



WADImena  Regional Water Demand Initiative  
Initiative de la Demande en Eau

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## **Water Demand Management Research Series**

by the Regional Water Demand Initiative in  
the Middle East and North Africa

### ***Gender & WDM in the Middle East & North Africa***

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## FOREWORD

The Regional Water Demand Initiative for the Middle East and North Africa (*WaDImena*) is funded and coordinated by the International Development Research Centre<sup>1</sup> (IDRC), with financial support from the International Fund for Agricultural Development<sup>2</sup> (IFAD) and the Canadian International Development Agency<sup>3</sup> (CIDA). *WaDImena* aims to promote effective water governance by enhancing water-use efficiency, equity and sustainability in the countries of Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Tunisia, Syria and Yemen, in addition to the Arab Peninsula countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE. *WaDImena* facilitates the adoption and implementation of water demand strategies and tools to influence policy processes in the Middle East and North Africa (MENA) region through applied research and field-level pilot activities, capacity development and knowledge networking.

Water Demand Management (WDM) is simply defined as ‘getting the most of the water that we have’, while taking into account the social, political, economic and ecological context in which this process takes place. WDM strategies and tools enable water-use efficient, equitable and sustainable practices and policies. Essentially, WDM requires a change in behaviors and practices in the way in which water is used, particularly in the agricultural sector where most of the water in the region is consumed. The role of applied, demonstrative and transformative research, the cornerstone of *WaDImena*, is to demonstrate what works, and what doesn’t, in the application of specific WDM strategies and tools within different contexts, with full participation of the communities involved. Effective water governance allows for an open and transparent process, with decision-making powers granted to the water-users themselves, coupled with an adequate enabling policy environment with the commitment and will to confront water scarcity issues.

*WaDImena* is delving deeper into capturing knowledge on the gender and water nexus in the MENA region. This is an area where there is still relative little information. To date, there is little systematic knowledge of the many means by which women and men manage water in the region. Preliminary research suggests that the women in MENA have a significant role to play in water management in the process of food production. Women in Egypt for example, while rarely owning the land they cultivate, turn on water and manage the flow in the fields, as well as supervise workers during irrigation. Rural women in Yemen spend huge amounts of time collecting and transporting water, often up and down steep slopes and coordinate water allocation and distribution for the various needs of the family and the household. Evidence suggests that they evaluate water quantity and quality and prioritize water for

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<sup>1</sup> The **International Development Research Centre** is a public corporation created by the Parliament of Canada to help developing countries use science and technology to find practical, long-term solutions to the social, economic, and environmental problems they face. [www.idrc.ca](http://www.idrc.ca)

<sup>2</sup> The **International Fund for Agricultural Development** is a specialized agency of the United Nations dedicated to eradicating poverty and hunger in developing countries. It develops and finances projects and programmes that enable rural poor to overcome poverty themselves. [www.ifad.org](http://www.ifad.org)

<sup>3</sup> The **Canadian International Development Agency** is the federal agency charged with planning and implementing most of Canada’s international development cooperation program in order to reduce poverty and to contribute to a more secure, equitable, and prosperous world. [www.cida.ca](http://www.cida.ca)

drinking and health and sanitation purposes; women also use recycled water for plants, small vegetable gardens and potted flowers.

To improve the contextual understanding of women's link with water in MENA and to the effectiveness of intended impacts, especially in relation to the lives of the rural poor, and to contribute to gender equality and equity in the region, *WaDImena* is employing social and gender analysis in its supported applied research and field-level pilot projects. While these projects are still in progress, and the results are yet to be analyzed, the premise of this collective work is: Gender analysis improves the quality, application and relevance of transformative action by, not only ensuring an understanding of the different roles and responsibilities of men and women, but also by recognizing, and reacting to the dynamics of power relationships and the challenges these pose. This gendered approach considers the impacts on men and women of all activities that seek to make more efficient use of the scarce water resources.

Gender analysis is a systematic way of looking at the different roles of men and women and assesses the different impacts of the actions and results on both. This form of analysis asks the 'who' question – who does what? Who has access and control over water? Who makes the decisions? Who benefits from more effective WDM implementation? Who is burdened? Ultimately, gender analysis asks the key questions relating to power dynamics, roles and responsibilities and relationships. While there is no checklist to "do" gender analysis and it is not a panacea, it requires first and foremost a heightened level of sensitivity on the part of researchers and project managers with respect to gender relations.

This paper highlights the main issues pertaining to gender and WDM in the countries of MENA and analyzes potentials and entry points for women's greater contribution to the management of the region's scarce water resources. The paper also discusses the gender impacts of WDM tools, policies and practices in relation to water economic instruments, engaging community groups and different stakeholders in the decision-making process, the use of non-conventional water resources, adaptation to climate change, policy and legislative issues, and institutional arrangements. The paper goes further to identify the most salient and relevant research gaps in gender and WDM in MENA and provides specific recommendations to deepen the discourse.

We hope that this paper advances the region's thinking in this area and contributes to heightening this sensitivity, which in turn could contribute to gender justice. We look forward to your comments and contributions to this discourse.

## ACRONYMS AND ABBREVIATIONS

ACU	Agricultural Cooperative Union (Yemen)
ADB	Asian Development Bank
FAO	Food and Agriculture Organization of the United Nations
GDRW	General Directorate of Rural Women (Yemen)
GEF	Global Environment Facility
IDRC	International Development Research Centre
INWRDAM	Inter-Islamic Network on Water Resources Development and Management
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resources Management
MAI	Ministry of Agriculture and Irrigation (Yemen)
MENA	Middle East and North Africa
MOA	Ministry of Agriculture (Jordan)
MWI	Ministry of Water and Irrigation (Jordan)
MWRI	Ministry of Water Resources and Irrigation (Egypt)
NCARTT	National Centre for Agricultural Research & Technology Transfer (Jordan)
NGOs	Non Governmental Organizations
NWRA	National Water Resources Authority (Yemen)
NWRP	National Water Resources Plan (Egypt)
PCUWA	Policy and Coordination Unit for Women in Agriculture (Egypt)
UNDP	United Nations Development Programme
WaDImena	Regional Water Demand Initiative for the Middle East and North Africa
WDM	Water Demand Management
WMCAs	Water Management Cooperative Associations (Bangladesh)
WUAs	Water Users Associations

## 1 INTRODUCTION

Water is central to poverty reduction, food security, health, agriculture, industry and gender and social equity. Increasing water scarcity and declining water quality have negative impacts on the potential for equitable and sustainable development, especially for vulnerable groups of the rural poor, and particularly for poor rural women, whose access and control over water constitutes the essence of their livelihoods.

The MENA region is in a condition of water stress and scarcity due to the limited amount of available freshwater and growing demand. It is expected that per capita renewable water resources will drop further from their present level of about 1,060 m<sup>3</sup>/year to as little as 547 m<sup>3</sup>/year by 2050.

Most countries in MENA have traditionally been concerned with finding means to augment water supply rather than to promote water savings by managing demand. Large infrastructure projects such as dams, reservoirs, desalinization and wastewater treatment plants have dominated water policies in the past century. It is only since the last decade or so when governments and water specialists have realized that the water supply management approach is failing to secure current and future water demands, and that a switch towards a more integrated approach is needed. Thus, countries of the MENA region are currently slowly changing to an integrated water resources management (IWRM) approach, which is a systematic process for the sustainable development, allocation, and monitoring of water resources. This approach considers the entire water cycle rather than its separate components, and views water as a single resource with competing uses and inter-linkages with ecological, social and economic systems. IWRM addresses a wide range of issues involving management of the resource; relations with and participation of water users; tariff reform for water supply, sanitation, and irrigation; strengthening of government agencies; decentralizing responsibility for delivering water services to financially autonomous utilities; and stronger enforcement of environmental regulations. Most of these issues include demand-oriented water management tools and strategies that contribute to efficient water allocation, better public health, more effective environmental sustainability, and transparent and accountable institutional arrangements.

- Water demand management (WDM) can be defined as any method -whether technical, economic, institutional, financial or social- that will accomplish one (or more) of the following five tasks:
- Reduce the quantity or quality of water required to accomplish a specific task;
- Adjust the nature of the task or the way it is undertaken so that it can be accomplished with less water or with lower quality water;
- Reduce the loss in quantity or quality of water as it flows from source through use to disposal;
- Shift the timing of use from peak to off-peak period;
- Increase the ability of the water system to continue to serve society during times when water is in short supply. (David Brooks, 2002)

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<sup>4</sup> World Water Council (2006). Middle East and North Africa Regional Document, WWF4, Mexico

A major challenge -and essential ingredient- in this approach is to ensure stakeholder involvement<sup>5</sup> whereby all stakeholders and vulnerable groups in particular, are guaranteed engagement in decision-making over the delivery and management of water resources. As women are significant water-users and are economically, socially and politically vulnerable, effective, efficient and sustainable water resources is more likely to be achieved when the knowledge and capacity of women is enhanced to adopt WDM approaches, and when they are given the space, tools and means to participate.

## 2 WDM AND SOCIAL JUSTICE

Most water professionals recognize that women and men have different interests in, and derive different benefits from, the availability, use and management of water, and ample global evidence supports the need to involve women in the design and management of water such as sanitation and irrigation management plans and projects. To date, gender mainstreaming<sup>6</sup> efforts in the water sector have focused primarily on increasing the number of female project staff, providing gender-sensitive training to staff members, ensuring that women are among project beneficiaries, inducting women as participants and service providers at the grass-root level and supporting women's role in water management<sup>7</sup>. With that, the water community has made some important strides in designing programs and policies that take into account the differing roles and responsibilities of men and women, though most of the progress has been made in the area of domestic water supply and sanitation. Yet, still much remains to be done on the broader questions of water resources management, particularly in rural contexts and more particularly on issues that deal with the demand side of water management.

Working to support gender equity through women's empowerment, IDRC has been exploring the concept of gender justice<sup>8</sup>. The concept argues that the failure of some gender mainstreaming initiatives is due to its evolution from being a process of transformation to being an end in itself. A central problem has been the difficulty of finding a fit between the technical project of mainstreaming gender equality in policy, programs and projects, and the political project of challenging inequality and promoting women's rights. We argue in this paper that with regard to water management, gender-mainstreaming initiatives

Gender justice can be defined as the ending of -and if necessary the provision of redress for-inequalities between women and men that result in women's subordination to men. These inequalities may be in the distribution of resources and opportunities, or in the conceptions of human dignity, personal autonomy and rights. (Anne Marie Goetz, 2007)

<sup>5</sup> Stakeholder involvement refers to the active and meaningful participation of small farmers (both men and women), large farmers, entrepreneurs, local authorities, local groups, non-governmental organization (NGO) staff and policy makers in decision-making processes concerning the use, management and conservation of natural resources. (IDRC 2006)

<sup>6</sup> Mainstreaming a gender perspective is the process of assessing the implications for women and men of any planned action. It is a strategy for making women's and men's concerns and experiences an integral dimension in the design, implementation, monitoring and evaluation of policies and programmes on all political, economic and societal spheres (IDRC 2003).

<sup>7</sup> See Empowers project, for an example, [www.empowers.info](http://www.empowers.info)

<sup>8</sup> Singh, Navsharan Mukhopadhyay, Maitrayee (2007) Gender Justice, Citizenship and Development. IDRC and Zubaan, New Delhi <http://idrinfo.idrc.ca/archive/corpdocs/126118/339-3.htm>

have become an end in of itself, rather than a process to tackle social inequalities and gender injustice, strongly related to access to productive resources such as water.

The term ‘gender justice’ is increasingly used in the development field because of the growing concern and realization that gender mainstreaming and gender equality are not sufficient to redress ongoing gender-based injustice. Gender justice as an outcome implies equal access between men and women to, and control over, resources combined with the ability to make choices. Gender justice brings in an additional essential element: accountability, which implies the responsibility and accountability of precisely those social institutions set up to dispense justice.

In the MENA region, accountability to the public is by and large weak, resulting in slow progress toward efficient and equitable water management. The voices of some groups, such as environmentalists, social change actors and women are not sufficiently heard by decision-makers. Insufficient consultation and provision with and for women jeopardizes a project and affect’s its efficiency and delivery, particularly when a project implies a change in peoples’ roles and responsibilities. Furthermore, we are not aware of any efforts that tackle gender-mainstreaming efforts in the context of social and gender justice with respect to natural resources and their management, but rather it is conceived as something that must be done to satisfy the requirements of the donors.

### **3 THE GENDER, WDM AND POVERTY NEXUS**

Available and accessible water offers significant contributions to economic well-being and contributes to achieving gender justice. Improved access to water for both the urban and rural poor creates livelihood opportunities and better health conditions that may break the cycle of poverty. Water also has important economic benefits through improving crop production through irrigation, industrial use, power generation and transport. Conversely, the lack of water contributes to the entrenchment of poverty. There is mounting evidence on the positive long-term effects of sustained economic development and income growth on gender equality on the one hand and equally strong evidence that gender inequalities hamper efficient economic development and negatively effect livelihoods on the other. It is here, at this interface, where the nexus of gender, water and poverty reduction lies.

Most countries in the region have policies to tackle poverty, and most have policies on water management, but rarely are the three (water, poverty and women) addressed together. In cases where there is some mention of gender concerns and perspectives, these are general (sometimes related to domestic water, water transport on foot and water rights). Specific gender provisions relating to water and the role that women could play in preserving, regenerating or managing water bodies, are rarely addressed, nor is there much in terms of women’s roles as beneficiaries, users and managers in any plans to address the poverty-environment nexus.

Eight research and pilot activities, funded by *WaDimena*, are exploring how best to provide women and men with opportunities to voice their concerns and contribute their knowledge on water demand management practices. For more information about these projects, please visit [www.idrc.ca/wadimena](http://www.idrc.ca/wadimena)

#### 4 WHY GENDER CONSIDERATIONS ARE IMPORTANT FOR WDM IN MENA?

Water users faced with water shortages, intermittent water supply and poor water quality are forced to engage in a number of coping strategies that may add cost, time, labor, reduce water efficiency, affect water quality, as well as, decrease food security and safety and are exposed to health risks which in turn have negative consequences on productivity and livelihood options. Most of these strategies often create greater concerns for women than for men, an issue that remains to be recognized and addressed by water managers and decision makers. For example, women often resort to irrigating their vegetable gardens with untreated wastewater from the household, which has serious health implications if the water is not properly treated.

A gendered perspective in WDM is necessary to ensure both women's and men's participation for improved water management practices. Involving both women and men enhances the results of water management initiatives and improves the likelihood of their sustainability with an eye on environmental conservation. It also contributes to ensuring that no unintended negative effects on men or women occur. The role of women in water management in MENA has been so far mostly neglected and limited information is available to fully understand the role women play in achieving water-use efficiency and sustainability in spite of the fact that women convey knowledge, attitudes, and practices that promote conservation, pollution prevention, and sustainable consumption of water.

The fundamental first step to addressing the role of gender and women in WDM is to support research and capacity development efforts of both researchers and policy-makers to undertake social and gender analysis and to look beyond the technical aspects of water resources management toward a greater understanding of the social and gender issues and power relations and contribute to the notion of social justice. With gender analysis, planners gain a more accurate picture of communities, natural resource users, households and water users. The inequalities between women and men influence how individuals respond to changes in water resources management practices. Understanding gender roles, relations, and inequalities can help explain the choices people make and their different options. The tools that are required for this task may be similar amongst all regions of the world, but there are particular gender-related issues that are unique to MENA, which must also be considered.

Gender analysis in relation to WDM must consider specific both domestic and economic needs of women. It should also consider women's access to water resources, the work done exclusively by men or women and together, the decision-making processes in water management and power relations and the implications for the capacity to participate in, or benefit from, new water management strategies. Gender analysis in WDM should also consider access to financial means, the extent to which women are involved in making decisions about water at the household, community and national levels, access that women have to other productive resources such as credit, land, training opportunities, education and information. The extent that tradition and culture circumscribe the capacity of women to make effective use of available water resources for both reproductive and productive purposes is also an important consideration and may be viewed as potential entry points for breaking down some of the existing cultural barriers which entrench gender injustice.

Finally, there is a need to explore the implication of WDM strategies on household nutrition and health with the adoption of WDM tools, such as the move to more cash crops through increased irrigation or the growing use of treated wastewater for irrigation.

WaDImena research on the gender and water nexus within the context of water scarcity and WDM has a number of starting points, which are built on lessons learned from previous work in the region and IDRC's experience in social and gender analysis. What we have found is that:

1. Gender analysis is challenging, and often viewed as donor-led, rather than a pivotal process in understanding the social context in which projects aim to achieve expected results and sustainable impacts.
2. Understanding the context in terms of power dynamics, opportunities and challenges of men and women to facilitate the ability to achieve and measure change is rarely explored.
3. Change itself is a long-term process, and strategic long-term capacity development is needed to build the capacity for gender and social analysis.
4. Conducting stakeholder analysis facilitates integrating gender analysis concepts because it reflects a consideration of the heterogeneity of the different social groups and the associated benefits and burdens.
5. Having women on project teams does not necessarily mean that gender issues will be applied consistently and sufficiently, but does facilitate the implementation of the approach.
6. There is limited knowledge on the distinct role of women as water-users in the region, but some information exists on women's role in accessing water. There is significant opportunity to fill the gaps in knowledge in this area.
7. Gender-neutral programming -indeed even gender mainstreaming efforts- may be neglecting the potential direct interventions that may lead to greater gender equality and equity.

## **5 GENDER ROLES IN WDM IN MENA**

According to the World Bank's MENA Gender Overview<sup>9</sup>, women's share of the total labor force increased from 26% in 2000 to 28% in 2005. Although progress on this indicator during 2000–2005 was greater than in any other region, MENA continues to lag in this regard. With consideration to other economic sectors, agriculture remains the largest employer of women.

Women form the backbone of the agricultural labor force in many MENA countries. Studies indicate that women, as paid and unpaid labor in countries such as Egypt and Morocco, constitute over 50% of the total labor engaged in agriculture; while in Sudan, Tunisia, Syria,

The division of labor in crop production varies between men and women from country to country in MENA. For example, women are involved in all stages of crop production in Yemen, whereas in Lebanon, women are engaged in sowing, weeding, harvesting and processing. Furthermore, women shoulder virtually all the work in the tobacco growing industry.

In Egypt, men are responsible for land preparation and pest control, whereas women are engaged in all other stages of crop production. Women are also engaged in marketing activities. In Syria, women are involved in sowing, thinning and weeding. In Jordan, women work in planting, weeding, thinning, harvesting and packing. (FAO, 1995)

<sup>9</sup> The report can be accessed at [http://siteresources.worldbank.org/INTMENA/Resources/MENA\\_Gender\\_Overview\\_2007.pdf](http://siteresources.worldbank.org/INTMENA/Resources/MENA_Gender_Overview_2007.pdf)

Lebanon and Iraq, they provide at least one-third of the labor required to sustain agricultural production. The extent to which rural women in MENA are engaged in agricultural production depends on several factors such as the degree of mechanization used on the farm, farm size, available male workers and their economic and social status within the household and ecosystem characteristics. From the available literature, it appears that women may have more prominent roles in water management in rained and pastoral ecosystems, as opposed to irrigated ecosystems. In any case, we feel that this might be an interesting hypothesis to explore.

Yemeni women, for example, are more involved in rained agriculture in the mountains and high plateaus, but as these regions shift to irrigated agriculture --an unsustainable practice for the most part, women become less involved. Yet, at the same time, as more men migrate to the cities or to the Gulf countries to find jobs, women are more and more involved in water resource management in both irrigated and rained agriculture. However, cash crops remain a man's responsibility where women's involvement is not as evident. In intermediate zones located between high plateaus and coastal areas, women still sustain rained agriculture and counteract water shortages with WDM indigenous practices. Here, traditional agriculture relies mainly on dry terraced farming which are maintained and managed by women, while young girls take on the responsibility of fetching drinking water, in addition to other water related household responsibilities. Adult women are responsible largely for daily agricultural activities, while men are in charge of seasonal ones. But both cooperate in major activities such as harvesting. These regions today suffer from terrace degradation and land erosion as rain-fed systems are neglected for unsustainable irrigated agriculture practices. Women are the first to be affected by water depletion by losing the competition between their need to secure water for domestic uses and men's desire to develop irrigation for cash crop production.

Also in Yemen, women are the ones who daily organize water allocation for the various needs of the house and the family. They evaluate both quantity and quality and prioritize water for drinking. They keep water for hygiene, and use the remaining quantities for washing food, cleaning the house and watering animals. They also reuse the remaining amounts of water to irrigate home grown plants. Quality has become a sensitive issue in many rural and urban areas in Yemen, despite efforts by some women to boil or filter water for drinking, and water-related diseases are more and more frequent. While devoting most of their daily activities in rain-fed agriculture practices and livestock rearing, many women have also developed knowledge in water and soil management.

The case of women in Ajloun, Jordan also illustrates the important role that women play to manage water. Ajloun women cope with drought and sustain their home gardens by focusing on hand irrigating short season vegetable crops in winter, and they use different methods for mulching, such as plastic sheets, weed residues, wood chops and fabrics to maintain soil moisture. They also plant seeds deeper in the soil, where moisture is better, and they reuse greywater from the kitchen to irrigate their gardens. When planting seeds, women learn to reduce the distance between seedlings to protect the bare soil from direct sun exposure and conserve moisture.

Women are particularly known to possess indigenous knowledge to maintain household food security, particularly in times of drought and famine. They often rely on indigenous crops that are

more tolerant to droughts and pests, providing a reserve for extended periods of economic hardship. In southern Sudan, for example, women are directly responsible for the selection of all sorghum seeds saved for planting each year. They preserve varieties of seeds that ensure resistance to the range of conditions that may arise in any given growing season.

In spite of the labor, income and risk management contributions, as shown in the examples above, men appear to have predominant control over decision-making, and women's access to, and control over, land, water, and other services such as credit, extension, training and markets is limited by comparison. This is mainly attributed to weak institutional structures, traditional and cultural practices, as well as women's lack of collateral.

Given the critical link between agriculture, poverty reduction and WDM, and the need to use the available water with the highest efficiency possible to secure livelihoods, women's effective roles and responsibilities in water management could boost agricultural development and contribute positively to sustainable environmental practices. However, these recompenses can be fully realized only if the strategies adopted in MENA for improving women's equitable access to resources and contribution to the decision making process are put in practice. Policy makers need to know more about water rights; the economic and cultural impediments that limit women's effective and secure access and use of water resources; and the benefits that can accrue by improving women's participation in water management.

## **6 GENDER IMPACTS OF WDM**

Ill-construed WDM strategies that emphasize water savings may have negative impacts on women's health and livelihoods and could place further additional burdens on women to save on water which they already have limited access to. Therefore, it is important that in implementing WDM, all possible gender impacts of WDM tools, policies and practices are thoroughly investigated. In this section, a few of these strategies and their potential impact on women are given additional thought.

### **6.1 Water Valuation**

WDM includes water-pricing mechanisms to encourage water conservation and more efficient use of water resources. There is already widespread acceptance of water pricing in principle throughout MENA although some aspects remain controversial and complicated.

Pricing provides a foundation to motivate behavioral change to save on water and generates revenues to sustain the expansion and maintenance of water supply. However, treating water as an economic good can have enormous implications for the poor's accessibility to water supplies, both for domestic and economic livelihood purposes. The burden may be heavier on poor rural and urban poor because women generally have less cash than men and fewer opportunities to shift of activities that consume less water.

While there is universal recognition of the need to provide some amount of water at low or no cost to the poor for household uses by developing a social tariff for the first block of water consumption, determining what that social tariff is remains problematic, as often, studies that show women's

willingness to pay for water might not accurately reflect their actual ability to pay for water. Women may be unable to raise cash from their husbands who may regard water as a woman's responsibility and place lower value on saving women's time and energy than the women do themselves. Without improved water supplies, women are caught in a vicious cycle" without improved water supplies, they have no space or time for income generating activities and without these, women cannot pay for water (Cleaver and Elson, 1995).

## 6.2 Non-Conventional Water Use

WDM promotes the use of non-conventional water in order to reduce the stress on freshwater resources. The utilization of wastewater, greywater or saline water saves conventional water and is a viable WDM strategy as it promotes lesser quality water to be used for specific purposes.

It is well known that irrigation with polluted water or raw sewage is a widespread practice in MENA where it is popularly used when there is no alternative source available. This practice can have immense benefits to women farmers and to poor farmers who have no alternative source of water, but not without serious health risks. In areas where freshwater is scarce, wastewater allows low-income farmers to grow crops they would not otherwise be able to grow. In comparison to freshwater, wastewater supply can be continuous, cheap, reliable, and available to farmers on demand. It can ensure crops all year round, and is rich with nutrients. Yet, as a significant proportion of agricultural laborers are women, the use of raw sewage has serious health and environmental effects which in turn affect livelihoods of the family as a whole.

Women may be a key source of support to advocate the safe reuse of wastewater. This implies gender-sensitive extension services to communicate the risks/benefits of wastewater reuse to women farmers who, in turn, can act as advocates of treated wastewater reuse. Gender sensitive strategies are also needed to ensure that women benefit equally from wastewater reuse. More research in the area of non-conventional water use to understand better whether women would be apt to pay for treated wastewater if the option was made available to them is also useful.

In Jordan, a pilot project implemented by IDRC in partnership with the Inter-Islamic Network on Water Resources Development and Management (INWRDAM) allowed the poor in Tufileh to reuse household greywater in home gardens<sup>10</sup>. The women of the community used small revolving loans to implement simple greywater recovery systems and set-up gardens. Although, women were not very prominent publicly, they are actually the ones who decided what went into the system. It is they who gauge the quantity of grease or soap that enters the system and women are the 'water managers' at the household level. Their active involvement was critical for ensuring that the system worked properly. The project allowed the community to offset food purchases and generate income by selling surplus production, earning an average of 10 percent of their present income. Had the households used municipal sources for this supplemental irrigation, on average, they would have used 15% more water and had 27% higher water bills. Moreover, the project helped community members gain valuable gardening, irrigation, and food preservation skills. Women reported feeling more independent and proud because of the income they generated, the skills that they gained and

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<sup>10</sup> Greywater Treatment and Reuse, Tufileh, Jordan [http://www.idrc.ca/en/ev-114551-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-114551-201-1-DO_TOPIC.html)

their enhanced ability to feed their families. It is worth mentioning here that an environmental impact assessment demonstrated that the quality of the treated greywater was adequate, and the negative impacts on soil and crops were negligible.

### **6.3 Community Participation**

The UNDP Resource Guide on Gender and IWRM<sup>11</sup> demonstrates that participatory processes and attempts to involve poor people' do not automatically include women. The guide identifies specific issues in this regard such as power relations in communities, inter-household and intra-family relations, different constraints to participation, different abilities to participate and perceived benefits of participation.

Farmers, both men and women need to develop a sense of ownership in irrigation management schemes. Participatory irrigation management and water user organizations (WUAs) allow -at least in theory- for greater participation of women in decision-making for improved water-use efficiency and equity. In reality, however, many constraints exist to fully allow for women's participation, including for example, land rights. Since WDM promotes local water management by facilitating the participation of all stakeholders, it also calls for the involvement of women in WUAs and other community-based initiatives.

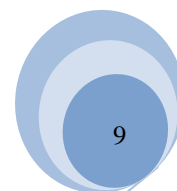
Yet, there is still a perception that women, though active in agriculture, are not as active in water management and thus may not be key players in WUAs. Their role in these associations have been thus constrained by this perception. There are a number of formal and informal ways

where women can participate in local water management efforts which could be investigated as important entry points for identifying realistic ways to make WUAs more gender equitable and representative. We do not know yet what hinders their participation, what strategies can increase this participation, what indirect ways do women use to influence water management, whether informal participation are just as effective as formal means, and how women's participation, either formal or informal can be used to advance WDM strategies and facilitate gender equity in the region.

A project in Minia, Egypt, conducted by the Minia University with the support of IDRC, examined the complicated issues of social management of water and the level and extent of water users'

In a Nile Delta village, IDRC conducted two multiphase projects aimed at improvements in water and sanitation. The project continued through 4 years of close work with local women, studying community conditions and practices contributing to disease, encouraging local people to identify their own problems, frame solutions, and organize change. As for organizing change, village women identified two problems for correction; a broken standpipe and a polluted canal. They fixed the standpipe, improving neighborhood water quality, by getting help from local authorities and investing their own labour. They couldn't clean the canal, defeated eventually by the political and bureaucratic complexities of arranging garbage collection. Perhaps most significantly, women and men discovered in village meetings that they could work together, within the bounds of traditional values, to secure shared benefits.  
*(David Brooks, 2002)*

<sup>11</sup> The Resource Guide on Gender and IWRM was launched during the world water forum in Mexico, March 2006  
<http://www.genderandwater.org/page/2414>



participation in water governance<sup>12</sup>. The project found that most men and women in Minia agree that women play a very active role in several agricultural tasks including applying chemical fertilizers and manure, caring for the animals and poultry and crop harvesting. Women also sell and buy at the market. Women are solely responsible for all household activities including bringing water for domestic use.

When it comes to irrigation, the contribution of women is considerably less, as irrigation is often a night activity, requiring significant strength and the uncovering of legs to plunge into water and mud. Also, violent conflicts among neighbors sometimes arise over water distribution and use. Since very few women own land, their ability to access credit in order to purchase water pumps, pipes and other equipment for irrigation is also limited, thus constraining their engagement in irrigation activities.

In the case of Minia, where WUAs have been established now for 15 years, no single woman is a member in any board of the WUAs. When asked about their possibility to become members, the majority said it was not possible. Moreover, very few women reported they knew any of the board members of the WUA, but the majority of women know the pump operator, who is the most important person in the association as he controls who gets water and when.

Lessons learned about women's participation in water boards in Fayoum, Egypt (as expressed by women themselves)

- Women members, like men have to attend implementation and follow-up of construction works. They also have to monitor the cleaning of canals twice a month.
- Women members have to understand the finances of the construction works before and after they are implemented.
- To encourage villagers to cooperate with women. When everyone understands fully the role of a women member, they express interest to cooperate with her.
- Whether or not they are formally educated, it is important that women members are active in their participation in water boards.

*(Soumaya Ibrahim, 2004)*

Studies document a number of ways women can have influence in informal ways. Some farmers in Yemen gathered to create the first General Association of Irrigation in 1999. The association regroups 81 small associations from all over the country and is registered as a member of the Agricultural Cooperative Union (ACU). Their initial priority was to build water reservoirs; however, they are now focusing on irrigation networks and equipment. The association is cooperating with the Ministry of Agriculture and Irrigation (MAI) to receive training. Some associations have women members while some are exclusively female.

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<sup>12</sup> Social Values and Management of Water in Egypt [http://www.idrc.ca/en/ev-83261-201\\_101018-1-IDRC\\_ADM\\_INFO.html](http://www.idrc.ca/en/ev-83261-201_101018-1-IDRC_ADM_INFO.html)

A recent study by WaDImena/IDRC<sup>13</sup> indicates that the exclusion of women, who undoubtedly bear the brunt of limited water in MENA from decision-making processes is an important consideration for WDM. Because women generally have less access to a whole set of opportunities such as education, information and access to public offices, they have fewer possibilities for participation in the formal organization and administration of water management. They are neither able to voice their concerns nor contribute their knowledge on water management practices and are not perceived as credible decision-makers. This difficult situation is complicated by lack of control over other productive assets (e.g. land, pumps, livestock), and limited access to extension services (mostly delivered by men and for men). Finally, in many cases, even if women wanted to have some input into water management decisions, women (especially in poor households) may simply be too busy performing domestic tasks to spend any time on anything else.

#### **6.4 Institutional Arrangements**

Countries in MENA that have introduced or accelerated water reforms have often done so as part of broader economic and structural changes. Fundamental reforms in water management often result from policy change in the areas of trade, liberalization and privatization rather than an organic, bottom-up and grass-root movement from those most affected by water scarcity.

Perhaps the most striking conclusion for future policy development that emerged from earlier reviews of WDM in MENA was that: In no case is WDM the main drive for government action. Wastewater reuse, for example, is being adopted but mainly to deal with growing volumes of sewage, not from the need to save freshwater. Concurrently, water prices are going up, irrigation management is being decentralized, but such processes have neglected women's needs and priorities in water sector reforms.

Women's responsibilities within the household for family health and the provision of potable water may heighten their concern for water conservation. Any strengthening of the political representation of women in MENA may therefore contribute to improved water management. The pivotal role of women as providers and users of water has seldom been reflected in institutional arrangements for the development and management of water resources.

Women's lack of access to and participation in decision-making bodies and processes, have hindered the representation of their differential needs and priorities in water sector programming. A case study on professional women and water management in Morocco, for example, shows that very few women are employed in water resources management institutions, and are generally employed at lower professional levels than their male counterparts. The study concludes that it is important to encourage girls to study and continue their professional training. This more long-term strategy was preferred over the use of quotas to increase the numbers of women in water related institutions. Both women and men said it was critical that professionals be well trained and not be hired simply

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<sup>13</sup> Stephen Tyler. (2007) WDM Research Report Series 2: Water Demand Management, Poverty and Equity. WaDImena/IDRC, Cairo, Egypt

because they were women. Quotas however, could be used to ensure more women are employed in water management institutions.

Preliminary analysis shows that there are very few women in development units, in government ministries and organizations in MENA countries. Egypt, Jordan and Tunisia are exceptions and have well established and well funded units and/or focal points with clear-cut objectives regarding their role in advancing the status of rural women, and some other countries have started to establish gender units and/or focal points of some sort. Yet, in most other countries, there is a clear marked gender division of labor in the concerned water institutions. Men are predominantly occupied in hardware jobs, and women are represented in the software, namely the secretarial, administrative and librarian jobs. Most senior positions, head of institutes and main departments of the ministries are headed by male employees and there is rare representation of women employees in decision-making posts of sub-departments and or policy-making meetings. As a result of the gender division of labor, it is mostly men who work as extension staff and go out to the field to meet with farmers and convey new knowledge and information to them. Lack of transportation and accommodation facilities in the field further impede women extension staff or engineers from engaging in the field.

Preliminary steps have been taken in the region to include women in the institutional arrangements of the water sector. The Water Resources Management Action Plans prepared by the Yemeni National Water Resources Authority (NWRA) for managing the 14 basins of Yemen consider that women's representatives must be included in the three components of the Organizational Structure for Plan Implementation: the Oversight Committee, the Plan Implementation Committee and the Water Users Organizations. However, NWRA and the Ministry of Water and Environment (MWE) lack women representation in their own organizations. They have no specific women sections though they have some technical women in their staff. Also in Yemen, The Ministry of Agriculture and Irrigation (MAI) has a General Directorate of Rural Women (GDRW), created in 2000, and is present in each governorate through its local branches. GDRW are working with decision-makers, creating and pushing for policies and strategies relating to rural women. The GDRW deals with different issues including water, and a female irrigation engineer is also represented. The central directorate will soon provide capacity building of its staff in the different regions and will train on gender analysis. The impact is however limited to women depending directly on the directorate and may be impeded further by transportation to the field.

Egypt has also taken some action in this regard; this includes establishing a Gender Focal Point at the Central Department of Irrigation Advisory Services (IAS) of the Ministry of Water Resources and Irrigation (MWRI). The mandate of the Gender Focal Point is to coordinate and promote projects and activities related to gender issues such as participation in irrigation and drainage management and to build capacities of MWRI staff and farmers in gender concerns. The government of Egypt's efforts also included establishing the Policy and Coordination Unit for Women in Agriculture (PCUWA) within the Ministry of Agriculture to respond to the need to mainstream women's concerns and needs in agricultural policy and practice.

Further efforts need to be exerted to institutionalize gender perspectives and concerns. These may include more in-depth research on the different levels of involvement and participation of both men and women and designing strategies to promote equal participation, allocating sufficient resources to gender units and/or focal points in Ministries, possibly in the form of knowledge, expertise, tools and funds. Efforts may also include investigating the constraints impeding the fulfillment of the policy objectives on both field and institutional levels and investigate measures needed to overcome barriers to mainstreaming gender concerns in the research programs of Ministries. Effective and sustained WDM implementation is unlikely to be achieved if traditional institutions are not capacitated for new, holistic and inclusive paradigms in the water sector. Institutional inertia, lack of political will, failure to build capacity of human and institutional resources and as well as blurred organizational structures will inevitably inhibit progress and sustainability.

## **6.5 Policy Issues**

With the growing acknowledgement of the water crisis in MENA, WDM has become, more than ever, a national priority for all the countries in the region. Institutions, legislation, technical and research apparatuses have been reformed --or are in the process of reform-- in an effort to contribute to better water management. Some reforms have taken gender issues into consideration, but most have not. Three examples from Egypt, Yemen and Jordan highlight these reforms.

In June 2004, Egypt developed its National Water Resources Plan (NWRP) "Water for the Future," which uses a multi-stakeholder approach led by the Ministry of Water Resources and Irrigation (MWRI). The stakeholders include all water-related ministries, NGOs, research institutions and the private sector. The plan includes a section on gender from the perspective of enhancing stakeholder involvement, namely by providing equal opportunities for men and women for engagement in discussion and decision-making on water use issues. Women are also seen as important recipients of information and communication efforts. The plan also specifies the need for equal benefits for men and women from effective and efficient water resources management.

The government of Yemen is implementing a water conservation strategy mainly relying on the newly established "Water Law". This law, ratified in July 2002, aims at better regulating the use of water resources, while protecting water quality and conserving water quantity. The Water Law acknowledges the value of traditional water rights and ancient irrigation systems. In spite of reaffirming the priority use of fresh groundwater for domestic purposes, the law never explicitly tackles the issue of gender in water management. According to some sources, the delays in the ratification of the law may have resulted because gender approaches were attempted in successive round-tables and workshops which lasted for a decade. Nevertheless, it seems that some women group representatives were involved in the preparation process. The Central Statistical Organization, Department of Gender Statistics has pointed out that the absence of women participation in the drafting and enacting of this law was primarily responsible for the legislative gaps addressing women. The Water Law, supposedly not affecting women directly, leaves institutions and future projects free to deal with the "gender issue" when and if needed.

Some ministries, governmental organizations and NGOs in Jordan have established gender units within their organizational structures, including the Ministry of Water and Irrigation (MWI), Ministry of Agriculture (MOA), National Centre for Agricultural Research and Technology Transfer (NCARTT), Jordan Environment Society and the Royal Society for Conservation of Nature. Some programs implemented under these bodies have contributed to better management of water resources by facilitating greater participation of women and other local community groups. Examples of such programs include the water education and public awareness programs and wastewater treatment and reuse projects in agriculture within MWI, a study on women's role in agriculture and the Kafa'a project (USAID funded) within MOA (Source?/), as well as the Jordan Valley Integrated Waste Management project within the Ministry of Planning. Results showed that women knowledge about water resources issues increased and women were trained on new skills in water conservation and management.

Efficiency and good management by rural women could be achieved, provided that they have the support and capacity. In the poor village of Rakin in Karak, Jordan, most households depend on subsistence agriculture for their basic food supply, and it is women who are responsible for water collection and use. An insufficient supply of water for human consumption, livestock and irrigation is considered a major problem in Rakin, which receives piped water only once every two weeks for six hours, and water has to be purchased at a very high price. Rakin Women's Society has tackled this challenge by installing water cisterns and water harvesting measures in households to store the water that is delivered by tankers, which families have to pay for<sup>14</sup>. The success of this project was so evident in the village that large numbers of applications for loans were presented to the Society's board.

The above example demonstrates how involving women directly contributes to enhancing the project's effectiveness and sustainability. The high payback ratio could be attributed to the fact that women play a leading role in managing the household economy. The revolving loan system supported, in addition to water cisterns, bee-keeping activities and solar cells installations. The project proved the immediate positive impacts and benefits for local communities at the household level.

Water sector policies must reflect women's needs, priorities and rights in relation to all possible water-use options. A gender strategy with clear goals, objectives and targets with tangible outcomes should aim at balancing different water issues through an integrated water resources management approach. Where there are conflicting needs, women's needs, opportunities and contributions must be recognized and met. Budgets for gender-mainstreaming and significant advocacy must also be made available by government, international agencies and donors. Perhaps most importantly, national water policies need to identify the relevant indicators for monitoring progress in achieving gender-related goals.

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<sup>14</sup> This project was supported by the Global Environment Facility (GEF) Small Grants Programme with technical support from the GTZ Watershed Management Programme

## **6.6 Adaptation to Climate Change**

There is rapidly growing evidence about the potential impacts of climate change on water systems, reservoir operations, water quality, hydroelectric generation, navigation and other water management concerns. The fourth assessment report on climate change impacts, adaptation and vulnerability of the Intergovernmental Panel on Climate Change (IPCC-2007), sets out some key findings regarding projected climate change impacts. The report states that, by mid-century, the annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics, some of which are water stressed areas. Drought-affected areas will likely suffer in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.

By 2020, between 75 and 250 million people are projected to be exposed to an increase of water stress due to climate change. If coupled with increased demand, this will adversely affect livelihoods and exacerbate water-related problems. Agricultural production, including access to food, is projected to be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. This would further adversely affect food security and exacerbate malnutrition. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020. The Middle East and North Africa region is highly vulnerable to climate change impacts. Climate change studies predict a rise in temperature, drop in rainfall and reduced water availability; reduced ground cover; heat-waves; and more frequent dust storms. Vulnerability to increasingly warmer and drier conditions and increasingly variable rainfall patterns, have been highlighted in key documents such as the IPCC-2007 report.

Adaptation and risk management practices for the water sector are being developed in some countries and regions that have recognized projected hydrological changes with related uncertainties. In the past, water management relied on the assumption that climatic conditions would remain the same. With growing evidence to the contrary, MENA governments must begin by

Poor women are generally on the receiving end of the effects of increasing environmental degradation and depletion of natural resources, because of their involvement in, and reliance on, livelihoods activities which depend directly on the natural environment, a key priority in the current climate change discussion is to ensure that decision-makers and key stakeholders alike understand the different types of vulnerability to climate change that women and men face, and their gendered implications.

*(Fatma Denton, 2002)*

re-evaluating their legal, technical, and economic, policy and institutions approaches for managing water resources in light of predicted impacts of climate change.

We argue that WDM is a strategic and effective adaptive strategy to the current challenge of water scarcity and will become more so as climatic variability and climate change impacts intensify. We further argue that WDM increases social resilience and contributes to preparedness policies, as opposed to the current responsiveness-policies to climate change in MENA.

There are several difficulties to consider in this process: first, the impact of climate change on the water sector is complicated and to a large extent unpredictable. Second, many impacts may be non-linear and chaotic, characterized by surprises and unusual events. Third, climatic change will impose additional stress on water systems. What is clear from all this is that women are particularly vulnerable to the risks posed by climate change and yet have a great deal of indigenous knowledge that could contribute to effective adaptation strategies.

Since women in developing countries, including those in MENA, constitute the poorest and most disadvantaged groups in society, it is possible that the impact of climate change may fall disproportionately on them. This alerts us to the urgent need to better understand the processes affected by climate change and begin immediately to develop effective adaptation strategies that use a gendered understanding.

## 7 RESEARCH QUESTIONS AND SOME RECOMMENDATIONS

As we have seen, the role of women in water management, particularly in the implementation of WDM practices and policies, has been so far neglected in research and development projects. Yet, women, like men, are important water users, and more effective, efficient and sustainable use of water is achieved when women are included in the decision-making process. There is a need for a systematic effort to identify where women's and men's challenges lie, capture their knowledge for enhancement and development to ensure that everyone is encouraged to adopt and implement innovative WDM strategies and tools. Involving both women and men hastens the achievement of sustainability in the management of scarce water resources and contributes significantly to gender equality and equity.

From our analysis of the current situation and from our efforts to systematize and contribute to this knowledge, we conclude with a list of research questions and a few recommendations -in no particular order- that can be addressed in future research efforts:

- *Do women have the right to manage water resources? How do entitlements, such as land, affect the rights of women to manage water resources?*
- *How do men and women use water? Are there gender differences in water-use?*
- *What are the current gender roles and responsibilities in water-use at the agricultural and domestic levels?*
- *How and when do women practice WDM? Do these practices differ from men?*
- *In agriculture, what management roles do women/men play in irrigated, rainfed and pastoral production systems?*
- *How do women/men value water, economically and socially?*
- *Do women tend to propel the WDM agenda further than men?*
- *Do women have traditional knowledge in WDM? For example, in home gardens, do women tend to use less water or less quality water?*
- *Do women relate to water resources in the same way? (i.e. as a heterogeneous group of water-users?)*
- *How are the roles/responsibilities in water management different for female-headed households and male-headed households?*

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- *Do women pay more – not only in terms of money, but also in their labor and time, for improved water demand management? Hidden costs (e.g. taking away from other duties, such as profit-making enterprise?)*
- *Does the burden of water demand management fall disproportionately on women/men?*
- *Do mechanized WDM tools (eg. drip irrigation) deny women access to water management and income generating activities?*
- *How much power/authority is given to women's traditional knowledge of WDM?*
- *If improved efficiency and equity means that water savings can be used elsewhere, do women benefit? If so, how?*
- *Is it proven that decentralization inevitably leads to increasing the participation of women in water management decision-making?*
- *Are women hampered by their ability to pay for water delivery and services?*
- *Does the increasing tendency to grow cash crops and export crops reduce women's access to domestic and agricultural water?*
- *What are the informal and indirect mechanisms that women use to increase their access to water and their influence on the use of water?*
- *What is the impact of water tariff structures for freshwater and treated wastewater that achieve WDM on pro-poor and gender equity objectives?*
- *What may be the role of extension workers in communicating WDM techniques and strategies to women farmers?*
- *What are the constraints that hinder women's participation in WUAs? And what could be the strategies to increase participation?*
- *Do women tend to propel the WDM agenda further than men?*
- *What are women's adaptive strategies (to cope with water stress/scarcity)? Are they different to those of men's?*
- *How do female hired laborers use water in comparison to female family farm laborers?*

### **Some Recommendations**

- Consider key questions in the conceptualization and design of projects as to how gender issues may be affected and influenced, for e.g. what are the challenges for women/men to actively participate in water-users associations? What do women do differently than men that can be extracted and built upon?
- Collect and analyze gender-disaggregated data for an in-depth understanding of the contextual situation and target groups.
- Understand that the collection of gender disaggregated data is not enough to do gender analysis, which requires an understanding of gender relations in terms of decision-making, power relations at the household, community and policy levels.
- Document and disseminate the evidence on gender and water issues for better water management.
- Apply gender-related indicators to improve the ability to monitor and evaluate the performance and effectiveness of project activities and integrate these learnings in future projects.

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