

## YEMEN

### Communities Organize to Better Manage Scarce Groundwater Resources

Despite some recent improvements, Yemen remains both the poorest country in the Arab world and the most water-scarce. Severe and continued aquifer depletion has significant implications, both on agricultural production and domestic water supply, notably in the highland region. High poverty levels make it difficult to mobilize financing for necessary investments and the capacity of

government institutions to plan, build, operate and maintain the necessary infrastructure and enforce existing statutes remains extremely limited.

In this situation, the development of replicable models, where community groups and associations collectively and sustainably manage their groundwater resources, may offer a potential solution. Such arrangements can improve stakeholder awareness of

the benefits derived from more resourceful ways of using water, as well as increased income. This can be a far more efficient way to manage the resource rather than through laws enacted by government agencies.

In 2005 the JSDF provided around \$1 million for the Community-based Water Management Project (CWMP). The objectives were:

- To support community development of Water Users Associations (WUAs), and enable these to develop management plans



Women farmers using drip irrigation

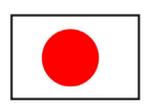
- To explore the scope for local regulation of groundwater and open up opportunities to generate income from water management.
- To support the implementation of the local management plans by WUAs

#### Results

The project was able to achieve the vast majority of its objectives under its three components:

**(1) Planning and Capacity building:** The CWMP successfully assisted beneficiary farmers to organize themselves into WUAs, in Hadramout, Taiz, and Dhamar (see Tables 1 and 2). Three male and three female WUAs were formed and provided with training. These contained around 11 Water Users Groups (WUGs), respectively and a total membership across all WUGs of 2,586 persons.

**(2) Community Water Management and Monitoring:** A geo-hydrological monitoring program was started. The WUAs took



responsibility for forming groundwater monitoring committees and supervising their operations. The committees in each pilot area were trained to monitor and manage groundwater resources, including long-term planning, monitoring, and evaluation of the water resources in the watershed, setting of water savings targets for the community, and subsequent monitoring of rainfall, groundwater levels, water abstraction, water quality and illegal drilling.

**Table 1 - General Data of the Pilot Areas (PA)**

<b>Component</b>	<b>Unit</b>	<b>Taiz</b>	<b>Hadhr</b>	<b>Dhamar</b>
Catchments	Area Km2	200	820	227
Study area	Area Km2	102	96	200
Cultivated area	ha	1229	4267	15000
Area under irrigation	ha	1228	1200	13,000
Wells - operational	No.	225	146	753
Wells - non-operational	No.	62	12	265
Aquifer category	level	Low hazard	Middle hazard	High hazard

**Table 2 - Men and Women Water Users Groups**

<b>Item</b>	<b>Unit</b>	<b>Taiz</b>	<b>Hadhr</b>	<b>Dhamar</b>
<i>MWUGs (Men Water Users Groups)</i>				
No. of Groups.	No	11	15	39
No. of members.	No	384	364	821
<i>WWUG (Women Water Users Groups)</i>				
No. of Groups.	No.	11	8	20
No. of members.	No.	431	115	471
<i>Total</i>				
No of Groups	No.	22	23	59
No. of members	No.	815	479	1,292

Preparation of a Groundwater Management Action Plan (GWMAP) was started under the CWMP. Some components of this have already been set up by the WUAs. The WUAs considered traditional norms



Farmers take water meter readings

and informal laws that could be used to regulate groundwater resources and were responsible for introducing the farmers to the reasons for reducing water abstraction hours and introducing conservation practices such as irrigating during cool period. The WUAs also supported infrastructure supply and received a considerable number of applications for modern irrigation and conveyance pipes which could increase the efficiency of irrigation.

**(3) Participatory Monitoring and Evaluation and Information Dissemination:** This component of the CWMP has prepared training modules for local users including visual materials to enhance dissemination of effective practices in the efficient use of irrigation water, reduction of groundwater abstraction, farming practices to improve crop yields and reduced use of water, the use of modern irrigation techniques and the adoption of soil and land conservation techniques.

The communities, along with the CWMP specialist, took the lead in training and knowledge sharing activities. The latter included local study tours between the pilot WUAs and those in other areas. A National Council of WUAs was established and a committee was formed from the three WUAs in the Pilot areas to ensure coordination, information exchange, mutual assistance and sharing of ideas. This group organized participatory self-evaluation of WUAs and WUGs in each area and the preparation of a brief assessment and evaluation of the Project to identify successful models for local water management (see Lessons Learned).

**Sustainability and Scale-up** - The CWMP has mostly attained its objectives. The Government is planning to establish a unit for WUAs under the National Irrigation Program which has been established in the Ministry of Agriculture and Irrigation to implement the Bank-financed Water Sector Support Project (WSSP). The CWMP models for WUAs will be replicated through irrigation advisory services

created under the GSCP (the Groundwater and Soil Conservation Project, also Bank-financed) and the WSSP nation-wide. Based on the successful implementation of the CWMP, the National Water Resources Authority (NWRA) has adopted CWMP models as the basis for national implementation.

However, the issue of “sustainable self-management” is yet to be resolved. Those WUAs established under the CWMP remain financially weak and still need financial support to continue their management. Revenue to the WUAs is predominantly from the minimal membership fees that can be charged, and only around 40% of these are recovered. This aspect is being reviewed by a team of consultants recruited under the GSCP and follow-up support to those WUAs will be provided under this project.

**Community Driven Development** - Local communities have become aware of the scarcity of groundwater through WUA activities in the pilot areas. They have been continuously monitoring groundwater levels, groundwater abstraction rate for irrigation, and watching for illegal drilling. They have now recognized the importance of protecting the groundwater resources for their future.

**Local Community Participation** - The CWMP has emphasized direct involvement of the local population including direct money flows to beneficiaries who are engaged in water monitoring and management activities. The CWMP has been closely linked with the GSCP which has provided PVC pipes and advanced on-farm irrigation equipment for CWMP farmers to save water.

**Social Inclusion** - The project extended its support for women water users by creating women’s WUAs, the first attempt to do this in the country, where women have traditionally been excluded from WUA membership.

**Project Data**

- Implementing Agency: *Water and Environment Center (WEC) of Sana'a University*
- Grant (TF053440) Amount: *US\$1.02 million*
- Implementation Period: *06/01/2005 to 06/30/2009*

significant impact on sustainable local resource management.

- Communities have a great deal of practical experiences and can provide logical solutions to real-world problems.

A 2009 Study<sup>1</sup> assessed ways to involve Water Users Organizations (WUOs, including WUAs) in integrated water resources management in Yemen. While reinforcing the lessons emerging from the project, the study added detail and usefully placed the findings in the international context.

This study found that WUOs have initiated requests, mobilized resources, and taken part in planning and implementing projects for rural water supply and for surface irrigation. For groundwater irrigation, WUOs have facilitated provision of pipes and other subsidized irrigation equipment intended to reduce water consumption, and helped improve awareness that groundwater resources are limited and being depleted. However, aid to individual farmers for irrigation and aid to communities for rural water supply is not yet well-linked to creating community commitment to improve groundwater governance.



Meeting of a Water Users Group (WUG)

**Lessons learned**

- Local communities are very motivated to manage their own resources but need initial support to initiate such activities through capacity building and awareness raising.
- Local communities can be important partners for law enforcement in terms of protecting groundwater resources from illegal drilling.
- The collective action of local communities has a

**Learn from communities.** Local action to regulate groundwater, for example by restricting well drilling, demonstrates what is feasible and how this can fit with local priorities. Successful cases need to be better understood, and experience shared among communities, as part of a process of encouraging genuinely decentralized institutional development.

**Water user organizations are diverse.** Traditional institutions for managing surface irrigation, from springs and spate flows in wadis (riverbeds), often continue to work relatively well, but can be disrupted by external intervention, especially if consultation is incomplete and designs are not compatible with traditional water rights. In groundwater projects, WUOs can be useful in implementation, but their longer-term sustainability remains questionable. WUOs may quickly become

inactive after project funding dries up. WUO federations and their representation in water management decisions at the sub-basin level and above are not yet well-developed.



**Communities need better support for local water governance.** Transfer of larger spate irrigation systems to WUOs seems problematic unless there is consistent and effective support. Support can include information, advice, facilitation (social mobilization), funding, delegation of authority, and the consistent enforcement of regulations.

Some WUOs are helping to collect monitoring data on wells for the National Water Resources Authority (NWRA), but lack feedback about the data and what it says about local aquifers. In general, communities lack information and advice to support local analysis and action to improve water governance. The aim remains to support communities in developing a methodology for local water management through problem-solving in which communities:

- assess local conditions, using their knowledge, plus available data and expertise;
- analyze relevant scenarios, with and without changes in water governance;
- envision feasible pathways toward more sustainable local water management;
- agree on and implement actions to solve problems and move toward sustainability;
- further develop local water management, through a continuing process of solving problems and providing useful services to communities.

In short, community ownership and effective management of resources will only be improved by providing access to the information on which they can base sound decisions.

**Multiple regulatory frameworks.** Governance institutions, through which decisions are made, rules created and enforced, and disputes managed, include government agencies and laws as well as tribal, religious, customary and informal institutions. This legal pluralism means that multiple forums are available for dealing with disputes - but this adds complexity and bureaucracy. In Yemen, the structure of formal water law includes a Water Law,

its regulations, and relevant cabinet decrees. The NGO Law provides a basis under which WUAs are registered, through procedures supervised by the Ministry of Labor and Social Affairs. Formal WUAs register

as voluntary associations, with members free to join or exit, and so lack authority to make and enforce rules. More effort is required to rationalize and streamline these structures and to ensure that existing statutes are enforced.

**Diversify approaches to organizing WUOs.** WUOs need to be able to take on diverse forms suited to local needs and circumstances. Sustainability depends on being able to survive using local resources, so WUOs need to be organized efficiently to deliver services that members want and are willing to contribute to. One useful option is a two-phase approach that allows more intensive organization during project implementation and simpler arrangements for post-project operation and maintenance. Working with women's groups offers a way to make women's participation more effective and sustainable. Co-management should be developed to combine the strengths of government agencies, WUOs, and other local institutions in improving water management, particularly for crafting and enforcing local rules for water governance that fit community conditions and capabilities.

**Weave networks for governance.** WUOs need horizontal and vertical linkages, particularly with local councils for resources and enforcement, and to higher-level organizations for advice, funding, enforcement and other support. Federations should be developed from the bottom-up, with genuine representation in decision-making. Power to make and enforce rules and collect fees, would make community water management more effective. Pragmatic steps to improve water governance at the local and sub-basin levels can help develop sustainable local water management.

---

## Notes

1. Bryan Bruns and Taha Taher (2009) "Yemen Water User Association Study: Findings and Recommendations for a Problem-Solving Approach", Consultant Report, December 19, 2009

---

**The Japan Social Development Fund** -- The JSDF is a partnership between the Government of Japan and the World Bank that supports innovative social programs in developing countries. JSDF grants are executed by NGOs/CSOs and local governments and implemented at the community level. JSDF projects meet four basic requirements: (i) they target and respond to the needs of poor, vulnerable, and disadvantaged groups, and aim to achieve rapid results, (ii) they are innovative and pilot alternative approaches or partnerships, (iv) they use participatory designs and stakeholder consultation to design inputs and as an integral part of monitoring and evaluation, (iii) they empower local communities, local governments, NGOs/CSOs through capacity building and rapid feedback of lessons learned, and (v) they focus on scale-up potential, replication and the sustainability of interventions.

