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# LET IT RAIN

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A CASE STUDY OF COMMUNITY-BASED WATER  
MANAGEMENT AND RAINWATER HARVESTING  
IN BAYOUDAH, JORDAN

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## ABSTRACT

This thesis is a case study on community-based water management and increased access to water through rainwater harvesting in rural Jordan. It also considers how women gain benefits through rainwater harvesting and their participation in community-based water management. Based on a holistic framework that merges community-based water management and water demand management, we examined Bayoudah village where a community-based organisation is allocating revolving loans to villagers to build rainwater harvesting systems. Through a combination of focus group discussions and semi-structured interviews, we discovered that while rainwater harvesting enabled community members, specifically women, to become independent water managers at the household level, the community-based management in question did not translate into a concrete enhancement of women's participation.

*Keywords: rainwater harvesting, water demand management, women, community-based water management, community-based organisation*

*Word count: 14 870*

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Finally, we proudly dedicate this thesis to the women of Bayoudah and to their delicious mint tea. Made with rainwater, of course.

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## ABBREVIATIONS AND ACRONYMS

|        |  |
|--------|--|
| CBO    | COMMUNITY-BASED ORGANIZATION                               |
| CWM    | COMMUNITY-BASED WATER MANAGEMENT                           |
| CWDM   | COMMUNITY-BASED DEMAND WATER MANAGEMENT                    |
| DAW    | UN DIVISION FOR ADVANCEMENT OF WOMEN                       |
| GWA    | GENDER AND WATER ALLIANCE                                  |
| MENA   | MIDDLE EAST AND NORTH AFRICA                               |
| MPIC   | MINISTRY OF PLANNING AND INTERNATIONAL COOPERATION, JORDAN |
| MSD    | MINISTRY OF SOCIAL DEVELOPMENT, JORDAN                     |
| MWI    | MINISTRY OF WATER AND IRRIGATION, JORDAN                   |
| RWH    | RAINWATER HARVESTING                                       |
| SIWI   | STOCKHOLM INTERNATIONAL WATER INSTITUTE                    |
| UNDP   | UNITED NATIONS DEVELOPMENT PROGRAMME, JORDAN               |
| UNIFEM | UNITED NATIONS DEVELOPMENT FUND, JORDAN                    |
| UNMP   | UNITED NATIONS MILLENNIUM PROJECT                          |
| WDM    | WATER DEMAND MANAGEMENT                                    |
| WHO    | WORLD HEALTH ORGANIZATION                                  |

## FOREWORD

We entered the field with the impression of knowing little about development in practice and we left probably even more confused.

In the meantime, the feeling of discovering so much about a totally different context, water scarce Jordan, and a completely new way to learn, field research, have revealed to be the greatest highlights of this Masters programme.

That being said, we submit this thesis with the conviction of contributing to the academic world. Yet, what is obvious is that this whole process benefited us the most in terms of life experience.

Learning by doing? Definitely.

*“There is no water scarcity.  
What exists is water mismanagement.”*

*(Khurana 2001: S60)*

# 1 INTRODUCTION

## 1.1 RESEARCH PROBLEM

The Middle East and North Africa (MENA) region cannot meet its current water demand as it is severely affected by water scarcity (World Bank 2007a: xxi). The situation is not expected to improve due to predictions that per capita water availability will fall by half between now and 2050 (*ibid.*). This shall occur in a context where water supplies will increasingly be pressured by continuous population growth but also by economic development, industrial and urban pollution as well as changing in rainfall patterns as a result of climate change (*ibid.*; UNPD 2009: 37). Living in arid and semi-arid climates, inhabitants of the MENA region are constrained to live under water stressed conditions that directly impede their access to safe water and development options (UNDP 2009: 39).

Arguably, water scarcity is the most pressing issue Arab countries are facing (Tolba 2009: 34) and Jordan is one country in the region that is already dealing with extreme water shortages (Beaumont 2002: 331-332). In this context, MENA countries are starting to realise that they have maximized their physical and financial resources in order to secure water supply, and need to refocus on water management. Indeed, over the last decades they have made massive investments so as to increase water supplies and the expansion of services. Consequently, the MENA region consumed the largest share of its available renewable water, compared to any other region in the world (World Bank 2007a: xxii). Over-extraction of groundwater keeps eroding its countries' national assets and water-related environmental issues bring about significant financial costs (*ibid.*). Also, groundwater depletion and mismanagement of water resources continues to be carried out without consideration of the consequences or respect towards sustainability and intergenerational equity (Salameh 2008: 62).

Yet change is hard to implement in the water sector as new initiatives are often not as effective as they could be and water allocations are still prioritised towards low-value sectors while needs for high-value ones are not met (Haddad & Lindner 2001). Adding to this, water reforms face strong opposition from politically powerful interests groups who would not benefit from breaking the status quo within the water sector. Besides, the extent to which water reforms can succeed depends on factors that are external to the water sector as policies that deal with other areas (e.g. agriculture, trade, energy, social security, etc.) have more influence on water management than many policies implemented by water ministries (World

Bank 2007a: xxv-xxvi). In Jordan, the strongest opposition is emerging from the agricultural sector. To meet its national water demand by 2025, the country would have to reallocate more water than the quantity used for irrigation in the last decade. Despite the fact that agriculture accounts for less than 10% of the GDP, the water transfer needed is not likely to happen (Al-Kharabsheh & Ta'any 2005: 218; Beaumont 2002: 319, 331).

There are no easy solutions to water problem in Jordan, but the severe scarcity will necessitate policies that include more efficient conservation programs and that do not search for new water resources, as these have already been exhausted. In light of the natural and institutional constraints facing Jordan's water management policies, decision makers should seek to find ways to lower the demand and enhance the efficiency of water at lower scales, instead of focusing on costly, hardly to implement and inefficient large projects<sup>1</sup> (Faruqui 2001; Salameh 2008: 66-67).

Therefore, a crucial shift is required: from water supply to water demand management. Adequate water management focused on water conservation is one of the keys to the preservation of ecosystems and freshwater resources, which in return, contribute to safeguard human and environmental health. Furthermore, it can also be a way to manage water that puts less pressure on women and enhances their livelihoods (Arafa et al. 2007).

Accordingly, this shift has to involve a bigger share and commitment from civil society, communities and marginalized people in the decision-making processes regarding water governance. The key is to develop water management that will be truly inclusive of all the water users and that will put focus on a more equitable and efficient water usages. It also means that water users should be empowered with tools, technologies, knowledge and abilities in order to become active in the promotion of effective water resources management. (Arafa et al. 2005: 1-2)

The communities can come up with their own solutions to answer their needs with the help of local technologies to move towards a more sustainable usage of water. In rural Jordan, community-led initiatives have been taking place over the last decade with the aim of

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<sup>1</sup> For example, one of the biggest failures in Jordan's water strategies is "Karama dam"; a costly project implemented in 1995 which has since been of no use to anyone, but instead has created negative consequences on local livelihoods and the environment. For more information see: Salameh, E. (2004) "The tragedy of the Karama Dam Project/Jordan". *Acta hydrochim. hydrobiol.* 32 (3): 249-258.

supporting the population with ways to improve water management as well as to better represent the needs and interests of otherwise excluded people. This usually takes the form of techniques aimed at the use or reuse of unconventional sources of water such as grey water or rainwater, which increase their access to water within households.

## **1.2 PURPOSE AND RESEARCH QUESTIONS**

The purpose of this study is to describe how the phenomenon of increased access to water through rainwater harvesting (RWH) can be promoted by community-based water management (CWM) and in return, can bring benefits to the lives of rural women and enhance their overall participation in water management. In our case, this phenomenon will be bounded by a village named Bayoudah, in the Balqa Governorate of Jordan, where the villagers can benefit from a revolving loan system through their community-based organization (CBO) in order to build a domestic RWH system.

Therefore, we pose the following research questions:

- How can community-based water management in rural Jordan increase the access to water through rainwater harvesting?
- What are the implications for women of increased access to water through rainwater harvesting?
- How do women participate in community-based water management?

### **1.2.1 SCOPE**

Hereby, we would like to emphasize that although the rural sector is investigated in this research, the objective is to focus on water consumption at the household level. Hence, the agricultural sector will not be touched upon. Furthermore, even though it is possible for some villagers to get RWH technology by their own means, this research will only focus on individuals who did so by obtaining a loan from the CBO, which represents a significant proportion of the population with access to RWH in Bayoudah. Lastly, the revolving-loan system through which the villagers obtain the RWH system will be briefly discussed as its economic and technical implications are beyond the scope of this research.

We refer to those women who are in charge of their household (as wives and/or mothers) and therefore have to accomplish and manage most of the chores within their household. Although women are included as research subjects, the reader should be aware that this study is not

framed within a feminist theoretical discourse. However, since it is important in this context, we will depict certain gender-related aspects within water management.

In the sections to follow, we will first present the research context. Then, we will introduce the theoretical overview, after which we will describe our methodology. Lastly, the analysis and discussion of findings will lead to the concluding remarks of this research.

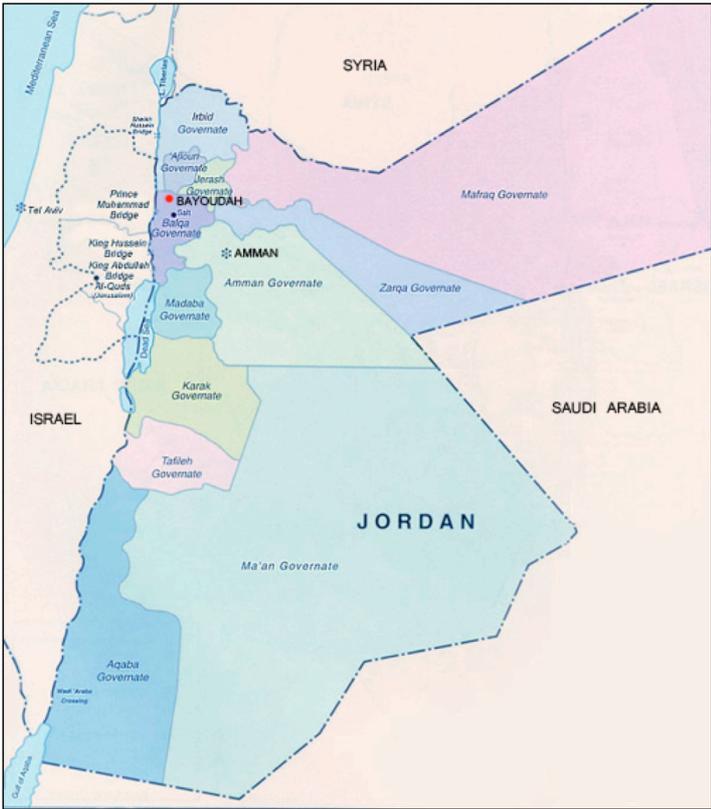
## 2 RESEARCH CONTEXT

The following section illustrates the case study context in which this research takes place. After presenting the water situation and briefly women’s position in Jordan, we will continue with the description of the local settings of the research.

### 2.1 COUNTRY CONTEXT

Jordan is situated in a very complex geo-political position by bordering Iraq, Saudi Arabia, Palestine, Israel and Syria (Figure 1). It is believed that the region’s constant instability significantly inhibits the country’s development (MPIC & UNDP 2004). The progress of its economy is further constrained by limited arable land and extremely scarce water and natural resources (MPIC & UNDP 2004:17). Water scarcity is seen as the main impediment to the country’s development (*ibid.*; Gorskaya 2009); 92% of its territory is arid (Haddadin 2000: 63) and it is classified as one of the five driest countries in the world (MWI 2009a: 2-1).

FIGURE 1: JORDAN GOVERNORATES



Source: Ministry of Planning and International Cooperation (MPIC) (2008)

### 2.1.1 WATER IN JORDAN

The causes of the severe scarcity are found in Jordan's physical attributes and social factors (Zaitoun 2009: 29). The deficit between water demand and supply has emerged from population growth during the last decades, due to an influx of Palestinian and Iraqi refugees in addition to foreign labour and high natural growth rate<sup>2</sup>. The country's scarcity problem is further exacerbated by the fact that its 'more powerful' and upstream neighbouring countries are using water that should benefit to Jordan (Haddadin 2000: 63). Continuous pollution, intensive farming, industrial development and future population growth will only put further pressure on available water supply (*ibid.*; CARE Australia 2009).

In 2008, per capita renewable freshwater resources were about 145 m<sup>3</sup>/year, which is considered to be less than one third of the 'water poverty line' (MWI 2009a: 3-1). Groundwater composes more than a half of the total water supply, but it is exploited at twice its recharge rate, which makes the water table drop and consequently, increases salinity level and pumping costs (*ibid.*). Also, from the total annual rainfall quantity that Jordan receives, 85% is lost through evaporation (Abdulla & Al-Shareef 2009: 196).

The majority of the country is provided with water through tap system which is paid in 'block tariffs'; the higher the consumption, the higher the price (Abu Taleb 2000: 5). As the infrastructure is old and inadequate, it often generates failures, water waste and uneven distribution (Gorskaya 2009: 16). The network losses and unaccounted water, i.e. illegal pumping or connection to the network and/or unbilled or unpaid water, include up to 50% of the total quantity supplied (*ibid.*). Further, as water delivery is intermittent, the population does not know when it will be delivered. This does not only cause problems with hygiene and health, but it encourages private water suppliers to sell water at high prices that additionally affect people's livelihoods (Haddadin 2000: 69). In this regard, as poverty in Jordan is found mainly in rural areas, water scarcity is felt at most therein (MPIC & UNDP 2004: 2). This has been one of the reasons for vast urban migration, unemployment and deterioration of already stressed water system in cities (Haddadin 2000: 69).

The Ministry of Water and Irrigation (MWI) is the official water institution in Jordan. Its newest Jordan Water Strategy (2008-2022) identifies the provision of safe and secure drinking

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<sup>2</sup> For the period between 1998 – 2002, the population growth rate in Jordan was 2.6% (World Bank 2009), which made it one of the ten countries with the highest population growth.

water as one of the core principles for the future water plan (MWI 2009a: 1-3). By recognizing that water demand-supply imbalance will not be solved with further improvements of supply infrastructure, but by finding means to limit or decrease current water consumption, the strategy supports sustainable use of water resources and usage of alternative water sources, including RWH (MWI 2009a: 1-1). However, in real terms, RWH has not received large amounts of attention and there is no explicit government program for its endorsement (Abdulla and Al-Shareef 2009: 199, 201).

Zaitoun (2009) however argues that, what he defines as the 'shadow state' are the interest groups that have real power in decision-making related to water. These are external and informal representatives of the government and those accountable for preservation of popular support for the monarchy whose interests in water sector put even more pressure on water resources (e.g. tribe leaders, large farmers in the Jordan River Valley, Higher Agriculture Council, etc.) (2009: 32). Their opposition to change towards a more sustainable national water management stems from the privileges that they gain from the current situation.

### **2.1.2 WOMEN IN JORDAN**

Women's access to health and education in Jordan has been considerably improved in recent years, but their 'economic empowerment' is still lagging behind. Jordanian women's main responsibilities are seen within the domestic activities and those related to taking care of children, elderly and sick. Therefore, due to their high unemployment rate and general low participation in the labour force, women have significantly less access and decision-making power over resources than men. Moreover, the gap between the legal regulations and the every-day women's lives further makes the achievement of gender equity slow. (MPIC & UNDP 2004: 23-26, 111-113)

Adding to this, the country's increasing water scarcity and its deteriorating quality negatively influences potential for women's development, especially for poor rural women whose access to water composes the core of their livelihoods (Arafa et al. 2007: 1, 16). Women in Jordan are the chief providers of clean water (Minoia 2007: 12) but oftentimes even farmers of irrigated and rainfed crops (Smirat 2006). Jordanian women are further characterised with vast tacit knowledge on how to cope with insufficient, unsafe or too expensive water (Arafa et al. 2007: 1).

## 2.2 COMMUNITY CONTEXT

### 2.2.1 BAYOUDAH

The village of Bayoudah is situated in the Balqa'a Governorate, 50km north-west of Amman. It has a population of about 3500 inhabitants, most of which are educated and working as farmers or government officials. The Balqa'a Governorate is placed in the 1.1% of Jordanian wet lands territory (MWI 2009b), with an average annual rainfall of 530.4 mm (Abdulla & Al-Shareef 2009: 200). Specifically in Bayoudah, rainfall amounts to an average of 400 – 450 mm/year (CARE Jordan 2006: 2) making a considerable amount of water that can be harvested (Abdulla & Al-Shareef 2009: 200).

The majority of the villagers are connected to the tap water system and their water comes from an artesian well established in 1986 by the government (Box 1). People normally receive tap water twice a week, but less often during the dry season, which is problematic for villagers living at the end of the system or in higher altitude. The low pressure in the pipes often prevents them to properly access the water and consequently, they have to wait for 'upstream' households to collect their water before they can proceed. The water arrival is irregular, so people constantly have to be ready to collect it. The tap water system's efficiency is further hindered by leakages and ageing infrastructure. (Key informant 5)

#### BOX 1: TAP WATER IN BAYOUDAH

Groundwater provided to the villagers originates from geological strata, which means that while it travels through the rocks, a lot of salts are being dissolved. The total dissolved solids (TDS) level is estimated to be about 900-1000 milligram per liter (mg/l) and during the summer even exceeding 1000 mg/l. Tap water hardness is higher than 200 mg/l; it is possible to feel it when one washes hands or to witness a layer of salt at the bottom of pots after boiling water. The villagers do not directly use this water for drinking and cooking. They either boil it before consumption or buy drinking water.

According to WHO (2006), TDS levels above 600 mg/l are already perceived as high and levels greater than 1000 mg/l make drinking water significantly unpalatable. Hardness level above 200 mg/l is perceived as very hard and may result in excessive soap consumption and it creates deposits of calcium carbonate when water is heated. However, WHO does not propose health-based guidelines for both TDS and hardness.

As the water table has fallen by 100m since the well construction, water salinity has been increasing. The amount of water in the well depends on rainfall recharge, which is very low, meaning that the well will eventually be completely empty. This situation is worsened by the continuous population growth in the village, as well as the fact that some farmers dig private wells for irrigation purposes that are fed from the same source as the main water well.

*Source: Interview with KI5*

## 2.2.2 ABD AL-RAHMAN BIN AOUF VOLUNTARY SOCIETY

The ‘Abd Al-Rahman Bin Aouf Voluntary Society’ is a CBO in Bayoudah that has existed for almost 20 years. Starting with 25 members at the beginning of the 90’s, it was officially registered under the umbrella of the Ministry of Social Development (MSD). Since its establishment, its work focused on the areas of social development, education and health, but over the last few years, it turned to environmental and water issues, with current activities consisting of giving out loans for RWH and grey water systems (Box 2).

### BOX 2: RAINWATER HARVESTING IN BAYOUDAH

There are two types of wells built in Bayoudah depending on the soil consistency around the house. If the soil is rather loose, and thus there are chances that sewage water might interfere with collected rainwater, people build concrete wells. Otherwise, the villagers mainly opt for the construction of a bell-shaped reservoir plastered with thin cementation material, which has the property to keep the water cold in the summer and warm in the winter. Villagers whose soil is simply not appropriate to dig a well choose to collect rainwater in above ground tanks that are usually made of metal or cement.

Before rainwater reaches the wells it goes through a small box filled with gravel that filters it from sediments or through a whole where the water enters so that the sand and other materials get trapped in the bottom while the water travels through it. It is common to add a tablet of chlorine in the well in order to kill pathogens and disinfect the water. This is usually done once a year when the water is collected and it makes it safer to consume. In addition, wells are cleaned once a year before the beginning of the rain season.

A loan to one family for RWH means an increase in its water storage capacity of 40 m<sup>3</sup> per year. If a family has 6 members, RWH will provide them with 20 litres per capita per day. On the other hand, the government provides people with tap water amounting to 160 litres per capita per day, out of which 50% is wasted due to leakages, so in reality, people receive 80 litres per capita per day. That means that the CBO, through RWH, is giving access to 25% of what the tap water system is providing to the villagers; on an average water consumption of about 100 liter per capita per day, 80 liters come from tap water and 20 from RWH. The difference is that it is clean water that people can drink safely.

*Source: Interview with KI5*

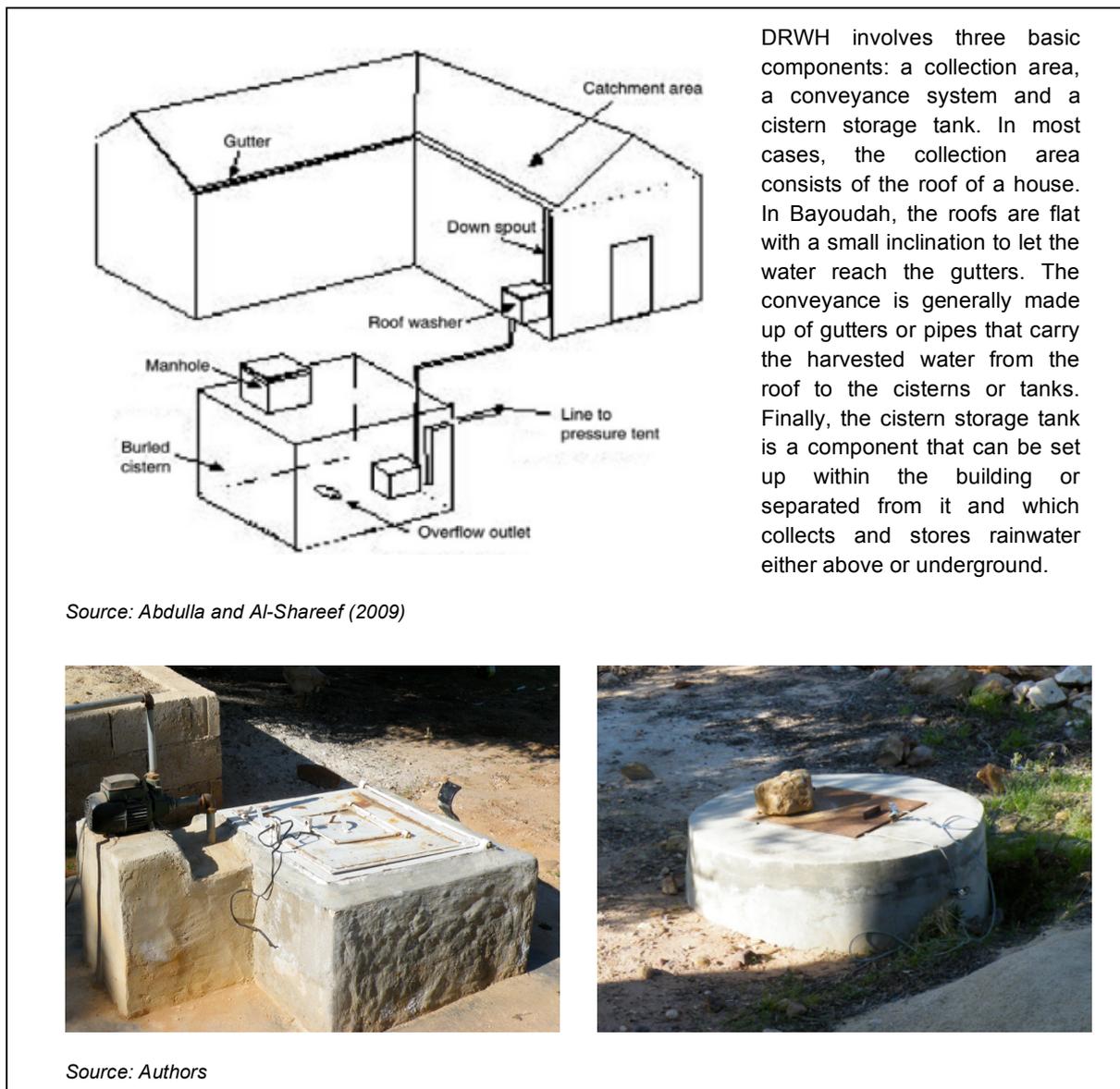
Today, the organisation’s membership accounts for about 90 members, including 28 women. The organisation’s board has 9 members who are elected every 2-3 years during the annual general assembly. Throughout the years, the CBO has benefited from development help supplied by various organisations such as UNPD, Mercy Corps and CARE for projects mostly related to natural resources management.

The Government of Jordan has been highly supportive towards the idea of CBOs such as the one in Bayoudah, as it recognises their relevance in identifying local needs and their role in being a formal representative of the poor. Although CBOs’ influence at higher levels has been minimal, the authorities cannot ignore positive impact that many of them have had on local development. (MPIC & UNDP 2004: 128; Key informant 1)

### 2.2.3 DOMESTIC RAINWATER HARVESTING

Villagers who are benefiting from a RWH system have the possibility to store ‘water from the sky’ falling on their roof in a well (underground) or in a tank (above ground) during the rain season, from October to April. RWH is an overarching name for the various processes used to collect and store rainwater from “rooftops, land surfaces or rock catchments, using simple techniques such as natural and/or artificial ponds and reservoirs” for agricultural or domestic purposes (Helmreich & Horn 2009: 119) (Figure 2). As opposed to agricultural RWH, which concerns irrigation for agricultural production, the water collected for domestic RWH is generally in the form of micro-catchments that are used as a source in the households for drinking, cooking and sanitation as well as for garden watering and small scale productive activities (Qadir et al. 2007: 7).

**FIGURE 2: RAINWATER HARVESTING SYSTEM**



### **3 THEORETICAL OVERVIEW**

The section presents the guiding concepts on which we base our analytical framework. After introducing Community-based Water Management (CWM) and Water Demand Management (WDM), we will discuss their relevance for understanding women's situation. Finally, we shall explain how we build our analytical framework and how we operationalise it in this study.

#### **3.1 COMMUNITY-BASED WATER MANAGEMENT**

CWM generally refers to communities' capacity to meet their local water needs. The concept originates from the overall community management approach to development (Schouten & Moriarty 2003).

##### **3.1.1 COMMUNITY-BASED MANAGEMENT**

From a grassroots perspective, local knowledge and skills are recognised as essential in elaborating solutions to solve local problems (Devine 2006: 521). According to Chambers (1997, in Devine 2006), the inclusion of local knowledge in development has the potential to “transform top-down bureaucratic planning” as well as “deep-rooted patterns of social power and hierarchy” (2006: 521), which are often the main impediments to development in some contexts.

As civil society-led development has been monopolized throughout the developing world by the NGO sector, alternative forms of poverty reduction are increasingly promoted within other arenas. In this respect, community-based action is opposed to large-scale and centrally planned development projects and it confirms how communities are able to organise themselves around their knowledge to address their local issues. (Devine 2006: 522-526)

Although their action is limited to their communities, CBOs are getting increasingly involved in numerous key development programmes, such as community water and sanitation schemes, natural resources management and micro credit delivery. They tend to be in better position to channel institutional funds for donor-assisted projects. Particularly regarding rural contexts, community development is an important strategy as it has the potential to build the capacities of local people, bring about more inclusive decision-making processes, enhance economic security and promote solidarity in the fight against poverty. (Opare 2007: 251-252)

### 3.1.2 COMMUNITY AS AN ENTRY POINT FOR WATER MANAGEMENT

CWM focuses its *modus operandi* at the water users and water services providers' level (Moriarty et al. 2010: 123). It chooses an entry point for water management that is emerging from the local level and advocates that final decisions should be made within established local institutions and communities, which already have experience and knowledge in water management (Butterworth et al. 2010: 70-72). This, in return, makes water resources decision-making more inclusive and enhances real participation (*ibid.*).

Water management at this level can offer opportunities to include the population in the decisions that affect them and their future regarding water. CWM promotes more democratic, accountable and decentralised decision-making that can be an efficient way to incorporate traditional local knowledge (Brooks 2002: 5). This also encourages an equitable use of water supplies and can potentially transform water scarcity problems into “sustainable efficiency” (*ibid.*). CWM techniques are generally cheaper and easier to learn and administer, and thus more attractive for people to use in their everyday life (Brooks 2002: 37). This is especially true when central governments fail to provide their citizens with adequate water supply (Schouten & Moriarty 2003: 167).

### 3.2 WATER DEMAND MANAGEMENT

Brooks is a front figure in the context of Water Demand Management (WDM), especially regarding the MENA region. We shall therefore focus on his approach throughout this section.

WDM emphasizes the importance of managing water demand as opposed to water supply. In the face of growing water constraints, the rationale for WDM acknowledges that in order to balance the supply and demand for water, there is a need to raise awareness about the alternative and complementary approaches to water management. In this perspective, water management has to realign on water-use efficiency, equity and sustainability (Box 3). (Arafa et al. 2007)

WDM works at two levels; governance, where different governmental bodies decide to elaborate policies to encourage the reduction of fresh water use and, the development of technologies that address consumers' water end-usages (Brooks 2006: 522-523). WDM

policies can be divided into four categories: non financial (awareness, technology), financial (incentives, pricing); mandatory (regulations); optional (market systems) (Baroudy et al. 2005: 4).

### 3.2.1 RAINWATER HARVESTING AS WATER DEMAND MANAGEMENT

Domestic RWH can significantly impact rural livelihoods in water scarce countries by enhancing people's access to water and making it available closer to them (Helmreich & Horn 2009: 120). From design to installation, domestic RWH is a relatively inexpensive technology and simple to reproduce so local people can implement it themselves (Qadir et al. 2007: 7).

Domestic RWH is part of a WDM strategy as it contributes to the more efficient use of already available water, i.e. rainwater. The distinction between water supply and water demand is not always easy to determine; an action directly aiming at reducing water use is WDM and so is an action working towards making a better use of already available supply (Brooks 2006: 525). This can be the case with a technique such as RWH; collecting water from rooftops is definitely for the purpose of enhancing water supply. Yet, because RHW practices are usually beneficial at the household level as well as on farms, they are more advantageous when they are implemented with the aim of curbing demand (Brooks 2006: 525). Moreover, there seems to be a consensus among analysts that tends to include all local sources of supply, like harvested rainwater, as part of WDM strategies (Brooks 1997: 4).

In our case-study, the chief reason why domestic RWH is considered to be working at the demand level is that while people are using stored harvested rainwater, they reduce their demand for already pressured sources of freshwater. Furthermore, according to the requirements previously listed in Box 3, domestic RWH specifically qualifies as WDM as storing free rainwater during the wet season in their wells enables people to use it during the dry season, when rainwater is extremely scarce.

### BOX 3: 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 tasks:

- Reduce the quantity or quality of water required to accomplish a specific task;
- Adjust nature of the task or the way it is undertaken so that it can be accomplished with lesser 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 availability of the water system to continue to serve society during times when water is in short supply.

*Source: Baroudy et al. (2005)*

### 3.3 WOMEN AND WATER MANAGEMENT

Both CWM and WDM stress the importance of including women in water management. For CWM, it is very important to include women in decision-making processes regarding water, as they are key actors in water management; they possess essential knowledge and skills concerning water conservation and they are in charge of most of the work related to water within their households (Brooks 2002: 14, 49; Khosla et al. 2004: 15). Also, local water governance is believed to be more effective and equitable when women are justly involved and participate fully, which arguably, is not always the case (Singh 2008: 929). Indeed, in some contexts, women form a marginalized group with limited participation in access to and control of natural resources such as water (*ibid.*).

As for WDM, equity means that people who usually have access to less or not enough water, i.e. women, can benefit from demand management related policies or practices. This is especially significant in a development context as it can directly foster the enhancement of women's livelihoods (Brooks 2006: 524). Water situations characterized by shortages, intermittent delivery, poor quality and low pressure force water users to devise various coping tactics that generate, *inter alia*, increased labour, water waste and costs as well as lower water use efficiency (Loza 1997: 48). As most of these strategies are primarily in the domain of women's every day responsibilities (*ibid.*), WDM is seen as the major hope for the enhancement of women's lives and thus better living standards for households (Brooks 1997). WDM implies a change in the way water is managed and as this might have a major effect on women, they become its crucial subjects (Brooks 2002: 50).

### 3.4 BUILDING AN ANALYTICAL FRAMEWORK

We can now conclude that changing the way water is managed, i.e. striving to decrease demand, is essential for water scarce countries. However, this becomes hard to execute when there is a lack of will from governments to encourage implementation from 'above'. In this sense, WDM seeks another entry point where potential vice versa effects could occur, i.e. 'bottom up' water management strategies. If communities become the primary initiators and 'change-managers' of the way water is perceived and its management is approached, they could eventually become role models in their surroundings and generate a positive spillover effect of their practice and knowledge to others.

In this respect, WDM grows to be particularly important to consider and moreover, possible to implement at lower, local levels, as it also recognizes this level to potentially be even more successful and effective. The shift in the way water is managed should come from its users; they can be its main advocates, as their everyday lives and future depends on it. Community-based water initiatives in this manner, do not only seek to improve the water situation of their members, but they further increase their capacities, and the communities as a whole become more confident to search for new solutions to other challenges that they face in their villages. Hence, combining a change in managing water with communities' abilities to carry this out independently turns out to be a powerful tool for creating solutions for water scarce contexts.

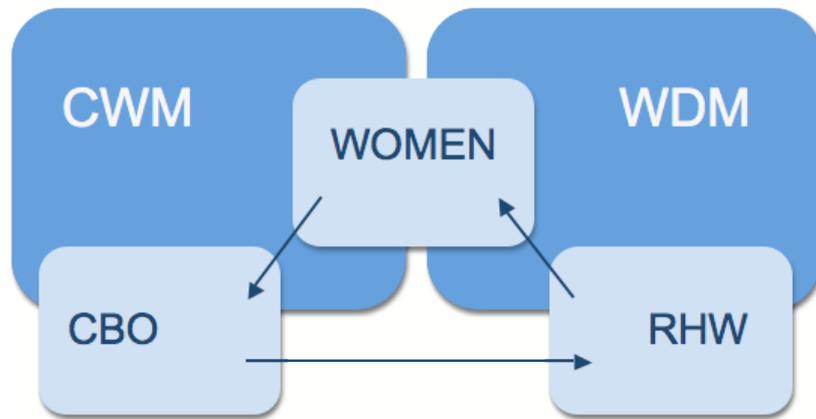
Both CWM and WDM are seen as means to accomplish their aims in a more sustainable and efficient way, notably by including otherwise marginalised stakeholders. Women, who universally have a direct and special relation to water, its usage and management in general, become the focal point of the analysis of how a community-based initiative can influence the water situation in the village by introducing a WDM technology. Women can benefit from improved access to water through WDM, but they can benefit even more from acknowledgement and realization of their role in water management by their communities. This, of course, does not solely influence their lives, but it can trigger larger changes within their families as well as the efficiency and sustainability of the water management strategy.

In this study, we merged CWM and WDM to create an analytical framework: Community-based Water Demand Management (CWDM). Whereas CWM can be performed through supply or demand management, WDM relates to different levels of stakeholder involvement, from governments to user level. Therefore, this study chooses to focus on the community level of WDM and the demand management aspect of CWM. Concretely, CWM can be exemplified by the work of the CBO to enhance the water situation in Bayoudah, whereas WDM is illustrated by the use of a technique such as domestic RWH. As both CWM and WDM emphasize the inclusion of women in the decision-making and in gaining overall benefits of water management, we will additionally combine the women aspect with the framework in order to shed light on the relation between the three.

Drawing from these theoretical linkages, we further relate the three sub-units together, which will also enable us to operationalise the framework in this study (Figure 3):

1. The CBO and its impact on better access to water through RWH;
2. RWH and its benefits for women; and
3. Participation of women in the local water management implemented by the CBO.

**FIGURE 3: COMMUNITY-BASED WATER DEMAND MANAGEMENT**



Source: Authors

## 4 METHODOLOGY

### 4.1 RESEARCH DESIGN

By acknowledging that our respondents have different realities, which are not external, definite and constraining to them, but that they are in a constant change, we based our research on an interpretive epistemological and constructionist ontological stance (Bryman 2008; Ragin 1994). We sought to interpret the phenomenon of our study in terms of the meanings that our respondents give to it and thus to report their perceptions about the CBO and RWH in Bayoudah (Creswell 1998: 15; Holland & Campbell 2006: 5-6).

This research is a single, embedded and representative case study (Yin 2003: 40-44) defined as *'increased access to water through RWH system at the household level and to women particularly, through community-based water management in Bayoudah'*. The case encompasses three subunits: 1) the role of the CBO in improving access to water, 2) the benefits to women and 3) the participation of women in CWM. It is representative because Bayoudah is an example of villages where CBOs have been striving to improve water situation by facilitating establishment of WDM techniques, such as RWH systems.

As we are recognizing that a case study should not achieve wider generalization or theoretical deduction, but capture the uniqueness of each case respectively (Gomm & Hammersley 2000: 3), we decided to undertake qualitative data collection. We found this method additionally valuable as the goal of our study is to present experiences of social group, e.g. women, whose perspectives are often not considered with other approaches (Ragin 1994: 83, 92). Our case study is pursuing inductive approach of qualitative research, which implies that we are not testing CWDM, but rather seeking to contribute to the debate on water resource management and community-led initiatives with findings arising from our data.

## **4.2 PURPOSIVE SAMPLING**

We chose purposive sampling as it is considered the most appropriate for qualitative research based on interviews (Bryman 2008: 458) and because it allowed us to better illustrate the case by focusing on the main aspects that we wanted to investigate (Silverman 2005: 129). Theoretical saturation guided the data collection, as we proceeded with interviews and focus groups until we could not discover new or relevant information (Bryman 2008: 416). The sampling strategy relied on searching for ‘confirming and disconfirming cases’, so as to find respondents who could be exceptions to the norm and discover patterns of variation within them (Miles & Huberman in Creswell 1997: 120). We tried to get away from the norm (housewives with basic education) to include women who have higher education and/or generate income.

Practically, we obtained a list from the CBO, which recorded all the households who 1) benefited from a revolving loan from the CBO for the construction of RWH well and 2) since the CBO started allocating revolving loans, i.e. five years ago (for the list of respondents, see the Appendix I). Although there is a certain number of households who got their RWH system by other means (e.g. privately), we only included people who obtained it from the CBO so as to investigate the community-led development aspect.

## **4.3 DATA COLLECTION**

The data gathering process occurred in distinct stages, allowing reflection upon the collected information and adjustment of the subsequent methods accordingly (Creswell 1998: 110). After briefly discussing the issue of entering the field, this section intends to provide a

chronological account of the different methods implemented for collecting primary data and concludes with a discussion of the limitations encountered.

#### **4.3.1 ENTERING THE FIELD**

The ‘formal permission’ to access the village of Bayoudah was mainly possible through our association with CARE<sup>3</sup>. The informal consent for entering the field was obtained from the community through a research assistant and a gatekeeper, that enabled an adequate level of fieldwork to be undertaken as well as allowing the respondents to better understand the situation and participate in the data collection process more enthusiastically (Leslie & Storey 2003: 82).

#### **4.3.2 FOCUS GROUPS WITH WOMEN**

The entry point into data collection were focus groups with women that allowed us to carry out a needs assessment for our research purpose and refine the thesis topic according to women’s collective perspectives and interpretations about water management. Moreover, it was intended as a way to meet women and introduce ourselves; although it is hard not to be perceived as external actors, by carrying out a participatory method, we believed that our acceptance from the villagers would be smoother, hence, the data collection more successful (Chambers 2008).

We performed two focus groups with an average size of 6 non-randomly selected women per group, invited by our gatekeeper. For the first one, we gathered women whose households have a RWH well as the one and only stratifying criterion. Later, however, we realised that most of women who participated did not get their RWH well through a revolving loan from the CBO and/or got their well too long ago to be able to recall the difference between before and after. Consequently, the second focus group included only women who got a RWH system through a revolving loan from the CBO within the last five years.

#### **4.3.3 SEMI-STRUCTURED INTERVIEWS WITH WOMEN**

The core part of the data collection meant to conduct 22 semi-structured interviews with women from the village, in order to develop specific knowledge about the context of our

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<sup>3</sup> We were interns at CARE Jordan from August 2009 until February 2010. CARE implemented a Permaculture project in Bayoudah in 2007; however our research topic is not directly related to it.

respondents (Kvale 1996: 98) and address individual perceptions of RWH and CBO, which arguably, cannot necessarily be entirely perceived through other methods (e.g. participant observation) (Bryman 2008: 466-468)<sup>4</sup>. We decided to meet our respondents at their houses (or in some cases at their work) so as to make them comfortable and therefore minimize the risk of establishing a hierarchical distance between us (Bryman 2008: 463).

#### **4.3.4 FOCUS GROUPS WITH MEN**

Once getting the women's side of the story, men's point of view about RWH and the CBO was investigated and the information gathered while interviewing women was tested. Because of time and resources constraints, it was not possible to undertake a semi-structured interviewing process with men. The first focus group included four, while the second included five men, all non-randomly selected. All participants were benefiting from a RWH well that they got through a revolving loan from the CBO within the last five years; thus they were picked from the list used to conduct semi-structured interviews with women.

#### **4.3.5 SEMI-STRUCTURED INTERVIEWS WITH KEY INFORMANTS**

Finally, it seemed essential to collect more information about the CBO by interviewing key informants. All together, five of them were interviewed: three CBO members (out of which 2 are board members and one is an employee of the CBO) and two people working at the MSD in the Balqa Governorate. Interviewing CBO members allowed us to get background information and an insight of how decisions are taken within the CBO. As every CBO in the governorate has to be registered and monitored by the MSD, we assumed that it was possible to get the 'outsiders' perceptions concerning the CBO in Bayoudah if employees at MSD were interviewed as well.

#### **4.3.6 OBSERVATIONS**

To palliate the fact of not using participant observation as a method for our data collection, we performed non-participant observations during the whole data collection process. Performing unstructured observation meant to take notes and pictures about the settings we were investigating in, i.e. the houses and work places where interviews took place and the surroundings, how the RWH system functions, looks like and how it is used, without having a specific schedule for recording those observations. (Bryman 2008: 257).

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<sup>4</sup> Six interviews were not considered in the analysis, as some women got their RWH well recently and did not have the opportunity to use it.

#### **4.3.7 LIMITATIONS**

The language barrier was the core deficiency of executing our data collection, primarily because it was never possible to understand the interactions between our research assistant and the respondents, making us completely dependent on her competencies. For the focus groups, not being able to grasp the dialogue, its dynamic, and interfere when necessary, notably limited the focal idea underlying this method in the first place. Furthermore, without residing in the village for a longer period of time, one cannot be fully aware of the 'real' contextual settings, which is key for conducting focus groups properly (Brockington & Sullivan 2003: 58).

Concerning semi-structured interviews, as their nature is to ask relatively open questions in order to give the opportunity to respondents to communicate their own perceptions about issues that they deal with (Kvale 1996: 105; Mikkelsen 2005: 171); the translation aspect once again interfered with this approach. Even if the purposes of asking the questions to our research assistant were thoroughly presented, we were not entirely sure if she might have been asking leading questions (Bryman 2008: 442).

Another limitation was that the respondents associated us with CARE although we stressed that we were independent researchers. This could have had an impact on their perception of us as they might have been thinking that we were present in the village in order to evaluate them or allocate funds for a project.

#### **4.4 QUALITY OF THE CASE STUDY RESEARCH**

As usual criteria of trustworthiness are not applicable in qualitative studies, Lincoln and Guba (1985) propose an alternative approach that can adequately assess the quality of this kind of study through the standards of credibility, transferability, dependability and confirmability.

As it was not possible to realize if our research demonstrates the real picture of the respondents' constructed realities (by having them approve it), we tried to enhance the credibility of our findings by undertaking prolonged stay in the field, triangulating methods (interviews and focus-groups) and peer-debriefing organized through LUMID courses (Lincoln and Guba 1985: 290, 296, 301-309).

Transferability is the most relevant for our context as it is answering whether the findings of our case study could be applicable to another (similar) setting (Lincoln and Guba 1985: 316). In order to make this viable we present the country and the village contexts by emphasizing their uniqueness and thus, creating a detailed description of our research milieu. This should allow others to analyze if those findings are likely to recur in other research environments.

As dependability refers to the question whether the research findings can be valid at other times, we are allowing an ‘audit’ of our study by keeping and making accessible all records of the raw data, transcripts and the entire research progression (Lincoln and Guba 1985: 299, 318). Assuring confirmability means that we sought to create a value-free inquiry; through a constant reflection on our study we strived to control for any personal biases, perspectives or interests (Lincoln and Guba 1985: 290).

## **4.5 ETHICAL CONSIDERATIONS**

Throughout the data collection we always started our interaction with the respondents by gaining their oral informed consent to participate in semi-structured interviews or focus groups and to be recorded and filmed for translation and transcription motives. Moreover, after thoroughly explaining the purpose of the research and stressing the fact that they would not gain anything directly from participating in it, all participants were guaranteed anonymity and access to the results.

### **4.5.1 RESEARCHING WITH WOMEN**

As underlined by Scheyvens and Leslie (2000: 124), concerns about being involved in an exploitative research process were anticipated. While some feminists raise doubts on the legitimacy and authority of ‘white middle-class women’ in conducting research with so-called ‘Third World women’ (*ibid.*), the evidence on the field and the overall situation of women in Jordan confirmed that we had to address this aspect. The need to align our research with the reality of Jordanian women was further nourished by the contingency of offering them a cross-cultural opportunity to reflect on their lives through our data collection (Scheyvens & Leslie 2000: 126).

**4.6 TRANSCRIBING AND ANALYSING DATA**

After each day of data collection, we proceeded with transcription and with what Silverman (2005) calls the ‘first stage’ of the analysis, that allowed us to be aware of emerging themes and thus enhance the quality of our ongoing data collection (Bryman 2008: 453). The transcription primarily meant translating and organizing the respondents’ answers. The data analysis was initiated with Kvale’s (1996) concept of meaning condensation; we strived to summarize the essence of our respondents’ answers into small statements in order to identify the main ‘meanings units’ expressed by them and recognized by us as being relevant for further analysis (1996: 192-194). During the core data analysis, data reduction was possible by forming codes based on the previous meaning condensation process. This was then aggregated in categories according to the emergence of broad theoretical themes. The final condensed categories that were formed and used in our narrative are shown in Table 1.

**TABLE 1: CATEGORIES FOR DATA ANALYSIS**

|   |
|---|
| <p>CMW and increased access to water through RHW</p> <ul style="list-style-type: none"> <li>(a) Loan system as the most affordable access to RWH</li> <li>(b) Loan system making access to water equitable</li> </ul> |
| <p>RWH and its benefits to women</p> <ul style="list-style-type: none"> <li>(a) Household water management</li> <li>(b) Benefits to the household</li> <li>(c) Benefits to women</li> </ul>                           |
| <p>Women participation in CWM</p> <ul style="list-style-type: none"> <li>(a) Gender mainstreaming in the loan process</li> <li>(b) Women's perception about applying for a loan</li> </ul>                            |

**5 FINDINGS, ANALYSIS AND DISCUSSION**

**5.1 COMMUNITY-BASED WATER MANAGEMENT AND RAINWATER HARVESTING**

Here we answer the first research question, which refers to the link between CWM and increased access to water through RWH. In the next paragraphs, explanations will be given regarding how the CBO is providing the most affordable access to RWH and how it allows for a more equitable access to water in the village.

### 5.1.1 PROVIDING THE MOST AFFORDABLE ACCESS TO RAINWATER HARVESTING

The CBO is important for the water situation in Bayoudah because it makes access to RWH possible for the members of the community, especially for “middle class people and under who cannot afford to get a well [through] their own [financial means]” (FGM2, M3)<sup>5</sup>. By giving out easily obtainable loans without interest rates and repayable on a monthly basis for 3 years, the CBO gives an opportunity to people to actually build RWH systems on their properties.

This is still true even if the amount for the loan is insufficient to comprise all the related costs. While the 1000 JD revolving loan used to be enough to cover all the expenses, villagers nowadays have to add another 500 JD because the cost of material has increased. It seems that this has not affected the willingness to get RWH systems in the village, as the waiting list at the CBO for the revolving loans is still as long as before. (KI5)

Many respondents indicated that without access to the funds from the CBO, there was no way for them to be able to afford to get a RWH system:

The revolving loan system is a great idea. A lot of people wouldn't be able to build a well without those loans. The CBO provides about 2/3 of the amount needed for the construction of the well so it gives an incentive for people to save the remaining amount (FGM1, M2).

Some people, on the other hand, claimed that while they would have been able to afford a RWH system on their own or by other means, they still make the point that having access to a loan from the CBO is a much faster and affordable process:

I would have been able to get a RWH well but it would have taken more time. I would have started with the money I had and continued later when I would save more money. I could also have gotten a loan from a bank but the interests are high. I could also have waited 2-3 years to save money and do it in one shot. But the main benefit of getting a loan from CBO is to not have any interest rates and the process is very fast. I got my RWH well in 2 months! (FGM1, M3)

### 5.1.2 DEMOCRATISING ACCESS TO WATER?

The loan attribution process at the CBO follows different conditions (Table 2). When applicants meet the requirements, the rule of thumb for loan allocation is on a ‘first arrived, first served’ basis, until the funds are running out. Thus, the CBO has a waiting list of applicants that are contacted when funds are available. It is also paramount to specify that

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<sup>5</sup> Hereinafter, SI refers to semi-structured interviews with women, FGW and FGM to focus groups with women and men while KI stands for key informants. See Appendix I for the complete respondents' lists.

applicants do not have to hold membership at the CBO; every single villager residing in the area covered by the CBO is entitled to apply as the ultimate goal is to ensure that every household has access to RHW. (KI3, KI4, KI5)

**TABLE 2: CONDITIONS TO OBTAIN A LOAN FOR RWH FROM THE CBO**

|  |
|--|
| <ul style="list-style-type: none"> <li>• Applicants must reside in the specific geographical area that the CBO covers (90% of Bayoudah)</li> </ul> |
| <ul style="list-style-type: none"> <li>• Applicants must not already have a well</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Applicants must own a house</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Applicants must prove their financial viability to repay the loan (guarantee)</li> </ul>                  |
| <ul style="list-style-type: none"> <li>• Applicants must not have received a loan from the CBO before for another project</li> </ul>               |

The villagers did not voice any discontent towards the CBO’s way of allocating loans. However, few mentioned that they had to submit several applications as they did not always meet all the requirements, specifically regarding proving their financial capacities to repay the loan. Because we mainly spoke to villagers who got a loan for RWH and to only a few that did not, we cannot elaborate on the views of people who did not get one. Chances are that those who still have not been able to apply or who got denied have discordant perceptions on the topic.

Notably, at the community-level, the CBO in Bayoudah enabled a certain degree of equity regarding better access to water. Transforming granted money from organisations into revolving loans allows for the money to come back for further funding of RWH and creates a sense of equality amongst the villagers (KI5). Although some conditions could marginalise some families, the loan system is viable and rather equitable because the same amount is given to whoever applies.

**5.1.3 GETTING AROUND COMMUNITY-BASED WATER MANAGEMENT’S LIMITATIONS**

As Schouten and Moriarty (2003) point out, one downside of rural CWM in terms of water supply is that solutions implemented at the local level are often overlooking impediments to the efficiency of the system in the future, which eventually jeopardises the amount of quantities of water people can access (2003: 73). In their overview of community-based water

projects in Kenya, Guatemala, Pakistan, Cameroon, Colombia, Nepal and South Africa, they noticed that local water supply projects are usually not so adaptive; they only consider “existing water sources, quantities and service levels at the time of construction. They take no account of the essentially dynamic nature of communities, and seldom allow for population growth or demands for higher service levels” (*ibid.*).

It seems that the attribution of loans to villagers to build RHW by the CBO in Bayoudah sidesteps this limitation for the most part. Indeed, although the rainfall patterns remain uncertain for the future, enabling people to collect their own water at the household level (as opposed to share one with an entire village for multiple sectors) is an appropriate measure to prevent impediments such as population growth; as long as the CBO has funds to allocate for loans, new households can always apply. This not only allows people in Bayoudah to individually have access to more quantities of water for drinking and cooking and protect them from tap water failures, but it also puts less pressure on the overall consumption of renewable water and treated drinking water.

Although community-based initiatives are generally well perceived in the natural resources management field as they enable local people to value and implement their own knowledge at the service of their environment (Chambers 1997 in Smith 2008: 355), bottom-up approaches to CWM like the one observed remain subject to further limitations. Arguably, putting all responsibilities on the shoulders of communities alone for resolving water problems is shortsighted as it underestimates the shortcomings of community-led action.

In her critical overview of bottom-up approaches to sustainable water management, Smith (2008) identifies tokenism and local capacity constraints as other limitations to CWM. The first one refers to circumstances where “participatory espousals in projects and policy briefs do not necessarily translate into a real and locally meaningful participatory process on the ground” (Heyd & Neef 2004 in Smith 2008: 359). The latter can be exemplified by conditions where communities, especially rural ones, lack the material resources to enable them to fulfil the water management strategies they come up with (Smith 2008: 361-362).

Considering the above findings, CWM implemented in Bayoudah somewhat succeeds in overcoming those limitations. It can be argued that potentialities for tokenism are minimised by the fact that the CBO, as key informants mentioned, does not target specific groups within

the community; all households, if meeting the basic criteria, are entitled to apply for a loan, hence, fully participate in water management with the acquisition of a RWH system.

Interestingly however, because in our case CWM translates into the implementation of a technology at the household level, one can assert that participation from beneficiaries is even more promoted. Compared to CWM projects where beneficiaries have to share a common source of water and ensure that all stakeholders' needs are equitably met within that water supply, which could potentially exacerbate power relations issues and impede the participation of power less people, harvesting rainwater in Bayoudah overcomes this dynamic by enabling villagers to be managers of their own little supply of water within their household. This also echoes what Mutamba (2004) underlines as the 'personal gain' versus 'community gain', i.e. community-led initiatives that are aiming to benefit to communities as a whole may trigger more participation from beneficiaries if these are able to identify "what's in it" for their personal benefit (2004: 106).

Lastly, the CBO overcomes 'local capacity constraints' by applying for grants from organisations and converting them into revolving loans for RWH. As some respondents claimed, the CBO is seen as the most relevant instance, especially compared to the government, to apply for that kind of funding, which is supported by Opare (2007) who contends that donor agencies are more willing to attribute funds to CBOs (2007: 252). The fact that the CBO gets the loan money back ensures a certain level of financial sustainability. As long as there will be organisations to obtain funds from, the CBO can rely on this opportunity to give out more revolving loans for RWH and eventually expand its water management strategies in other ways<sup>6</sup>.

But one can wonder how financially sustainable it really is to rely on external organisations to make CWM happen and how often does it really happen that CBOs obtain funds so 'easily' from international organisations? To answer the first question, perhaps the CBO should seek to involve the government more in its solution in order to make it part of the answer to problems instead of by-passing it by getting funds externally. Secondly, we believe that our case is atypical as some of the CBO board members are well connected to development

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<sup>6</sup> At the time of data collection, Key informant 5 informed us that the CBO was in the process of applying to a well-known international NGO for a grant in order to fund a new CWM project: the construction of a canal linking a nearby surface water course to the village.

organisations in Jordan and have an excellent knowledge about the application procedures to obtain funds.

To summarise, it can be said that the key element to improving access to water through RWH is the CBO's implementation of a revolving loan system that enables the villagers to afford the acquisition of the technology as well as making the whole process more equitable. The loan system is also beneficial as it ensures a relatively sustainable source for funds to continue the project in the future, as population growth in the village will require more RWH systems to be built.

## **5.2 RAINWATER HARVESTING AND WOMEN**

This section will present the findings and discussion about the impact of increased access to water through RWH on rural women in Bayoudah. It will first elaborate on the household rainwater management, after which the benefits arising from RWH to household and to women specifically will be discussed.

### **5.2.1 HOUSEHOLD RAINWATER MANAGEMENT**

In order to realise what specific benefits emerge from RWH, we firstly strived to detect how the management of this system is carried out at the household level. Both women and men agreed that women manage rainwater used for inside the house, whereas men manage everything related to RWH outside the household: the maintenance of the RWH system (pipes and pump) and the cleaning of the well and roof.

Water from the RWH well is used only for drinking and cooking and in rare occasions for showering or cleaning. Women agreed that:

Solta<sup>7</sup> water is only for laundry and house chores in general. Water from the RWH well is only for drinking, cooking and sometimes showering. [However] when there is no Solta water, water from the well is used for everything (FGW2).

Whereas women did not even mention it, men claimed that they additionally use rainwater for home-garden irrigation at the end of the dry season, if there is water left in the well and before cleaning it for the next rain season. This supports the idea that the rainwater is mainly used inside the house for domestic activities conducted only by women (cooking, drinking and

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<sup>7</sup> Tap water provided by the government is called Solta water by the villagers.

sometimes cleaning), as the amount of rainwater for irrigation is insignificant and happens only once annually. This leads to the notion that RWH facilitates women's everyday lives, and they could be seen as its direct beneficiaries; "Benefits go mainly to me, because all the tasks connected to me now are easier to implement. I am the main and the biggest beneficiary" (SI, W50).

As women primarily use water for reproductive activities (UN Water 2006), and as rainwater in Bayoudah is used solely for those purposes, it seems that through RWH, by offering diverse quality and quantity of water for households, women ought to gain the most (World Bank 2007b:1). Managing rainwater follows the recognition that in rural households women hold a key role in water usage, supply and management (Khosla et al. 2004: 15). Similar findings about women being the main household water managers can be seen in other countries as well. For example, women in Yemen daily organize water allotment for their families: they calculate both quality and quantity and give priority to drinking water, they separate water for hygiene, what is left they use for animals and cleaning, and they reuse some water to water home-grown plants (Arafa et al. 2007: 6). Manundu's (1997) research on WDM initiatives in Machakos District, in Kenya, revealed that women bring decisions about domestic water: where to get it, who will collect it, how much, where to keep it and how to divide it for different usages (1997: 52).

In Jordan, people need to seek alternative sources for domestic water. In these conditions, RWH is an essential source for drinking and other domestic necessities (Abdulla & Al-Shareef 2009: 197). Indeed, even in some other countries (e.g. Kenya) rainwater for domestic usage turned out to be the most popular water source (Sturm et al. 2009: 776). In Bayoudah, rainwater can be seen as a complementary water source. Regarding water quality, households choose which water will be used for which purpose (Thomas 1998: 97). This is also something that Sturm et al. (2009) point out in their study in rural Namibia; RWH was an alternative water resource; although its contribution to domestic needs was substantial, it was not sufficient to satisfy them all. Hence, it worked as a complement to other water.

## **5.2.2 BENEFITS TO THE HOUSEHOLD**

When discussing the benefits arising from RWH, women as well as men tended to classify them in two types: benefits to the household and benefits to women exclusively. As we focus

on women in this study, we decided to mention the benefits to the household because they still largely benefit them first.

### **(1) PERCEPTION OF BETTER HEALTH**

Access to safe drinking water was one of the main benefits that both women and men brought up. They were of the opinion that tap water is not healthy for human consumption as it is smelly and dirty, and that rainwater quality is much better. One man confidently said: “[Rainwater] is clean water (5 times more than Solta water). It can be used directly as it doesn’t need to be boiled” (FGM2, M5). Villagers appear extremely relieved that they and their families can drink safe and clean water. One woman stated: “I am relaxed because I don’t have to worry about what my children are drinking now: I put the drinking water in a special container that everyone knows they can drink from” (SI, W37).

Water consumers usually distrust water that seems aesthetically improper: dirty, of a strange colour or that has unlikeable smell and taste, although these features do not necessarily have negative effects on health (WHO 2006: 210). The acceptability of drinking tap water in Bayoudah is of a rather subjective nature and it might be impacted by several factors, including cultural and social considerations, as well as the quality of water that community is used to (*ibid.*). People tend not to have confidence in the quality of tap water, and thus not consume it for drinking, when they 1) distrust their governments, 2) do not understand the water treatment procedure and the advantages of chemicals added to it and 3) when unreliable delivery makes them think that even the quality of delivered water is of a low-standard (Song et al. 2009: 235-236). In Jordan, the general trust in water authorities seems to have been low, that can be argued with the past experiences when tap water was not treated properly, which led to health problems among citizens (Salameh 2008: 60-61). The inadequate delivery system, probably further decreases the impression of its quality.

Due to old infrastructure and intermittent supply in Bayoudah, when tap water reaches houses it usually contains dirt and stones (FGW1). Also, delivered water is stored for about a week in pipes/tanks while it is being used, which might further impact its quality (Al-Omari et al. 2008: 189) and arguably decrease people’s willingness to consume it for drinking. On the other hand, as rainwater is not in contact with soil and rocks, it does not contain salts and minerals which makes it pure, soft and tasteless (Che-Ani et al. 2009: 133). This further

creates the villagers perception that it is of a high quality, and thereby even of beneficial impact on health (Abdulla & Al-Shareef 2009: 204).

## **(2) SAVING MONEY**

Saving money was raised as one of the key implications of having a RWH system. Firstly, rainwater is free potable water, as said by one respondent, “Money wise, you pay only once to build the well and then you get free water all the time” (FGM2, M4). Since it is used primarily for drinking and cooking, there is no need to spend significant resources on buying water. Also, by having access to an additional water resource, people can use less tap water and save on water bills. Further, before getting a RWH well, if a household was not buying drinking water or fetching rainwater elsewhere, they drank boiled tap water and thus used more gas. Likewise, women who did not walk in order to fetch water, but who collected it by vehicle, needed to give away money for this purpose as well.

Saving money by purchasing less tap water is experienced in many RWH examples around the world (see e.g. Che-Ani et al. 2009 for Malaysia). Moreover, considering each context specifically, RWH can be in monetary terms competitive to the public water supply (Sturm et al. 2009: 784). The authors thus advocate its introduction as a complementary water source even in areas that are covered by public supply. In the Jordanian context, RWH can be used as a supplement to tap water hence, notably reduce household’s expenditures (Abdulla & Al-Shareef 2009: 206).

### **5.2.3 BENEFITS TO WOMEN**

#### **(1) LESS STRESS**

A core benefit mentioned by women is the fact that rainwater is a backup system to tap water, which means that it can substitute it whenever the latter runs out. In this sense, women are less worried about household water management; “It’s such a relief to have a RWH well” (FGW2). Because they have enough water that will last for the whole dry season, women can perform their household responsibilities without worrying that it will run out. Comparing to the period before the RWH well, one woman noted:

Before I had to focus my days and life around water [...]. Now, when Solta water runs out, I don’t feel stressed about it, it’s normal. Why? Because of the well [...] I don’t worry if [Solta water] comes late or if it doesn’t come, because I can use well water (FGW2, W2).

Many women declared that they feel less stressed now also because before the installation of a RWH well, every time they went to fetch water, their children stayed at home alone. They were afraid that something might have happened to them while they were gone; “When my husband worked I found it hard to go and get some water and leave my children alone. I am more relaxed now when I have water in my house” (SI, W22).

Less stress also follows the fact that with the introduction of the RWH, women have regular and constant access to safe drinking water. They say that there is always water in the well and the only thing they have to do is to pump it or fetch it at any time they want. They further claim that this is probably one of the most notable differences compared to the period before having the RWH well; they do not have to go elsewhere to ‘get water’ as drinking water is right next to their houses (FGW2) and they can completely rely on their rainwater reserves.

When tap water is characterized with frequent service disruption, RWH is perceived as an accessible alternative (Rosenberg et al. 2008). It especially affects the well-being of women as it mitigates their everyday concerns; they are the ones in charge of collecting and managing water, and hence they have to bear the pressure, stress and anxiety related to it (Moriarty & Butterworth 2003: 12).

## **(B) SAVING TIME**

The vital benefit to women is that they do not have to carry water to their houses. This increases their time that now can be used elsewhere, but even the effort and energy employed for the aforementioned activities. As one woman said:

When I heard about the loan for RWH wells [...] and I told my father, everybody was very excited, especially my mother and sister because they had to carry water from my grandparents everyday (SI, W20).

Some women claimed that time is saved on boiling tap water in the case of those who used to consume it for drinking. Also, because of a lower hardness, rainwater boils much faster than tap water and uses less soap to achieve cleaning, thereby allowing women to spend less time on these tasks. One women informed us that for example “lentils need 1 hour to cook with tap water and 30 min with well water” (FGW2, W3), whereas another one noted that:

Solta’s water won’t act in a proper way as clean water; therefore, you need more soap and more water. With the water from well it is faster [to clean] because it doesn’t have particles that exist in tap water. Well water cleans better and the other one uses more soap to give you the same effect, and takes more time (FGW2, W5).

Before the RWH well, women had to wait for tap water to reach their houses in order to pump it. Since its delivery is irregular and no one knows exactly what day and/or time it will be delivered, women used to stay up long hours in the night waiting for it. They also had to reorganize the household's water distribution and usage accordingly. Now, by having a back up to tap water, they can be more relaxed and not spend time on waiting.

I save time because I used to be awake until late in the night [to wait for Solta water to arrive]. Also, the whole day I would spend time on figuring out how much water we have, how to distribute it [...]. Now I don't waste time anymore on this (SI, W35).

Time saved from having an increased access to water through RWH is mainly dedicated to spending time with children (e.g. helping them with school-work), completing the household chores, performing religious activities (e.g. praying and reading the Koran) and leisure time.

As 25% of women's time might be spent on fetching water (Sullivan 2002: 1196), more time and energy saved from not having to collect it is raised as the most significant benefit to women (CAP-NET & GWA 2006: 4). This can be replicated in better food preparation, care of children, education, participation in community, productive activities, empowerment and leisure (DAW 2005: 5-8; SIWI & UNMP 2005: 19; UN Water 2009: 88). For example, Pandey and Moffatt (2005) describe a study in Nepal where improved and closer access to water saved women's time that they used on productive activities, chores and rest (2005:189), whereas a study in Sri Lanka demonstrated that with better access, women had more time to start income-generating activities (Aladuwaka & Momsen 2010).

Women's role regarding household water supply has traditionally been in the sphere of reproductive water activities or the so called basic needs: drinking, cooking, cleaning and sanitation, whereas the attention on their productive use of water has been minimal (Thomas 1997). As defined by Moriarty et al. (2004), reproductive activities do not refer only to women's role in agriculture, but they further include usage of water for small-scale, usually informal activities that generate income or enhance nutrition (2004: 25). In Arab countries especially, a women's position is often placed within the domestic responsibilities. Women are seen as secondary income earners and reliant on men who are the family's foremost financial contributors (UNIFEM 2004: 6-7).

In our case, women did not allege that saved time encouraged them to start an income-generating activity or any occupation occurring outside their homes (e.g. education or community-work). This can be explained by the fact that some women interviewed are already employed and/or have income-generating activity. Secondly, women in Bayoudah have many children to take care of, which limits their capacities to carry out additional work. It can also be that the time saved with RWH is not so significant that it could enable their dedication to other productive pursuits.

Then again, it is important to be aware of tradition and culture's influence on restraining women's capacity to efficiently utilise more water for productive and reproductive use (Arafa et al. 2007). Water-related work done by women in the MENA region is not considered as productive time, but it is linked mainly to their reproductive responsibilities (Minoia 2007: 12). In this sense, benefits derived from saving time from collecting water mainly translate into better childcare, hygiene and nutrition (*ibid.*).

#### **5.2.4 SATISFYING ONLY PRACTICAL NEEDS**

RWH in Bayoudah appears to be an alternative water source that is more reliable and sustainable than other sources (Song et al. 2009: 239), i.e. the tap water system. It gives to households, and women especially, larger autonomy (Thomas 1998) as it enables them to become individual water managers by having their own clean and relatively ample source of water in front of their houses (Che-Ani et al. 2009).

It generates several benefits to people, with a particular potential to alleviate women's everyday lives. Women in Bayoudah bear the weight of water scarcity and therefore are the most disadvantaged. Improving their capacities through RWH is the equity feature of WDM as it puts vulnerable people first and therefore can advance their situation regarding water management and water decision-making (Brooks et al. 2007; Brooks 2006).

Rainwater in Bayoudah is used primarily for drinking and cooking, tasks that belong to women's everyday responsibilities and which make them more relaxed about the household water management and save their time and effort. The question is, however, whether saved time in this specific context, satisfies women's strategic needs or it only assures and thus preserves their practical needs for water (Moser 1989). RWH did not drive women to spend

this time on potentially empowering activities, such as education, income-generating or community involvement (Aladuwaka & Momsen 2010: 44). However, it did secure their practical needs for water as domestic water users (Coles & Wallace 2005: 11). In our case, practical needs are fulfilled when RWH meets the inadequate water situation experienced by women, which previously impeded their execution of reproductive role within the family.

### **5.3 WOMEN AND COMMUNITY-BASED WATER MANAGEMENT**

This section is taking a deeper look at women's inclusion in the overall CWM by investigating how women are included in the process of getting a loan from the CBO. It is related to our last research question, which addresses the link between women and their participation in CWM in Bayoudah. This will be the occasion to discuss the lack of gender analysis from the CBO, the impediments to women's participation as perceived by them as well as the diverging point of views from some 'economically empowered' women from the community.

#### **5.3.1 ABSENCE OF GENDER MAINSTREAMING IN LOAN ATTRIBUTION**

While the CBO reveals to be very successful and well perceived in the community, we however noticed that it is not including any kind of gender analysis in allocating loans for RWH as it does not specifically target women as recipients for loans. This can be explained by the fact that the CBO is targeting households and that people generally do not make difference between women and their household, or even, do not see the need to specifically target women at all. (KI3)

In the water sector, gender mainstreaming necessitates commitment at all levels, from national to local, to guarantee attention to gender (Regmi 2005: 95). However, because it is at the organisational level, such as within CBOs or other types of civil society organisations, that the concrete and pertinent policies and practices are developed, gender mainstreaming at this level becomes crucial (*ibid.*). Mainstreaming gender at the organisational level is therefore considered as a tool to promote gender equity (UNDP 2004:31-32).

In our case, mainstreaming gender could mean that the CBO would recognise that a considerable amount of women in Bayoudah might lack the legal entitlements or simply the informal social approval or self-confidence to be able to register an application for a RWH

loan. Consequently, the CBO would specifically target them in the loan allocation process. Instead, it can be argued that the CBO is assuming that women will undoubtedly benefit from a technology such as RWH without giving them the visibility they rightly deserve in the process of acquiring it. On the other hand, one can assert that, RWH as developed in Bayoudah does not bring about negative or harmful consequences for women such as increasing their workload or making water management more burdensome.

### 5.3.2 PERCEIVED IMPEDIMENTS TO WOMEN'S PARTICIPATION

When the issue of applying to the CBO for a RHW loan was brought up with women during semi-structured interviews, several tendencies were highlighted. Some women contended that applying for a loan is not women's role and they should not even consider being part of it:

My husband applied under his name because he had the idea [of getting a RWH system] and traditionally it's his role to do that. It is a man's job to take care of these things. All women think this way (SI, W6).

Why would I apply? Men take care of this kind of things, it's their responsibility and it's not appropriate for women to do it (SI, W39).

In the same perspective, women identified additional impediments for them to be considered as relevant candidate to apply for a loan: the lack of connections, i.e. not being 'a local' (women from other villages who got married to a man in Bayoudah: "I do not feel like I could apply as I do not know any people") and the absence of collateral (SI, W42). Interestingly, few women even confessed that their husbands registered for a loan without even consulting them before hand (SI, W42, W46).

Yet, other women assert that in the end, it does not matter who applies, husband or wife, as long as somebody does it in the name of their household. This is especially true for women who technically applied for a loan but in reality, it was their husbands that were engaged in the paperwork at the CBO, in providing collateral as well as in repaying the loan:

I applied for the loan for no specific reason. It does not matter who applies. I applied and my husband did all the paperwork and I just went to sign it (SI, W31).

It is important to acknowledge that these two tendencies have been observed with both housewives and women who work and earn an income outside their household.

The impediments evoked above can be seen through different angles. First, those related to individual factors, chiefly women's lack of consideration for their status as water main managers; women do not consider their key role in the household regarding water as a rationale for involving themselves more formally in the loan process at the CBO. While women are not prevented to apply at the CBO in any way, other reasons such as patriarchal norms ("it's a man's job") or general values that restrain them from participating actively in affairs occurring outside their household can represent the institutional factors impeding women's participation in CWM (Singh 2008: 927).

Another way to understand the extent of women's participation in CWM is to realise that in some cases, where they manage to benefit indirectly without participating directly, women tend to not see the need to involve themselves more formally in CWM (Meinzein-Dick & Zwarteveen 2003: 155). Considering the various benefits they gain from RWH, this would explain why some women in our case, although mentioning actual impediments to their participation, were also contending that it does not matter who applies for a loan between them or their husbands as long as somebody from the household does it.

### **5.3.3 'ECONOMICALLY EMPOWERED' WOMEN: DIFFERENT DISCOURSE**

In another perspective, in some cases where women are economically independent and who applied for the loan, provided collateral and are repaying the loan, their perceptions seem to be different. These women rather thought that it was normal for them to apply as they are the ones who, as household managers, are aware of the family needs, hence in an appropriate position to do so (SI, W21, W50). The women who are working at the kindergarten, which is ran by the CBO in the context of another project, declared that the fact that they are connected to the CBO through their work enabled them to be the most appropriate person to apply for the loan (*ibid.*).

It is also relevant to note that this last category of economically empowered women seemed rather proud of themselves as being active actors in getting a loan for RWH, as well as being the one in charge of repaying it. Notwithstanding the fact that most of them were stressing that it is normal for them to contribute to their household, they still showed some signs of happiness specifically related to this situation, which was not witnessed with the other types of women:

I am very proud because I feel that I served my family with my share [by doing] all the logistics for the application to the CBO (SI, W19).

I am really happy about getting a well on my own. I am doing a man's job; I contribute productively to my family. [The RWH system] is my legacy to my family (SI, W53).

Contrary to women who did not participate fully in the loan process to get a RWH well, these women did not perceive any impediments to their participation. This tends to testify the belief that individual and institutional factors like the ones mentioned previously are insufficient to explain the extent of women's participation. The fact that some women in the same environment managed to overcome those impediments proves that to identify the conditions hampering or encouraging women's participation in CWM, one needs to "develop a holistic analysis of how the complex web of factors interplays in a particular community situation" (Singh 2008: 927). In this sense, various aspects like age, generation, social status, etc. are also influential in the creation of complex systems of thought regarding gender participation in issues like water management (Singh 2008: 930). In our case, women that not only rely on a certain level of economic independence but are also connected to the CBO are the ones who seemed to be less impeded to apply for a loan for RWH.

The above findings show that even if there is a good percentage of women who officially apply for a RWH loan, the reality is that only few of those interviewed are actually in charge of repaying the loan or providing the collateral for it and are characterized as economically empowered. Therefore, it cannot be claimed that the CBO is empowering women through the loan distribution system, as women who are already economically empowered are repaying the loans they applied for themselves. Hence, we observed that most men are applying for the loans as well as repaying it with their source of income. The cases where wives apply is more than often just a façade; those women do not participate in the loan application process, they do not provide a guarantee, nor they are expected to repay it.

#### **5.3.4 WHY IS IT IMPORTANT TO INCLUDE WOMEN THEN?**

If women are the main water managers in their household and they benefit the most from RWH in practice, no matter if they are the ones who apply for a loan from the CBO, provide guarantee or repay the loan, why do we care so much if they participate in CWM outside of their household or not?

One answer could lie in the potential externalities that better participation of women can lead to. As mentioned before, the sense of pride felt by the women who are fully participating in

**FIGURE 4: HEART-SHAPED WELL**



*Source: Authors*

does not make a difference who from husband or wife applies and is in charge to organise the logistics of gaining a RWH system.

the loan process is a chief example for our case. Similarly, one interviewed widow, who is part of the ‘economically empowered’ group of women, was very proud to show us her RWH well, which she deliberately decided to build in a heart shape (Figure 4). Of course, this example is anecdotal and does not intend to prove that women are better able than men to apply for a RWH loan; it rather serves to challenge the assumption that it

If gender mainstreaming was mentioned earlier as part of a gender equality strategy, women empowerment follows the same line (UNDP 2004: 31). It can be argued that CWM projects can be designed or organically emerge as means to empower women, as they can allow them to achieve ‘power within’, which is when “women reflect, analyse, and assess what they have taken for granted, and become aware of socially constructed and socially shared biases” (Aladuwaka & Momsen 2010: 44). Arguably, in our case, although we did not engage ourselves in a thorough investigation about women empowerment, we witnessed very little signs of ‘power within’ amongst the women interviewed who were ‘economically empowered’.

CWM performed by the CBO in Bayoudah did not result in significant enhancement of women’s participation. It was not an objective pursued by the CBO in its loan allocation for RWH, which could be a relevant justification. Therefore, we remain in the presence of a situation where CWM often is “in reality, a group of men making decisions about a system that will be used exclusively by women” (Schouten & Moriarty 2003: 61).

## 6 CONCLUDING REMARKS

The purpose of this study was to investigate how increased access to water can be promoted at the community level and how it affects women lives with regard to their household water management and their participation in community water management. To do so, we posed three research questions which addressed these aspects.

We answered the question related to CWM and increased access to water through RWH by demonstrating how the implementation of a revolving loan system by the CBO in Bayoudah provided affordable and equitable access to safe and clean water. Moving to our second question, we found a positive link between RWH and its implications for women by demonstrating that they are the main rainwater managers within their household and therefore benefiting the most from RWH in terms of living in less stressful water-related conditions and saving time. Lastly, we addressed our final question, which concerned the participation of women in CWM, by explaining how the CBO does not specifically mainstream gender in its loan allocation process. Thus, in this regard women's participation is not realised to a large extent.

Through our analytical framework and elaborating from our context, community-based water demand management has shown that:

- There are demand-oriented alternatives to palliate the limitations of water supply systems and they can be drawn from local knowledge;
- People can become independent water managers at the household level with a water demand-related technology such as domestic RWH;
- People can benefit from a free substitute to other sources of water by relying on rainwater for drinking and cooking; and
- A larger number of households can implement RWH through an affordable financial tool such as the revolving loan system carried out by the CBO.

However, in our study, community-based water demand management did not provide conditions for women to develop their 'power within'; saving time through easier water management from RWH did not stimulate the engagement of women in productive activities. Neither did the CBO specifically encourage women to participate in water management outside of their household by targeting them in the revolving loan process. It was mainly the

‘economically empowered’ women who were fully involved in the loan process that seemed to benefit the most from CWM in terms of self-satisfaction and pride in their contribution to their family’s wellbeing.

As our case is set in a specific context, the outcome of this study is a result of the particular characteristics of the CBO and the village investigated. Therefore, we acknowledge that the same study in other settings might lead to different conclusions. Further research on CWM and women’s participation would be relevant to deepen the understanding of how gender issues are dealt within local water-led initiatives. Likewise, researches should explore gender implications of other WDM technologies, such as grey water, in order to enlarge the debate on how they can benefit women.

The relevance for development of this study lies in the importance of finding sustainable solutions to water scarcity and associated negative consequences that come with it. We demonstrated how community-based water initiatives can use local capacities to solve their water problems and therefore, be an appropriate entry point to water management in general. While the scope of this thesis recognises the key role of communities in solving water related problems, we consider that further investigations should elaborate on how governments can also be part of the solution by supporting communities through capacity-building.

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## APPENDIX I: RESPONDENTS LISTS

### FOCUS GROUPS WITH WOMEN

| Women                       | Age | Family size   | Education                                       | Occupation                                     |
|-----------------------------|-----|---|---|--|
| <b>Focus group 1 (FGW1)</b> |     |   |   |  |
| W1                          | 42  | 6 (4 children)  | High school                                     | Housewife                                      |
| W2                          | 48  | 7 (5 children)  | Primary school                                  | Housewife                                      |
| W3                          | 41  | 7 (5 children)  | High school<br>(1 <sup>st</sup> year completed) | Housewife                                      |
| W4                          | 41  | 7 (5 children)  | Diploma <sup>8</sup>                            | Housewife                                      |
| W5                          | 27  | 0 (non married, no children and living with parents)                  | University                                      | Small private business (officially unemployed) |
| W6                          | 35  | 0 (non married, no children and living with parents)                  | High school                                     | Unemployed                                     |
| W7                          | 28  | 0 (non married, no children and living with parents)                  | High school                                     | Unemployed                                     |
| <b>Focus group 2 (FGW2)</b> |     |   |   |  |
| W1                          | 33  | 5 (3 children)  | Diploma   | Kindergarten teacher                           |
| W2                          | 26  | 5 (3 children)  | High school                                     | Housewife                                      |
| W3                          | 30  | 4 (2 children)  | High school                                     | Housewife                                      |
| W4                          | 39  | 6 (4 children)  | Diploma   | Small private business                         |
| W5                          | 42  | 9 (2 families: widow, 4 children, daughter-in-law and her 3 children) | Primary school                                  | Housewife                                      |

<sup>8</sup> Diploma refers to 2 years of education completed after high school.

## SEMI-STRUCTURED INTERVIEWS (SI) WITH WOMEN<sup>9</sup>

| <b>Women<sup>10</sup></b> | <b>Age</b> | <b>Family size</b>                | <b>Education</b> | <b>Occupation</b>        |
|---------------------------|------------|-----------------------------------|------------------|--------------------------|
| W25                       | 33         | 11 (9 children)                   | Primary school   | Housewife                |
| W53                       | 42         | 9 (7 children)                    | Primary school   | Housewife                |
| W16                       | 65         | 14 (12 children)                  | Illiterate       | Housewife                |
| W21                       | 36         | 6 (4 children)                    | Diploma          | Director (public sector) |
| W50                       | 34         | 5 (3 children)                    | Diploma          | Employee (public sector) |
| W6                        | 53         | N/A                               | Illiterate       | Housewife                |
| W39                       | 37         | 4 (2 children)                    | Primary school   | Housewife                |
| W42                       | 53         | 10 (7 children and 1 grandmother) | Primary school   | Housewife                |
| W33                       | 32         | 4 (2 children)                    | University       | Midwife                  |
| W31                       | 47         | 6 (4 children)                    | University       | Housewife                |
| W20                       | 27         | 3 (1 child)                       | University       | Housewife                |
| W35                       | 30         | 4 (2 children)                    | University       | Primary school teacher   |
| W46                       | 35         | 4 (2 children)                    | University       | Employee (public sector) |
| W37                       | 42         | 9 (7 children)                    | High school      | Retired                  |
| W22                       | 41         | 7 (5 children)                    | High school      | Housewife                |
| W19                       | 27         | 4 (2 children)                    | University       | Architect                |

<sup>9</sup> 22 women were officially interviewed but only 16 were considered valid for our analysis.

<sup>10</sup> The number attributed to each woman is according to the list of respondents we got from the CBO.

## FOCUS GROUPS WITH MEN

| Men                         | Age | Family size  | Education      | Occupation            |
|-----------------------------|-----|--|----------------|-----------------------|
| <b>Focus group 1 (FGM1)</b> |     |  |                |                       |
| M1                          | 42  | 9  | Primary school | Retired               |
| M2                          | 17  | 0 (non married, no children and living with parents) | Primary school | Student               |
| M3                          | 56  | 11   | Primary school | Retired               |
| M4                          | 55  | 7  | High school    | Retired               |
| <b>Focus group 2 (FGM2)</b> |     |  |                |                       |
| M1                          | 46  | 6  | University     | Agricultural engineer |
| M2                          | 34  | 3  | Diploma        | Technician            |
| M3                          | 37  | 5  | High school    | Government employee   |
| M4                          | 39  | 6  | High school    | Private sector        |
| M5                          | 44  | 4  | High school    | Private sector        |

## SEMI-STRUCTURE INTERVIEWS WITH KEY INFORMANTS

| Key informant | Role as key informant   |
|---------------|---|
| KI1           | Employee at the Ministry of Social Development, Balqa governorate           |
| KI2           | Employee at the Ministry of Social Development, Balqa governorate           |
| KI3           | Board member, Abd Al-Rahman Bin Aouf Voluntary Society, Bayoudah            |
| KI4           | Administrative employee, Abd Al-Rahman Bin Aouf Voluntary Society, Bayoudah |
| KI5           | President, Abd Al-Rahman Bin Aouf Voluntary Society, Bayoudah               |

## APPENDIX II: INTERVIEW GUIDES

### FOCUS GROUPS WITH WOMEN

#### FOCUS GROUP 1

What does your day look like?

- Do you have a job?
- What are your responsibilities within your household?
- In what kind of activities are you involved?

What is your water situation?

- How do you access to water?
- What is your daily (or weekly or monthly) water consumption?
- For which purpose do you use water?
- Do you have access to enough water according to your needs?
- Where does the water in Bayoudah come from?
- Do you feel like there are inequalities between the different households in the village regarding access to water?

Who takes decision regarding water in your village?

- Do you have any influence/power, as a woman, in the way water is managed? How?

When did you get a water harvesting system?

- How did it impact your water consumption?
- Can you describe how having a water harvesting system changed your life?
- What was the role of the CBO in your access to a water harvesting system?

What do you think of the CBO in Bayoudah?

- Is it a positive or a negative thing?
- Do you feel like women can access the CBO easily (as well as men for example)?
- Are (some) women in Bayoudah organized in a women association?

#### FOCUS GROUP 2

When did you get a water harvesting system?

- How did you get it (privately/revolving loan/government)?
- How did it impact on your water consumption?
- Are you using more water?
- Do you spend less money on buying water?
- Can you make a comparison with your situation before you got a water harvesting system?

What are the benefits for your household in general (husband, children and yourself) of having a water harvesting system?

What are the specific benefits for you as an individual woman of having a water harvesting system?

- Does it make your life easier? How?
- Does it impact your diet? Do you eat better?
- Can you clean your house better?
- Is it less worrying / stressful for you, now that you have access to more water for free?

- Do you have more free time? If yes, what do you spend this extra time on (house chores, taking care of animals, spending time with family, activities in the village...)?
- Do you feel that you work more inside the house now?
- Do you have more time/possibilities to start earning income for your family through income-generating activities (having animals and selling their products; hand-crafting, knitting etc.)?

When water is scarcer (i.e. in the summer), how do you manage the water in your household?

- What are the priorities (e.g. sanitation, cooking, car-washing) and who decides them (you, your husband, together)?
- When water is scarcer, does it impede you as a woman to answer your personal needs or to complete your tasks as a housewife?
- When water is scarcer, can you contact higher authorities (village or government) to get them to help you accessing more water or do you just try to cope with less water?

Does a better access to water give you more time to be involved in other activities than your housewife responsibilities or does it not?

- If yes, what kind of activities are you involved in?

## SEMI-STRUCTURED INTERVIEWS WITH WOMEN

How did they hear about the possibility to get RWH well through their CBO?

- Whose idea was it to get one?
- How the decision to get one has been made?
- Who applied for the loan? Why? (If you had money would you consider applying by yourself?)

How do you think you are benefiting from the well?

What is water from the well used for?

- Who is the main responsible for completing these tasks?
- Are you also the one who decides how the water from the well will be consumed or is it someone else?

Are you performing any side activities?

- What is the impact of having a water harvesting system on these activities?)

Would have it been more complicated to get a well if there was no CBO?

- Why?
- What are the other ways to get it?
- Is it hard as women to apply?
- Would she advise other women to apply? Why?

## FOCUS GROUPS WITH MEN

What are the benefits of having rainwater harvesting well?

By talking to your wives we have noticed that women are in charge of most of the activities related to water management inside the house and men outside the house. Do you agree?

- What are your activities in relation to the well? What do you do: maintenance, pumping of water, cleaning or...?
- Do you think that your wives benefit more from the well than you?

What was your responsibility in getting a well?

- Did you apply yourselves?
- Did you provide a guarantee?
- Have you repaid the loan?

If there was no CBO would you be able to acquire a well anyway? Was it your only option?

Do you think that the CBO has improved water situation in Bayoudah? Why / How?

## **SEMI-STRUCTURED INTERVIEWS WITH KEY INFORMANTS**

### **INTERVIEWS WITH MSD STAFF**

What do you know about CBO in Bayoudah?

What do you think about it?

Can you compare the CBO in Bayoudah with the others in the governorate in terms of water management?

As a government representative, what do they think about the work of CBOs?

- What is the official position of the government regarding CBOs?
- Do you support the work of CBOs?
- Do you have good collaborations with them?

As CBOs have to be registered at the MoSD, how does the ministry monitors/overviews the activities of the CBOs in the governorate/country?

### **INTERVIEWS WITH CBO REPRESENTATIVES AND EMPLOYEE**

How long have you been a member of the CBO and how long have you been working for it as a representative / employee?

- Why did you decide to get involved in the CBO as a member and as a representative?

Can you remind us when and how the CBO started and its main accomplishments throughout the years?

- When did the population of Bayoudah start to be aware of the existence of the CBO?
- What is the recipe for having a good CBO well accepted from the population?

According to you, do people like the revolving loan system for rainwater harvesting?

- If yes, why? If no, why?
- Do you get feedback (positive or negative) from the population in Bayoudah about this activity?

What is the water situation in Bayoudah?

- How does the CBO contribute to improve the water situation?
- Why do they think that water harvesting is good and why do you give out loans for it?

How and when did you start / get the idea of giving out loans?

- What are the conditions to get a loan for water harvesting well from the CBO?
- Do you favor certain groups (e.g. old, poor, women) when you give out loans?
- How much are the loans for water harvesting wells?