation
- Water monitoring
- Marketing procedures
- Food processing (female)
- Water law and the legislation issues
- On farm management

The process has been conducted through field visits, farm days, and workshops, distribution of brochures, drawings and leaflets. The awareness committee has done very well in the raising of awareness amongst farmers.

3.3.5 Monitoring

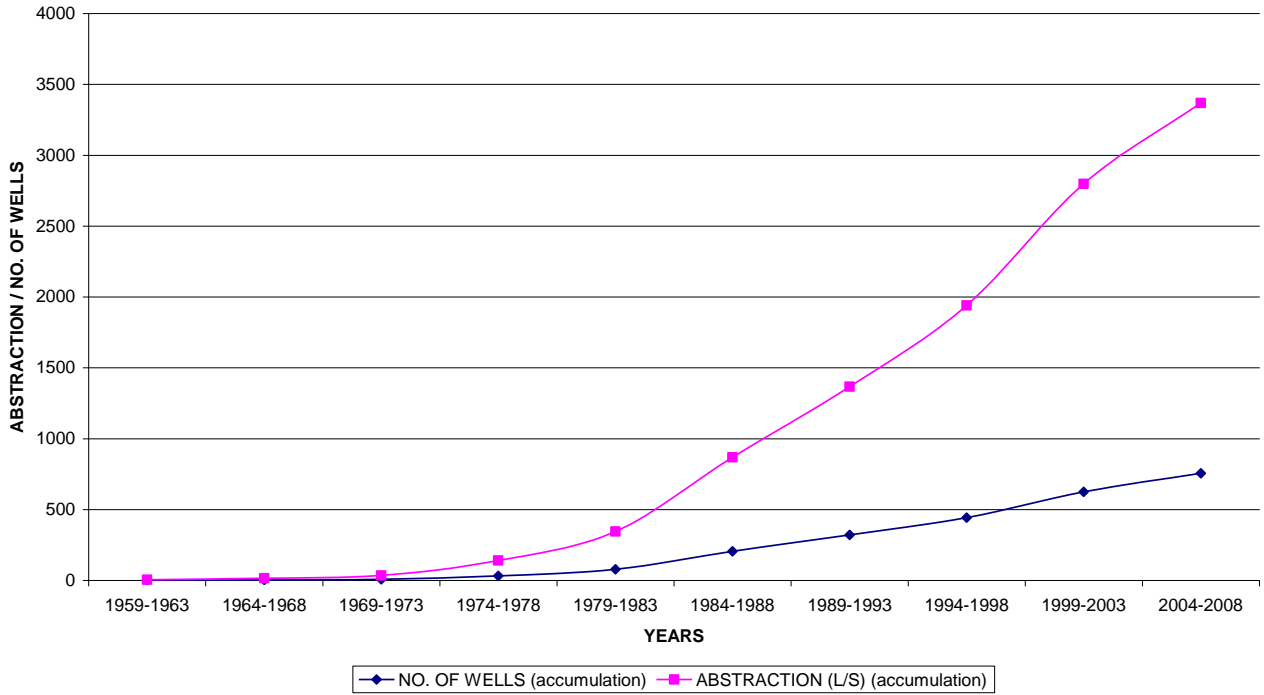
Wells inventory have resulted in a total of 1018 wells including the village of Yakar (see table below). This would change the water abstraction estimation and accordingly the drop in the water level. However since Yakar is not yet part of the WUA, this could be neglected.

Table (3-21): Number of wells in the pilot area of Dhamar

Status of Various Type of Wells in Qa' Jahran/ Dhamar			
	Operational	Non-operational	Total No. of Wells
Yakar	102	48	150
Survey Without Yakar	651	217	868
Total (with Yakar)	753	265	1018

A graph has been constructed using the data on number of wells and the amount of abstraction to understand the trend of water consumption according to GW Mate criteria.

THE TOTAL ABSTRACTION



THE ABSTRACTION

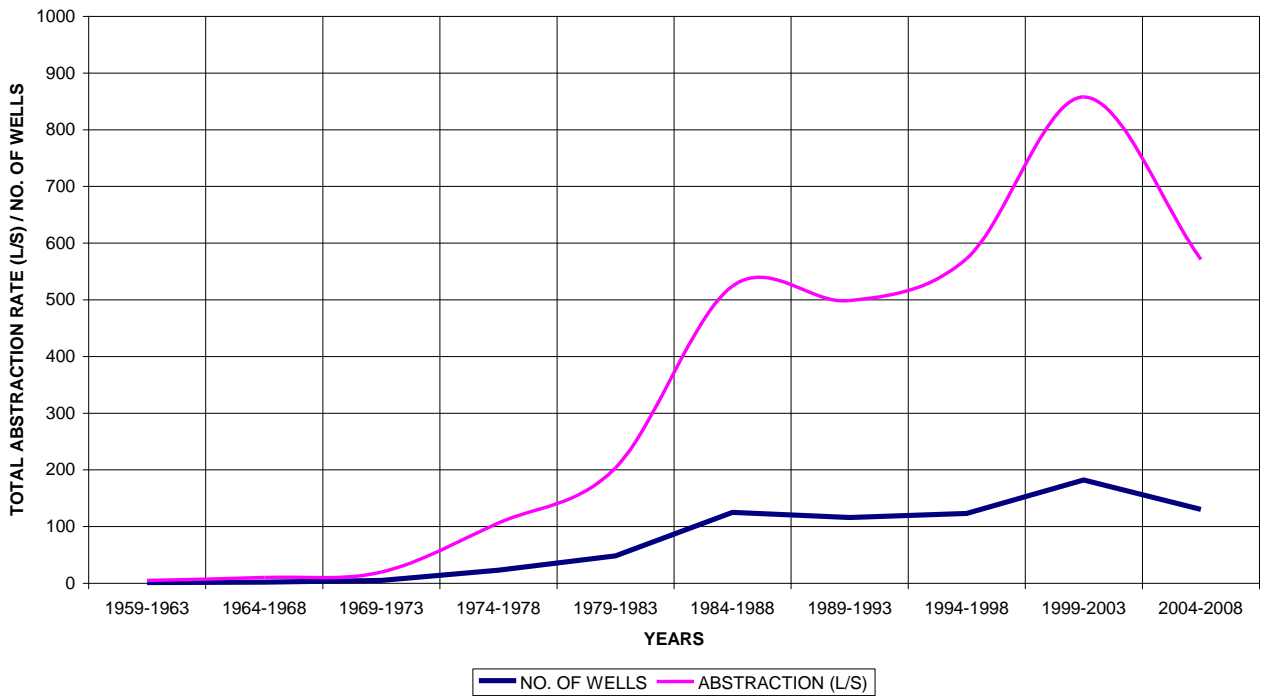


Table (3-22): Wells abstractions in the pilot are for the years 1959-2008

Years	No. of Wells	Production (l/s)	Accumulative no. of wells	Accumulative Production (l/s)	Production (m3/yr)	Production (Mm3/yr)
1959-1963	1	4.9	1	4.9	152409600	152.41
1964-1968	2	10.1	3	15	314150400	314.15
1969-1973	5	19.533	8	34.533	607554432	607.55
1974-1978	23	105.91	31	140.443	3294224640	3,294.22
1979-1983	48	203.68	79	344.123	6335262720	6,335.26
1984-1988	125	523.93	204	868.053	16296318720	16,296.32
1989-1993	116	498.61	320	1366.663	15508765440	15,508.77
1994-1998	123	572.703	443	1939.366	17813354112	17,813.35
1999-2003	182	857.73	625	2797.096	26678833920	26,678.83
2004-2008	130	570.996	755	3368.092	17760259584	17,760.26

The above table indicates the analysis of the values obtained from the well survey which have been incorporated as graphs above.

We can see from the second graph that there is a steady rise in the use of water with very sharp slope in the years 1979-1984. This clear since this is the period where there are a boost in drilling wells and using high energy pumps. Whilst a fluctuation of water use exists between 1998-2003. A complete well monitoring report is available for the area

3.3.6 Training and Capacity Building

In the first step of forming WUGs, several capacity building seasons were hold with the different groups. These training and awareness courses aimed at increasing the knowledge on water resources, management, and some other technical issues such as monitoring, on farm management and preparation of management plans. These are listed as follows:

- Leadership
- Awareness campaigns
- Communication and general relations
- On farm management and
- Participatory planning

Conduct several training courses for the board of directors and the committee of audit and control, and other technical committees in both men and female WUAs; the following are the training courses:

- “Planning and administrative management” (men – female).
- “Public relations” during the period (men – female).
- “Water measurement” for water monitoring committee in Ka’a Jahran WUA.
- “Simple accountancy for public associations” (men – female).
- “On farm Management” for irrigation committees in both WUAs (men- female)
- Food making and preservations (females only).

Table (3-23): Illustrates training courses for administrative board in both associations:

No	Period	Days	Subject	Targets	Trainees		
					M	F	Total
1	19 – 30\4\2008	10	Planning and management	Board of directors	19	15	34
2	18 – 21\5\2008	4	Public relations	Board of directors	19	15	34
3	25 – 26\5\2008	2	Water measurement	water monitoring committee	18	0	18
4	8 – 16\6\2008	8	Simple accountancy	Board of directors	19	15	34
5	20 – 23\7\2008	3	On farm management	irrigation committees	19	7	26
6	23-30/11/2009	7	Awareness campaigns implementations	Extension and awareness committees	18	13	31
7	1-5/3/2009	5	Food making and preservation	WWUA members	-	22	22

3.3.7 Demonstration Farms:

Install 1 ha bubbler irrigation network for peach trees in Dhaf village and 2 drip irrigation network for tomato in Biat Rashed village. The third 1 ha bubbler network installed in Alkherba village. The project tried in these farms to provide the best on farm water management through:

- The reduction of input costs
- Better water and irrigation scheduling
- Crops that uses less water
- Water conveyance and distribution
- Irrigation during cooler times

The project has provided seeds, fertilizers and the extension service to the farmers to encourage them to use a complete package in these fields. On the other hand another control fields were set nearby the demonstration fields to compare the results. Farmers are very happy with the process, that there is a reduction on pump time, fuel costs, labor, and there is good products. Results are still to be compared after the season has finished in a few months time.

Table (3-24): Demonstration and non-demonstration farms and the type of irrigation

Demonstration farms		Area ha
Bubbler		1
Drip		3
Non-Demonstration farms		
Bubbler		2
Drip		1

Table (3-25): Names of villages and farmers of the demonstration farms.

No	Village	Farmer	Site			Irrigation type	Crop
			E	N	Z		
1	Bait Rashed	Nasser Saba	425421	1632406	2338	Drip	Tomato
2	Alkherba	Nasser Al Mukadam	425287	1638846	2342	Drip	Tomato
3	Dhaf	Dhazan Zaid	423415	1643494	2346	Bubbler	Jawafa
4	Waset	Abdul Gali Sarhan	423133	1641190	2361	Drip	Potato

Data recording of the demonstration farms were agreed upon with the presence of Eng. Khaled Al Silwi to be the responsibility of the GSCP FU for the reason not to replicate the same work. Signs on the main road were installed to indicate the sites of the demonstration farms.

Table (3-26): Summary of irrigation scheduling on agricultural extension farms in Qa'a Jahran /Dhamar

Name of farmer	Crop	Village	Coordinate		Fuel used rate (liter/m ²)	
			N	E	Extension farm	Control farm
Dahan Saleh Zid	wheat	Dhaf	1643647	422681	4905.8	5882
Saleh Abd Allah Sarhan	wheat	Wasteh	1638128	422167	4844.8	5753.6
Mohammed Meshley	Onion	Wasteh	1639362	423834	3425	4260

Table (3-27) Water use and fuel rate for the demonstration farms

Name of farmer	Crop	Village	Water used rate (m ³ /m ²)		Fuel used rate (liter/m ²)	
			Extension farm	Control field	Extension farm	Control field
Dahan Saleh Zid	wheat	Dhaf	0.49	0.58	0.12	0.16
Saleh Abd Allah Sarhan	wheat	Wasteh	0.48	0.57	0.15	0-0.19
Mohammed Meshley	Onion	Wasteh	0.34	0.42	0.08	0.11

The results of the demonstration farms for **wheat** farms are:

- Water saving is 19% because of scheduling according to crop water requirements
- Fuel saving is 29%
- Working hours savings are **(NA) due to the not date not complete yet**
- Labor savings **(NA) due to the not date not complete yet**
- Increase in wheat yield grains production is **(NA) due to the not harvested yet**

- Increase in straws **(NA) due to the not harvested yet**

The results of the demonstration farms for **onion** crop are:

- Water saving is 24 % because of scheduling according to crop water requirements
- Fuel saving is 37%
- Working hours savings are **(NA) due to the not date not complete yet**
- Labor savings **(NA) due to the not date not complete yet**
- Increase in onion yield grains production is **(NA) due to the not harvested yet**

3.3.8 Conveyance Pipes

There is an increase in requests to the WUAs for pipes (PVC and PE) from the members and non members.

The agreement with GSCP is that requests should go through the WUA to encourage more enrollments of farmers. This strategy has proved viable. The following table lists the total of pipes quantities.

Table (3-28): Quantities of pipes distributed in cooperation with GSCP

No.	Pipes Type	No. Of Farms	No. of Beneficiaries	Areas in has	Quantity (m)
1	PVC	131	136	516.2	10291
2	PE	13	15	49.8	5900
total		144	151	566	

3.3.9 Water Harvestings

The selection of the harvesting tanks sites has been determined in coordination with GSCP FU in the project area. The WUAs representatives were presented in the meetings. The meetings agreed on the following:

- The WUA should nominate several sites (suggested about 20)
- Conduct field survey for the suggested sites.
- Select five reservoirs as priorities for the WUA to start with.

Table (3-29): shows the nominated sites by the WUAs:

Nr	Village	Site	Notes
1	Alhama	Alfajeer – Alkhank	New reservoir
2	Alehsa'a	Alfedya – reservoir near Sayla	(Border) New reservoir
3	Alkharba	Sakat helal – Almasela – Alnamhea – detween two villages	Border – reservoir – Karef
4	Almadar	Kheraf	Border
5	Bani Qaws	Mid of the village	Reservoir
6	Sharara	Alesha – Inkal (majel Albiat – Majel Daheem)	Borders (Reservoirs)
7	Thaf	Sekaf (Majel Alnos)	Reservoir – old pool
8	Alnakeel	Village	Reservoir
9	Fatayel	Village	Kareef
10	Wasta	Hamar – (Kareef in the village middle)	Reservoir – Kareef
11	Bani Sarhan	Alfara'a – Majel sayda – (Dar alhaza pool)	border - reservoir - reservoir
12	Bani falah	Alghol – alsha'ab – alwadi – almajel	Border – border – Reservoir – Reservoir
13	Alkohol	Alghol dam – village	Reservoir
14	Hagrat ma'bar	Shoa'ab dahboul – alshea'b	Water border – Reservoir
15	Biat rashed	Almajara	New Reservoir
16	Shanatheb	Alsdor	New v
17	Alaleeb	Bab alghool – alsafa	Border
18	Biat almabedi	Alshoa'ab akwa'a	Border
19	Biat aldogah	Alagmah	Border
20	Biat alma'atof	Alshoa'ab	New Reservoir

Table (3-30): shows the selected sites with the agreement of GSCP and their statues:

Nr	Village	Site	Position		Notes
			N	E	
1	Alhama	Alfajeer	1640471	0430271	Under construction
2	Bani Sarhan				Under construction
3	Bani falah				Under construction
4	Alkohol	Alghool dam	1641595	0419601	Completed
5	Fatyel	Village pool	1638333	0420201	Completed
6	Dhaf				Under construction

3.3.10 Agricultural Landholdings at Village Level

Table (3-31): indicates the villages land holdings in Dammar.

No	Village	Agricultural area (Libna)			Fallow Land (Libna)	Total (Libna)	Total (ha)	% of types of lands			Total %
		Irrig (wells)	Rainfed	Total				Irrig. (wells)	Rainfed	Fallow	
1	Wasta	402,500.00	140,875.00	543,375.00	140,875.00	684,250.00	3041.11	58.82	20.588	20.59	100
2	Ftaeel	10,000.00	7,000.00	17,000.00	3,000.00	20,000.00	88.89	50.00	35.00	15.00	100
3	Alkherba	124,000.00	24,800.00	148,800.00	12,400.00	161,200.00	716.44	76.92	15.39	7.69	100
4	Higrat Ma'abar	60,000.00	30,000.00	90,000.00	18,000.00	108,000.00	480.00	55.56	27.78	16.67	100
5	Bail Al-Nihme	82,000.00	28,700.00	110,700.00	28,700.00	139,400.00	619.56	58.82	20.59	20.59	100
6	Bani Qaus	85,000.00	63,750.00	148,750.00	17,000.00	165,750.00	736.67	51.28	38.46	10.26	100
7	Bani Sarhan	47,500.00	38,000.00	85,500.00	28,500.00	114,000.00	506.67	41.67	33.33	25.00	100
8	Al-Ulaib	54,000.00	32,400.00	86,400.00	32,400.00	118,800.00	528.00	45.46	27.27	27.27	100
9	Al-Mdara	147,500.00	59,000.00	206,500.00	51,625.00	258,125.00	1147.22	57.14	22.86	20.00	100
10	Tafadhul	77,500.00	50,375.00	127,875.00	23,250.00	151,125.00	671.67	51.28	33.33	15.38	100
11	Bait Rashed	36,000.00	21,600.00	57,600.00	12,600.00	70,200.00	312.00	51.28	30.77	17.99	100
12	Alhema	3,000.00	10,000.00	13,000.00	8,000.00	21,000.00	93.33	14.29	47.62	38.10	100
13	Bani Falah	17,500.00	14,000.00	31,500.00	10,500.00	42,000.00	186.67	41.67	33.33	25.00	100
14	Al-Kaulah	45,000.00	36,000.00	81,000.00	27,000.00	108,000.00	480.00	41.67	33.33	25.00	100
15	Al-Ahsa	7,500.00	5,250.00	12,750.00	3,000.00	15,750.00	70.00	47.62	33.33	19.05	100
16	Al-Naqil	10,500.00	5,250.00	15,750.00	1,050.00	16,800.00	74.67	62.50	31.25	6.25	100
17	Dhaf	160,000.00	56,000.00	216,000.00	32,000.00	248,000.00	1102.22	64.52	22.58	12.90	100
18	Sharara	13,500.00	9,450.00	22,950.00	6,750.00	29,700.00	132.00	45.46	31.82	22.73	100
19	Ma'abar/Bait Al-Dugha	6,000.00	3,000.00	9,000.00	2,400.00	11,400.00	50.67	52.63	26.32	21.05	100
20	Ma'abar/Bait Al-Magidi	87,000.00	26,100.00	113,100.00	13,050.00	126,150.00	560.67	68.97	20.69	10.35	100
21	Ma'abar/Bait Mehras	16,500.00	6,600.00	23,100.00	3,300.00	26,400.00	117.33	62.50	25.00	12.50	100
22	Shanadheb	122,000.00	24,400.00	146,400.00	18,300.00	164,700.00	732.00	74.07	14.82	11.11	100
23	Yakar	312,000.00	109,200.00	421,200.00	78,000.00	499,200.00	2218.67	62.50	21.88	15.63	100

			0							
Total	1,926,500.0	801,750.0	2,728,250.0	571,700.0	3,299,950.0	14666.4	58.38	24.30	17.33	100
	0	0	0	0	0	4				

Percentage of irrigated areas in villages

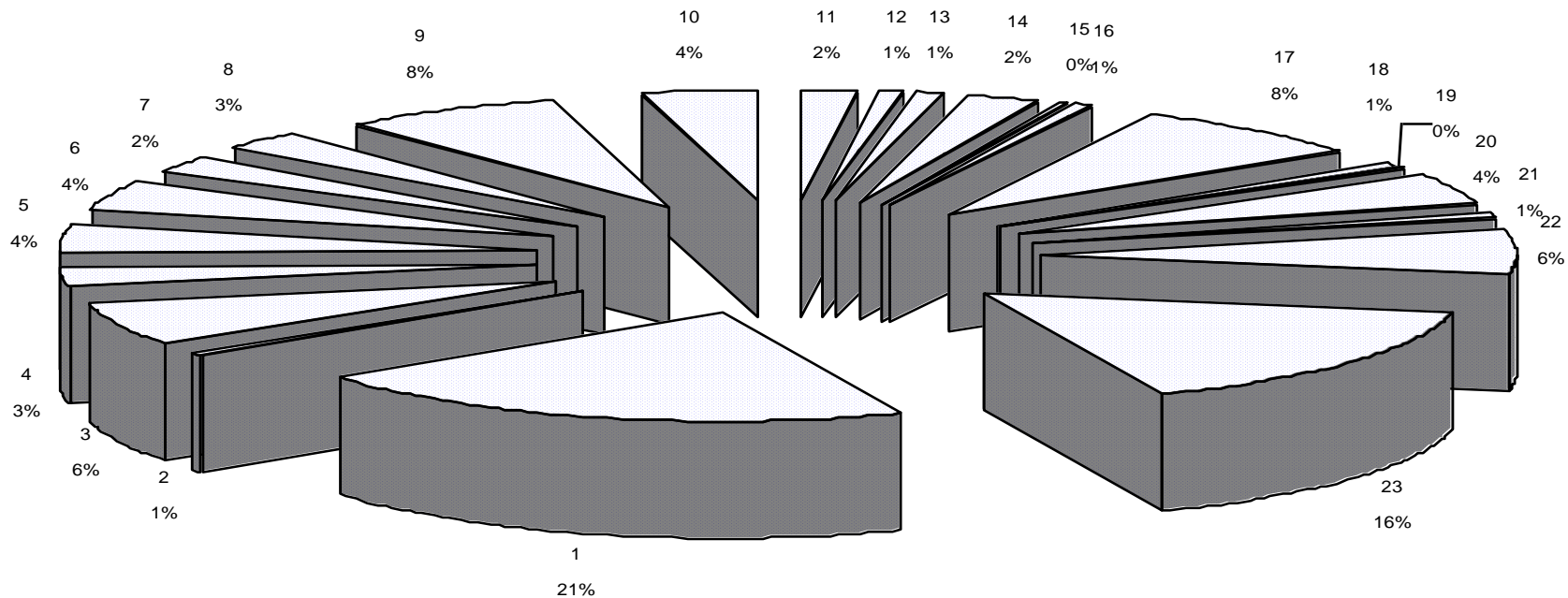


Diagram shows the irrigated land distributions percentages of the villages (Numbers correspond to the village name in the table)

3.3.11 Silver Filter Pots

The CWMP has initiated an interesting activity by providing families in the pilot area with silver filter pots that able to clean and purify drinking water and minimizes the problems related to water pollution. It has been suggested by the FTL and the WWUA that more silver pots are needed to Dhamar area due to the concentration of poor families in specific areas that drink from cisterns and open polluted sources. Therefore, project has provided the WWUA with 120 pots to distribute among families according to the following criteria.

- Families are poor
- Families are drinking from open water surfaces or polluted sources
- Families show the interests in using such system and would take care of them
- Families are members of the WWUA or are willing to join

Reports from the pilot area suggest that there more families are asking for such systems.

3.4 Lesson learned

- Water Users associations either men or women are taking an important role working with their communities. They managed as a new body in the PAs to attract more members, more WUGs and WWUGs, and to work for the welfare of the community in front of other authorities and organizations in the area for the moment.
- Local communities are ready to take the lead when they have the chance
- The enthusiasm and willingness of the communities to work collectively, save precious non renewable water and adapt new technologies
- Communities own great deal of experiences and can provide logical solutions
- Traditional leaderships in the pilot areas differs from Shieks in Dhamar. educated people in Taiz and religious people in Hadhramout.
- The selection of the PAs was successful in that it produces three distinctive areas that have:
 - Different topography
 - Distinctive social characteristics
 - Inherent experiences and knowledge
 - Moderate to high level of community participation
 - Excellent degree of commitment to serve the communities
 - Quick understanding and perceptions to skills

- The proposed participation methodology and the tools used proved to be applicable to the local communities
- The build up of their skills and follow up is an important process to gain confidence with the communities and to achieve better sustainable results.
- The communities think the government has a role on causing water scarcity by not providing the support and services and not implementing the Water Law.

3.5 Indicators of Success

The Indicators assumed to measure the project outputs are as follows:

- **The willingness of farmers to organize themselves into men water users associations WUAs.** This has been done and three WUAs have formed are legal entity
- **Excellent reactions and support from governmental, local authorities, and NGOs.** This is achieved
- **Formation of at least one women water users association.** In fact three Women Water associations were formed are very successful and are legally recognized.
- **Excellent reactions and support from partners in the field.** This is gained
- **Organizations consider CWMP as a model for replication.** CWMP is now replicated by NWRA in Tareem, Hadhramout and other programs recommend to learn from CWMP
- **WUAs committees are disseminating their skills to others and work as consultants.** The WUAs are sharing experiences with other WUAs and establish coordination committees

3.6 Next Steps

One Dissemination workshop will be held in Sana'a and three in the pilot areas during June 2009.

WSSP!

4 Annexes

4.1 The Financial Statuses of the Project

4.1.1 The Audit Report April 2009

DRAFT

REPUBLIC OF YEMEN

**JSDF - COMMUNITY WATER MANAGEMENT PROJECT
P074413-TF054230**

**FINANCIAL MANAGEMENT SUPERVISION MISSION
APRIL 18, 2009**

A. MISSION OBJECTIVES

1. The purpose of the mission is to review the financial management aspects of the project to ensure its compliance with the Grant Agreement dated June 1, 2005, specifically on para. 4 – Withdrawal of Grant Proceeds and para. 5 on Accounts and Audits. This FM supervision mission aims to provide assurance that the grant proceeds are spent accordingly. The review covers the financial arrangements, adequacy of the financial management system, staffing of the SFD and its funds flow, accounting software, reporting, auditing, status of disbursement and Designated Account (DA previously referred to as Special Account).
2. The mission also discussed the World Bank’s policy, procedures and requirements for the closing of the grant on June 30, 2009, with the Water and Environment Center, Sana’a University Project Coordination Unit (PCU), the implementing entity.

B. FINANCIAL DATA

3. The Client Connection database financial data of the Grant as of April 19, 2009 shows 84% of the Grant proceeds have been disbursed (Table 1).

TABLE 1. FINANCIAL DATA

Grant Amount	US\$ 1,078,200.00
Disbursed	US\$ 906,114.55
Percent Disbursed	84.04%
Undisbursed	US\$ 172,085.45

C. FINANCE AND AUDIT

4. **Designated Account** (*previously referred to as Special Account*). The Sana’a University PCU has its **DA-B** at Central Bank of Yemen (CBY) with initial deposit of **\$ 100,000**, which is equivalent to about 10% of the Grant amount.
5. **Disbursement**. The WAs are signed by the Project Manager and the Project Accountant. The PCU withdraws funds from the Grant using **reimbursement disbursement method** (previously referred to as traditional disbursement method).
6. The PCU has access to the Client Connection (CC) and is able to reconcile its Project accounts with the World Bank CC database. A reconciliation of the Project accounts with the Client Database indicates a difference of US\$3,287.74, with the Bank’s records. The PCU has to probe further into the differences in the related WAs and adjust its records or request the Bank to clarify the differences. This has to be completed by May 25, 2009.

Account Reconciliation

Category No.	Description	PCU	CC	Difference
1A	Consultants' Services	420,688.17	420,249.23	438.94
1B	Labor, compensation and incentives	102,802.06	105,476.78	(2,674.72)
2	Training	146,812.01	143,061.69	3,750.32
3	Goods	44,463.03	41,465.00	2,998.03
4	Works	2,602.70	7,592.03	(4,989.33)
5	Incremental Operating Costs	84,557.02	87,368.00	(2,810.98)
	Total	801,924.99	805,212.73	(3,287.74)

7. **Funds Flow.** The PCU pays its consultants, suppliers or contractors by issuing either checks or payment instructions to the CBY to effect payments to the named payee. The Project Accountant processes the payments based on approved invoices and in accordance with the Operational Procedures.

8. **Organization and Staffing.** The PCU is managed by the Project Manager, while the Project Accountant is responsible for the accounting and financial management system of the Project financed from the Grant. There is a secretary providing support to the Project Manager and the Project Accountant. There are job descriptions for the Project Manager, Project Accountant and the Secretary, included in the Operational Procedures.

9. **Financial Management and Accounting System.** The computerized accounting and financial management system (including Chart of Accounts, accounting journals, ledgers, etc.) was installed by a local system developer. The Financial and Accounting Procedures is available in the Operational Manual.

10. The PCU maintains asset register that identifies the assets financed from the Grant. The PCU would turn over the assets of the Project to the Sana'a University. A copy of the list of assets to be handed over to the University will be provided to the Bank by May 10, 2009. The PCU would send a copy of the letter of transfer and acceptance of the assets financed from the Grant with the attached list of assets and its value to the World Bank.

11. **Interim Financial Reports (IFRs, previously called Financial Monitoring Reports-FMRs).** The PCU generates quarterly IFRs (i) Sources and Uses of Funds; (ii) six-months forecast; (iii) actual expenditures statements, and (iv) bank reconciliation. It uses excel software to prepare the IFRs. These are provided to IDA within 45 days after each subsequent calendar quarter.

12. The PCU will provide the Bank with the Budget and Disbursement Plan for April-October 2009, which includes the four months grace period from closing of the Grant on June 30, 2009. The PCU is aware that only contracts signed prior to the Grant closing date can be paid within the four months.

13. **Recordkeeping.** PCU keeps all the documents and records of the Project in its offices, in accordance with the Grant Agreement dated June 1, 2005, para. 5-(b).

14. **SOE Review.** There was no review of SOEs conducted during this mission.

15. **Internal Controls.** The PCU consists of only three staff, and the internal controls are built-in the Financial and Accounting Procedures found in the Operational Manual, that describe the authorization, clearance and approval responsibilities of the individual staff.

16. **Audits.** Based on para. 5- (b), the PCU would submit its audited financial reports not later than six months after the end of each year, to the World Bank. The PCU informed the mission that the audit report for the period ending December 31, 2008 was submitted to COCA for clearance. This will be translated in English and expected to be submitted to the WB by June 30, 2009. The final audit for the period January to October 31, 2009 would be send to the WB by December 30, 2009.

17. The final audit requires the PCU to set-up an escrow account at CBY to cover the audit fees. The PCU would initiate the process by May 10, 2009.

18. **Risks.** There are appropriate guidelines and procedures including review and approval processes in the FM Manual. There is quarterly and annual audit by an external auditor, as required under the Grant.

19. **Next Steps.** The PCU agreed to take the actions described in Annex 1.

ANNEX 1
COMMUNITY WATER MANAGEMENT PROJECT
AGREED ACTIONS

ACTIONS	RESPONSIBILITY	COMPLETION DATE
1. Examine further the differences by WAs and adjust PCU's records or request the WB for explanations.	Project Accountant	May 15, 2009
2. Provide the Budget and Disbursement Plan for the period covering April-October 2009 (para. 12).	Project Accountant	May 10, 2009
3. Submit the list of assets financed from the Grant (para. 10)	Project Manager	May 10, 2009
4. Provide the World Bank with a letter of acceptance of the assets with the attached list of assets and its corresponding value, financed from the Grant by Sana'a University (para. 10).	Project Manager	November 15, 2009
5. Submit the audit report for period ending December 31, 2008 (para. 16).	Project Accountant	June 30, 2009
6. Set-up escrow account to cover the costs of the final audit covering January-October 2009 (para.17)	Project Manager Project Accountant	May 30, 2009
7. Submit the final audit report (para.16)	Project Manager Project Accountant	December 30, 2009

LIST OF PEOPLE MET

Dr. Taha M. Taher Project Manager Sana'a University Community Based Water Management Project Email: cwmpwec@net.ye tmtahiri@y.net.ye Office Phone 212621 Fax No. 212622 Mobile Phone 777 187 897	Mr. Yazel Abdou Saleh Almekla Project Accountant Sana'a University Community Based Water Management Project Email: cwmpwec@net.ye yazelalmeklafi@yahoo.com Office Phone 212621 Fax No. 212622 Mobile Phone 777 167 117
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4.1.2 Disbursements

(1) Appropriations from Grant and the Uses of fund until April 2009:

Financed from Payment %	Funds U.S. Dollar	Category	Uses of funds 2006:	Uses of funds 2007:	Uses of funds 2008:	Uses of funds 4 2009:	Total	Disbursed from allocation %	Balance as 30 Apr, 2009 U.S Dollar
100%		(1) Services:							
	514,200	(a) Consulting	61,489	162,725.90	170,426.04	46,365.00	441,005.55	63%	73,194
	184,000	(b) Incentives for field workers	2,432	40,586.16	51,705.29	32,577.07	127,300.91	34%	56,699
100%	190,000	(2) Training	3,929	45,221.63	88,757.62	14,777.65	152,685.90	80%	37,314
100%	50,000	(3) Goods	34,304	10,831.00	0.00		45,135.00	90%	4,865
100%	20,000	(4) Civil works	0	0.00	3,211.13		3,211.13	16%	16,789
100%	120,000	(5) Operating expenses	22,341	24,170.00	33,844.72	9,459.39	89,815.11	75%	30,185
		SA					90,240.23		
Total	1,087,200		124,495	283,535	347,945	103,179	949,394	87%	219,046

(3) Appropriations from Grant and the Uses of fund from January 2009 until April 2009:

Financed from Payment %	Funds U.S. Dollar	Category	Uses of funds 11/2007:	Disbursed from allocation %
100%		(1) Services:		
	514,200	(a) Consulting	78,942	11%
	184,000	(b) Incentives for field workers		
100%	190,000	(2) Training	14,777.65	8%
100%	50,000	(3) Goods		0%
100%	20,000	(4) Civil works		0%
100%	120,000	(5) Operating expenses	9,459.39	8%
Total	1,087,200		103,179	9%

4.2 General Data of the Pilot Areas (PA)

Table (4-1): Characteristics and General Data of the PAs

Component	unit	Taiz	Hadhr	Dhamar
Catchments Area	Km ²	200	820	227
Study area	Km ²	102	96	200
Total of population	No	18547	3880	42426
Cultivated area	Ha	1229	4267	12175
Area under irrigation	Ha	1228	1200	8616
% of irrigated area	%	100	28	87
Average rainfall	mm/yr	500	60	359
Poverty index	index	62	62	30

Number of wells

Item	unit	Taiz	Hadhr	Dhamar
Operational	No.	225	146	698
Non-operational	No.	62	12	170
Total	No.	287	158	868
Average Discharge	l/s	6.5	10	5
Depletion rate	m/yr	0.5	1.8	3.0
Aquifer category	level	Low hazard	Middle hazard	High hazard

Monitoring wells

Item	Unit	Taiz	Hadhr	Dhamar
Monitoring wells	No.	28	8	30
date monitoring started	Date	June 08	Dec-07	Jan 09
Monitoring data available	Months	7	12	3
Rainfall Stations	No.	2	3	2

Men and Women Water users Groups

Item	Unit	Taiz	Hadhramout	Dhamar
MWUGs (Men Water Users Groups)				
No. of Groups	No.	11	15	39
No. of members	No.	384	362	821
% of MWUGs from total members of WWUGs and WUGs	%	48	78	64
WWUG (Women Water Users Groups)				
No. of Groups	No.	11	7	59
No. of members	No.	431	102	471
% of WWUGs from total members of WWUGs and WUGs	%	52	22	36
WWUAs dates of formation		05/01/2008	12/05/2008	08/04/2008
MWUAs dates of formation		06/01/2008	16/01/2008	09/04/2008

Table (4-2): Wells productivity in the project area Taiz

Nr	Name	Pro. L/S	Working hours H/Day		Benefiters	Notes
			Summer	Winter		
1	Mahoud abdulkarem	3.7	22	2	10	
2	Abdullwali Abdullah noman	7.5				
3	Ghaleb saif mansour	5.5	4	11	6	
4	Mohamed abdo mansour	5.5	4	8	50	
5	Mohamed noman ali	3.6	11	6		
6	Mohamed Abdullah saleh	3.4	22	5		
7	Abdullrahman Abdullah sultan	15	22	5	20	
8	Abdu Othman nasari	7.9	22	5		
9	Ahmad saif ali	18	3	22		
10	Amen sharaf abdo	15				
11	Mohaned abdo saed alnoor	4	12	14		
12	Nasher ali Mohamed sofyar	6	22	12		
13	Mohamed ahmad alsabri	4.9		1		
14	Abdullrahman ahmad jasser	6		16		
15	Abdullah abdulkarem saif	8				
16	Ahmad Abdullah saleh	8				
17	Amen aqlan ali	7	10	8		
18	Abdullhameed aqlan ali	7				
19	Mohamed salem yahya hamedian	5				
20	Ali saed ali	5				
21	Abdullmenk ali abdo	12				
22	Abdullwali abdo alhaj	10				
23	Ghaleb Abdullah	4.5				
24	Abdo mahyoub saif	6.8	10	3		
25	Abdo ali Hassan	5	10	3		
26	Rafeeq abdullghafour	10	3	10		

Nr	Name	Pro. L\S	Working hours H\Day		Benefiters	Notes
			Summer	Winter		
27	Ali m. fadhl	5	6	0:30		
28	Mohamed ali bin ali	4.2	12	8		
29	Abdullghafour alhaj sultan	7	12	8	3	
30	Abdullah saed	5	12	6		
31	Sultan ali ibraheem	4.5	3	1:30		
32	Mahyoup saed mohammed	1.4	10	2		
33	Saif ali nagi	3.3	11	1:20		
34	Ghaleb mokbl ali & broths.	5	11	6	12	
35	Yehya ahmad Abdullah	3	12	5	30	
36	Ahmad kassem Hassan	4.2	12	2		
37	Fare'a saed Hassan	4.4	12	5		
38	Ahmad rohan alshareef	3.8	12	5		
39	Majed abdullmenk abdo saed	15	12	6		
40	Ahmad Abdullah ala'arashi	12	12	3		
41	Kaeem ghanem	10	12	6		
42	Abdullkader abdo kassem	12	12	6		
43	Ahmd hazza'a ala'jam	12	12	8		
44	Ahmad mahyuop abdullaq	11	12	8		
45	Abdullaleem aklan ali	12	12	8		
46	Abdullsalm mahyuop kassem	12	12	6		
47	Hassan ahmad Mohamed	11	12	8		
48	Ali mohammed	10	12	9		
49	Mohamed ali alkadi	10	12	8		
50	Abdullwahed sa'ed senan	15	6	2		
51	Ali abdu ghaleb mohammed	20	3	2		
52	Sultan abdu salem	1.5	4	1	5	
53	Ismaeel kassem	5	1	10	1	
54	Abdo Othman algrafi	8	7	1	7	
55	Abdo Abdullah algrafi	2.5	1:30	0:30	2	
56	Mohamed ali saed	3.5	4	1	1	
57	Bandar Abdullah saed	3.5	3	0:30	2	
58	Abdulljabar Abdullah Othman	7	12	5	30	
59	Saed Mohamed Hassan	6.2	12	2	10	
60	Hameed ali Hassan	7.1	12	7	50	
61	Abdullwahab saed kaed	5	12	6	20	
62	Mahmoud Mohamed assaj	4.5	12	5	1	
63	Mohamed assaj Mohamed	5	9	4	5	
64	Ahmad abdullfatah alsofi	4	7	3	3	
65	Abdullghafar Abdullah noman	4	5	0:30	2	
66	Ibraheem mahyuop Mohamed	4				
67	Ali Hassan abdo ali	4.8				
68	Fahd abdullelah kasem	4.3				
69	Hazza'a Mohamed abdo Hassan	4.4				
70	Anwar Mohamed abdullhameed	4.4				
71	Abdullah Mohamed qaed hameed	5				
72	Taher Mohamed alabbal	3.6				
73	Saif ahmad bin ahmad	3.9				

Nr	Name	Pro. L\S	Working hours H\Day		Benefiters	Notes
			Summer	Winter		
74	Hazza'a Mohamed abdo Hassan	4.5				
75	Abdulljabar ahmad qaed	6.2				
76	Haza'a Mohamed fadel	3	12	1:30	10	
77	Saed saif mokbel	4.7				
78	Ahmad abdullhameed alabsari	7.9				
79	Haza'a Mohamed abdo Hassan	6.5				
80	Khalel Mohamed ismaeel	1	2	0:15	4	
81	Ahmad Mohamed fadel	1	6	1:26	8	
82	Othman ali	1.5	8	1:30	4	
83	Abdullghani motea' ghaleb	3	5	1		
84	Mohamed sofyan	3	6	0		
85	Noman Abdullah ghaleb	3	6	0		

4.3 Stockholm World Water Conference 2008

The presentation of the project in the conference in August 2008 was successful and showed to others that community role is very effective and active, it also spot light over the significant role of Sana'a University and Water and Environment Center in carrying out this project especially giving the chance to women associations in the society which previously weren't accepted to do any action. CWMP was selected with nine presentations form among 90 proposal. Its rank was the 7th in the conference.

The presentation could be found in the following web:

<http://www.worldwaterweek.org/programme/wednesday/wed18-innovationsingroundwatermanagement.asp>

or

<http://www.project.empowers.info/page/1687>

or

http://www.bgr.bund.de/nn_333158/EN/Themen/TZ/Politikberatung_GW/Grenzueberschreit_Kooperation/Nahost/pbgw_stockholm_seminar_mena_2008.html