



REGIONAL ASSESSMENT - WATER USERS' ASSOCIATIONS IN THE SWIM-SM PARTNER COUNTRIES

**Final document produced after discussion and validation during the
WUAs Expert Regional Workshop (23-24 April, 2012, Athens,
Greece)**

Version	Document Title	Author	Review and Clearance
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Acknowledgements:

For the regional part of the review, special thanks need to be directed to the National representatives and the experts who participated in the Water Users Associations Regional Workshop that was held by SWIM-SM in Athens between 23 and 24 April 2012, and enriched the regional assessment with their insights, experience and active participation: Aziz Bachik; President of an irrigation association in Algeria, El-Hadji Belkateb; General Director at the Algerian National Office of Irrigation and Drainage, Safwat Abdel-Dayem; the Secretary General of the Arab Water Council, Jochen Regner; Independent expert from Germany, Tahel Brandes; Acting Deputy Director General, Regulation Division, and Tal Shaviv; Deputy to Legal Advisor, Legal Advisor Department, from the Israeli Governmental Authority for Water and Sewage, Ali Al-adwan; Principle Technical Advisor in the German-Jordanian Programme "Management of Water Resources" – Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH, Fadi Abu Sahyon; Head of Irrigation Section at the Northern Jordan Valley Directorate, Ziad Ababneh; the Director of the Water Users Associations Unit at the Jordan Valley Authority, Kamal Kara; Consultant representing Lebanon, Abdelaziz Anbari; farmer and president of a water users association in Morocco, Mohamed Nabil Aloussi; project director at the Moroccan Regional Directorate of Agriculture of Fes Boulemane, Emad Ramadan; Acting Director General of the Water Control Directorate at the Palestinian Water Authority, Diya' Salameh; Water Projects Coordinator, Programs and Projects' Department in the Palestinian Agriculture Relief Committee; Samhan Samhan, Projects Manager at the Palestinian Hydrology Group, and Abdelkader Hamdane; Independent expert from Tunisia.

For the countries' assessment and case studies, special thanks are extended to the partner countries focal points, representatives and officials, donors, and Water Users Associations for their invaluable contributions, time and generous assistance to help fill the questionnaires; and their support in providing all the supplementary documents related to the countries' assessment and case studies, namely; Mr. Atef El Kashef; Director of Irrigation Improvement Sector at the Egyptian Ministry of Water Resources and Irrigation, Mr Qais Owais; Director of Northern and Middle Jordan Valley Administration – in the Jordan Valley Authority (JVA), Mr Ziad Ababneh; Director of the Water Users Associations (WUAs) Unit – JVA, Mr Ali Al-Adwan; Principle Technical Advisor in the German-Jordanian Programme "Management of Water Resources" – GIZ, Mr Sulaiman Abu Alfawares and Mr. Saleh Balawneh, Pump 55 WUA in the Jordan Valley, Dr. Fadi Comair; Director for Hydraulic Resources at the Lebanese Ministry of Energy and Water (MEW), Mr Kamil Fakhry; Btedai cooperative for the users of modern irrigation techniques, Committee President, Ms. Mona Fakhri; Director for Water at the Lebanese MEW, Mr. Georges Fakhry; Head of Registry at MEW, Ms. Maya Mouhanna; Head of section for irrigation and rural development at the Lebanese Ministry of Agriculture, and Finally from Tunisia, Ms. Sondes Kamoun, General Director of Planning and Hydraulic Balance at the Ministry of Agriculture, Ms Raqya Al Atiri and Mr. Abdelhamid Mnajja, Rural Department and Water Exploitation at the Ministry of Agriculture, Mr. Denis Pommier, Agriculture and Rural Development Department at the European Delegation in Tunisia, Ms. Ditlinde von Davidson, Water Resources Division at KfW, Mr. Klaus Vollmer and Mr. Fethi Ben Mahmoud experts at the consulting company IGIP and Mr. Serge Marlet at the Agricultural Research for Development Centre-CIRAD.

Disclaimer:

This document has been produced with the financial support of the European Union. The contents are the sole responsibility of the implementing Consortium and can in no way be taken to reflect the views of the European Union.



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List of acronyms

AVSI	Association of Volunteers in International Service
EU	European Union
FAO	Food and Agriculture Organisation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit, GmbH
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit, GmbH
Ha	Hectare
IMT	Irrigation Management Transfer
ISIIMM	Institutional and Social Innovations in Irrigation Mediterranean Management
IWRM	Integrated Water Resource Management
M&E	Monitoring & Evaluation
NGOs	Non-Governmental Organizations
O&M	Operation and Maintenance
PCs	Partner Countries
PIM	Participatory Irrigation Management
PPP	Public Private Partnership
ROSS	Emergency Initiative for Rehabilitation, Occupation, Services and Development
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WUA	Water Users Association

ALGERIA

COS	Conseil d'Orientation et de Surveillance (Monitoring and Orientation Council)
OPI	Offices des Périmètres Irrigués (Offices of the irrigation schemes)
MRE – DEAH	Ministère des Ressources en Eau - Direction des Etudes et des Aménagements Hydrauliques (Ministry of Water Resources – Direction of Studies and Hydraulic Planning)
ONID	Office National d'Irrigation et de Drainage (National Office for Irrigation and Drainage)

EGYPT

BCWUA	Branch Canal WUA
CDIAS	Central Directorate for Irrigation Advisory Services
CUA	Collectors Users Association
DWB	District Water Board
EPADP	Egyptian Public Authority for Drainage Projects
EPIC	Environmental Policy and Institutional Strengthening Indefinite Quantity
EWUP	Egyptian Water Use and Management Project
IIP	Irrigation Improvement Project
IIS	Irrigation Improvement Sector
IMS	Irrigation Management System
MWRI	Ministry of Water Resources and Irrigation
NWRP	National Water Resources Plan
RMC	Regional Management Committee
WMO	Water Management Organizers
WUO	Water Users Organizer
WASAMED	Water savings in Mediterranean Agriculture
WUU	Water Users Union

JORDAN

JCC	Jordan Cooperation Corporate
JD	Jordanian Dinar
JVA	Jordan Valley Authority
MWI	Ministry of Water and Irrigation



WMIA	Water resource Management in Irrigated Agriculture
LEBANON	
AWO	Autonomous Water Office
CDR	Council for Development and Reconstruction
LC	Local Committee
LRA	Litani River Authority
MEW	Ministry of Energy and Water
MoA	Ministry of Agriculture
RDP	Rural Development Project in Northern Beqaa
SBIS	South Beqaa Irrigation Scheme
WE	Water Establishment
MOROCCO	
ABH	Agence du Bassin Hydraulique (<i>River Basin Agency</i>)
AUEA	Association d'Usagers de l'Eau Agricole (<i>Associations of Agricultural Water Users</i>)
ORMVA	Offices Régionaux de Mise en Valeur Agricole (<i>Regional Agricultural Development Authorities</i>)
AGR/DDGI	Ministère de l'Agriculture/Direction pour le Développement et la Gestion de l'Irrigation (<i>Ministry of Agriculture/Directorate for the Development and Management of Irrigation</i>)
OCCUPIED PALESTINIAN TERRITORY	
PA	Palestinian Authority
TUNISIA	
AIC	Association d'Intérêt Collectif (<i>Associations of Collective Interest</i>)
CRDA	Commissariat Régionaux au Développement Agricole (<i>Regional Directorate for Agricultural Development</i>)
GDA	Groupements de Développement Agricole (<i>Agricultural Development Groups</i>)
GH	Groupeement Hydraulique (<i>Hydraulic Groups</i>)
GIC	Groupeement d'Intérêt Collectif (<i>Groups of Collective Interest</i>)
MARHP	Ministère de l'Agriculture, des Ressources Hydrauliques et de la Pêche (<i>Ministry of Agriculture, Hydraulic Resources and fisheries</i>)
PNEE	Programme National d'Economies d'Eau (<i>National Water Saving Programme</i>)
PPI	Périmètres Publics Irrigués (<i>Public Irrigation Schemes</i>)
SAEP	Systèmes d'Alimentation en Eau Potable rurale (<i>Rural Drinking Water Supply Systems</i>)
TD	Tunisian Dinar



EXECUTIVE SUMMARY

Participatory Irrigation Management (PIM) is a key term in the toolbox of current approaches to improve the efficiency and performance of water resources management in the countries that are to cope with the issue of water scarcity, or problems associated with global and climate change in the foreseeable future (Regner et al., 2006). The term PIM refers to the participation of users – the farmers in all aspects and levels of irrigation management. A more comprehensive variant of PIM is Irrigation Management Transfer (IMT) which is the full or partial transfer of responsibility and authority for the governance, management and financing of irrigation systems from the government to water users associations (WUAs) (Vermillion, 2005; Peter, 2004). The devolution of management responsibility over irrigation systems or parts thereof requires:

- A firm policy decision to transfer a meaningful level of responsibility over the management of irrigation systems to water users;
- A legal framework for establishment of independent WUAs, and for empowering them;
- A capability within WUAs to manage the irrigation system or sub-system serving them;
- A capability within public irrigation agencies to (i) provide technical and institutional support to WUAs and (ii) oversee the performance of WUAs;
- Economically viable irrigated agriculture: To be independent and self-managed, WUAs have to be financially autonomous and viable.

The objective of this report is to review the progress of PIM, identify the range of experiences and assess the status, achievements and challenges of the WUAs in the nine Partner Countries (PCs), draw lessons and opportunities for improvement.

To this aim a desk based assessment using evaluation studies and projects implemented by governments, donors, regional organizations and research institutions, supplemented with information from national partners was carried out. In parallel, specific case studies from Egypt, Jordan, Lebanon and Tunisia, able to display the diversity of experiences were selected in consultation with the national partners, and in-depth assessments were carried out. The initial findings of this assessment, were documented in the first draft report and was used to inform the discussions during the SWIM-SM WUAs' Expert Group Regional Workshop that was held in Athens on 23-24 April 2012, involving national, regional and international experts who validated the findings, and provided insights on next steps and potential types of activities in the next implementation years of the project. The workshop results were documented and are available at http://www.swim-sm.eu/files/SWIM-SM_WUA_WORKSHOP_REPORT_EN_final.pdf

In view of the above, the following can be concluded regarding the status of the WUAs in the PCs:

The nine countries involved in the assessment are at different stages in their policy commitment and in the development of a legal framework that incorporates the concepts of managerial and financial independence for WUAs and their long-term sustainability.

Several problems have emerged during the implementation of IMT. Many of these problems are universal. Essentially, there have been three major constraints:

- First, there has been a lack of or disaggregated political support in most countries. This has resulted in an inadequate support to the process.
- The second one is of a legal nature. Often, governments have not wanted to face the difficulties of changing the existing laws through parliamentary processes and have tried to implement the reforms with existing, unsatisfactory legislation or with ministerial decrees that have lacked the necessary weight and authority. The result has been that often the legal responsibilities and nature of WUAs are not clear or do not cover well the real responsibilities.
- The third has been the lack of managerial skills within the WUAs, which has resulted in poor provision of water services.



Despite these significant similarities, the experiences of the PCs still show particularities and allow to distinguish among different breadths of reforms application:

Rigorous enforcement of policy and institutional and legal measures coupled with an advanced technology and a performing, still evolving Public-Private Partnership (PPP) in water management have been very effective in Israel. In Tunisia and Morocco, IMT is a national strategy and WUAs have a legal status. However, these two countries differ in the conformity of their policy goals with their respective legal texts and the allocation of responsibilities. Moreover, the imbalance between the irrigated areas and the allocated water resource in Tunisia, is binding the productivity of agriculture and consequently accentuating the financial problems of the WUAs while, a growing involvement of the private sector as service provider to the WUAs characterized a more mature water sector in Morocco.

In Egypt, Integrated Water Resources management (IWRM) is a national strategy but IMT is still confined to the tertiary level, whereas several projects funded by International donors aiming at transfer at the branch canal and district levels are still constrained by an ambiguous political support, the lack of a legal framework associated to a controversial water system in its hydraulic and institutional aspects. The Egyptian experience can be to a certain extent compared to the Jordanian one, where the national strategy on IMT and PPP is clear in the texts, encouraging pilot experiences to consolidate the transfer and the performance of the associations, but the lack of a legal framework (the associations are registered under a cooperative profile) and a re-orientation of the Jordan Valley Authority (JVA) mandate, coupled with the government's reservations to rapidly hand out significant responsibilities to the WUAs are slowing down the process and confining the WUAs roles to routine small scale actions. .

Lebanon and Syria show similarities despite the difference in their experiences in irrigated agriculture, in the general contexts that governed the countries till the recent past and in the breadth of initiatives. In both countries, the transfer initiatives are relatively young, shyly cited in the national strategies, disaggregated, mainly driven by donors and lacking the right ingredients for an enabling environment. Moreover, more “hard” interventions still dominate the water system. This “engineering” approach characterizes the Algerian water sector as well. Actually, despite the significant structural and regulatory reforms adopted by the Algerian government, the water master plan is still not in formal use and the focus of water planners and policymakers remain focused on hardware such as physical systems, rather than on software such as management and institution-building.

Palestine shows a more complex system, where scarcity and lack of clear strategies are associated to a general context conditioned by the state of negotiations with Israel.

The constraints underlying the water system failures in water resources development and management are mainly related to a joint governance system, with asymmetries of power and capacity, a weak institutional capacity and an investment environment that creates huge costs and delays.

Overall the region, the results of the process can be perceived as a mixture of successes and failures.

Developing and enhancing institutions that can respond to, and appropriately support initiatives, offer a pathway for making government investment in irrigation more productive and better aligned with the interests of water users and strengthen local commitment.

Participation improved design and construction as demonstrated by the success of PIM at mesqa level in Egypt and “Btedhi Cooperative” in Lebanon. However, the sustainability of WUAs remains questionable. The main operational constraints include enforcing sanctions, financial autonomy and support received from the water agencies.

There still is a widespread need for a clearer legal status and water rights given to WUAs and farmers. Without a clear legal status, WUAs cannot operate properly because they do not know the extent of their responsibilities. It is also as important to devise workable procedures for monitoring the behaviour of irrigation water suppliers and users, sanctioning non-conforming behaviour, and resolving conflict as it is to devise the rules themselves.



A clear example is given by the Tunisian and Jordanian experiences as well as the pilot initiatives at Branch canal in Egypt, still struggling to different extents with the ambiguity of roles and the over-control of the agencies.

An almost immediate impact of the transfer process was a significant reduction in conflicts between water users over the delivery of irrigation water. The rapid and significant decline in water-related conflicts provides strong feedback to water users, as to their ability to successfully assume responsibility for improving the operation of their irrigation system, addressing equity issues. In addition, IMT process has forced a new look on the way services are provided to users in the assessed countries. This has been perhaps one of the most remarkable achievements of the newly established WUAs, and the experience extensively reported by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in all targeted areas in Jordan valley and in mesqas in Egypt.

Moreover, a continuous monitoring and evaluation (M&E) and a consequent readjustment of the process, which should be conceived as an adaptive and flexible learning process, are essential. Beyond replication models, one-size-fits-all, a main issue is the coalition of users' interests as shown in Rash El Gharb Water Board in Egypt, and the capability of the process to match with the local natural and social conditions as in Jordan, where the established associations accounted also for the traditional mechanisms of problem solving in rural areas.

Except for Israel which is experimenting a broader Public Private Partnership through the encouragement of Regional WUAs, little has been done in the region to increase the financial capacity of WUAs to mobilize and manage resources, or to address transparency; a major asset of a successful process. Moreover, PIM projects often assume that they will improve farmers' income, but have not included elements directly focusing on income generation.

There is a range of mechanisms which could be explored, ranging from designing needs-based budgeting and water charge, to the possibility of borrowing or joint investing, to diversifying agriculture and developing agri-businesses. Cheques and balances should be issued and approved as well, through controlled mechanisms to ensure that WUAs are acting according to the members' interest, as well shown in Henchir-Rmel WUA in Tunisia.

Increasing competition for water is bringing increasing pressures for reallocation of water from irrigation to other sectors. WUAs at primary levels in countries like Morocco where transfer occurred at the secondary and tertiary level, and federations such as the regional WUAs in Israel, should be strengthened and encouraged as they can provide a structure for participation in water resources management, dealing with problems such as reallocation and water quality.

All the above, demonstrates that PIM needs systematic public awareness campaigns, capacity building programs, consultations and involvement of all stakeholders.

Finally, this study indicates that IMT is an approach for irrigation sector reform with the potential to improve the sustainability of irrigation systems. It should involve both hard and soft interventions and be conceived as an adaptive and flexible learning process, which is not confined to a beginning and an end, and evolve into progresses. However, what is certain is that irrigation sector reform is a must and very few countries can afford to disregard the potential benefits it offers.



INTRODUCTION

Agriculture is by far the largest user of the world's water, soil and biodiversity. Today it finds itself at the centre of the debate on how to conserve the world's environment.

Irrigation accounts for 70 percent of the total water withdrawals of the globe; a percentage that is close to 85 percent when considering the scarce water resources in the Near Eastern countries. Domestic water supply, industry and manufacturing, and the environment itself, are now in direct competition with the agriculture sector for increasingly scarce water resources (FAO Water Reports, 2007).

As a matter of fact, since the advent of the Green Revolution, a large number of poverty alleviation and food security oriented projects have relied on irrigation as an important factor for improving land and labour productivity. The Green Revolution was based on the twin premises that: 1) the government is the engine for development and 2) a standard package of inputs should be promoted by government bureaucracies. Typically, the government coordinated all support services, and the farming community was perceived only as beneficiaries (instead of partners).

However, successive evaluation studies have concluded that Government-controlled irrigation systems often failed to achieve their development objectives in terms of areas irrigated, productivity increases and poverty alleviation. While Governments have been successful in raising the financial resources needed for the development of irrigation infrastructure, they have been less successful in creating an effective institutional and legal framework within which the infrastructure can be exploited in a sustainable manner. This reflected the facts that:

- (i) Government managed irrigation systems tend to perform below their intended capacities;
- (ii) the financial and institutional resources needed to make Government-controlled irrigation systems sustainable have been beyond the capacities of most Governments to bear; and ;
- (iii) under Government managed irrigation systems, farmers lacked the motivation to make economic use of water due to a distorted perception of the true cost of water delivery, and often its unreliable nature (WASAMED, 2003).

The following legacies of the state-driven paradigm of rural development have lingered long after the Green Revolution:

1. Top-down administration of water and agriculture programs by government agencies;
2. Large, over-staffed government bureaucracies with under-paid staff and little money for operation, maintenance and management expenses;
3. Dependence of less-developed countries on external loans;
4. Prolonged low prices for basic cereal and grain crops;
5. Dramatic expansion of irrigated areas without a corresponding increase in funds available for the operation and maintenance (O&M) of irrigation systems;
6. Rapid deterioration and declining productivity of irrigation systems;
7. Weak civil society organizations. (FAO; INPIM International E-mail Conference on Irrigation Management Transfer June – October 2001).

In order to overcome the constraints imposed by the seven legacies and to respond to the increasing water scarcity, decreasing productivity, rising environmental concerns and sectoral conflicts, many countries around the globe opted for a change in water management paradigm.

Particularly, the last decades witnessed a revisiting of the irrigation management practices of the Near Eastern countries; the national policies together with the population growth and increase of food demand, having driven and accentuated for the last century the hydraulic mission of their economies via supply-driven management of water resources. Consequently, financial resources were mainly allocated to the construction of infrastructure, while O&M operations were neglected.

Nowadays, among other procedures, the governments in these countries adopt a philosophy of increasing efficiency, namely, producing "more crops per drop". This concept was translated into improving technical efficiency of irrigation systems. This has further evolved to the stage of modernizing irrigation schemes which suggests increasing irrigation efficiency beyond technical aspects. The concept responds to the need



to enhance irrigation services and delivery by pinpointing and addressing institutional, managerial and technical dimensions (IPTRID, FAO; 2006).

Participatory Irrigation Management (PIM) is a key term in the toolbox of current approaches to improve the efficiency and performance of water resources management in the countries that are to cope with the issue of water scarcity, or problems associated with global and climate change in the foreseeable future (Regner et al., 2006). The term PIM refers to the participation of users – the farmers in all aspects and levels of irrigation management. All aspects include planning, design, construction, Operation & Maintenance (O&M), financing, decision rules and the monitoring and evaluation of irrigation systems. All levels include the primary, secondary and tertiary levels. From another point of view, PIM usually refers to the level, mode or intensity of user participation that would increase farmer responsibility and authority in the management process. A more comprehensive variant of PIM is Irrigation Management Transfer (IMT). IMT is the full or partial transfer of responsibility and authority for the governance, management and financing of irrigation systems from the government to water users associations (WUAs) (Vermillion, 2005; Peter, 2004). Groenfeldt (2003) states that PIM processes build two forms of capital: productive capital (better maintained irrigation infrastructure) and social capital (new institutions such as WUAs, skills, leadership and community action) (Peter, 2004).

The growing need for PIM/IMT approaches is due to the following advantages:

- Reducing financial and budgetary difficulties of government;
- Improving irrigation management efficiency;
- Better and timely O&M of irrigation infrastructure;
- Changing farmer's attitude of over dependence on external assistance;
- Positive experience on new institutional arrangements that can be extended to other areas;
- Promoting community activities;
- Facilitating collection of water fees. (APO, 2002; Saleth and Dinar, 1999).

Apart from this, an appropriate PIM approach has to decrease risks of water supply and maintenance costs of the pressurized distribution system; ensuring a higher security of water supply through improved reliability of the system and increasing the cultivated areas due to a lower share of buffer zones within irrigation plots which are a part of farmers reaction against the risk in water supply. In addition, PIM should be designed and implemented in a way to reduce conflicts between farmers. It is because improved and more transparent communication structures originating from the adoption of PIM reduce a number of conflicts between farmers and the need for interventions of governmental authorities in local dispute (Regner et al., 2006).

A review on the various PIM approaches, adopted across the world indicates that establishing WUAs is central and crucial for ensuring the efficiency of these approaches (The 4th Asian Regional Conference & 10th International Seminar on Participatory Irrigation Management Tehran-Iran May 2-5, 2007).

Over the last decades, a large number of countries around the world have adopted programs to transfer management of irrigation systems from government agencies to water users associations or other private sector entities (Johnson, et al., 1995). This type of reform began to be implemented as far as the 1960s in Taiwan, Bangladesh and USA; in the 1970s, in Mali, New Zealand and Colombia; and in the 1980s, in the Philippines, Mexico, Tunisia and the Dominican Republic. The bulk of the irrigation reform peaked in the 1990s, when countries such as Morocco, Australia, Turkey, Peru, Albania and Zimbabwe initiated the process. Today, IMT is taking place in five continents and more than 57 countries have embarked on some type of irrigation sector reform that has IMT (FAO Water Reports, 2007). These experiences witness demonstrable improvements in economic water use efficiency, sustainability and a more responsible handling of water resources and public funded installations (World Bank, 2002). Consistent with general structural adjustment strategies adopted, irrigation management transfer has been supported as well by the major international development banks and many Non- Governmental Organizations (NGOs) (EDI, 1996, Arriëns, et al., 1996).

The objective of this report is to review the progress of PIM, identify the range of experiences and assess the status, achievements and challenges of WUA in the nine PCs, draw lessons and opportunities for



improvement that can be undertaken by SWIM program, shedding light on specific experiences from case studies in Egypt, Jordan, Lebanon and Tunisia.

METHODOLOGY

The rationale for selecting the PIM approach as a tool for upgrading the management of irrigation systems and, thus, enhancing the chances for their long-term sustainability derives from a broad-based international experience, which highlighted the necessity and demonstrated the feasibility of devolving responsibilities for irrigation systems management (including funding of O&M) from public agencies to water users sharing a hydraulic unit or a command area. In this framework, an attempt was performed to draw the profiles of the nine PCs, documenting the evolution of the PIM process and WUAs implementation.

To this aim, a desk based assessment using evaluation studies and projects implemented by governments, donors, regional organizations and research institutions, supplemented with information from national partners was carried out.

In parallel, specific case studies in Egypt, Jordan, Lebanon and Tunisia, able to display the diversity of experiences were selected in consultation with the national partners, and in-depth assessments were carried out, based on a questionnaire that was developed to document the context within which IMT and PIM was initiated including available strategies, policies and the legal framework, the implementation process, outcomes, impacts and lessons learned..

Accordingly, the following steps for the devolution of management responsibility over irrigation systems or parts thereof were assessed in the selected four countries:

- The policy decision to transfer a level of responsibility over the management of irrigation systems to water users, along with concrete actions.
- The legal framework for establishment of WUAs, and for empowering them to operate and maintain irrigation systems. This framework consists of the enabling law, the by-laws of the WUAs, and the Transfer Agreement between the public irrigation agency and the WUA, specifying the rules for the hand-over of responsibility to WUAs.
- The capability within WUAs to manage the irrigation system or sub-system serving them, in conformity with O&M standards specified in the transfer agreement and in compliance with the principle of fair access to water by all members.
- The capability within public irrigation agencies to (i) provide, on-demand, technical and institutional support to WUAs, particularly during the formation stage, and (ii) oversee the performance of WUAs to ensure that the irrigation infrastructure developed with public funds is managed in a sustainable manner.

Based on the above, the outcomes and impacts derived or expected from PIM and WUAs are brought together and the main constraints (and how they have been or should be overcome), key conclusions and recommendations are summarized.

OVERVIEW OF THE EVOLUTION OF WATER USERS ASSOCIATIONS IN THE PCs

IMT has been applied to fit diverse reform needs, ranging from pilot areas of a few hundreds hectares (ha) to large schemes of several hundred thousand hectares and a national effort encompassing millions of hectares. Similarly, the reform was induced by different actors and drivers, took place at various hydraulic levels and resulted in a variety of institutional arrangements. The assessed nine PCs show a diversity of strategies with regard to the modernization of their irrigation sector, ranging from supply to demand management and of experiences, ranging from centralized management to full devolvement of the responsibilities to users. The assessed experiences clearly reveal the start-up of the reforms in the water sector all over the region even though, IMT is not yet adopted in some countries like Algeria, is just



emerging in Syria and is driven by the willing of the Palestinian farmers to face the challenge of managing a scarce resource, in a particular context of undefined National water rights and responsibilities. This applies also to the Lebanese context, where the necessity for self-organization is pushing farmers to fill the juridical gap in the legal basis and mask their associations behind agricultural cooperatives. International programs which started decades ago are encouraging the Egyptian and Jordanian governments to institutionalize the pilot experiences in PIM and to shift transfer to higher hydraulic levels, while Morocco and Tunisia are witnessing a partial and/or full devolvement of responsibilities, and a continuous evaluation/re-adaptation of their experiences, and Israel is encouraging PPP through the establishment of regional associations able to invest in exploitation and distribution of marginal water in the framework of a mature water economy despite the resource scarcity and pressures.

The present section documents the state of PIM in the region and the progress in the application of reforms, as part of the irrigation modernization process, and examines the breadth of activities undertaken.

To enhance the performance of irrigation schemes, the Algerian government has adopted significant reforms. Structural reform has involved the decentralization of water resource management and the establishment of an autonomous irrigation agency. Regulatory reform has focused on water pricing with the goal of cost recovery. The O&M of the hydraulic infrastructure in the large irrigation schemes were conceded to thirteen offices OPI (*Offices des Périmètres Irrigués/Offices of the irrigation schemes. These are* Public establishments having an industrial and commercial character), five of which are under the ministry of water resources and eight under the wilayas. According to the executive decree 85-260, the OPIs manage, use and maintain the irrigation and drainage networks and have to develop extension actions to sustain irrigation in the schemes. However, the five regional offices still suffer a chronic deficit and rely for survival on execution of works to third parties and the majority of the eight offices of the wilayas are practically not operational (Guemraoui and Chabaca, 2005).

As required by law, Algeria is updating its water master plan. As of May 2006, the Ministry of Water Resources – Direction of Studies and Hydraulic Planning (MRE – DEAH; *Ministère des Ressources en Eau - Direction des Etudes et des Aménagements Hydrauliques*) has prepared one draft for each of the four hydrologic regions. Such plan is not in formal use, and as such, is not yet followed by any authority.

Moreover, the country is still facing a governance gap (The World Bank, 2007). Little attention is paid to integrated management and proper maintenance of schemes or to the voices of local stakeholders. Although **the adopted Water Law (2005) introduced the concept of stakeholders participation in all water-related decisions**, in reality, the young water users associations are since 2006 part of the monitoring committees of the irrigation campaigns carried out in the large irrigation schemes, and are represented by two members in the Monitoring and Orientation Council (COS - *Conseil d’Orientation et de Surveillance*) of the National Office for Irrigation and Drainage (ONID – Office National d’Irrigation et de Drainage). In addition, the realization by the state of any small and medium infrastructure is conditioned by the creation of a WUA. However, the sense of participation is not yet developed and the associations are still lacking the institutional and legal arrangements which organize their involvement/devolvement of responsibilities, and the proper technical and financial autonomy which regulates their functions for a proper management/maintenance of the schemes.

Syria faces the challenge of lacking a comprehensive regulatory framework for integrated water resources management. Over 140 laws dealing with water have been passed since 1924. Prohibitions on well drilling and groundwater pollution have been passed, but there are no clear mechanisms for their enforcement. The Syrian water sector is both highly centralized and fragmented between sector institutions that have overlapping functions and responsibilities.

The responsibility of dealing with water resources management lies with a number of ministries, which are all represented in the Council of General Commission for Water Resource Management.

The performance of the irrigation sector is relatively low and there is large scope for improvement and water saving. Low irrigation efficiency can be attributed to an ineffective water management system.



Funds allocated to O&M works which represent around 10 percent of the Ministry of Irrigation budget for the year 2000, do not meet the requirements of the major O&M needs (World Bank, 2001). In addition, the water charge collected from farmers covers only around 80 percent of the routine maintenance cost of the canal system. Therefore, there is a risk that irrigation infrastructures may enter in the vicious cycle of accelerated degradation due to lack of the required funds for maintenance.

In order to face the increasing needs, Syria has adopted for more than two decades a number of modernization activities for improving irrigation efficiency, focusing mainly on physical interventions to improve off-farm and on farm systems. Recently, the Syrian government has adopted (October 2005) the principle of PIM. However, in Syria, farmers are already organized in a Farmers' Union. The Union is a member of the Supreme Agriculture Council, which is an apex policy making body headed by the Prime Minister and has members from the major water related ministries. There are parallel regional councils to the Supreme Council in each Governorate with similar arrangement and representation.

The Farmers' Union has branches in all the Governorates with ramifications down to the village and farm level (Farmers' Association). Farmers elect Associations and Union boards. At the field level, Farmers' Associations are responsible for irrigation management including farm water rotation. In addition, the Association closely cooperates with the irrigation agencies in the identification and planning of maintenance works, mainly at the tertiary level. They are also responsible for collecting information on farms' agriculture production. Furthermore, in order to increase the sense of system ownership, Farmers' Associations participate in the planning and commissioning of irrigation civil works. However, farmers do not have direct roles and responsibilities in the management and O&M of irrigation schemes; these are the responsibilities of the irrigation agency.

It is obvious that the present institutional and organizational arrangement of farmers in Syria provides a strong base and opportunity for introducing PIM policy. As a matter of fact, the Water Law (October 2005) indicates the establishment of Water Users Associations as a legal entity for O&M of irrigation systems in areas where water sources are collectively used. WUAs in a specific irrigation scheme can be established by an order issued by the Minister of Irrigation. However, so far the creation of pilot WUAs is progressing very slowly. In addition, the acts, official instructions and by-laws defining the roles and functions of these associations, their structure and internal working rules and the roles and responsibilities of the WUAs' staff (general body, president and managing committee) and the roles of the irrigation agency have not been issued yet. Furthermore, there is a need to develop a model of memorandum of understanding or service agreement between the WUAs and concerned irrigation agencies that enumerates roles and responsibilities.

The occupied Palestinian territories (oPt) represent a particular case where the development and reform of the water sector are mainly driven by the progress of negotiations with Israel. In 1995, the Oslo II agreement contained provisions on water and sewage that recognized undefined Palestinian water rights, and returned some West Bank water resources and services responsibility to the Palestinian Authority (PA). In the context of the Peace Process, water was referred to as a final status issue, but interim arrangements were made until status could be resolved.

Oslo Interim Agreement divided the West Bank into three Zones, A, B and C. According to the agreement, Zone A was supposed to be completely under PA jurisdiction and control while PA has jurisdiction over civil issues in Zone B and has no jurisdiction over Zone C which is nearly 60% of West Bank Area and includes the potential areas for development. The Interim Agreement concluded on September 28th, 1995 contained Article 40 on Water and Sewage, which essentially:

- recognized the Palestinians' water rights in the West Bank, although these were not defined
- set governance arrangements for a five year interim period, notably a Joint Water Committee (JWC) was created to ensure that Israel will have the final say on any water or wastewater project to be developed for the Palestinian benefits in the West Bank, especially in Zones B and C.
- provided for additional supply from wells, mainly in the Eastern Aquifer and any other agreed on sources during the interim period.

The general expectation was that this interim agreement would be revised within a five year period as part of the final status negotiations. However, sixteen years later the "interim" agreement is still in place and the



hopes that Oslo would bring water resources for a viable state under Palestinian control and that water for agriculture would underpin growth have only been very partially realized. The factors restricting Palestinian water sector development include sector governance, and movement and access restrictions beyond the control of the Palestinian Authority, as well as internal contributing factors, notably governance and capacity weaknesses of Palestinian institutions (The World Bank, 2009).

As a matter of fact, despite the broad lines of the Palestinian Water Authority (PWA) policy which advocates stakeholders' involvement in water resources management, a clear strategy on governance is still missing. Moreover, the absence of bilateral agreements with Israel, especially regarding ground water ownership and management, are burdening the modernization of a vital sector. However, literature reports some examples on voluntary PIM experiences, often backboned by NGOs, and mainly emerging from the growing necessity to manage a scarce and essential resource in areas relying on agriculture, such as: "Qabatya Cooperative for irrigation" in Jenin; "Thennabah Cooperative for agricultural Services" in Tulkarm; Tammun Cooperative for protected Agriculture in Tubas; Al-Muruj agricultural cooperative in Qalqilya; Al-Auja Agricultural Cooperative. However, these associations, driven by the only necessity of farmers, are far from being self-sufficient in terms of O&M nor sustainable, and thus don't fulfil the basic prerequisites for a PIM as an essential element of a modernization process.

Actually, creating a sustainable WUA is not an easy task especially when there is no enabling environment for it. This is also the case of Lebanon, where the legal base and the related legislative texts are either complex or outdated. The only jurisdiction in Lebanon over WUAs dates back to the French mandate.

Indeed, the French elaborated the same text for Lebanon, Morocco, Algeria and other colonies based on the French Syndical Association (governed by the law of the 21st of June 1865), which to date, has never been adapted to the local specificities or the social realities of the countries (Gedeon, 2007).

In year 2000, Lebanon launched the reform of its water legislation. Laws number 221 and 241 published respectively in May and August 2000 and law number 337 issued in March 2002 established a new institutional policy for water management in Lebanon (Comair, 2008) setting, among others, new competences for the Ministry of Energy and Water (MEW) and for the Water Establishments (WEs). These four new WEs (Beirut-Mount Lebanon, North Lebanon, South Lebanon¹ and Beqaa) are entities operating under the MEW and responsible for large hydraulic projects in their respective areas, their design, and O&M and for financial investments and tariff collection (Comair, 2008), whereas, small and medium projects were marginalized in the reform. In 1999, MEW published a ten years master plan (MP) (2000-2010) defining the strategy of the sector. In 2003, under a cooperation program in the water sector between the Lebanese and the French government, a Water Code was written.

Although the laws organizing the water sector were published in the year 2000, the presidents and the six members of the WEs Boards were only appointed late in 2002 delaying the effective application of the laws (Comair, 2006). These WEs were supposed to take over the management of the irrigation, potable water and sewerage schemes from the old AWOs (Autonomous Water Offices) and LCs (Local Committees). Unfortunately, not all the old offices are yet connected to the new WEs which in addition, lack human and financial resources and thus are restricted to the only management of potable water. Moreover, the management of the small and medium hydraulic projects was not tackled.

Finally, the Water Code written by the French and the Lebanese governments has not been promulgated yet by the Lebanese parliament. Considering the events that happened in Lebanon during the last ten years, the term for the implementation of the decennial plan (2000-2010) of the MEW has been postponed till the year 2018 as confirmed by Comair (L'Orient le Jour, 2009a).

In 2006, under the supervision of the EU-funded project 'Institutional and Social Innovations in Irrigation Mediterranean Management' (ISIIMM) and with the cooperation of the Food and Agriculture Organisation

¹ The law 221/2000 intentionally disposed in its 7th article that the Litani River Authority (LRA) will remain bound to the law of 14/8/1954 concerning the development, management and exploitation of irrigation schemes and associated works in South Beqaa and South Lebanon. That is why today the WE of the South is only responsible for potable and wastewater management and not irrigation water. The LRA being created by a law published on the 14th of August 1954. In 1955, the LRA was given the technical and the financial power for operating and exploiting all Litani River Basin related projects. In 1962 this power was extended to include a water development plan for all the Litani/Awali basins and the area between the international Beirut-Damascus road and the southern Lebanese boundary (Comair, 2006).



(FAO) and the MEW, the water expert lawyer Hyam Mallat wrote a draft proposal for a decree project related to the establishment of Irrigation WUAs in Lebanon, which is just an update of the bylaw 320/1926. It allows the land owners of a certain area to form a WUA and permits the landlords to be represented by the tenants. The constitution of such a WUA does not require a lot of administrative paperwork and the set goals are:

- Achievement, maintenance, exploitation and execution of repairing works and extension that will be beneficial for the scheme.
- Equitable distribution of irrigation water between the members
- Setting of tariffs according to exploitation and maintenance costs
- Collection of fees
- Refereeing when conflicts emerge between members or between members and non- members
- Protection of water quality

Unfortunately, the text was not promulgated by the parliament. In 2011, the EU funded project “Projet d’Appui au Développement Local dans le nord du Liban”, undertook a study on the WUAs in Lebanon, with a view to promote the concept in North Lebanon and transfer the management of irrigation networks installed by the project to WUAs through an agreement with the MEW. Moreover, the “Hydro-Agricultural development for Marjeyoun area” project managed by the United Nations Development Program (UNDP) and involving Litani River Authority (LRA) and the NGO “Association of Friends of Ibrahim Abd El Al”, drafted a national law for WUAs and is currently working on its approval by the Lebanese Parliament.

Finally, the draft strategy for water developed by the MEW under the initiative number I.1 (1.8) that clearly stated the need for the creation of WUAs in small and medium schemes has been approved by the Council of Ministers on March 9, 2012.

Despite the institutional and juridical gap in the legal basis of WUAs in Lebanon, several initiatives were found to be efficient in order to fill the *lacunae* and makes things work better. That is why the great number of WUAs created since 1997 are in reality masked behind cooperatives. In 1972 the decree related to the creation and management of Cooperative² () was published. In Lebanon, instead of establishing informal WUAs, initiators preferred to create agricultural cooperatives as they have a legal status and they can also tackle rural development and agricultural issues. Agricultural cooperatives flow under the directorate of agricultural cooperatives in the Ministry of Agriculture (MoA) and are numbered to more than 560.

The first successful attempt to create a WUA was achieved in 1997 through personal initiative in the village of Mchaytiyyeh under the ‘Agricultural Cooperative Association of Mchaytiyyeh’ in order to manage the newly implemented irrigation scheme. This association received the support and financial help from many local and international bodies such as the United States Agency for International Development (USAID) and the Japanese Embassy.

The creation of the ‘Lake Share Communities Union’ on the South Beqaa Irrigation Scheme (SBIS) in 2003 was the fruit of the European Union (EU) funded Water Savings in Mediterranean Agriculture (WASAMED) project with the cooperation of LRA, Lebanese Agronomic Research Institute (LARI) and Chamber of Commerce, Industry and Agriculture of Zahleh and the Beqaa. An international funded project launched by the Italian Cooperation in Lebanon was also behind the creation of the ‘Irrigation Water Users’ Association of Jabbouleh’ in 2004.

Many international donors and NGOs were involved in the socio-economic rehabilitation and relief programs that followed the 2006 war. The Italian NGO AVSI (Association of Volunteers in International Service) worked also under the Italian Cooperation in Lebanon – ROSS (Emergency Initiative for the Rehabilitation, Occupation, Services, Development) Emergency Program in the rehabilitation of the Dardara irrigation network and the management of its water resources. In 2008 the ‘Marjeyoun-Khiam Plain Water Users’ Association’ was created. A new status has also been conceived by the Rural Development Project (RDP) in Northern Beqaa, mainly funded by the Italian Ministry of Foreign Affairs that created a **Water Users’ Cooperative** in Btedhi. This is a first in Lebanon and could be used as an example

² Association of persons united to meet their common economic, social, and cultural needs through a jointly-owned enterprise



for other WUAs in the future. This cooperative profited from micro-credits in the form of irrigation equipment. It immediately installed the collective irrigation scheme by its own means and with the financial contribution of local partners and the technical assistance and supervision of the RDP project.

In conclusion, in Lebanon there are no formal WUAs but only embryos of associations, masked behind agricultural cooperatives that have been created under the impulsion of external donors or projects, aiming at the sustainability of their accomplishments, and often lacking the technical and managerial skills to survive the end of a project and to maintain an infrastructure. Moreover, the many initiatives undertaken are disconnected as they do not build on any former achievement and are not a part of a broader national strategy.

Unfortunately, nothing has been done yet by the ministries concerned or by the government except for the approval by the Council of Ministers on March 9, 2012 of a draft strategy for water developed by the MEW under the initiative number I.1 (1.8) that clearly stated the need for the creation of WUAs in small and medium schemes. However, the law regulating WUAs activities is not yet promulgated despite the many campaigns promoting it.

Egypt has a different experience with IMT which, initially driven by International donors, started decades ago. Egypt Water Use and Management Project (EWUP 1977-1984) funded by USAID, first recommended the involvement of farmers in water management to ensure more efficient operation, improved maintenance and protection of physical works. The Irrigation Management Systems Project (IMS), which had started in 1981 with USAID funding, followed up on the EWUP recommendations. In 1987 the Irrigation Improvement Project (IIP) launched the first large-scale attempt at forming formal user organizations. IIP has since evolved into the organizational set-up of the Irrigation Improvement Sector in the Ministry. The IIP included the Central Directorate for Irrigation Advisory Services (CDIAS), which was assigned the tasks to organize farmers into Water Users Associations. **This can be regarded as the start of the formal introduction of farmers' participation in water management in Egypt.** With the modification of Law 12 in 1994 known as Law 213 (and bylaw 14900/1995), WUAs acquired a legal status and were defined as legal organizations at the mesqa level in the improved irrigation systems in the Old Lands; mesqas being private properties already owned, managed, operated and totally maintained by the users. The same Law 213 also introduced the Water Users Unions (WUUs), which are defined in much the same manner except that these are applicable only in the New Lands, where PIM is not related to mesqas and IMT has been applied from the beginning of reclamation. More than thousand WUAs and hundreds of WUUs have been established to date.

The WUAs established through the modernization process, incorporate representatives of farmers that benefit from the Mesqa. The WUA is responsible for Mesqa improvement (such as selection of Mesqa type, locating the new Mesqa, locating Mesqa turnouts), operating and maintaining the single point lift pump, scheduling turns among water users, resolving disputes, and Mesqa maintenance. For each Mesqa, a board of at least 5 members, responsible for setting - independently from any governmental influence - and collecting operation and maintenance fees, is elected. The capital costs for mesqa improvements under IIP are recovered on annual instalments over not more than 20 years, while the costs of pumping units as well as the cost for land levelling are repaid over three years in equal annual instalments. This can be regarded as a very generous incentive from the government. Usually, a WUA has a bank account which enables the control of its financial status.

Building on the success of WUAs at mesqas, the Egyptian Public Authority for Drainage Projects (EPADP), as part of their program to construct tile drainage networks, modelled and established numerous Collectors Users Associations (CUAs) to carry out routine maintenance tasks on the tile drainage system and in particular clean collector manholes. The CUAs have never received the legal recognition as WUAs and have consequently remained voluntary, however thousands of CUAs were established (on the collective drainage level) over the old lands.

In the 1990s, many projects tried to transfer irrigation management to higher levels and started to establish pilot Branch Canal WUAs (BCWUAs). These projects were funded by the Dutch Government and USAID. In 2007 the National Water Resources Plan (NWRP) has been adopted. It is based upon IWRM. Decentralization, participation and IWRM became the main themes of the Ministry of Water Resources



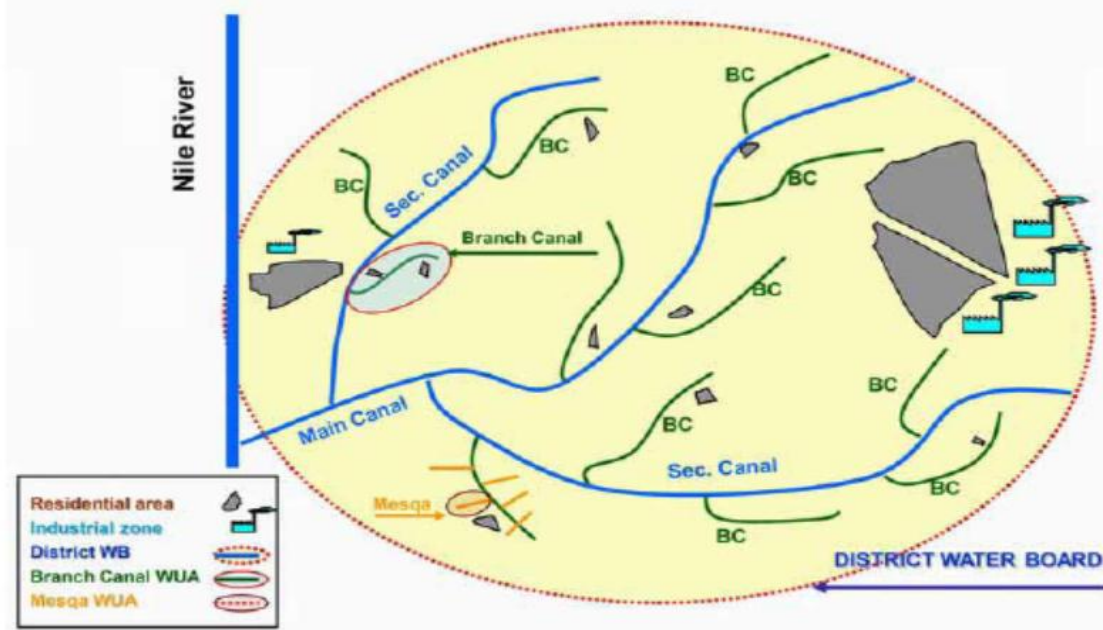
and Irrigation (MWRI) policy which recognized that the transfer has to be applied at higher levels. The NWRP has foreseen the establishment of a total number of 4000 BCWUAs and 200 District Water Boards (DWB) up to 2017.

According to the NWRP, when effective IMT will take place, the BCWUA will be devolved the responsibility for water management within the defined boundaries whatever the types of water uses are (agricultural, domestic and industrial), and thus should incorporate the CUAs as well. However, during the joint management period between the Government and the BCWUAs, the BCWUAs are involved in the water management only through consultation and active participation.

On the other hand, DWBs are organized at the District level (25000 – 50000 acres) where each BCWUA falling within the district boundaries is represented. The members of the DWB are organized in committees (for irrigation, drainage, planning, administration and finance...) and elect only one speaker who represents the District Water Board in a Joint Management Committee for the Integrated Districts management; composed among others from representatives of the MWRI. The DWB is mainly involved in the coordination of water allocation among water sectors and Branch canals. The figure below shows the structure of the water system in Egypt.

Structure of the water system in Egypt

Despite the heterogeneity of the initiatives, their applicability and impacts, the complexity of the Egyptian



water system, and the slowness of the process which negatively affects the sustainability of active participation, positive experiences in the transfer to Branch canal level have been documented. One success story is Rash El Gharb local board (detailed in annex to the report) which was able through the first year of establishment to make great leaps in establishing an office, developing the internal regulations, drawing-up an action plan (although its sole focus was drainage), and establishing a very strong network of allies in the MWRI and other stakeholders in the area. Moreover, it was able to show its achievements in: i) the establishment process and thus to become a notable stakeholder among all the active institutions in the area; ii) the organization of the rotations at the canal and to fruitfully cooperate with the district engineer; iii) tackling residential problems - insect infestation, sewerage disposal; iv) self-financing and execution of maintenance works in coordination with the MWRI. Of all its achievements, perhaps the most notable is that Rash El Gharb Water Board has acted as a melting pot for the community. Large and small investors, graduates and settlers of the area have all become a community maybe for the first time since the lands were reclaimed and a settlement began to materialize. The Graduates overcame their



trepidations, and the investors overcame their seclusion to cooperate and served their common interest – water management. The initiative included all parties, but the investors took the lead to manage and yield resources for the process. The spin-offs of the developing of that community continue to erupt in all aspects of water management. One such spin off is the noticeable increase of the commercial activity in Shagaa, the central village of the command area (Source: CDIAS)

However, despite the national strategies and development plans, BCWUAs and DWBs still lack a legal entity **to date**. They are still implemented through a Ministerial Decree issued by the Head of Central Department for Water Resources and Irrigation at the Governorate, and ruled according to internal regulations defined in a Memorandum of Understanding signed with the MWRI. Only seven DWBs have been established so far in pilot areas. **In conclusion, the long Egyptian experience in PIM was not able to date, to shift the transfer to higher levels nor to continuously monitor and evaluate the pilot experiences and consequently take the necessary arrangements to amend and/or go forward.**

Governmental strategies, supported by international programs and donors, promoting a demand management approach and a Public Private Partnership are driving the participatory process in Jordan. **The Irrigation Policy 1998** of the Ministry of Water and Irrigation (MWI) in Article 34 stipulates that “Pilot irrigation areas shall be designated to test the workability of PIM, where farmers will assume the responsibility of water delivery to their farms. When found successful, PIM will be extended to the Jordan Valley irrigation systems”.

Moreover, one of the goals stated for irrigation in the MWI water **strategy 2008-2022**, is “Jordan will have one service provider for irrigation water for the whole country, whereas the retail function for irrigation water will be privatized and/or handled by empowered farmers’ associations”.

The JVA, a governmental organization under the MWI, responsible for the social and economic development of the Jordan River Valley, including the development, utilization, protection and conservation of water resources, states in Article 3 of its Development Law (Law No. 19, 1988) and its amendments, sub article 2 the following:

"The Authority may entrust to private entities the leasing, management or operation of the projects it has implemented or is implementing and/or managing, by a decision of the Cabinet of Ministers upon recommendation from the (JVA) Board and in accordance with the effective laws and regulations. **However, the property of irrigation and water resources development projects is excluded from such transfer**".

According to **JVA strategic plan 2003-2008**, a clear objective is set out to increase involvement of the private sector in irrigation water management operations through implementation of management contracts for irrigation water management and distribution and involving farmers in the management of irrigation water distribution systems.

As shown above, **Jordan's policy documents indicate a strong intent to shift toward greater participation**, establishment and enhancement of WUAs, including legitimizing legislation which is advocated in several documents, **but evidence is hindered among others by the government's reservation to move rapidly beyond transferring irrigation water distribution to the WUAs in addition to pending legal issues related to the lack of financial autonomy of JVA.**

Attempts to consider end users' demands in irrigation management in the Jordan Valley allowed for a distinction into two programs. The first started in 1998 with the so-called TO2 (Turn Out at Km 2 of King Abdallah Canal) Pilot project in the area of Adassyeh (a Cooperation program between JVA and the French technical cooperation – Water and Agriculture Regional Mission - based in Amman) and focused on the improvement of technical premises in on-farm water distribution. The direct incorporation of farmers' views was restricted to a consultation via a rapid rural appraisal in 2000.

The second program in Jordan's attempts to involve farmers in irrigation management focuses on a participation that exceeds the role of information delivery and reception of extension messages on improved irrigation methods. **The GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit, GmbH) funded Water Resource Management in Irrigated Agriculture (WMIA)** project, which started in 2001,



supported the creation of farmer-owned WUAs in the Jordan Valley by building on knowledge about traditional and informal cooperation structures in rural societies in Jordan. Responsibilities transferred to the associations comprised in the first step the self-administration of water distribution within the respective irrigation area and the hand-over of the keys of the concrete boxes (farm turnouts), which contain meters and valves of each farm outlet to the farmers' fields.

The WMIA project started negotiations with the farmers in 14 pilot plots in 2002 and supported them in establishing their formal WUAs until the end of 2003. The **outline of the WUAs** is based on the principles of:

- One voice per field with irrigation outlet: This does not coincide with the principle of "one man, one vote" since farmers may cultivate areas which correspond to a fraction of a field up to a significant number of fields, but it does respect the traditional, well understood and accepted principle of connecting land with water rights. At the same time, a group of farmers located at the same outlet and cultivating a fraction of a field would select one representative.
- The election of a board for each WUA: The elected body organizes the WUA meetings and negotiates with governmental authorities, which adds significantly to the transparency of decision processes and reduces social frictions due to informal linkages.
- The official registration of the WUAs under the umbrella of the Jordan Cooperative Corporation (JCC), which guarantees their sustainability by embedding them in the legal framework and anchors the compliance of the process of the participatory elements within Jordan's development plans (The 4th Asian Regional Conference & 10th International Seminar on Participatory Irrigation Management Tehran-Iran May 2-5, 2007).

Based on the service contracts between JVA and the WUAs responsible for retail distribution, JVA covers the operation costs and provide WUAs with spare parts. With the support of the GTZ (currently GIZ) project, JVA regularly provides technical training for WUAs on irrigation water distribution, maintenance of farm turnouts and monitoring, and assists in building administrative skills as well.

When the concept gained the support of the farmers, forming the suitable shape of water associations in the pilot study area in the north, middle and south of the Jordan Valley started and took the following forms:

- Water councils: They are based on the traditional mechanism of problem solving. Water councils are recognized by JVA. Each council has 15 – 20 elected farmers.
- Water users committees: they are also based on or similar to the traditional form of farmers' management that existed before the formation of JVA. A water users committee is a group of representatives of farmers elected by the farmers in a general assembly after several informal meetings. Although the committees have no legal status as such, they are recognized by JVA; normally a letter is issued by the JVA Secretary General to this respect.
- Water users cooperatives: they are the type of associations that have a legal status. Cooperatives follow the JCC (Law No. 18 / 1997). Cooperatives must have their internal statutes that specify the objectives, capital, membership procedures and financial and administrative issues. It should be noted that JCC was the only available facility to register the water associations. In January 2010, however, a dedicated bylaw to allow establishing WUAs under the water related authority was drafted. A bylaw for a WUAs federation was also being drafted (German-Jordanian Programme – Management of Water Resources, 2010).

To date, a total of 23 WUAs exist in the Jordan Valley, representing 80% of the total irrigated areas. After the confidence building and WUA establishment phases, the **Task Transfer Phase** started (2006-2009). The continuous monitoring allowed the identification of 12 WUAs which were high on selected targets including participation on voluntary basis, willingness to undertake the responsibility of retail distribution, reduction of the number of complaints submitted by the farmers and the increase of distribution efficiency in the area managed by the WUA. These WUAs (representing 45% of the area) were transferred few tasks through **agreements stipulated** between the WUAs and JVA. Tasks transfer was effected following two months of intensive training on the technical and management functions that will be assumed by the



WUAs, such as water budgeting, meter readings, reading of the irrigation order released by JVA, controlling of pressure valves and calculating distribution efficiency, minutes and report writing, filing, computer skills, and internal financial auditing.

The period 2009 to present corresponds to the **Sustaining Phase**. It marks establishing new WUAs and extends the task transfer areas. It is foreseen that the partial transfer of tasks will affect 5 additional WUAs, which will raise the whole IMT area to 62%, expanding the experience with a view to full devolvement of responsibilities over retail distribution and partial maintenance, so far confined to farm turnouts.

Moreover, a WUA unit was established at JVA during this phase to monitor and evaluate WUAs performance, supervise the implementation of management contracts, follow up financial claims and assist WUAs staff. In the near future this unit will also be responsible for WUAs registration (substituting thereby the role of the JCC).

However, even with the success stories in the establishment of WUAs in Jordan (pump 55 WUA success story is reported in the annex), the tasks transferred to the WUAs' remain limited to distribution of irrigation water to farmers, and there is still a strong need for further empowerment through, among others:

- i) Official re-orientation of JVA mandate. A draft amendment to the Jordan Valley development Law is presently under review, involving changes to transfer JVA mandates for retail distribution to the WUAs. The said law will allow JVA to provide the legal umbrella for the establishment of WUAs and the legal requirements for the WUAs to collect fees from farmers.
- ii) Acquisition of the right to enforce sanctions related to the transferred functions such as illegal water use. Currently, WUAs simply report illegal actions to JVA and are represented in its sanction committee taking part to the related decision making.

A more mature and progressive water sector characterizes Morocco and Tunisia especially with regard to IMT. The World Bank has called Morocco a “champion [of water policy] in the MENA region” (World Bank 2008). This is due to a variety of factors including development of water laws, decentralization of water management, public-private partnerships in water development, and demand-side policies. In response to an increased occurrence of droughts in the late 1980's and early 1990's the government approved the 1995 Water Law, which established water as a public good and reorganized water management in the country. Furthermore, the law bestows complete authority on the government to regulate, distribute, and monitor water in Morocco (FAO Water Law and Standards, Morocco). The restructuring of the water sector placed responsibility for planning and policymaking at the national level, but implementation and management at the regional level (Tsur et al. 2004).

The River Basin Agencies (*Agences du Bassin Hydraulique*, ABH) were created by the Water Law (Law #10-95) and one ABH was established for each of the nine main river catchments in the country. The ABHs are public organisms that benefit from legal personality and financial autonomy, and are in charge of water resources management in the basin. Their role includes implementation of water management plans, enforcement of water rights, financial and technological assistance to private operators, water monitoring, studies, water resources protection, and flood control. Each ABH operates under the supervision of a board that sets its general policy and approves its action plan. The Board is composed of one third government representatives, one fourth public organizations and the remainder of representatives of corporate chambers, regional and local councils, ethnic collectivities and water users associations.

The management of the large irrigation area is implemented through the various **Regional Agricultural Development Offices** (*Offices Régionaux de Mise en Valeur Agricole*, ORMVA), autonomous bodies that operate under the umbrella of the Ministry of Agriculture. Their mission includes: management of the irrigation districts; operation and maintenance of irrigation infrastructures at the irrigation district level; providing technical assistance to farmers; and collection of irrigation water tariffs.

In order to keep the ORMVAs financially autonomous, it was decided since 1970s that water users have to pay for the expenses related to the O&M and amortization of the irrigation infrastructures. Unfortunately,



these dues were not paid and 50% of the expenses were paid by the State while the development of high scale irrigation remained dependent on public funds. To solve this problem it has been decided that water users be fully involved and participate in irrigation management. In fact, associations of agricultural water users (*Association d'Usagers de l'Eau Agricole, AUEA*) have been created in the ORMVAs (AGR/DDGI, 1999). Though **AUEAs** were established shortly after independence, they wielded very little power until the 1990's when a government decree gave them more power over local water distribution (Bennis & Saeq 1998). WUAs in Morocco are public-interest associations with a legal status. They are established voluntarily, either on the initiative of the Government or on the demand of two-thirds of the owners or tenants of the land served by the irrigation system and membership is open to all owners and tenants of land within the irrigation scheme. Existing agricultural associations (associations syndicales agricoles) that are involved in water management for agricultural purposes can also be transformed into WUAs. The law provides a model statute for WUAs.

The IMT process involved the secondary and tertiary levels, with responsibility and authority fully devolved for O&M and partially devolved for enforcing sanctions and resolving disputes. Although the WUAs are not granted specific water rights or rights on the irrigation infrastructure, the Government can delegate to them the power to expropriate land within their service area for reasons of public interest. Their current role is to oversee service levels, setting charges, collection of charges, and water allocation (World Bank 2007a). Each member pays dues to cover the expenses of their AUEA, which also results in more personal involvement in the water sector and more incentives to maintain the system (Meinzen-Dick 2000). In addition to this revenue, WUAs can receive government subsidies.

The AUEAs in Morocco also give farmers some influence in national irrigation policies (Tsur et al. 2004), sitting in the board meetings of ABH and contributing therefore in formulating water policy at the basin level.

The **private sector** is growing in importance as well in Morocco's water sector. As part of its move towards public-private partnerships, many Moroccan government agencies have begun to rely more on consulting companies for advice and technical support. These consulting companies tend to be either home-grown Moroccan companies or foreign firms that work directly with Moroccan consulting companies.

The water savings observed through efficient use of water in irrigation project under participatory irrigation management have been quantified to possible extent. However, there is possibility for a larger amount of water saving by community through water saving awareness program. At present, the movement of participation of beneficiaries in irrigation management is in full swing. It is expected that the transfer of management to beneficiaries will result into sustainable, efficient and economic water use.

Overall, the Moroccan water sector has a strong regulatory framework and a good level of performance. A particularly strong point both in the documents and in practice is the identification of policy goals and the allocation of responsibilities to achieve them. In this context, three main water organizations have most of the influence: the Water Secretariat, which also provides primary leadership role; the Basin Agencies; and the Ministry of Agriculture. These organizations have devolved power to organizations, such as ORMVAs which continue to fully manage the large hydraulic infrastructures, and WUAs which are designed to perform specific tasks in the small and medium ones. Few pilot PIM experiences are registered at large scheme level while the existing WUAs are seeking to be organized in a Federation which would increase their influence over the water system and thus increase their performance directly related to their capacity to recover O&M costs and provide a satisfactory service.

Since its independence, Tunisia has made huge efforts to equip and then modernize public irrigation schemes. Starting 1990, efforts have been deployed to consolidate a demand management strategy in irrigation, essentially based on the rehabilitation of the obsolete distribution systems, the establishment of adequate tarification systems and the enhancement of water use efficiency through the national water saving programme (Programme National d'Economies d'Eau - PNEE) of 1995. One important axis of the programme granted incentives ranging from 30 to 60% of the total investment cost of micro-irrigation systems. Consequently, the global efficiency of irrigation has increased by 25%, reaching 60-70%, irrigated surfaces have progressively increased to 400 000 hectares in 2006 with the surface area almost doubling over the last 20 years (BACHTA, 2006). Moreover, institutional reforms were undertaken with a view to the



decentralization of the management of public water systems. In this context, the management of Rural drinking water supply systems (Systèmes d’Alimentation en Eau Potable rurale; SAEP) and public irrigation schemes (Périmètres Publics Irrigués;PPI) was transferred to the users organized into Agricultural Development Groups (Groupements de Développement Agricole; GDA) (Stratégie Nationale de Promotion des Associations d’Intérêt Collectif (AIC) - 1992). GDAs are established when hydraulic infrastructures are set up. They are involved and trained since the carrying out of the studies in order to achieve technical, administrative and financial self-management of drinking water in rural areas and irrigation facilities at all levels.

This policy reactivated the old participatory management practices. Actually, PIM in Tunisia dates back to the 19th century. The first water users association was created in 1896 in the South, in the oasis of Zarzis. The WUA legal framework has evolved throughout years, and between 1933 and 1936, the texts defining the statutes of the Associations of Collective Interest (Associations d’Intérêt Collectif, AIC) were elaborated. The broad experience acquired by Tunisia in PIM and the efficient M&E system have led to the setting and implementation of the National Strategy for the Promotion of Water Users Associations (Stratégie Nationale de Promotion des AIC) in 1992. The objectives of the Strategy being:

- The setting up of reliable and sustainable SAEP
- The redefinition of the role of the State following the decentralization of the water management.
- The promotion of self-sufficiency of the AICs

- Four general guiding principles have been followed for this strategy, namely:
 - The State pays for investment costs (new and renewal works) and major repairs.
 - All public stakeholders have to contribute to provide adequate support to AIC.
 - The strategy has to include the private sector in all the aspects of mentoring and management.
 - AIC first provides for the operation and maintenance of systems and, subsequently, in a relatively long term, shoulders the full responsibility of the systems.

- The State had set up a support framework for Water Users Associations based on the following rationale:
 - To ensure the durability of investments;
 - To make population increasingly self-sufficient in managing the systems;
 - To protect water resources

In 1999, AIC were renamed GIC (Groupement d’Intérêt Collectif; Groups of Collective Interest) and in 2007, their legal status was updated and responsibilities were extended and consequently named GDA.

At present, the WUAs have private legal status, the bases of which are sometimes unclear to stakeholders and often poorly formalized. Although the new legal framework and the standard legal status do not mention it clearly, GDAs have the task of managing public assets like water and hydraulic infrastructures. In legal terms, they might have a broader mission. The movement has been oriented towards more extensive opportunities for associations in terms of competences/powers and a theoretical liberalization of management following on the disengagement of the state.

However, extensive liberalization in operation has carried a lack of formalization of responsibilities. The Regional Directorate for Agricultural Development (Commissariats Régionaux au Développement Agricole; CRDA), the authority entitled to apply the state policy in terms of water and agriculture at regional scale, has great difficulties in ensuring the monitoring of GDA because of the scarcity of resources and personnel (AL ATIRI, 2006) or problems with the organization, definition and understanding of their specific missions within the GDA. The GDAs lack effective empowerment due to the ambiguity of the roles and the lack of authority over the access to a scarce resource and over the enforcement of sanctions at the levels legally transferred. These different elements have entailed a crisis of confidence between GDAs and their members and between GDAs and CRDA.

Recent consultations (2010) between the Ministry of Agriculture and donors have led to reflect on the lessons learned and the paths to be followed for sustainable management of hydraulic infrastructures by users association. A new approach was conceived, namely the National Strategy for the Sustainability of hydraulic systems (irrigation systems and rural drinking water supply systems) (Stratégie Nationale de Pérennisation des systèmes d’eau). It is considered as a means to guarantee continuous drinking water



supply and sustainable irrigation development. This strategy replaces neither the national strategy of 1992, nor the participatory approach of 2007. It completes them through a new vision that places them in a modern and more advanced context.

The 2009-2010 National Strategy for the Sustainability of hydraulic systems is still strongly correlated with the strategy of 1992 (KFW, DG/GREE, 2010) the guiding principles of which are still in force. Eleven principles underpinned the national strategy of 2009-2010:

- Continuous application of the participatory approach of the national strategy for the creation and promotion of GDA.
- The consolidation of GDA approach through skills training, intensive management and monitoring.
- Progressive professionalization of GDAs.
- Sound management of systems and strict application of the cost recovery principle.
- The rigorous application of regulations and the fight against non-payment, fraud and illegal connections.
- Users' motivation to effective participation.
- Clarification and improvement of interventions of the GDAs' mentoring units within the Ministry of Agriculture, Hydraulic Resources and fisheries (Ministère de l'Agriculture, des Ressources Hydrauliques et de la Pêche; MARHP).
- Progressive restoration of CRDAs responsibilities, on the exclusive sovereign functions of supervision and control.
- The development of better cooperation between units of MARHP and local authorities.
- The integration of the local and regional private sector as service providers to GDAs.
- The protection and integrated management of water resources.

In 2011, in principle, all irrigation schemes were transferred to associations. However, this political decision effectively collides to date with the difficulty of creating fully operational WUAs as aforementioned. Three different situations are observed. The first one where one forth to one third of the associations work well, autonomously and with satisfactory performance; a second one where one third to half of the associations work with some difficulties, and the third one where major difficulties are encountered. Weaknesses of GDA legal status and the lack of application of regulations bring about difficulties in collection of fees and compliance with management rules (illegal connections in particular) (KFW, DG/GREE, IGIP, 2011). Moreover, the lack of involvement of the private sector, able to assist the GDAs in their functions, is a real handicap. A specific status for water users associations was recently proposed: the Hydraulic Group (Groupement Hydraulique, GH). This new legal framework is still being evaluated by the services of the ministries and encounters strong resistance.

Rigorous enforcement of policy, institutional and legal measures have been very effective in Israel, and in many aspects made the country a worldwide leader in water resource management. The Israeli experience is mainly characterized by a mature economy, driven by a difficult context of scarcity, political unrest and advanced technology. The core of Israel's water management is the Water Law of 1959. The statute has been defined essentially as an "enabling act" that provides the basis for the government to control water demand and charges for the water and related services it provides (Laster, 1976; Laster, 1980). The law denies private and riparian rights to water and claims that water resources are a public property subject to control by the State.

Following the 2006 amendment to the Water Law many responsibilities of the ministries with respect to the water sector were transferred to the newly created Council of the Governmental Authority of Water and Sewerage (the "Authority"). The Council is an inter-agency body, headed by the Director of the Authority, and composed of senior representatives of the Ministries of Finance, National Infrastructures, Environmental Protection, Water and Energy and Interior and 2 non-governmental members appointed by the Ministers of Agriculture and Rural Development and Water and Energy. The council implements the water law, plans, develops, allocates, and manages water, and sets and annually revises water prices which need the approval of a special parliamentary committee before application.

At the operational level, a Public Private Partnership characterizes Israel. The Water Authority relies mainly on **Mekorot**, a state-owned water company that produces and distributes around 65 percent of the water supply in the country. Mekorot operates the National Water Carrier, the pipeline system that moves water southwards from Lake Galilee to the Negev desert. On the other hand, **water supplied by private**



parties, primarily for agricultural use, is managed by water associations, annually evaluated prior to license renewal. In most cases the associations belong to consumers who are farmers, with limited technical and managerial abilities and water quotas as well. Since 1999, the government allocates incentives amounting to 60% of the total cost of a recycled water supply system in order to promote new suppliers. The Water Authority is actually encouraging the local associations to get organized in a larger economic and more professional structure dedicated to water supply: the Regional association, which would enable users to influence the water management at regional level for the benefit of the agricultural use. Actually, the Regional associations are allocated a regional quota and conferred the authority to distribute water and determine water tariff with a view to further development and improvement of the water sources and the supply and distribution systems. This recent experience demonstrated its ability to optimize water use and quotas distribution, emphasizing the advantage of decentralization. The Regional associations are showing interest to invest in recycling plants and exploit marginal water. However, equitable distribution of water among users and Governmental flexibility in management and development of water resource remain a major concern (Manor S. and Hagali Z., Survey on Irrigation Modernization, FAO, December 2002).

CHALLENGES AND CONSTRAINTS

Implementing IMT involves *inter alia*:

- Creating an enabling environment (Policies; Legal Framework; Political Will) for formal farmers' organizations such as WUAs;
- Preparing water users to take over the governance and management of irrigation schemes;
- Making essential technical and physical improvements in irrigation systems with farmers' participation;
- Reforming the irrigation agency;
- Training staff for new functions, introducing new forms of auditing and monitoring.

Many steps are common across the world. Part of the reason for this commonality is the extensive involvement of international financing agencies and technical assistance agencies in IMT programmes across the countries.

Several problems have emerged during the implementation of IMT as well. Again many of these problems are universal. As previously shown, there have been essentially three major constraints.

First, there has been a **lack of political support** in most countries. This has resulted in an inadequate support to the process and slowing it down.

The second one is of a **legal nature**. Often, governments have not wanted to face the difficulties of changing the existing laws through parliamentary processes and have tried to implement the reforms with existing, unsatisfactory legislation or with ministerial decrees that have lacked the necessary weight and authority. The result has been that often the legal responsibilities and nature of WUAs are not clear or do not cover well the real responsibilities.

The third has been the **lack of technical and managerial skills** within the WUAs, which has resulted in poor provision of water services.

Despite these significant similarities, the experiences of the Partner-Countries still show particularities and allow distinguishing among different breadths of reforms' application as reported hereafter.

Rigorous enforcement of policy and institutional and legal measures coupled with an advanced technology and a performing Public-Private Partnership have been very effective in Israel, and in many aspects the country is a worldwide leader in water resource management. It is clear that economic incentives have played a key role in stimulating innovative technologies, most obviously in irrigation. The increasing block system used for agricultural and domestic uses, with all uses (including individual abstractions) being metered and sewage costs incorporated into municipal water rates is of key importance. However, Israel still faces crucial challenges most of which are characteristic of a mature water economy operating in an acute water stress condition and is actually reacting by reviewing the pricing and subsidization policy,



experiencing among other initiatives, the implementation of large economic and competitive structures “Regional WUAs” having more authority on the water sector and more devolved responsibilities.

In Tunisia and Morocco, IMT is a national strategy and WUAs have a legal status. However, these two countries differ in the degree of conformity of the policy goals to their respective legal texts and the allocation of responsibilities. Moreover, the imbalance between the irrigated areas and the allocated water resource in Tunisia, is binding the productivity of agriculture and consequently accentuating the financial problems of the WUAs while, a growing involvement of the private sector as service provider to the WUAs characterized a more mature water sector in Morocco.

Morocco’s legal documents support wider participation which primarily appears in the form of decentralized water management, through basin agencies and local committees and commissions that advocate participation by a wide variety of public and state representatives. One aspect of decentralization is the establishment and enhancement of AUEAs at tertiary and secondary level and few pilot experiences at primary level, in a trial to increase the public participation in the agricultural sector. However, some priority actions still need to be implemented in Morocco in order to speed up and sustain the process. These actions are mainly linked to providing the adequate technical and managerial support and recognizing several rights to AUEAs (contracting bank loans; deciding annual water allocation and irrigation programs such as modernization; participating in making the annual maintenance and rehabilitation budget; promoting lucrative activities), rehabilitation of the irrigation facilities prior to transfer and the reorganization of the irrigation agencies and its adaptability to the co-management. This would enable and encourage a successful transfer process at the primary level as well.

In Tunisia, PIM is colliding with numerous difficulties and constraints. The naming change of the WUAs was significant at only the regulation plane. Legislation evolves frequently, which limits the transparency of the legal status to internal (CRDA, local authorities, regional services of the Ministry of Finance,...) and external players, limits GDAs prerogatives and does not allow them to execute their functions of public interest.

The weaknesses of GDA legal status and the lack of application of regulations bring about difficulties in collection of fees and compliance with management rules (illegal connections in particular), especially where agriculture is not productive and unable to profit from the flexibility that an association could ensure. The extension of the scope made GDA missions unclear and poorly intelligible to the beneficiaries and the population. The pragmatic and technical orientation deeply marked the organizational foundations of the local population and somehow occurred at the expense of the associative spirit and the autonomy of the rural world.

In Egypt, IWRM is a national strategy but IMT is still confined to the tertiary level, whereas several projects funded by International donors aiming at transfer at branch canal and district level are still constrained by an ambiguous political support, and the lack of a legal framework associated to a controversial water system in its hydraulic and institutional aspects. For centuries the relevant authorities in Egypt were extremely hierarchically structured and the predominant management tool was authority and top-down management. Engineers decided on water allocation by virtue of their expertise. To a large extent this organizational culture still exists. Although there are intensive efforts that have successfully introduced the concept of water users participation at different levels through diversified approaches (water policy initiatives; pilot projects; awareness campaigns; water law amendment (213/1996)...), the level of participation remains limited. Most of the associations are still not functioning as intended, as they do not have a legal standing (DWB; BCWUA), and no clear strategy exists regarding their long-term financing.

In Jordan, the national strategy on IMT and PPP is clear, encouraging pilot experiences to consolidate the transfer of retail distribution to performing associations. However, the lack of a re-orientation of the JVA mandate, and reluctance to transfer tasks beyond irrigation water distribution, are slowing down the process, confining the WUAs roles to routine small scale actions, and the legal evidence legitimizing WUAs is still awaiting among other things, the resolution of the financial autonomy of JVA.

Moreover, a low performing irrigation system in some targeted areas mainly preoccupies the farmers. Despite the success stories, these problems coupled with the technical and managerial skills of farmers,



remain the problems at the basis of a process, further slowed down by resistance to change by some JVA officers and influential farmers who feel threatened by the establishment of a democratic process.

Lebanon and Syria show similarities despite the difference in their experiences in irrigated agriculture and in the general contexts that governed the countries till the recent past. In both countries, the transfer initiatives are relatively young, shyly cited in the national strategies, disaggregated, mainly driven by donors and lacking the right ingredients for an enabling environment.

WUAs in Lebanon are masked behind agricultural cooperatives that have been created under the impulsion of the population, external donors or projects. The draft strategy for water developed by the MEW clearly stating the need for the creation of WUAs has been very recently approved by the Council of Ministers (March 9, 2012) however, the law regulating WUAs activities is not yet promulgated despite the many campaigns promoting it. In order to overcome the constraints related to the proper exploitation and management of water resources, the new institutional settings and reforms should be effectively implemented in Lebanon. This applies among others to the operability of the WEs which are supposed to accompany the establishment of WUAs; an important component of the general water reforms, and instead, are still enduring financial, technical and managerial problems.

Syria has adopted irrigation modernization policy and is planning to modernize the irrigation system during the next ten years. The Water Law provides the legal base for the installation of Water User Associations in irrigation. However the implementation of this policy requires the development of an integrated strategy for irrigation modernization covering the legal, institutional, and physical and human resources development aspects. The strategy should be based on a thorough analysis and assessment of the irrigation sector issues and constraints.

Despite the significant structural and regulatory reforms adopted by the Algerian government the water master plan is still not in formal use and the focus of water planners and policymakers remains focused on hardware such as physical systems, rather than on software such as management and institution-building. This leads to a purely “engineering approach” to the planning of infrastructure and the investment portfolio. Institutional issues, including limited accountability, transparency and user participation, are not resolved. Irrigation management issues are exacerbated by a lack of maintenance, constraints to fee collection, water allocation system and land reform, low conveyance efficiency and weak stakeholder involvement.

Although the pertinent legislation provides the relevant opportunities, the private sector is not yet actively involved. Water tariffs are decided at the national setting, without regional differentiation and all water sector investments are public and financed from the national budget.

Institutionalizing public-private partnerships, promoting PIM together with extensive capacity development programs are important challenges to the modernization of the Algerian water system (Laoubi and Yamao, 2009).

The water system in Palestine is conditioned by the state of negotiations with Israel. The hopes that Oslo would bring water resources for a viable state under Palestinian control have only very partially been realized. The constraints underlying the water system failures in water resources development and management are clear:

- A joint Israeli – Palestinian governance system, with asymmetries of power and capacity that does not facilitate rational planning and development of Palestinian water resources and infrastructure.
- An investment environment that creates huge costs and delays
- Implementation constraints that can make the movement of even one pipe a logistical and administrative challenge
- Weak institutional capacity of the PA for planning, implementation and management
- Development partnerships with donors that move uneasily between the political context and the development challenge and are often stuck in emergency rather than strategic mode (The World Bank, 2009).

The table below summarizes the current state of some common IMT constraints/challenges across the nine PCs.



	Algeria	Egypt	Israel	Jordan	Lebanon	Morocco	OPT	Syria	Tunisia
Political support	weak	ambiguous	yes	for retail distribution	weak	high	weak	weak	high
Resistance to IMT by agency	NA	yes	yes	yes	yes	NA	NA	NA	yes
legal framework for IMT	no	only at mesqa	NA	no	no	yes/strong	no	no	yes/weak but evolving
technical & management capacity of WUA	NA	to reinforce	to reinforce	to reinforce	to reinforce	to reinforce	to reinforce	to reinforce	to reinforce
Hydraulic level transferred	----	Mesqa	- Tertiary (by local WUAs) - Starting from recycling plant (regional WUAs)	Retail in performing targeted areas	----	Secondary and Tertiary	----	---	Whole distribution system

NA = Not Applicable

LESSONS LEARNT

As might be expected from any complex reform process, there are implementation aspects that lead to partial or non-achievement of original objectives. The PIM & IMT experiences show possibilities and limitations and overall, the results can be perceived as a mixture of successes and failures.

Participation can improve design and construction. This is demonstrated through the PIM positive experience at mesqa in Egypt where a large investment program entailing a switch from rotation to continuous flow, single point lifting and mesqa improvement was successfully implemented through the Water Users Associations (WUAs). Some pilot experiences in Lebanon yielded the same success despite the absence of any official support and the lacunae in the existing juridical system. In Btedhi-Lebanon, a Water Users' Cooperative was created in the framework of the RDP project of the Northern Beqaa. This cooperative, actively participated to the selection and implementation of the design and management options of the collective irrigation system achieving, along years, high levels of performance with regard to O&M, allocation equity and service timeliness. However, **the sustainability of WUAs remains questionable**, especially when the process is constrained to the implementation of a program, endorsed by funding agencies and not supported by a clear national strategy and a legal status.

Strong political support for irrigation management greatly facilitates implementation, and helps considerably in passing the necessary legislation for giving legal authority to organized farmers, to assume the management responsibilities for their irrigation system, as demonstrated by the Moroccan



experience. Such legislation may also be necessary to establish a legally and technically valid water rights framework.

In the same framework, it might be very constructive to countries like Lebanon embarking in the modernization and reforming of the water sector to **customize the different initiatives by International funding agencies**, and **evolve the international programs into their organizational set-up** as has occurred in Egypt and Jordan, signing the official initiation of a PIM process, and in countries like Algeria and Syria, where the road for the reforms was undertaken but is still struggling with the engineering approach, to **focus on social capital** (human resources & institutional reform) and **balance demand and supply management efforts**.

Moreover, **the main operational constraints to the success of PIM remain the width of authority given to WUAs** including enforcing sanctions, financial autonomy and support received from the water agencies. This involves **a clear re-orientation of the irrigation water authority role and effective devolvement of responsibilities to well-prepared WUAs**. A clear example is given by the Tunisian experience, still struggling with the ambiguity of roles and by the pilot initiatives in Jordan and at Branch canal in Egypt, still suffering the over control of the agencies, mainly lying on governmental financing despite policies and announced reforms.

Actually, in some cases, the irrigation agencies do not believe that farmers are capable of managing an irrigation system and in other cases, despite the unreliable O&M, the farmers feel more comfortable with the Government administering and operating and maintaining the irrigation system. However, **an almost immediate impact of the transfer process, is a significant reduction in conflicts between water users over the delivery of irrigation water**. The rapid and significant decline in water-related conflicts provides strong feedback to water users, as to their ability to successfully assume responsibility for improving the operation of their irrigation system, addressing equity issues. In addition, **IMT process has forced a new look on the way services are provided to users** in the assessed countries. This has been perhaps one of the most remarkable achievements of the newly established WUAs, **leading to considerable improvement in the performance of the water service**. This experience is extensively reported at mesqas in Egypt and in many targeted areas in Jordan valley like **Pump 55 association**. Actually, the performance records of this association (reported in details in the annex), annually evaluated by the JVA, shows that it is high on its target indicators as it was able to improve the distribution efficiency, the equity and timeliness of water delivery, the quality of maintenance, and the efficiency of fee collection, reducing as well the cost of O&M to farmers and to government.

Convincing farmers and Government, of farmers' ability to manage their irrigation systems involves farmers training in the various institutional and technical areas. Training topics need to be presented in an understandable and practical way, with the likelihood that many of the topics might need to be given again, especially when new representatives are elected into the farmers' organizations. **Time is also required, measured in years**, to become adequately familiar with maintenance, operation and management practices, and to gain confidence with the own management capabilities. Joint walkthroughs with farmers and agency staff have been the single most effective technique for communication and cooperation. Walkthroughs symbolize and implement the willingness of government to listen to farmers. They provide an empirical, field-based approach to identifying problems and discussing ways to make things better. Solutions can then be followed-up by farmers and government. This is extensively documented in the Jordanian experience which initially faced mutual mistrust and resistance.

Beyond replication, models, one-size-fits-all, the coalition of users interests as shown in Rash El Gharb Water Board in Egypt **and the capability of the process to fit irrigation management to local natural and social conditions** as in Jordan, where the established associations accounted also for the traditional mechanisms of problem solving in rural areas, are essential ingredients for an active participation. However, due to various factors, including limited time and belief in the superiority of standard bureaucratically approved procedures, there is a frequent tendency to impose standard models of WUA organization, with little adjustment to fit local circumstances. This is made clear also through the Tunisian experience, which is colliding with many constraints due to the technical and pragmatic orientation of the process, which didn't consider the specificities of the rural environment nor its improvisational creativity.



Continuous monitoring and evaluation of the associations and the consequent readjustments of the process, are essential and continuous challenges to face with view to a long standing and sustainable process as shown in the new strategy aiming at the sustainability of WUAs in Tunisia, the new forms of regional WUAs experienced in Israel and the PIM process in Jordan Valley.

OPPORTUNITIES FOR IMPROVEMENT

IMT is an approach for irrigation sector reform with the potential to improve the sustainability of irrigation systems. The process requires **strong political commitment, negotiations among stakeholders, and long-term capacity building**. Based on the challenges facing the implementation of PIM in the PCs and the lessons learnt from their different experiences, the following opportunities for process improvement all over the region can be drawn.

International financing institutions and governments should allow IMT programmes to be learning opportunities and to be flexible so that, essential tasks and transfer levels can be done effectively and defined with full farmers' support. Rather than asking how to increase farmer participation in government projects, it may be better to reverse the question and ask how government can best participate in farmers' efforts to secure and improve their livelihoods. Being a learning process, **PIM necessitates a continuous M&E** which scope is not limited to financial and programmatic aspects, but that would permit lessons to be learned throughout the process.

The institutional change in irrigation management and the adoption of PIM policy necessitate an institutional change in the irrigation agencies to accommodate the new management system. This should include the important need to **reorient the irrigation agency and plan how to support agency staff to adapt to the new situation**. Without this, agencies tend to resist IMT. **As a minimum, agencies need to redeploy staff from transferred responsibilities and build their capacity to train, establish and strengthen WUAs.**

Developing and enhancing institutions that can respond to, and appropriately support initiatives, offers a pathway for making government investment in irrigation more productive and better aligned with the interests of water users and strengthen local commitment.

In addition, irrigation modernization requires the introduction of new functions and methods for irrigation management. **An institutional strengthening strategy for the irrigation agencies requires a detailed analysis of the agency functions and mandates, the process and methods they use in the application of their functions and an assessment of their physical and human resources capacity.**

To this aim, **flexible training and capacity building programmes are a must and should be an integral part of the process** in order to develop:

- Awareness among different stakeholders on irrigation modernization objectives and components;
- Capacity of the Public institutions (Ministries, general basin directorates or irrigation agencies) in O&M and irrigation management;
- Extensive farmers training programmes on the O&M of new techniques and on-farm irrigation water management, as well as on irrigated agriculture farming practices in areas, where irrigation conservation techniques were implemented or are planned to be implemented.
- Managerial and technical skills of WUAs and irrigation agencies and conflict management skills.

Nevertheless, **there still is a widespread need for a clearer legal status and water rights given to WUAs and farmers**. Without a clear legal status, WUAs cannot operate properly because they do not know the extent of their responsibilities. **It is therefore as important to devise workable procedures for monitoring the behaviour of irrigation water suppliers and users**, sanctioning non-conforming behaviour, and resolving conflict as it is to devise the rules themselves. Those who do not conform to the rules need to have sanctions imposed upon them. As soon as some individuals monitor others and impose sanctions, conflict will occur over rule interpretation. Lack of monitoring, sanctioning, and fair, inexpensive arrangements for



conflict resolution can all undermine a complex system of mutual expectations and commitments. As with any sanction, if enforcement is credible, then the sanction itself rarely needs to be imposed.

Globally, a major challenge which would make pathways for IMT most favorable, is a productive agriculture. If agriculture is more profitable, then farmers will be more interested in irrigation management. ***PIM projects often assume that they will improve farmer incomes, but have not included elements directly focusing on income generation.***

This is well demonstrated through the experience of Henchir-Rmel GDA (reported in the annex). Actually, the establishment of the irrigation scheme was supported by the Belgian cooperation program which defined the cropping calendar, the crops water requirements, and the corresponding irrigation schedule. In a regional context favouring the agricultural production (land tenure, important markets,..) fruit trees and field crops were substituted with prime and extra prime quality vegetables intensively practiced. These assets, together with the business orientation of the farmers were behind the accomplishment of good economic returns and the reinforcement of farmers' willingness for an autonomous management of the irrigation scheme. ***This shows that the support to the public administration and WUAs should not be constrained to the hydraulic aspects but it has to include as well the support to the interconnected aspects of an integrated irrigated agriculture.***

Actually, ***there is increasing recognition of the importance of diversifying agriculture and developing agricultural business. Diversification makes irrigation management more complex. Greater reliability may be required, through improved main system operation or through more flexibility for farmers to locally distribute water according to their needs.*** It is clear that the farmers together with the private sector have a primary role in developing agri-business. However, ***there is a necessary role for government in 1) ensuring security in the rights governing access to land and water; 2) establishment of a precompetitive business environment.***

Moreover, ***little has been done to increase the financial capacity of WUA to mobilize and manage resources.*** There are a range of mechanisms which have been used in other countries to enable farmers to finance irrigation development. In many areas farmers earn good returns growing value irrigated crops. ***They may need some technical guidance, but would be quite capable of financing irrigation improvements themselves, if suitable mechanisms existed.***

Appropriate mechanisms could be applied for collective borrowing. If the government believes that gains to consumers and other benefits from irrigation justify a subsidy, then it could provide grants to combine with loans. ***There are successful examples of incremental improvements where financial responsibilities have been shared between government and farmers according to their financial capacity to contribute to the works.***

Increasing competition for water is bringing increasing pressures for reallocation of water from irrigation to other sectors. ***WUA federations should be strengthened and encouraged as they can provide a structure for participation in water resource management, dealing with problems such as reallocation and water quality.*** Reallocation is likely to be smoother, more equitable and more successful if based on good information about farmers' concerns, and thorough consideration of how reallocation can respond to farmers' interests as well as those of municipal and industrial users.

The box below summarizes the actions that represent opportunities for the improvement of the PIM process across the nine PCs

Institutional strengthening for the irrigation agencies

- *Re-orientation of the irrigation agency mandate through:*
detailed analysis of the agency functions, the process and methods used in their application and an assessment of its physical and human resources capacity;
redeployment of staff from transferred responsibilities to establishment, training and strengthening of WUAs.

Establishment of a clear legal status



- <i>Enabling WUAs to have financial autonomy, enforce sanctions and resolve disputes</i>
Establishment of M&E systems
- <i>Devising workable procedures for monitoring irrigation water suppliers and users sanctioning non- conforming behaviours</i> - <i>Sharing information across pilot projects and irrigation schemes for re-adaptation of the process where necessary</i>
Increase financial capacities of WUAs:
- <i>Diversification of agriculture and development of agri-business through:</i> greater reliability and equity through improved O&M; security in rights governing access to land and water; technical guidance: support of the public administration and WUAs should include the support to the interconnected aspects of an integrated irrigated agriculture - <i>Develop appropriate mechanisms for designing needs based budgeting and water charge, possibility of collective borrowing and/or joint investing</i>
Develop awareness campaigns, flexible training and capacity building programmes addressed to irrigation agencies, WUAs and farmers
Develop and Strengthen the Federations of WUAs, through a clear legal framework and sound capacity building as they can provide a structure for participation in water resource management

CONCLUSIONS AND RECOMMENDATIONS

From the sections above, it is possible to draw the following i) conclusions and recommendations that should be considered at the regional level and ii) highlights on specific experience of the PCs.

i) At the Regional Level:

- PIM needs **systematic public awareness campaigns, consultations and involvement of all stakeholders**. This is important to generate commitment and design a more appropriate program.
- International funding institutions and governments, should conceive PIM as an **adaptive and flexible learning process, so that essential tasks can be effectively done with farmers support**. To this aim **capacity building** tackling technical and governance issues are a must.
- High **political commitment** is essential, when it is weak, efforts should be made to strengthen it. To this aim, **sharing information on M&E of pilot initiatives and organizing study tours to countries representing success stories** as per PIM can encourage the support.
- **Transparency** is a major asset to address; **checks and balances should be issued and approved through controlled mechanisms** to ensure that WUAs are acting according to the members interest. This should be a part of the capacity building activities and included in the M&E system.
- **Institutional change** in the irrigation agencies to accommodate the new management system is required. This should include the important need to **reorient the irrigation agency and plan how to support agency staff to adapt to the new situation and to strengthen WUAs**. This re-orientation should be **coupled with the establishment of a clear legal status which enables WUAs to have financial autonomy, enforce sanctions** and execute their functions of public interest.
- IMT programmes should address the **WUA long run financial capacity and strategies**; a range of mechanisms could be explored ranging from designing needs- based budgeting and water charge, to the possibility of borrowing or joint investing.



- The possibility of WUAs to **develop agri-business** should be explored.
- **Federation of associations** would have a greater potential in reporting farmers concerns to a multi-sectoral arena for a more equitable allocation of water.

ii) Country Specific:

- More focus on social capital (**human resources & institutional reform**): **institutionalize stakeholders involvement**, and **balance demand and supply management efforts** in Algeria and Syria where the road for the reforms was undertaken but is still struggling with the engineering approach. Capacity building is a major asset in this regard.
- **Build on the existing texts in Syria** to give a legal framework and devolve effective responsibilities for the farmers' associations in the modernization (mainly focusing on hardware), **fitting the process to the local conditions**, to avoid the accelerated degradation of the infrastructure, learning from farmer's initiatives and incorporating them in design of new irrigation systems (customize). This is a lesson learnt among others from the successful experience of **Btedhi Cooperative** which allowed for a remarkable increase in water fees collection, showing the satisfaction of the farmers with regard to the system management and the quality of maintenance. As a matter of fact, the Syrian farmers are already organized in a Farmers' Union which has branches in all the Governorates. However, they only perform through the local associations, the management at field level and water rotation among farms, as their cooperation with the irrigation agencies with regard to the planning and commissioning of irrigation civil works is limited to an advisory role. This role should be institutionalized allowing for more effective participation.
- **Continuous M&E and performance assessment** in the countries with a PIM experience i.e. Jordan, Egypt, Morocco and Tunisia, countries like Lebanon where different initiatives have been implemented, and/or Israel where a new form of Regional WUAs is under experiment.
- **Address the bottlenecks in Egypt and Jordan** impeding the transfer to higher levels through: clear legal framework; re-orientation of the agencies mandates; training of agencies and WUAs; building on success stories like **RASH EL GHARB Water Board** and **Pump 55 WUA in the Jordan Valley** mainly related to a productive agriculture, a transparent management and a continuous support by the agency.
- **Encourage the agri-business systems in potential areas** such as in **Henchir WUA-Tunisia** (reported in the annex) and irrigation entrepreneurship (PPP) models (the Israeli model) for a long term financial autonomy and possibility of investment. The GDA is benefiting to date from the trainings organised by the public administration and in addition, is trying with some difficulties, to develop the appropriate structures for, and the technical competencies in information release, especially on themes dealing with business oriented agriculture, in a context (land tenure, important markets,...) which favours the agricultural production. The accomplishment of good economic returns is driving the willingness of farmers for an autonomous and sustainable scheme management. A productive approach would be that to organise and address the same training to many GDAs assembled together who can take charge of the salary of the trainer who would be supporting and advising the farmers.
- **Perceive the IMT as an on-going developmental & evolutionary process** and encourage international agencies programs, particularly in countries initiating the process like Syria and Lebanon, or Palestine with a particular water system and context.
- **Continuing support and training to WUAs** after their establishment for their self-sufficiency and overall sustainability.
- **Work with government teams for the introduction of PIM**, possibly supported by consultants, is more effective in the long term. These teams are usually subjected to a powerful capacity building process and become advocates of PIM within government organisations. Examples are Egypt and Jordan, where the international programs evolved somehow into the organizational set up of the ministries



This study indicates that IMT/PIM is an approach for irrigation study reform with the potential to increase sustainability of irrigation systems. However, the reform should include both “hard” and “soft” interventions. It involves inter alia strong political commitment, negotiations among stakeholders and continuous capacity building. This initially long process can evolve into diverse progresses: re-organization of the institutional set up of the agriculture sector; irrigation modernization; economic changes in support to irrigation.. and should not be foreseen as a process with a clear beginning and end. However, what is certain is that irrigation sector reform is now necessary and few countries can afford to disregard the potential benefits that it offers.



LIST OF REFERENCES AND SUPPORT DOCUMENTS

Abdel Aziz Y. and Oliemans W. (2002). *Water boards in Egypt: Supporting decentralized water management*. Submitted to: International Network on Participatory Irrigation Management INPIM, Sixth International Seminar (April 21-27, 2002), Beijing, China.

Abed Rabboh R. (2007). *Water demand management in Syria*. In: Blue Plan, UNEP/MAP. Third regional workshop on: Water and sustainable development in the Mediterranean - Water demand management, progress and policies. Zaragoza, Spain, March 2007. Ministry of Local Administration and Environment MLAE, Damascus, Syria.

Agence de Bassin Hydrographique Constantinois-Seybousse-Mellegue (2009). Institutional framework and decision-making practices for water management in Algeria: Towards the development of a strategy for water pollution prevention and control in the Seybousse River Basin. *Institutional and Economic Instruments for Sustainable Water - Management in the Mediterranean Basin INECO. Coordination Action Project supported by the European Commission through the 6th Framework Programme* Contract No: INCO-CT-2006-517673.

AGR/DDGI (1999). Study of the national scheme to protect the quality of water resources. Ministry of Agriculture, Rabat, Morocco.

Allam M. (2002). *Case study from Egypt: survey on irrigation modernization - Beni Ebeid Area*. International Programme for Technology and Research in Irrigation and Drainage IPTRID.

Al-Atiri R. (2006). Evolution institutionnelle et réglementaire de la gestion de l'eau en Tunisie. Vers une participation accrue des usagers de l'eau. L'avenir de l'agriculture irriguée en Méditerranée. Nouveaux arrangements institutionnels pour une gestion de la demande en eau. Cahors, Cirad, Montpellier, France.

Al-Atiri R. (2005). *WP1 de WADEMED sur les instruments économiques de la modernisation de l'agriculture irriguée. Analyse des politiques hydrauliques. Cas de la Tunisie*. Sousse, Tunisie, November 2005.

Al-Atiri R. (2004). *WP1 de WADEMED sur les aspects techniques de la modernisation de l'agriculture irriguée dans les pays du Maghreb: Cas de la Tunisie*. Rabat, Maroc 2004.

Allisson P. (2005). *Water Market Middle East: Exploiting a Booming Market*. Global Water Intelligence, Media Analytics Limited, United Kingdom, January 2005.

Arlozorov S. (1997). *Report of the Committee for Examining the Management of Water Supply in Israel*. Ministry of Infrastructures, Jerusalem.

Arriëns-Wouter L., Bird J., Berkoff J. and Mosley P. (1996). Overview of Issues and Recommendations, v.1. In: *Towards Effective Water Policy in the Asian and Pacific Region. Proceedings of the Regional Consultation Workshop*, Manila, Philippines, May 10-14 1996. Asian Development Bank.

Asian Productivity Organization APO (2002). Organization Change for Participatory Irrigation Management. *Report of the APO Seminar on Organizational Change for Participatory Irrigation Management, Philippines*, October 23-27 2000 (SEM-32-00), Tokyo, Japan.

Bachta M.S. and Zaïbet L. (2006). Les innovations institutionnelles comme adaptations à l'évolution du contexte des périmètres irrigués : cas de la Tunisie. In: Bouarfa S., Kuper M. and Debbah A. (eds) 2007. *L'avenir de l'agriculture irriguée en Méditerranée. Nouveaux arrangements institutionnels pour une gestion de la demande en eau. Actes du séminaire Wademed*, Cahors, November 6-7 2006, Cirad, Montpellier, France. <http://halshs.archives-ouvertes.fr/docs/00/18/98/84/PDF/I-Bachta.pdf>



Baroudy E., Abid A.L. and Attia B. (2006). Managing water demand: *Policies, practices, and lessons from the Middle East and North Africa forums*. International Water Association.

Beaumont P. (2005). Water Institutions in the Middle East. In: Tortajada, Biswas A.K. (eds), *Chennat Gopalakrishnan, Water Institutions in the Middle East: Policies Performance and Prospect*, pp.131-152, Springer, New York, United States of America.

Bennis A. and Sadeq H.T. (1998). Population and irrigation water management: General data and case studies. In: DeSherbinin A. and Dompka V. (eds). *Water and population dynamics: case studies and policy implications*. Washington, D.C., American Association for the Advancement of Science [AAAS], 1998, pp. 263-81. <http://www.aaas.org/international/ehn/waterpop/morroc.htm>

Central Intelligence Agency CIA (2009). *The World Factbook: Jordan*. <https://www.cia.gov/library/publications/the-world-factbook/geos/jo.html>

Choukr-Allah R. (2010). Wastewater Treatment and Reuse in Morocco: Situation and Perspectives. In: Lamaddalena N., Bogliotti C., Todorovic M. and Scardigno A. (eds). *Water Savings in Mediterranean Agriculture & Future Research Needs. WASAMED project. Proceedings of the International Conference, February 14-17 2007*. IAMB, Valenzano, p.115. Options Méditerranéennes, B 56. <http://ressources.ciheam.org/om/pdf/b53/00800770.pdf>

Comair F. (2008). Gestion et hydrodiplomatie de l'eau au Proche-Orient. *L'Orient le Jour*, 11 July 2008. Beirut, Lebanon.

Comair F. (2006). Water Sector in Lebanon: An operational Framework for understanding legislative and institutional reforms. United Nations Economic and Social Commission for Western Asia - UN ESCWA, Beirut, Lebanon.

Courcier R. (2002). *Case study from Jordan: survey on irrigation modernization - North of the Jordan Valley*. International Programme for Technology and Research in Irrigation and Drainage IPTRID.

DG/GREE, 2008 : « Rapport de synthèse de la situation des GDA/PPI 2007

Diao, Xinshen, Dinar A., Roe T. and Tsur Y. (2008). A general equilibrium analysis of conjunctive ground and surface water use with an application to Morocco. *Agricultural Economics*, 38:117-135.

Economic Development Institute of the World Bank (1996). *Handbook on participatory irrigation management*. World Bank, Washington DC, United States of America.

Fatta D., Salem Z., Mountadar M., Assobhei O. and Loizidou M. (2004). Urban Wastewater Treatment and Reclamation for Agricultural Irrigation: The situation in Morocco and Palestine. *The Environmentalist*, 24(4):227-236, DOI: 10.1007/s10669-005-0998-x.

Food and Agriculture Organisation FAO (2010). Water profile of Egypt. In: Kundell J. And Cleveland C.J. (eds), *Encyclopedia of Earth*. Washington D.C., Environmental Information Coalition, National Council for Science and the Environment. http://www.eoearth.org/article/Water_profile_of_Egypt

Food and Agriculture Organization FAO (2009). *AQUASTAT database: Jordan*, Rome, Italy. <http://www.fao.org/nr/water/aquastat/countries/jordan/index.stm>

Food and Agriculture Organization FAO (2008). *AQUASTAT database: Lebanon*, Rome, Italy.

Food and Agriculture Organization FAO (2007). *AQUASTAT database: Israel*, Rome, Italy.



Food and Agriculture Organization FAO (2005). *AQUASTAT database: Morocco*, Rome, Italy.

Food and Agriculture Organization FAO (2005). *Water law and standards: Morocco*. <http://www.waterlawandstandards.org>

Food and Agriculture Organisation FAO, International Network on Participatory Irrigation Management INPIM (2001). Irrigation management transfer sharing lessons from global experience June 2001. In: *International e-mail conference on irrigation management transfer, sharing lessons from global experience June-October 2001*.

Food and Agriculture Organisation FAO, International Programme for Technology and Research in Irrigation and Drainage IPTRID (2006). Irrigation Modernization: Constraints and Solutions. In: Salman M. and Garces C. (eds). *Symposium Proceedings, Damascus, Syria, 28-31 March 2006*.

GDA Henchir Rmel (2012). *Assemblée Générale Ordinaire du GDA Henchir Rmel à Moknine sous le symbole l'économie des eaux d'irrigation, une responsabilité commune*, January 25 2012 – Document in Arabic.

Gedeon S. (2007). *Lebanon: case studies synthesis*. Institutional and Social Innovations in Irrigation Mediterranean Management ISIIMM, Euro –Mediterranean Regional Programme for Local Water Management.

German – Jordanian programme, 2010: “Water User Associations; The story of participative irrigation management in the Jordan Valley”.

Ghadban A. (1993). Water Resources and their Uses in the Syrian Arab Republic. *International*

Conference on Water Uses and Water Conservation, UN ESCWA. November 28 - December 2 1993, Amman, Jordan.

Gharios G. (2009). *Lebanese Waterways Strengthening IWRM through WUAs in Irrigation Schemes*. Wageningen University, Wageningen, The Netherlands. Master thesis.

Ghneim A., Bakir P. and Regner J. (2005). Rural communities sharing surface runoff, a survey of experience in irrigated agriculture in Jordan. *Report of the project on water resource management in irrigated agriculture*. German Technical Cooperation, Amman, Jordan.

Goldman M.D. (1996). *Managing the Water Systems – the Legal Framework in Israel*. The Florsheimer Institute for Policy Studies, Jerusalem.

Guemraoui M. and Chabaca M.N. (2005). Gestion des grands périmètres d'irrigation : l'expérience algérienne. In : Bachtta M.S. (ed). *Les instruments économiques et la modernisation des périmètres irrigués. Séance 1. Politiques hydrauliques : expériences passées et perspectives. Actes du séminaire Euro Méditerranéen*, Sousse, Tunisie, Novembre 21-22 2005.

Groenfeldt D. (2003). *Background paper on Participatory Irrigation Management*. Circulated at the World Water Forum III, Tokyo, Japan, March 16-23 2003.

Hafsi M. and Boughriba A. (2003). Five years experience in reverse osmosis plant optimization performances in Morocco. *Desalination*, 153(1-3):227.

Haddadin M.J. (ed.). (2006). *Water Resources in Jordan: Evolving Policies for Development, the Environment, and Conflict Resolution*. Resources for the Future Press, Washington D.C., Unites States of America.



Hamdy A., Tuzun M., Lamaddalena N., Todorovic M. and Bogliotti C. (eds). *Participatory Water Saving Management and Water Cultural Heritage, Proceedings of the 1st WASAMED workshop*. Options Méditerranéennes, series B: studies and research, no. 48, CIHEAM/IAMB-EU DG Research, 2003.

Haouari N. (2003). *Case study from Morocco: survey on irrigation modernization - la Tessaout amont – Haouz*. International Programme for Technology and Research in Irrigation and Drainage IPTRID.

Hefny M. and El-Din A.S. (2005). Egypt and the Nile Basin. *Aquatic Sciences*, 67:42-50.

ICID, INPIM (2007). *Proceedings of The 4th Asian Regional Conference & 10th International Seminar on Participatory Irrigation Management*, Tehran, Iran, May 2-5.

Institutional framework and decision-making practices for water management in Algeria. Towards the development of a strategy for water pollution prevention and control in the Seybouse River Basin March 2009, Prepared by the Agence de Bassin Hydrographique Constantinois-Seybousse-Mellegue Contract No: INCO-CT-2006-517673 (6th, framework programme)

International Fund for Agricultural Development IFAD. (2005). *Armenia, Egypt, Morocco, Tunisia. action-research programme on the identification and testing of methodologies and approaches for effective introduction of participatory irrigation management*, Rome, Italy.

Irrigation and Water Engineering Group, Ministry of Energy and Water MEW. (2005). *Projet d'Appui à la Réforme Institutionnelle du Secteur de l'Eau au Liban*.

Johnson S.H.III, Vermillion D.L. and Sagardoy J. A. (eds). (1995). *Irrigation Management Transfer: Selected papers from the International Conference on Irrigation management Transfer*, Wuhan/China, September 20-24 1994. Water Report 5. Rome: FAO and IIMI.

Jamal M., Al-Shaye R. and Kaisi A. (2006). *National Plan for Irrigation Modernization in the Syrian Arab Republic*. General Commission for Scientific Agricultural Research GCSAR and Agriculture and Agrarian Reform MAAR, Damascus, Syria.

Karaa K. et al., (2008). *Modernization of irrigation systems: measures to reduce pressure on water demand in Lebanon*. 2nd Workshop on technological perspectives for rational use of water resources in the Mediterranean region, Marrakech, October 30 2008.

KFW, DG/GREE, 2010: Cadre logique de la stratégie nationale de pérennisation des systèmes d'aep en milieu rural et des systèmes d'irrigation.

KFW, DG/GREE, IGIP, 2011 : « Stratégie nationale de pérennisation. Révision du cadre juridique, réglementaire et contractuel des GDA. Synthèse. »

Laoubi K. and Yamao M. (2009). Management of irrigation schemes in Algeria: an assessment of water policy impact and perspectives on development. In: Brebbia C.A. and Popov V. (eds). *Transactions on Ecology and the environment. Water Resources Management V. n. 125*: 503-514. WIT Press. doi:10.2495/WRM090451

Laster R. (1980). For Elaboration of the Legal Aspects of Water, see, Legal Aspects of Water Quality Management in Israel. In: Hillel S. (ed). *Water Quality Management under Conditions of Scarcity: Israel as a Case Study*. New York Academic Press, Unites States of America.

Laster R. (1976). *The Legal Framework for the Prevention and Control of Water Pollution in Israel*. Ministry of Interior, Jerusalem.



Leonard. T.M. (ed) (2006). *Encyclopedia of the Developing World*. Routledge, New York, United States of America.

Long W. (2007). Water reform efforts stuck in neutral as crisis looms. *The Daily Star*.

L'Orient le Jour (2009).a, *Pour la semaine de l'eau, réunion des directeurs de l'eau de la Méditerranée au Liban*.

Majzoub T. (2010). Water Laws and Customary Water Arrangements. *Report of the Arab Forum for Environment and Development: Water: Sustainable Management of a scarce resource*, pp.137-152.

Manor S. and Hagali Z. (2002). *Case study from Israel: survey on irrigation modernization*. The Hefer Valley Water Users Association. FAO, Rome, Italy.

Mazareh N., Shatanawi M. and Ghezawi. (2004). Jordan Experiences in water saving and participatory irrigation management. In: Hamdy A., Tuzun M., Lamaddalena N., Todorovic M. and Bogliotti C. (eds). *Participatory Water Saving Management and Water Cultural Heritage, Proceedings of the 1st WASAMED workshop*. Options Méditerranéennes, Series B: Studies and Research, 48:171-184.

Meinzen-Dick R. (2000). *Property rights and maintenance of irrigation systems*. Eschborn, Germany: Deutsche Gesellschaft für Technische Zusammenarbeit.

Ministry of Water Resources and Irrigation MWRI (2005). *National Water Resources Plan, 2017*. Planning sector, MWRI, Egypt.

Ministry of Water Resources and Irrigation MWRI. (2002). *Synopsis of Ministry*. http://www.moh.gov/eg/en/en_design/summary_en.aspx

National Agriculture Policy Center NAPC (2003). *The state of food and agriculture in the Syrian Arab Republic 2002*. FAO Project GCP/SYR/006/ITA.

Nofal I., Dudeen B. and Rabi A. (2003). Participatory water management and cultural heritage in palestine: the case studies of al-muruj scheme and al-auja spring. In: Hamdy A., Tuzun M., Lamaddalena N., Todorovic M. and Bogliotti C. (eds). *Participatory Water Saving Management and Water Cultural Heritage, Proceedings of the 1st WASAMED workshop*. Options Méditerranéennes, series B: studies and research, no. 48, CIHEAM/IAMB-EU DG Research; pp. 217-229

Ostom E. (1992). *Crafting Institutions for Self-Governing Irrigation Systems*. Institute for Contemporary Studies (eds). San Francisco, California, United States of America.

Palestinian Central Bureau of Statistic PCBS. (1999). *Small area Population, 1997-2010*. Report. Ramallah, Palestine.

Peter J.R. (2004). *Participatory Irrigation Management*. Paper presented at inaugural symposium The International Network for Water and Ecosystem in Paddy Fields, November 1-2 2004, Tokyo, Japan, INWEPF/SY/2004(06).

Regner J., Jochen H., Salman A.Z., Wolff H.P. and Al-Karablieh E. (2006). Approaches and Impacts of Participatory Irrigation Management (PIM) in complex, centralized irrigation systems-experiences and results from the Jordan Valley. In: *Conference on International Agricultural Research for Development, Bonn, Germany, October 11-13 2006*.

République Algérienne Démocratique et Populaire, Conseil National Economique et Social, Commission de l'Aménagement du Territoire et de l'Environnement, Commission de l'Aménagement du Territoire (2000). *Avant-projet de rapport. L'eau en Algérie : le grand défi de demain*. <http://www.cnes.dz/eau%20DZ.htm>



Restrepo C.G., Vermillion D. and Munoz G. (2007). *Irrigation management transfer: worldwide efforts and results*. FAO Water Reports n. 32. Rome, Italy.

Saadi A. and Ouazzani N. (2004). Perspectives of desalination of brackish water for valorisation in arid regions of Morocco. *Desalination*, 165(1):81.

Saleth R.M. and Dinar A. (1999). *Water challenge and institutional response: A cross-country perspective*. Rural Development Department, The World Bank, Washington DC, United States of America.

Salman M. (2004). Institutional reform for irrigation and drainage in Syria: diagnosis of key elements. In: *Food and Agriculture Organization (FAO), Syrian Expatriates Conference (2004), Damascus, Syria*.

Salman M. (2002). *Case study from Syria: survey on irrigation modernization - Old Alyarmook Project*. International Programme for Technology and Research in Irrigation and Drainage IPTRID.

Skogerboe G.V., Merkley G.P., Rifenburg R.F. (2002). *Establishing sustainable farmer-managed irrigation organizations*, 331 pp.

State Comptroller (1990), *Report on the Administration of Israel's Water Economy*. Jerusalem, p. 53.

Tal A. (1994). Law of the Environment. In: Kaplan (ed.) *Israel Business Law*. Kluwer, Boston, pp. 241-353. Reprint of second ed.

Tsur Y., Roe T., Doukkali R. and Dinar A (2004). *Pricing irrigation water: Principles and cases from developing countries*. Resources for the Future Press, Washington D.C., United States of America.

United States Agency for International Development USAID (2010). *Mena Regional Water Governance Benchmarking Project Country Profile: Egypt*. Washington D.C., United States of America.

United States Agency for International Development USAID (2010). *Mena Regional Water Governance Benchmarking Project Country Profile: Jordan*. Washington D.C., United States of America.

United States Agency for International Development USAID (2010). *Mena Regional Water Governance Benchmarking Project Country Profile: Morocco*. Washington D.C., United States of America.

United States Department of State (2007). *Background note: Morocco*. United States of America. <http://www.state.gov/r/pa/ei/bgn/5431.htm>

Varela-Ortega C. and Sagardoy J.A. (2001). The utilization of water resources for agriculture: Analysis of current regime and policy. In: *First mission report*. FAO project GCP/SYR/006/ITA. FAO-Italian Government Cooperative Program.

Vermillion D.L. (2005). Irrigation Sector Reform in Asia: From Patronage under Participation to Empowerment with Partnership. In: Shivakoti G., Vermillion D.L., Ostrom E., Yoder R., Lam W.F. and Pradhan U. (eds). *Asian Irrigation in Transition*. Sage Publications, New Delhi, India.

Vermillion D.L., Douglas L. and Sagardoy Juan A. (1999). *Transfer of Irrigation Management Services: Guidelines*. FAO Irrigation and Drainage Paper n. 58. ISBN 92-5-104308-6.

Viala E. (2008). *Implementing IWRM in Egypt: From Concept to Reality*. United States Agency for International Development USAID. wwwc2008.msem.univ-montp2.fr/resources/authors/abs797_article.doc

Wardam B. (2009). *Jordan Spared a water crisis this year, but the future?* Arab Environment Watch. <http://www.arabenvironment.net/archive/2009/6/887658.html>



Water Authority of Jordan WAJ (2008). *Irrigation Water Policy*. Amman, Jordan. <http://www.waj.gov.jo/English/polices/polices.htm>

World Bank (2009). *West Bank and Gaza assessment of restrictions on Palestinian water sector development*. Report No. 47657-GZ.

World Bank (2009). *Water in the Arab World: Management Perspective and Innovations*. The World Bank, Washington, D.C., United States of America.

World Bank (2008). *Accountability for better water management results: Morocco*. <http://go.worldbank.org/QZUJ4G5RW0>

World Bank (2007). *Climate change, irrigation, and Israeli agriculture: Will warming be harmful?* Policy Research Working Paper 4135.

World Bank (2007). *People's Democratic Republic of Algeria. A public expenditure review : assuring high quality public investment. Volume I : main report. Report No. 36270-DZ*. <<http://ddp-ext.worldbank.org/EdStats/DZAper07a.pdf>>

World Bank (2007). *Making the Most of Scarcity: Accountability for Better Water Management in the Middle East and North Africa. MENA Development Report on Water*.

World Bank. (2006). *Water Resources Management in an Arid Environment: The Case of Israel*. Analytical and Advisory Assistance Program China: Addressing Water Scarcity. Background Paper n. 3.

World Bank (2003c). *Algeria: Elements for a Water Sector Strategy*.

World Bank (2002). *A handbook to get the involvement of irrigation users in all aspects of irrigation management, and at all levels*. Environment and Natural Resources Division (EDIEN) and New Products and Outreach Division (EDINP) World Bank Institute (WBI), of the World Bank.

World Bank (2001). *Syrian Arab Republic Irrigation Sector Report*. Rural Development, Water and Environment Group, Middle East and North Africa Region, Report No. 22602–SYR.

Yavuz E. (2008). *Turkey, Iraq, Syria to initiate water talks*. Today's Zaman March 12 2008.



ANNEXES

EGYPTIAN CASE STUDY – RASH EL GHARB WATER BOARD

The Egyptian Case study was drawn based on the information provided by Mr Atef El Kashef, Director of the Irrigation Improvement Sector (IIS) – MWRI – Egypt

PIM - HISTORICAL DEVELOPMENT

In view of responding to the challenges facing the Egyptian water sector and in line with the international developments, users' participation has been adopted as a main policy of the MWRI.

1. In 1994, the development of Water Users Associations and Water User Unions at *mesqa* level (farm level) was made formal government policy after the adoption of Law 213 and from here onwards, much of the irrigation infrastructure development was accompanied by the set-up of these organizations.
2. Users' participation moved up into the system in 1995, in Fayum, with the creation of the first 'Local Water Board' at branch canal level. By law, branch canals are owned and managed by the MWRI while the *mesqas* are owned and managed privately by all the water users that are served by a specific *mesqa*.

The first User Organizations at Branch Canal Level: Local Water Boards

Fayum Water Management Project built on the long tradition in participation and established the first Water Board in 1995. Called 'Local Water Boards', these organizations developed as consultative bodies through which farmers could participate in decision making by recommending maintenance and repair priorities to the MWRI engineers. As consultative bodies, the local water boards have had limited formal authority or means as they have been limited in their ability to enforce decisions, apply sanctions to their members, generate and allocate resources and obtain an improved service from the irrigation and drainage authorities. In 1999, the experiment was expanded under the USAID sponsored Water Policy Reform Program (WPRP) through which 3 BCWUAs were established. This activity was followed up by a policy experiment in irrigation management transfer, under which 4 BCWUAs were set up. A further 6 BCWUAs were established with support from the Irrigation Improvement Project (IIP), with a strong emphasis on improving water distribution.

The National Water Board Project

To consolidate the initial success of Water Boards and address the above constraints, the National Water Boards Project was set up. The project objective was formulated as:

To develop a viable National policy and legal framework for Participatory Water management improvement at secondary level.

To reach the objective, the project worked towards achieving the following outputs:

- Formulation and testing in 10 pilot areas of a practical approach to develop sustainable Water Boards;
- Development of a training program for the Ministry staff and the Water Board committee members on Participatory Water Management;
- Development of a monitoring and co-ordination system for nation-wide establishment of Water Boards;
- Definition of the role and functions of the Ministry with respect to the functioning of Water Boards after their establishment;
- Formulation of legislative amendments;
- Initiation of support by national and regional leadership.



Under the guidance of the above mentioned projects and departments such as IIP, Fayum Water Management Project, Central Directorate for Irrigation Advisory Services (CDIAS), Environmental Policy and Institutional Strengthening Indefinite Quantity (EPIQ) and the Water Boards Project, more than 200 water boards have been established to day in 10 Governorates of the Lower, Middle and Upper Egypt, covering an area of more than 650,000 acres.

RASH EL GHARB IRRIGATION SCHEME

Rash El Gharb is a 5.3 km long branch of El Nasr canal. The 5000 acres irrigation scheme, mainly equipped for sprinkler and drip irrigation, lies in the new reclaimed area of Nubaria, which major village is El Shagaa of El Behira Governorate in the West Delta. Of the total users of 580 (85% land owners and 15% tenants); 400 are fresh irrigation and rural engineering

graduates and 180 are investors. The cropping pattern is much diversified and counts among others: cereals (wheat and maize), fruit trees (oranges and peaches), leguminous (beans)...

PIM-DRIVING FORCES

Rash El Gharb Water Board is established at the level of a secondary (branch) canal and represents a command area of 5000 acres. The community consists of large and small investors as well as graduates and settlers.

Of all the command area, an estimated 40 % has been cultivated as the rest was termed unfit because of severe drainage problems that left lands inundated with ponds. These problems have been reported to the representative of the MWRI but didn't yield any response. In order to overcome these constraints, the community leaders approached the Water Boards Project and asked to join its activities. Consequently, Rash El Gharb Water Board was established in 26/9/2001. Since its initiation, a settlement began to materialize. The graduates overcame their trepidations, and the investors overcame their seclusion to cooperate and serve their common interest – water management. The initiative was jointly taken by all parties, however, the investors took the lead. The spin-offs of the community development continue to erupt in all aspects of water management and are expanding into others of everyday life. One example is the noticeable increase in the commercial activity in Shagaa.

RASH EL GHARB WATER BOARD – ESTABLISHMENT, CONSTRAINTS AND ACHIEVEMENTS

Rash El Gharb Water Board was established through a ministerial decree, under the framework of the revised 213/1994 Water Law, which is still awaiting the approval by the parliament.

When approved, the new law will provide the missing legal framework to the water boards which will be recognized as user-managed organizations. The corresponding by-laws have been drafted as well, based on the experiences in pilot areas. These will be issued after the Law is approved by Parliament. In the new legal framework, a water board has three functional levels:

As a user-managed organization, it is **responsible for both irrigation and drainage as well as water quality in a specific command area**. However, at the present stage, the jurisdiction of the water board is limited to a consultation role at the *branch* or *secondary level*. In the future, after capacity is built up, the system management will be decentralized to district water boards and their Branches. These organizations would have the necessary economies of scale, the technical and organizational capacity for water management and sound financial practices. Water boards would then be part of the water management hierarchy in Egypt.

The process of increasing participation or decentralization, in which water boards are presently embarking, can be visualized as a continuum ranging from the initial stages of 'No Interaction' and 'Informing' to 'Community Decision' and 'Community Control'.

Rash El Gharb Water Board is formed by 52 members (the Representative Assembly) out of whom 11 form the Executive Committee. Through the first year of establishment, the board was able to make great leaps in establishing an office, develop the internal regulations, draw-up an action plan (although its sole focus was drainage) and establish a very strong network of allies in the MWRI and other stakeholders in the area.



Moreover, it was able to show its achievements in: i) the establishment process and thus to become a notable stakeholder among all the active institutions in the area; ii) the organization of the rotations at the canal and to fruitfully cooperate with the district engineer; iii) tackling residential problems - insect infestation, sewerage disposal; iv) self-financing and execution of maintenance works in coordination with the MWRI.

The Executive Committee was re-elected in a true enforcement of the confidence of the representative assembly in 2003. In the following year its efforts bore fruits. The drainage problems have been solved, and 90% of the lands have been cultivated.

NATIONAL IMPLEMENTATION PROCESS – RESPONSIBILITIES

The implementation of Rash El Gharb Water Board followed the process defined at national level; the main actors, responsibilities and functions being summarized in the following sections.

GOVERNMENT ROLE

A number of main parties are involved in the implementation of the Water Board Development Process:

1. Field Teams at District level, including the District Engineers for Irrigation and Drainage, CDIAS and may include consultants;
2. MWRI at Directorate and Governorate level (in the case of the Water Boards Project), formally organized into a Regional Management Committee (RMC);
3. Project Management and MWRI Central Management from Departments such as the Irrigation, EPADP, and CDIAS.

MWRI Field Teams at District Level

- The implementation of the Water Board Development Process is the task of the MWRI District Teams, including Irrigation, drainage and CDIAS.
- The team is in close contact with the water board community, other local organizations such as the Local Unit, Co-operatives, Health Department, Agriculture Extension and NGOs.
- The Teams are headed by a Coordinator and are composed of both Male and Female Water Management Organizers (WMO) and the regular District Engineers for Irrigation, Drainage and other relevant Departments.

MWRI Management at Directorate and Governorate Level

- Guidance and supervision of the process, as well as co-ordination with third parties, is the task of MWRI Management at Division and Governorate Level.
- Regional Management Committees are set up, chaired by the Undersecretary of the MWRI, and consisting of the General Directors of Irrigation, Drainage, IIP and CDIAS.
- In areas where Groundwater would be a major source of water or e.g. in Horizontal Expansion Projects, the Directors General of these departments would also be part of the RMC.
- The RMCs are complemented by the Inspectors, who are in close contact with the District Teams.
- One of the responsibilities of the RMC is to facilitate contact between the water boards and organizations from other Ministries, necessary to adequately perform their function of integrated water management.

MWRI Central Management

- Regulation, evaluation, policy development and monitoring are the final responsibility of the heads of the Central Level Departments such as EPADP, the Irrigation Department, Groundwater and Improvement Sectors and CDIAS.



- These departments are generally organized in a 'Steering Committee' which is formally responsible to guide the institutionalization of water boards and ensuring that they become part of everyday water management in Egypt.

The responsibilities of each of the above parties are summarized in the Table below:

Task	MWRI District team	MWRI Governorate management	Project Management	MWRI Central Management
Policy development			X	
Process planning	+	X	+	
Implementation	X	+	+	+
Training and guidance		+	X	
Supervision and monitoring		X	+	+

X = Primary Responsibility

+ = Supporting Role

Specific Roles

- In each District, a Coordinator is assigned to supervise, organize, coordinate and manage all the field activities in the District/Area. The Coordinator reports directly to the RMC.
- The tasks of the Coordinator are:
 1. Coordinate and monitor the implementation steps of water board development process and any other supporting field activities.
 2. Prepare and lead monthly monitoring and planning meetings and report on these to the RMC.
 3. Undertake regular co-ordination with the RMC and other outside organizations where appropriate such as the Ministry of Agriculture and Land Reclamation, Development Projects, Local and Regional Government Agencies.
 4. Coordinate and monitor the activities of the CDIAS and the Drainage and Irrigation Engineers in co-operation with the RMC.
 5. Plan, guide and supervise the activities of the Water Management Organizers (WMOs) in each canal area.
 6. Train the WMOs and any other involved Government staff.
 7. Ensure the incorporation of the gender perspective in the Process.
 8. Manage any Field Office(s).
 9. Report on a regular basis to the RMC.

District Engineer (Irrigation, Drainage)

- The engineers from the Drainage and Irrigation departments are assigned part time for the implementation of the water board development process in their area. They remain responsible for their regular tasks in operation and maintenance of the irrigation and drainage system in their District as well and report to the Coordinator and superiors in the RMC.
- Their main tasks include:
 1. Assist in specific steps of the water board development process.
 2. Share information on the operation and maintenance of the irrigation and drainage system with the water board and District field team colleagues.
 3. Participate in the monthly monitoring and planning meetings.
 4. Participate, where possible, in surveys, meetings and training workshops organized for the water board.
 5. Participate in training workshops in the water board development process and participatory water management.
 6. Provide technical assistance for the water board to prepare their annual plan.



7. Incorporate water board priorities into the District annual plan as outlined in the MWRI Joint Planning Protocol.
8. Delegate tasks to water boards as agreed upon in the MWRI Decree.
9. Assist water boards in technical and organizational matters by attending water board committee meetings.
10. Assist in monitoring and evaluation of water board development in their area.

CDIAS Engineer

- The CDIAS engineers are assigned the assistance to the activities of the Water Board Development Process in their area. At the same time they remain responsible for their regular tasks in WUA development.
- They report to the Coordinator and to their supervisors in the RMC. Their main tasks in Water Board Development include:
 1. Assist in specific steps of the Water Board Development Process.
 2. Participate in the monthly monitoring and planning meetings.
 3. Participate, where possible, in surveys, meetings, awareness campaigns and training Workshops organized for the water board.
 4. Provide advisory services and train the water board committee members, WMOs, Engineers and any other involved Government staff.
 5. Provide technical assistance for the water board to prepare the annual plan.
 6. Assist water boards to take on delegated tasks from the Irrigation and Drainage Engineers as agreed upon in the annual plan and/or Decree.
 7. Assist water boards in organizational and communication matters.
 8. Assist in monitoring and evaluation of water board development in their area.

WATER MANAGEMENT ORGANIZERS ROLE

- The WMOs are stationed in the water board areas and form the liaison between the MWRI and the water users.
- The WMOs are primarily responsible for carrying out the detailed steps of the water board development process and any supporting surveys, meetings and practical assistance to the users to establishing and building up their organization.
- The WMOs directly report to the Coordinator. Their tasks include:
 1. Implement the steps of the Water Board Development Process.
 2. Execute the diagnostic surveys, monitoring and data collection.
 3. Establish good relations and trust with the community in the Water Board area.
 4. Participate and assist in conducting small and large meetings, participatory studies, workshops, and any other activity initiated in the area.
 5. Assist and train the participant water boards in developing their organization.

PLANNING AND MONITORING

Planning and Monitoring Meetings are organized in each District/Area on a monthly basis. When appropriate, the meetings involve different areas to stimulate the exchange of experiences and include training activities as well.

KEY LESSONS LEARNED AND CHALLENGES

- The role and mandates of the Water Users Organizers (WUOs) in water management need to be backboned by a clear legal framework which is still awaiting approval. However, there is an ample opportunity within the present institutional framework to operate as well as shown by the specific case of Rash El Gharb.



- An immediate capacity building programme is needed in order to form the MWRI field operating staff on how to actively engage WUOs in decision-making.
- Taking into account the sheer size of the Egyptian water management system, procedures need to be developed that allow for a differentiated participation to the water sector management by level and tasks.
- A monitoring and evaluation programme is essential to allow for the devolvement of more responsibilities and an evolvement of the participatory process to higher levels in well performing WUOs; this devolvement of responsibilities should however be accompanied by a re-orientation of the mandate of the MWRI and its different departments, which cannot continue to run their regular activities despite the presence of an active WUO.



JORDANIAN CASE STUDY – PUMP 55 AREA; ASSOCIATION FOR AGRICULTURAL SERVICES AND IRRIGATION

The Jordanian Case study was drawn based on the information provided by:

- Mr Qias Owais, Director of Northern and Middle Jordan Valley Administration - JVA
- Mr Ziad Ababneh, Director of WUA Unit – JVA
- Mr Ali Al-Adwan, German-Jordanian Programme "Management of Water Resources"
Principle Technical Advisor
- Mr Sulaiman Abu Alfawares and Mr. Saleh Balawneh, Pump 55 WUA

PIM – DRIVING FORCES

The Jordan Valley had been known as the fresh fruit and vegetables supplier to Jordan. This status, however, was challenged along the years by the continuous stress on water resources. The JVA, established in 1977, showed an excellent model in the management of bulk water, but in the 1990s the retail irrigation water distribution faced a gradual decrease in efficiency due to several factors such as maintenance costs and deterioration of the network.. Being overwhelmed with bureaucratic processes and lack of resources to manage the situation, the efficiency of water distribution in the valley was jeopardized, which resulted in a lack of trust between the farmers and the authority, loss of faith in the operation and competition on water. Driven by these factors, in line with the national strategies and policies and motivated by donors, JVA started an Irrigation Management Transfer at retail distribution level. The partial devolvement of the management responsibility followed an agreement stipulated between the JVA and the WUAs and targeted 12 among the 23 WUAs established in the Jordan Valley.

WUA – LEGAL, INSTITUTIONAL FRAMEWORK AND ESTABLISHMENT

WUAs in Jordan are established under the JCC following the procedures stipulated in Article 3 of the Cooperative Associations bylaw 1998. As such, the WUA acquires a legal status allowing for its financial and administrative independence (Article 17 of JCC Law No. 18 / 1997) and enabling it to own funds and assets, stipulate contracts...

Eligible members are Jordanian landowners or tenants (of not less than 3 ha) within the association service area, older than 18 years old, (except when a minor is a legitimate inheritor of a deceased member) and of good reputation.

The membership is compulsory. In reality, 90% of the farmers are members. However the WUA serves members and non-members. The association is established with no less than 10 people. Founders elect a preparatory committee, consisting of a minimum of three of members. The preparatory committee is responsible for the association registration (application and follow up) and preparation of the internal statute. The application signed by all the founders is submitted to the JCC director in the required form together with the internal statute (equally signed by all founders). The Dissolution of an association is effective if 75% of its members approve it through signing or finger stamping the request.

PUMP 55 AREA ASSOCIATION FOR AGRICULTURAL SERVICES AND IRRIGATION

The WUA at Pump 55 was among the 12 associations targeted for transfer. The pump 55 association no longer uses freshwater from the King Abdullah Canal (except during winter floods) which carries valuable drinking water from the Yarmouk river. The irrigation water needs are delivered from the King Talal Dam, through Zarqa Carrier III where recycled wastewater from Jordan's capital, Amman, is collected, dispensed and used for unrestricted irrigation in the Middle Jordan Valley, including the WUA 55 service area. The farmers also invest in high-tech agricultural techniques and valuable crops for export (mostly vegetables - constituting about 95% of the cropped area). The area equipped with localized systems and effectively irrigated is around 1065 ha for a total of 270 farm units where 40% of the farmers are landowners while 60% are tenants. Each unit is allocated an irrigation control box (Turnout), with measurement devices. At present 110 farmers (representing 90% of the farmers) are parts of the Pump 55 association.



The Control over the canal, the Zarqa carrier, the irrigation network and the pumping stations is the responsibility of JVA, while the WUA was transferred the tasks of retail water distribution, detection of illegal water use and alerting the JVA.

IMPLEMENTATION PROCESS

GIZ started supporting participation activities in Pump 55 service areas in 2004. Several meetings were held with farmers introducing the participation concept and encouraging farmers to participate in irrigation management. A General Assembly attended by 70 farmers was held in 2004 and a water council with 18 members was elected for Participatory Irrigation management.

IMT: Resistance and implementation

The farmers showed resistance to a transfer to be performed under the umbrella of the JCC. The resistance is justified by the bad experience farmers had with the cooperatives established in the 1970s in the Jordan Valley and characterized by inefficient financial and administrative management. Moreover, the duality in irrigation management involving both JVA and the WUA accentuated the farmers' fear and resistance to the transfer.

However, after several meetings involving farmers, JVA and JCC, the farmers decided to step forward and establish a formal WUA with a defined statute. In 2006 the WUA was founded and a management committee was elected. Two subcommittees were elected as well among the management committee members to participate on a voluntary basis in irrigation water distribution in collaboration with JVA. In 2009, retail water distribution task on 1050 ha out of a total of 1065 ha was transferred to the WUA through an Agreement stipulated with the JVA, which defines the functions and duties of each of the parties, and which is annually renewed based on target indicators. Table 1 lists the main steps of the implementation process.

Table 1. Main programs, components and implementing agencies

Year	Program Component	Main Program	Implementing Agency on behalf of the German government (BMZ)
2004³-2007	Water Resources Management in Irrigated Agriculture (WMIA)	Water Program	GTZ
2007-2008	Water Users Communities	Water Program	GTZ
2008-Now	Water Users Associations	Water Program	GTZ presently called GIZ

Tasks transfer was effected following two months of intensive technical training on the functions to be assumed by the WUA, such as water budgeting, meter readings (installed on farm gates and pump stations), interpreting the irrigation order released by JVA, maintenance of flow meters and limiters, controlling of pressure valves and calculating distribution efficiency. Administrative management training was also conducted as well and it included minutes and report writing, filing, computer skills, and internal financial auditing.

Presently JVA is regularly inviting the WUA leader and employees to training and workshops and responds to the training needs upon request.

INTERNAL STATUTE

According to Article 3 of the Cooperative Associations bylaw of 1998, associations must have their internal statutes (internal rules, laws and procedures) that specify the objectives for their establishment, capital,

³ GIZ started supporting participation activities in WUA Pump 55 service areas in 2004



conditions related to approval and dissolution of memberships, financial, arbitration and administrative provisions.

The internal statute of pump 55 WUA defines the following purposes of its establishment, in line with the agreement stipulated with JVA:

1. Participate to the management and distribution of water to the agricultural farms in Development Area 21 of King Abdullah Canal Project lands
2. Work with government or non-government parties to monitor and control the quality and the quantity of irrigation water provided to the farms
3. Notify the JVA of any illegal actions by JVA employees and farmers, involving either water distribution or any service managed by JVA
4. Collect fees and money as authorized by JVA and within the WUA capacity and willingness thereof
5. Participate with the JVA in following up and monitoring water distribution, identification of illegal actions, registration/control of violators and consequential fining with the relevant parties
6. Participate in Maintenance work of distribution network and irrigation equipment according to capacity, equipment and experience available at the WUA through an agreement with JVA
7. Claim and follow up on any of the farmers rights within the WUA service area
8. Rehabilitate irrigation facilities in coordination with JVA and donors
9. Prevent assault on valves and irrigation devices or vandalism of pressure reducing valves, to increase water distribution efficiency and equity through coordination and cooperation with JVA.

Other purposes are related to facilitating marketing of farmers' products, carrying out relevant trainings and workshops, cooperating with other local, regional or international organizations to support the WUA achieving its objectives, carrying out investment projects...

FUNCTIONS

Government role

JVA carries out all major maintenance work concerning water distribution management within the pump 55 irrigation area, including the main and sub-main lines, as well as all the water resources facilities and any other tasks that are not covered by the obligations of the Association. However, it coordinates with the Pump 55 WUA in i) preparing and executing the maintenance and rehabilitation programs s; ii) preparing the daily irrigation schedules; iii) preparing and implementing the programs of agricultural roads maintenance and rehabilitation; and iv) preparing seasonal water budgets.

PUMP 55 WUA role

Following the good performance evaluation of the Association during 2010, water distribution tasks were expanded to include also the maintenance of the farms' turn outs and the control and stopping of the illegal use of water.

At present, the association performs the following functions, well defined through the agreement stipulated with JVA:

1. Participating alongside with the JVA in the management of irrigation water before the water source (i.e. before the Pump 55). This participation includes:
 - Preparation of water budgets and irrigation schedules related to the pump irrigated area
 - Protection and control of water resources and facilities and informing the Authority of any violation
2. Management of irrigation water distribution after the pump 55; conducting the following activities:
 - Distribution to the farms of the water shares allocated to the pump area according to a well-defined irrigation schedule
 - Field supervision and control of violation and water consumption and presenting necessary reports thereof to the Authority and relevant parties



- Identification of problems related to the distribution of water within the working area of the Association and following up farmers' complaints and attempting to solve them
- Collection of information on cropping patterns on a monthly basis in collaboration with JVA
- Supervision and follow up at farms units' of the water allocation and consumption through the main meter readings
- Conduction of all maintenance works at the farm units turn outs and stopping of the illegal use of water which is fined more severely now than it was in the not-too-distant past. Legal water is charged at a rate of 0.085 Jordanian Dinar (JD) per cubic meter by the JVA while illegal water usage - if detected - is punished with a rate of 0.250 JD per cubic meter
- Supervision and follow up on water distribution from the irrigation network source to the farms turnouts according to the irrigation water schedule
- Control and protection of irrigation conveyance lines as well as main and sub-main valves systems
- Preparation of reports (monthly and annual basis as well as work progress) including the minutes of the management committee meetings and the monthly claims
- Appointment of qualified staff to implement the tasks of the Association
- Chair of the Association and his staff are committed to working hours according to irrigation schedules described in the related annex of the agreement on the distribution staff analysis

FINANCING

The source of financing of the WUA is the initial membership fee which is paid once, upon admission, in addition to the stocks. Each member should own not less than 200 JD worth of stocks. However, in order to encourage farmers to join the WUA, only 40 JDs are requested (about 70 US dollars) of which 5 JDs represent the membership fee.

According to the management (service) contract between JVA and the WUA, all costs related to retail distribution and maintenance are supported by JVA. Actually JVA pays an annual sum of twenty-five thousand six hundred JD (25600) to cover the cost of water distribution as per the tasks agreed upon with and carried out by the Pump 55 WUA, which submits monthly all due financial claims organized and audited properly.

The costs paid by JVA correspond to the following:

1. Annual salaries: In order to reduce the costs and increase the efficiency of irrigation water management and achieve participation between the neighbouring and similar associations, it has been agreed between the pumps 55 and 50 Associations to appoint two persons serving both associations; one acting as a water official and maintenance manager and another as a data entry clerk.. Consequently, the annual sum paid by JVA covering 75% of the total costs cover the following:
 - WUA Chair person
 - Water Official (serving Pump 55 and Pump 50 WUAs)
 - 4 Ditch Riders
 - 1 data entry clerk (serving Pump 55 and Pump 50 WUAs)
2. Lump sum maintenance cost (12% of total costs)
3. Transport expenses (9% of total costs)
4. Administration supplies and expenses (4% of total costs)

In addition to the above mentioned items, the authority is committed to providing relevant spare parts related to the farms' turn-outs, excluding any infringement cases, as well as any maintenance supplies for the Association, to enable it to carry out maintenance work assigned to it according to what is set out in the third article of the Agreement.

RESPONSIBILITIES AND ASSOCIATED CADRE

Table 2 reported below, summarizes the responsibilities transferred to the Pump 55 WUA, the associated cadre carrying out the specific tasks and the relative time step.

**Table 2. Responsibilities transferred to Pump 55 WUA, associated cadre and time step**

Responsibility	Cadre / Time step
I. Participation with JVA to the works performed upstream the pump station (at the canal)	
Participation in preparing water budgets	Chair of Association, water official/ Beginning of season
Participation in preparing the maintenance and rehabilitation program, including agricultural roads	Chair of Association, Water official / daily
II. Authority transfer:	
Implementation of the irrigation schedule/ water distribution	Chair of Association, water official, ditch rider / daily
Implementation of maintenance tasks related to the farms' turn-outs (gates) in irrigation areas 50 and 55	Maintenance technician according to a mechanism agreed upon between the WUAs 50 and 55
Field supervision / violation reporting	water official / daily ditch rider / daily
Collection of cropping pattern data	Ditch rider / monthly
Preparation of meters' readings	Ditch rider / monthly
Documentation, archiving and preparing reports	Data entry clerk (treasurer) / one day per week
Preparing of annual budget and financial activities	Treasurer
Coordination and collaboration with donors	Chair of Association, Water official, Association management committee

KEY LESSONS LEARNED, CHALLENGES AND ACHIEVEMENTS

Sharing responsibility with JVA resulted in increased awareness of the water scarcity in the Jordan Valley. Joint planning and implementation dissolved the mistrust with JVA and created farmers' ownership. This motivated them to improve the irrigation management situation and their performance under water scarcity conditions. However, the following support services need to be strengthened in order to achieve sustainability of the young experience:

- Exploring possibilities to increase financial sustainability of the WUA including investment opportunities under limited financial conditions
- Strengthening conflict management skills and dialogue management
- Technical Training on: routine maintenance, on-farm management and water budget preparation
- Enforcement of accounting, managerial and computer skills and data entry.

Moreover, the implementation process was challenged with many problems that continue threatening its sustainability and need to be faced:

- Lack of financial sustainability, especially that fees and fines collected all go to the JVA and then to the Ministry of Finance
- Technical problems related to lack of financial capacity at JVA to rehabilitate the irrigation network
- Fluctuations in water supply at the source and water resources scarcity
- Lack of adequate legal frame for farmers' participation in irrigation management made the farmers insecure toward the sustainability of the WUA and the transfer. This creates lack of job security among the WUA employees. Moreover, conflicts are solved thanks to the good reputation of the WUA but no legal basis is in place for institutional intervention.
- Lack of fringe benefits for WUA employees (social security and health insurance)



- Difficulties for providing a qualified technical cadre by the Association
- Effects of the deteriorated quality of irrigation water on agricultural investments and on the distribution network of irrigation water
- Difficulty of monitoring and following up the distribution of water for some irrigation turn-outs located within the area of the agricultural units
- Unclear violation control and reporting mechanisms
- Repeated power cut-offs at the pumps during water distribution
- Delayed responses by JVA in conducting maintenance tasks under its responsibilities

However, the performance records of Pump 55 WUA which is annually evaluated by the JVA shows that it is high on its target indicators and was able to achieve the following results:

- reduction of Cost of irrigation O&M to farmers by 15%
- reduction of Cost of irrigation O&M to government by 15%
- Increased efficiency of fee collection (reaching 100% in 2011, compared with 67% prior to the task transfer)
- Improving the quality of maintenance
- Improving the water delivery timeliness
- Improving the distribution efficiency from 86% in 2007 to 93% in 2009
- Improving equity of water delivery (reduced penalties and improved farmers satisfaction). Actually, flows increased from 2 Liters/sec to 6 Liters/sec due to reduction of illegal abstractions and improved pressure level
- Increasing crop yield as a consequence of utilization of modern irrigation techniques, thanks to a better management of the irrigation system and consequently a better service to users
- Applying leaching fractions to improve soil salinity as a consequence of the good water management under scarcity conditions

Table 3 summarizes the performance assessment of and the results achieved by Pump 55 WUA in 2010 and 2011.

Table 3: summary of performance results of Pump 55 WUA by indicator

Year	Water Quantity Ordered (MCM)	Water Quantity Discharged (MCM)	No. Of Fin es	Illegal Water Quantity (MCM)	No. Of Compl aints	No. of mainten a nce cases for irrigation devices
2010	3.88	3.91	77	0,0254	139	336
2011	3.36	3.70	18	0,0125	69	277
Differe nce	0,52	0,21	59	0,0129	70	59

Source: Workshop for Evaluating the Performance of the Water Users Associations Operating by Task Transfer Contracts, Amman , Thursday , 09/02/2012



LEBANESE CASE STUDY – BTEDHI COOPERATIVE FOR THE USERS OF MODERN IRRIGATION TECHNIQUES

The Lebanese Case study was drawn based on the information provided through the official documents of RDP project and by:

- Dr. Fadi Comair, Ministry of Energy and Water , Director for Hydraulic Resources
- Mr Kamil Fakhry, Btedai cooperative for the users of modern irrigation techniques, Committee President
- Ms. Mona Fakih, Ministry of Energy and Water, Director for Water
- Mr. Georges Fakhry, Ministry of Energy and Water, Head of Registry
- Ms. Maya Mouhanna, Ministry of Agriculture, Head of section for irrigation and rural development

PIM – DRIVING FORCES

The economy of Deir El Ahmar – Btedhi district (Baalbeck Caza), rests essentially on agriculture. The agricultural area amounts to 2000 ha; scattered among the valley and the village. The area is potentially water rich but is affected by periods of drought that are getting increasingly severe and long. The gradual desertification of the territory resulted in growing migration of local populations.

The village of Btedhi is mainly fed by Yammounneh intermittent lake through an open channel. The village water right amounts to 25% of the channel discharge which would not exceed 10 liters/second during the peak period (July-August) but is mainly greater than the farmers needs in winter and early spring.

In order to enhance the agricultural production, the population of Btedhi sought to increase the water availability during the irrigation season, accumulating in a reservoir the winter water in excess. Through a USAID program, Btedhi proceeded with the construction of an 85000 m³ capacity reservoir. This initiative was further encouraged and financed by the church, the Ministry of Energy and Water (MEW), the Lebanese Army, the Pontifical Mission, Private Donors, Caritas and the Italian Cooperation, leading to i) the completion of the works at the reservoir; ii) the participatory development and installation of a tertiary pressurised distribution network and iii) the creation of a water users associations currently operating and managing the irrigation system.

WUA – LEGAL, INSTITUTIONAL FRAMEWORK AND ESTABLISHMENT

Under existing texts of laws, water resources management is the responsibility of the national government through the MEW, the Water Establishments, and the Litani River Authority. It is the policy of the government to delegate the management of the tertiary networks to WUAs but no law has been promulgated so far to offer a framework for their creation.

However, feeling the need for local management of water resources especially in medium and small schemes, encouraged by international organizations, and in the absence of a legal framework, farmers have formed groups that acted like ad hoc WUAs and registered their association under one of the following three formats:

1. NGO registered at the Ministry of Interior and operating under the laws governing NGOs.
2. Cooperative registered under the Ministry of Agriculture operating under the laws governing cooperatives.
3. Water committee registered at the MEW (currently forbidden after the issuance of law 221 for water).

BTEDHI COOPERATIVE FOR THE USERS OF MODERN IRRIGATION TECHNIQUES

Btedhi Cooperative was established in 2005 and was transferred the Operation and Maintenance (O&M) of the irrigation system serving 60 owned ha, out of which 40 ha are irrigated and mainly equipped for localized irrigation (95% drip irrigation; 5% surface irrigation). The collective irrigation system managed by the cooperative consists of:

- An 85000 m³ accumulation reservoir
- A pumping station
- A 2000 m³ buffer (regulating) reservoir



- Four distribution sectors (60 ha)

IMPLEMENTATION PROCESS

The Italian Cooperation in partnership with the Mediterranean Agronomic Institute of Bari, Caritas-Lebanon and the Council for Development and Reconstruction (CDR), started supporting participation activities in Btedhi in 2004 through the Italian funded project "Rural development of High Bekaa Valley". Several meetings were held with farmers who were looking for the implementation of the distribution system supplied by the accumulation reservoir. A major characteristic of the implementation process in Btedhi is the participation of farmers, not yet organized in an association, to the setting of the executive project for irrigation water distribution and its management rules.

After some resistance shown - due to lack of awareness - by a part of the population to the Irrigation Management Transfer to an association, the farmers in a general assembly held in January 2005, decided to step forward and establish a formal WUA with a defined statute. In February 2005, the WUA was founded and registered at the Ministry of Agriculture, directorate of Cooperatives (law 17199 of August 18, 1964), under the cooperative standard bylaw defining its objectives, administrative boundaries, responsibilities and years of operation (30 years).

INTERNAL STATUTE

Following the standard structure of cooperatives, the general assembly made up of all the members of the cooperative owning at least one share, elects a Board of Directors made up of 5 members through secret ballot each two years.

The membership is voluntary, the eligibility being constrained to the villagers, resident and non- resident, land owners and tenants. The members have the right to i) access water for irrigation through the scheme built by the cooperative, according to an irrigation calendar agreed between the farmers and the board of directors, ii) elect the Management Board and the Foresight Committee. They also have the duty to i) protect the network, ii) comply with the irrigation calendar, and iii) pay a cost for the water they are supplied with.

All shareholders have the same voting power, regardless of the number of shares they own.

The Board which is responsible for the daily operational, administrative and financial management of the cooperative, elects among its members a president, a vice-president and a secretary. The Board is entitled to accept or reject memberships and to resolve conflicts. Its overall work is followed up by an oversight committee made up of 3 elected members, who annually report to the General Assembly.

Purposes

The internal statute of Btedhi WUA defines the following purposes for its establishment, in line with cooperatives bylaw:

1. Improve irrigation in the village of Btedhi
2. Install a pressurized irrigation network
3. Build the capacity of the farmers on installing pressurized irrigation networks
4. Develop a seasonal irrigation calendar
5. Raise the awareness of the local population on the importance of water in general and irrigation in particular
6. Purchase equipment and supplies for the operation of the cooperative
7. Protect the environment by any possible means

Dissolution

The cooperative can be dissolved through a decision of the general assembly and/or the directorate of cooperatives.

In the first case, one or more of the following reasons should apply:

- the purpose of its creation is fulfilled
- it is faced with barriers blocking the achievement of its objectives
- it is bankrupt



- it is merged with another cooperative
- For any additional reason identified by the general assembly

In the second case, dissolution is possible if one or more of the following conditions occur:

- the cooperative did not start exerting its functions within one year from the publication in the official gazette of the creation of the cooperative
- the years of operation are elapsed (30 in this case)
- the number of members decreases below the legal limit and no new members have joined within the same fiscal year
- it is bankrupt
- it neglects for a period of one year the performance of its duties
- further to investigation by the directorate of cooperatives, it is established that the cooperative is conducting political, partisan, or sectarian work or that conflicts have arisen among the members preventing it from continuing its work.

FUNCTIONS AND FINANCING

Government role

The MEW has provided funding to share in the cost of building the reservoir and the network. The Ministry of Agriculture oversees the work of the cooperative from an administrative point of view and in certain cases, it also provides financial support.

Btedhi WUA role

Btedhi WUA develops yearly a seasonal irrigation calendar which governs water distribution among farmers. It is responsible for the full O&M of the system and is entitled to enforce sanctions on farmers who do not fulfill their duties by cutting water supply.

It is financially sustainable as the sales of water to farmers cover the rates to be paid to the Government for the water supplied from Yammouneh lake, all the regular O&M activities, and the costs of the employees who daily run the system. The water costs are assessed seasonally and they account also for unforeseen (emergency) needs.

KEY LESSONS LEARNED, CHALLENGES AND ACHIEVEMENTS

Btedhi irrigation scheme and WUA implementation were backboneed by a number of international programs in addition to the contribution of the Lebanese army and MEW, which funded and technically supported the process. Moreover, the system was conceived and implemented upon the request and with the participation of a very active local community, who was transferred the management of a new and highly efficient system.

Actually, Btedhi WUA is highly performing. The efficiency of water fees collection is very high, showing the satisfaction of the farmers with regard to the system management and the quality of maintenance. The timeliness and equity of water delivery, as well as the irrigated area, the crop yields and the farm income increased. O&M costs being entirely covered by the fees paid by the farmers, eliminated the cost of irrigation to the Government. These tremendous results have encouraged increased support by the donors and the ambitions for sustainable projects by the association. Actually, the WUA is considering installing alternative energy supplies in order to reduce the cost of pumping for one section of the village.

The main lessons that can be drawn from Btedhi WUA achievements and success story are the following:

- There is a higher potential of success for the WUA if the system is highly performing and the transfer is driven by local demand. A main asset to the success of Btedhi experience is the active involvement of the community in the technical project design and later on in its implementation; the process was therefore driven by both, the donors and the local community, fully aware of the potential of the new established system and the mode to operate it and manage it efficiently. In conclusion, awareness campaigns, capacity building programs on sustainable water management covering technical and institutional issues, and active participation are very important ingredients to the sustainability of the initiatives.



- With the lack of legal and policy instruments, farmers are trying to find a way around the system to legalize their association, which indicates that they believe in the advantages of WUAs. Moreover, the current management of Btedhi association is reviewing the status of cooperative and might consider applying the new law for WUAs when promulgated. This willingness in addition to the success of the ad hoc WUAs are giving the right push to the government to change its policy and delegate management of irrigation to local associations.

Following are some figures reporting on the achievements of the WUA and the Implementation of the Participatory Process.



	
<p>The accumulation reservoir</p>	<p>The pumping station</p>
	
<p>The buffer (regulating) reservoir</p>	<p>Soil sampling</p>
	
<p>Soil analysis</p>	<p>Stakeholders Meeting: Participatory Implementation</p>



					
Stakeholders Implementation	Meeting:	Participatory	Stakeholders Implementation	Meeting:	Participatory



TUNISIAN CASE STUDY – HENCHIR WATER USERS ASSOCIATION

The Tunisian Case study was drawn based on:

- the report prepared by the technical committee of Henchir Rmel in 2012 and presented during the annual meeting of the General Assembly;
- the information provided by Mr. Abdelhamid Mnajja, Département du Génie Rural et de l'Exploitation des Eaux – Ministère de l'Agriculture.

HENCHIR RMEL IRRIGATION SCHEME - BACKGROUND

The Henchir Rmel Irrigation Scheme – Moknine (Monastir governorate) was constructed in 1992. At that time, the crops prevailing in the area were fruit trees and field crops and the scheme was supplied with treated waste water. The irrigation scheme covers an area of 110 ha, totally equipped for localized irrigation, and serving a total of 120 farmers; all landowners. The management of the scheme was transferred to a WUA established on February 9, 1993 under the status of "AIC". Consequently a Board consisting of a president, a chief accountant and four members was elected.

Five years later, the chemical by-products released by the textile industry in the treatment station, notably deteriorated the quality of the irrigation water and negatively impacted the soils and the agricultural production.

HENCHIR WATER USERS ASSOCIATION

FIRST INTERVENTIONS: NEGOTIATION WITH MARHP

With the aim of re-establishing the soils properties and the agricultural production quality, Henchir Rmel AIC entered into negotiations with the MARHP regarding the source of water supply. Finally an agreement was reached and the AIC was accorded the right to supply the irrigation scheme with surface waters, instead of treated water, if fulfilling two conditions:

- To increase the fee per cubic meter of water consumed from 20 millimes (treated water) to 175 millimes (surface water);
- To completely manage the new system to be installed consisting of:
 - 1 semi-buried reservoir with capacity of 1000 m³
 - 1 floating station
 - 1 elevated reservoir /water tower with capacity of 100 m³
 - 3 pumping stations
 - 1 voltage transformer (medium voltage)
 - 1 electrical cabinet

THE REHABILITATED SCHEME

After the stipulation of the agreement, the rehabilitation of the system was taken over by the state and was accomplished in 1998 with a total cost of 900 000 Tunisian Dinars (TD). Since, Nebhana dam supplies Henchir Rmel Irrigation Scheme with surface water, presently farmers produce prime and extra prime quality vegetables.

ESTABLISHMENT AND FUNCTIONS

In compliance with the legal framework of WUAs in Tunisia, the status of Henchir Rmel association changed to GIC in December 20, 1999 and to GDA in September 19, 2006. The process of the GDA establishment was backboned by the support of the public administration through the CRDA. The CRDA conducted awareness campaigns highlighting the advantages and the duties of a GDA. Further, the administration organized training sessions tackling administrative and technical issues to be handled by the GDA, from accounting to management, operation and maintenance of the scheme.

Accordingly, the full responsibility and authority of the following was devolved to the GDA:



- Use and maintenance of the hydraulic infrastructure from the conveyor to the hydrant;
- Water distribution: each year, the GDA negotiates with the government the volume of water to be allocated to the irrigation scheme. Based on the accorded total volume, the irrigated area and the type of crop, the GDA negotiates with the farmers the volume to attribute to each farmer and accordingly, an agreement is signed for the specific irrigation season;
- Fees collection: the payments of water quotas are due before the starting of the irrigation season, after the signature of the agreement between the farmer and the GDA.
- Equipment of farms with water meters in order to reduce losses. Moreover, the farmers are encouraged by the GDA, to use irrigation techniques enabling a sound and an efficient use of water.

The day to day management is instead conferred to technicians who perform the following tasks:

- Follow up of water consumption
- Opening and closing of outlets
- Maintenance of the equipment (hydrants; valves...)

Moreover, a technical director is responsible for the financial management (accounting, billing,...), technical management (data acquisition, control of irrigation schedule, follow up on the losses, technical damages and accidents..) and administrative management (management of the contracts, preparation of the moral and financial report to the General Assembly, invitation of the members to meetings..).

KEY LESSONS LEARNED

Government side

The establishment of the irrigation scheme was supported by the Belgian cooperation program which defined the crops water requirements, the cropping calendar and the corresponding irrigation schedule. The cooperation project started in the 1980s to support the irrigation schemes of the coastal zone served from Nebhana dam. This showed that the support to the public administration should not be constrained to the hydraulic aspects but it has to include the support to the related aspects of an integrated irrigated agriculture: cropping patterns, cropping techniques...

GDA side

The GDA since its establishment had to face many difficulties, among others, the deteriorated quality of the treated waste water and the limited quantity of surface water allocated to the irrigation scheme. These constraints strengthened the willingness of the farmers to act and participate as a community to the table of negotiations with the government. Finally, they generated the right impulse leading to the success of the GDA.

Moreover, in a regional context which favours the agricultural production (land tenure, important markets,..) and with the business orientation of the farmers, good economic returns were accomplished. This result reinforced the farmers' willingness for self-organization and autonomous scheme management, with the perspective of yielding major returns.

In addition, the respect for the local democratic rules through the free elections and the alternation of responsibilities through the renewal of the Board, backboneed the success of the GDA.

CONTINUOUS CHALLENGES

To date the GDA is benefiting from the trainings organised by the public administration. This effort should be continuous as each year new elections concerning the renewal of one third of the board are due and consequently the new members should be trained to ensure the good running of the GDA functions and its sustainability.

The administration provides the training to the trainers who are responsible for the knowledge transmission to the GDA members. This approach is yielding satisfactory results in the case of Henchir Rmel, but adequate actions should be undertaken to ensure the continuity of the necessary training activities.



The GDAs are particularly interested in two specific themes dealing with (i) the business oriented agriculture and the right training of the farmers to this purpose and (ii) the reinforcement of the structures for and competencies in dissemination.

A productive approach would be that to organise and address the same training to many GDAs assembled together who can take charge of the salary of the trainer who would support and advise the farmers.

ACHIEVEMENTS

The performance records of Henchir WUA shows that it is high on its target indicators and was able to achieve the following results:

1. The GDA has a very good control over the expenses in terms of operation and maintenance of the irrigation system leading to an optimum O&M cost, entirely handled by the farmers; with 100% fee collection efficiency. Moreover, since O&M tasks were transferred to the GDA, the governmental financing inside the scheme was reduced to zero; Annex 1 reports on the financial situation of the GDA since its establishment in 2009 to 2011. At the end of every irrigation season the Board reports to the General Assembly on the achievements and constraints presenting and discussing the financial balance and the available budget;
2. The irrigation equipment and structures are very well maintained and operated, which allowed 100% of the farmers to use localized irrigation techniques improving the overall distribution efficiency; as a consequence, the irrigated area increased by 16 ha and the intensification rate reached 127% since 2011;
3. The water delivery timeliness and equity improved; actually the irrigation schedule (the rotation to be applied) is agreed upon among the farmers at the beginning of each irrigation season based on the cultivated crops and the area to irrigate;
4. Before the creation of the irrigation scheme, fruit trees and field crops prevailed in the area. At present, the main cultivated crops are prime and extra prime quality vegetables, which significantly increased the farmers income.

EXTERNALITIES

Positive externalities were assessed in the Henchir rmeil irrigation scheme thanks to the successful management performed by the GDA. Far from its legal obligations, the GDA was able to execute a rural track (400m long and 12m large) and to construct a bridge over the valley "ghsil" connecting as such the eastern to the western part of the scheme.

Annex 2 shows with figures some of the achievements of the GDA.



Annex 1: the financial situation of the GDA since its establishment in 2009 to 2011.

2009 January 1 December 31 2011	YEAR 2011	YEAR 2010	YEAR 2009	
	535•17.891	785•16.144	738•30.139	1- Old Balance
				2 - Debit
000•11.980	000•3.760	000•4.280	000•3.940	Subscriptions
000•5.180	000•1.560	000•1.900	000•1.720	Maintenance
000•158.756	000•50.923	000•58.525	000•49.308	Water sale
000•28.024	000•3.070	000•15.184	000•9.770	Others
000•203.940	000•59.313	000•79.889	000•64.738	Total
738•234.079	535•77.204	785•96.033	738•94.877	Total Debit
				3 - Expenses
100•90.984	100•32.983	000•31.947	000•26.054	Water purchase
709•6.952	749•3.912	660•2.287	300•752	Operation
962•16.009	066•8.613	700•2.645	196•4.751	Maintenance and rehabilitation
465•16.909	465•7.110	000•5.079	000•4.720	Salaries
760•4.051	700•2.102	620•161	440•1.787	Management and administration
019•12.316	109•720	770•5.539	140•6.056	Others
727•69.169	350•4.076	500•30.481	877•34.611	Investment and equipment
107•999			-	Electricity
849•217.392	646•60.517	250•78.142	953•78.732	Total Expenses
889•16.686	889•16.686	535•17.891	785•16.144	New Balance
575•23	575•23	461•103	546•0	Cash
314•16.663	314•16.663	074•17.788	239•16.144	New Account



Annex 2: Some of the achievements of the GDA in figures



Excellent Maintenance of the pumping station



Water meters in a protective box at each farm gate



Utilisation of localized irrigation techniques for efficient water use





Enlarging the rural track



Rehabilitation of the water tower



Preventive Maintenance of the irrigation network



Installing a disk valve to reduce water losses