



On the Path of Resilience to Climate Change in Jordan



INTERNATIONAL UNION FOR CONSERVATION OF NATURE – REGIONAL OFFICE FOR WEST ASIA



ACKNOWLEDGMENTS

This case study comes as part of the Social, Ecological & Agricultural Resilience in the face of Climate Change (SEARCH).

Jordan Team: Suhaib Khamaiseh and Mohammad al Faqeeh

SEARCH is a three year (2011 - 2013) regional project led by the International Union for the Conservation of Nature – Regional Office for West Asia and implemented in partnership with ten organizations (CEDARE, PHG, AWO, GEOSS,UAWC, BDRC, SPNL, MADA Association, Abdelmalik Essadi University, IUCN MED and ATED) from the five countries mentioned above and is supported by the IUCN Global Water Program in Switzerland and the Centre for Development and Innovation (CDI) - Wageningen in the Netherlands.

The objective of the project is to increase social and ecological resilience in watershed ecosystems of the Mediterranean Region in the face of climate and other drivers of change. Among the results that the project aims to accomplish is joint development and application of practical tools and guidelines (i.e. the toolkit) with policy makers to contribute to regional, (sub-)national and sector strategies and plans for climate change adaptation, water resources management, poverty reduction and economic development.

This case was produced with the support and commitment of the SEARCH partners and team. They are:

- Arab Women Organization in Jordan
- National Center for Research and Development in Jordan

“This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility IUCN ROWA and can in no way be taken to reflect the views of the European Union.”

INTRODUCTION

The Hashemite Kingdom of Jordan

The Hashemite Kingdom of Jordan is a constitutional monarchy with a representative government. It is bordered by Syria to the north, Iraq to the east, Saudi Arabia to the east and south and the occupied Palestinian Territories to the west. The total landmass of Jordan is approximately 88,778km². Jordan's climate is characterized by being Mediterranean with hot dry summers and cool wet winters.

Jordan's demographics are thought to be major factors affecting its development. Jordan's population has exceeded 6 million people mostly living in urban centers. It is a fact that imposes great challenges in the light of climate change, (UNFCCC, 2009).

Being classified as one of the driest countries in the world, Jordan carries great burdens when dealing with climate change impacts. Despite the great efforts by governments in trying to adapt to and manage climate change impacts on rural areas in Jordan, water resources per capita are drastically falling as a result of mismanagement and



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Figure 1: Shows the map of Jordan

population growth. Jordan's natural resources are under stress and are further expected to be aggravated by climate change in the future, (UNFCCC, 2009).

Zarqa Governorate & Pollution

Zarqa Governorate is the third densest governorate in Jordan and is located 25km east of Amman. Being an industrial city, Zarqa has the largest number of factories in Jordan,

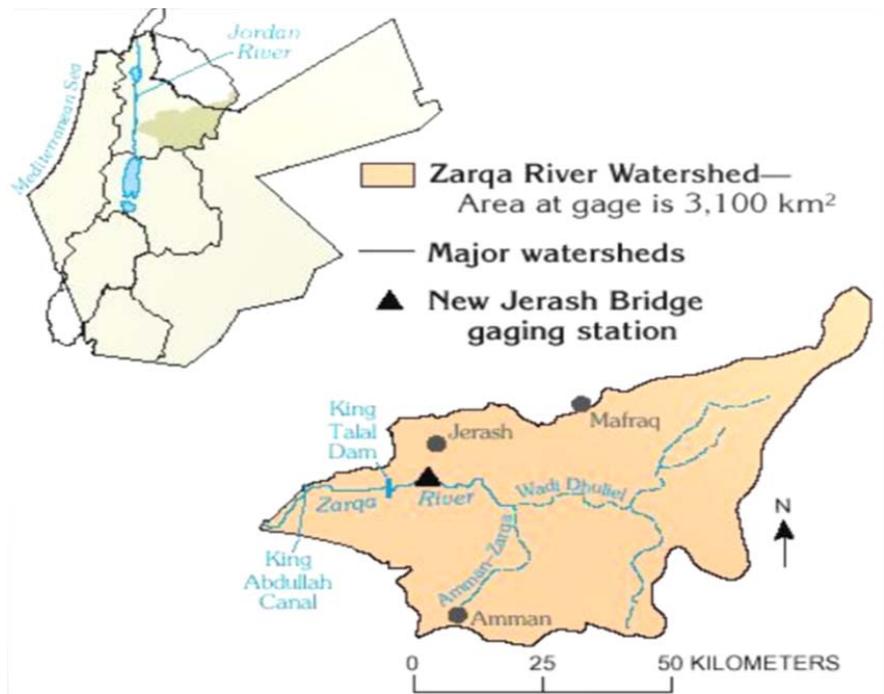
hosting Jordan's only oil refinery. From the north, the oil refinery and the waste water treatment plant cause pollution in water and air. One of the biggest unmanaged landfills is situated in south of Zarqa, causing river and air pollution that affects the city. Desertification has swept through the east of this governorate, bringing eastern wind and sand to Zarqa's residents.

Agricultural areas are located along the Zarqa River; irrigated areas are mainly around groundwater wells and along the side beds of the river while rain-fed agriculture can be found at higher rainy altitudes. The rest of the basin has scattered vegetative areas used for grazing while land use plans are not taking environmental impacts into consideration and the loss of scarce vegetation cover is rapid. Linked to growing poverty and degrading livelihood conditions, the environmental impacts are increasingly aggravating.

As a result of unplanned and uncontrolled activities, the governorate's basin is now facing environmental problems such as land deterioration and desertification, groundwater salination and reduced base flow.

Zarqa River Basin & Climate Change

The area of the Zarqa River Basin (ZRB) is about 3,900km². Zarqa River consists of two main branches: Wadi Dhuleil, which drains the eastern part of the catchment area and Seil-Zarqa, draining the western part. Both meet at Sukhna forming the Zarqa River. The catchment area of



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Figure 2: Zarqa River Watershed

Zarqa River is the most densely populated area in Jordan comprising around 65% of the country's population and hosting more than 85% of its industries, (IUCN, 2008).

Connected through a canal and pipes to the King Abdullah Canal, the Zarqa River provides irrigation for 84km² of land. Pumping from the aquifer in the upper Amman-Zarqa groundwater basin, the high rate of urbanization and sealing off of land surface in urban Amman by concrete, as well as ineffective water management by households and farmers, all have a major impact on the water flows of the Zarqa River

and have further worsened downstream pollution problems. Moreover, surface water in the river is excessively pumped for agricultural purposes.

The basin was initially examined in the first national communication report to the United Nations Framework Convention on Climate Change (UNFCCC) under the theme "Vulnerability and Adaptation to Climate Change" in 1999. Results showed that changes in rainfall over the ZRB will occur, as surface runoff decreases and temperature increases due to climate change. According to the vulnerability assessment and

adaptation in the water sector conducted by the Jordan's "Second National Communication to the United Nations Framework Convention on Climate Change" (UNFCCC) in 2009, the potential impacts of climate change on hydrological systems and water resources of the ZRB showed that surface runoff will be highly undermined. It is therefore expected that the effect of climate change on water resources on the ZRB will be significant and that an increase in temperature of up to 2° C will occur accompanied by a decrease in precipitation of up to 20% in upcoming years.

"Zarqa is currently in its worst environmental condition ever" – Wasfi Al Momani, Development Unit, Zarqa Municipality

COPING WITH CLIMATE CHANGE

Social, Environmental and Agricultural Change

The local community in the ZRB depended on livestock and agriculture for income. Only 15 years ago, the ZRB fostered more than 80 farmers along the river alone.

With the changing climate, rainfall drastically decreased over the past decade. Rain-fed crops no longer survive in harsh weather and are thus in



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Figure 3: One of the only 8 farms left in the ZRB

need for irrigation. Farmers had to look for alternatives, for that reason only 8 farmers along the river side exist today.

Over the past decade, huge environmental shifts have occurred in Zarqa. The government issued a wastewater channel that passes through the river. In order to sustain their livelihoods with the changing climate, farmers resorted to unattainable environmental practices to irrigate their crops.

This resulted in extreme environmental pollution in the ZRB that affected groundwater and river stream. The municipality resorted to closing all farms using the Zarqa River for irrigation which was detrimental to livelihood resources of most farmers.

Alternatives were not given to the farmers and most of them had to look for new options to sustain their families. With the high unemployment rate in

Zarqa, most of the families have succumbed to poverty.

“The municipality bulldozed our farms down and offered us no alternatives. We don’t trust them anymore.” – Abu Fadi, Khirbet al Hadeed, Zarqa

The local community in the ZRB has little trust in their municipality. It was evident that the municipality has a negligible role in the community which reflected badly on the presence of NGOs. Knowledge about the severity of the environmental and social aspects in the community is limited, with little or no awareness about climate change aspects. The climate change concept is misinterpreted and thought to be caused by war or population increase.

Managing Change & Identifying Alternatives

Despite negative impacts of climate change socially and environmentally, the local community has adapted to certain aspects. Positive impacts were found during tough drought seasons making it easier for locals to cope. For instance, shorter winters meant longer cultivation seasons and less reliance on fossil fuel for warmth. That has proved to decrease their monthly expenditure.

Farmers owning wells have kept their farms operating while others had to find other livelihood resources, like working with the municipality or other labor positions.

Better integration between the local community and decision makers has brought about positive and sustainable changes on the ground. Shifting towards systems that engage local communities in the decision making process was found to be better than solving acute problems on the ground immediately without any local community intervention, (Schouten et al, 2007). Consequently, a joint approach led by the International Union for the Conservation of Nature (IUCN) aimed to fill that gap between stakeholders.

The Arab Women Organization (AWO) & the Badia Research Program (BRP), led by the IUCN and funded by the European Union have aimed at increased climate change resilience in Zarqa through the project “SEARCH” (Social, Ecological & Agricultural Resilience in the face of Climate Change).

Climate change resilience is the essential capacity of the local community to withstand shocks and rebuild when

necessary. For poor and less-developed communities like Zarqa’s, however, resilience cannot simply suggest lessening vulnerability to climate change. Enabling the community to cope is not sufficient. Transformation capacity is needed to allow these communities to be part of the change & decision making process to allow local and national climate change resilience.

A resilience framework applied in the area focused on capturing local knowledge and insights on changing environmental, social and agricultural aspects. Captured knowledge was later translated to setting national strategies and plans that better address climate change adaptation in the future.

APPROACHES AND METHODOLOGY

Building the methodology was based on using the IUCN REWARD “Guidelines for Adaptive Watershed Management and Local Water Governance”. These were tailored for the climate change adaptation dimension by further strengthening the incorporation of climate change scenarios and risks, uncertainty treatment and

adaptive management. The objective was to develop a strong, dynamic and climate-mainstreamed approach to watershed resources management. This approach was therefore delivered in practical outputs; in the form of climate-resilient watershed development strategies, plans and activities, and improved communication and decision-making between stakeholders in the community.

During implementation of the project, three watershed and water districts were selected for adopting resilience-based methodology for climate adaptation in the Zarqa River Basin: Rusaifa, Khirbet Al-Hadeed and Shomar.

The Participatory Rural Approach was adopted in attaining climate resilience through establishing relationships with different stakeholders including the State and local authorities and strong ties were built with farmers who were invited to each of the planned training workshops. Other approaches were also adopted including the Self-Mobilization Approach to enable the farmers discover by themselves the actual problems they were encountering and the weaknesses they should face in order to embark on

appropriate solutions. Also adopted was the Partnership Approach by which the role of each partner in the implementation process was defined.

Scenario building proved to be the most effective tool in strategizing and planning, allowing local participants to propose the adaptive and coping measures. An explicit early example of such measures was the reduction of electricity consumption through installing roof solar-energy hot water reservoirs in Khirbet Al-Hadeed and Shomar demonstrating an environment-friendly energy.

PILLARS OF SUCCESS ESTABLISHED

The application of the above approach and methodology has been concomitant with a process of several steps that establish a mode of resilience based on several pillars addressing challenges to climate change adaptation efforts:

1. **Creating multi-stakeholder committees** connecting between beneficiaries and the State and creating a sense of responsibility and ownership among different stakeholders.

2. **Participatory approaches** that built agreed upon visions, scenarios for every watershed and water district, involving all stakeholders and increasingly improving their awareness of climate change impacts and readiness to undertake necessary coping measures.
3. **Defining key priorities** in activities to be implemented within the strategy.
4. **Undertaking pilot projects** that demonstrate adaptation measures.
5. **Local action planning** to identify problems and agree on adaptation strategies.

“We established a local committee that will hopefully help us present our problems and proposed solutions to the municipality... It brought us together to change our current situation... I am very hopeful.” – Imad Al Thawahreh , Khirbet al Hadeed, Zarqa

INSTITUTIONALIZATION & DISSEMINATION

To ensure sustainability, the institutionalization of the approaches adopted was emphasized by the facilitation

team as early as the beginning of the project implementation. Eventually, it became evident that a commitment has developed to use these approaches at the local level. This was made possible by the new accessibility of information to end-users. The resultant experiences will also be disseminated in other communities and environmental interventions.

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