# Restoring Hima Ecosystem Functions in Lebanon

THE REGIONAL KNOWLEDGE NETWORK ON WATER - RKNOW

# Acknowledgments

**This case study comes as part of the Regional Knowledge Network on Water (R-KNOW) and is funded by the European Union.**

R-KNOW is a three year regional project (2013-2015) funded by the European Union under the framework of the 'Strengthening the Capacities of Non-State Actors' action of the Neighborhood Civil Society Facility (European Neighborhood and Partnership Instrument).. The project aspires to create a Regional Knowledge Network on Water that will assist in strengthening the application of systematic approaches to water management and water governance in five countries (Lebanon, Jordan, Palestine, Morocco and Egypt) and aims to influence the policy and decision making processes in a way to enhance good governance in the water sector.

**R-KNOW partnership**

- International Union Conservation of Nature (IUCN), Global Water Programme – Switzerland and the Regional Office for West Asia (ROWA) – Jordan
- EMWIS Technical Unit (Euro-Mediterranean Information System on the know-how in the Water sector) - France
- Centre for Environment and Development for the Arab Region and Europe (CEDARE) – Egypt
- Palestinian Hydrology Group for Water and Environmental Resources Development (PHG) – Palestine
- University Abdelmalek Essaâdi of Tetouan - Tangier Morocco
- Arab Women Organization of Jordan – Jordan
- Society for the Protection of Nature in Lebanon - Lebanon

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This document is prepared as part of the "**Restoring Hima ecosystem functions through combating the problems of water resource management in the identified Hima-IBAs of Lebanon**" project, which is a 3 year project.

## Executive Summary:

Water demand in Lebanon is an issue which is not only affected by physical conditions of the resource, but it is highly related to crises-crossed formulation constituting of tribal, sectarian and political faultiness, where water scarcity can easily provoke. Anjar and Kfar Zabad are two villages on the level plain of the Bekaa valley (Figure 1). Those villages are characterized by high biodiversity value due to their richness in water resources. They are comprised of a marshland formed by rivers and springs, creating a typical habitat for African Eurasian water birds, and breeding habitat for globally threatened Syrian Serin bird which led to its announcement, by SPNL and BirdLife International, as an IBA in 2005. Also the area was declared as a Hima (community based management system), by SPNL and the municipality of Anjar and Kfar Zabad, due to its high biodiversity and livelihood values. The marshlands sustain the livelihood of the surrounding farmers and fisheries and provide the fresh water supply to over 30 villages around.

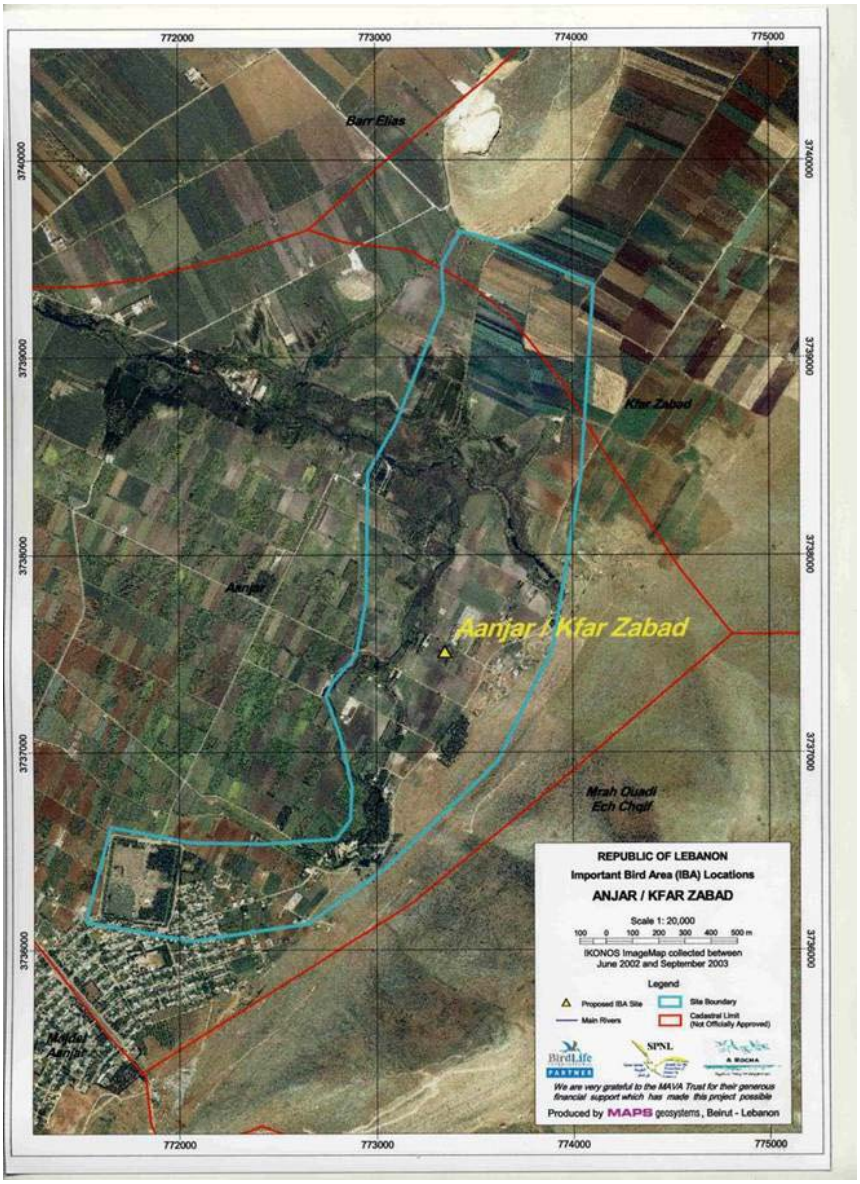


Figure 1: Map of Anjar Kfar Zabad IBA Hima. The area within the blue line is the scope of work for this project.

Nevertheless, the area suffers from degradation of its water resources leading to the destruction of the present biodiversity and to serious problems in water quality and quantity. This is due to over extraction, and misuse of water resources caused mainly by agricultural aggravated practices. Also water supply and shares seems to be a conflicting issue between different stakeholders supported by the different political and sectarian background, aggravated by climate change stresses. The following problems were highlighted as major threats in the conceptual model below which require strategic action in order to combat the pressure on the Hima ecosystems.

The project aims to restore Hima Ecosystem functions though promoting sustainable community-based water management systems, with the following specific objectives:

1. To improve the management of water quality and quantity used for agriculture from the canals, wells and wetlands in both Anjar and Kfar Zabad Himas.
2. To promote the sustainable, community-based practice of water use for agriculture by the farmers of Anjar and Kfar Zabad.
3. To improve the valuation and appreciation of the Hima water ecosystems in Anjar and Kfar Zabad IBA for people and nature.

The project would achieve these objectives by developing three major strategies in order to tackle the above threats as follows:

1. Improvement of water infrastructure, management and monitoring in Anjar
2. Implementation of Agri/Environmental awareness campaign in Anjar and Kfar Zabad
3. Igniting wise water management in Kfar Zabad

## Introduction:

Anjar and Kfar Zabad villages are characterized by high biodiversity value due to their richness in water resources. They constitute one of the remaining marshlands in the Middle East which are formed by rivers & springs, creating a typical habitat for African Eurasian water birds (Figure 2).

Although the following water ecosystem possess a high biodiversity value; nevertheless, it is under threat due to the unsustainable human practices in the area including agriculture, which represents the major income generating activity of the local community. The dependency of the locals on agriculture lead to the over exploitation of water resources from the springs, wetlands and underground wells, the use of inefficient irrigation methods (flood irrigation, sprinklers etc.), and the overuse of chemicals and pesticides which inflicts negatively on the surrounding habitat and puts it under a major threat.

Furthermore, the problem of water exploitation in Kfar Zabad was further aggravated by the absence of an organized water institution that assures the efficient distribution of water

Figure 2: Anjar Kfar Zabad wetland

shares without leading to any conflicts. The following problem did not exist in Anjar due to the presence of Anjar Local Water Users Association (AWUA), which assures the management of the Anjar water canal network for agriculture and assures wise distribution of water shares and thus prevents water conflicts in the distribution of the water resources. However, the physical structure of this water system, characterized by an open earthed canal network, decreases the efficiency of the system and allows for water losses. On the other hand, the absence of a database in order to manage the amount of water pumped to the agricultural lands in relation to crop needs decreased the efficiency of this system. In addition, it was sensed that the community of Anjar and Kfar Zabad are unaware about sustainable agriculture practices and techniques, and about the correlation between ecosystem services and its values in the sustainability of their livelihoods.

## Strategy and Implementation:

The major stakeholders involved in the management of water resources in Hima Kfar Zabad need to cooperate together under one committee in order to work together on the management of water resources in the Hima of Kfar Zabad. Thus, through this project is an opportunity for creating a platform for cooperation

aiming to improve the management of the water resources. The following project took an opportunity of the strong local governance structure in Anjar, led by a Water Users Association (WUA), to manage water resources for agricultural purposes as an approach to be exchanged to the nearby Kfar Zabad village in order to resolve the highlighted problems related to poor governance and management structure for water resources management.

The problems of water resources management in Hima Kfar Zabad were not only linked to the poor management structure, but also to the un-sustainable agricultural practices which constitute over drilling from underground wells and from the wetlands, over-use and mis-use of agricultural chemicals and pesticides. Also some problems were linked to farmer's unsustainable and irresponsible behavior in relation to agricultural practices including the cultivation of water demand crops. Thus, igniting the wise water management in Kfar Zabad represents a major strategy that this project will address in order to resolve the highlighted problems above.

In order to implement this strategy several activities will be implemented under this project including the exchange of the experiences of the good government of the WUA of Anjar, to Kfar Zabad through several workshops and meetings which assures the exchange of experience and setting the platform for a good governance of water resources management in Kfar Zabad, thus leading to the development of a WUA in Kfar Zabad too. Along this exchange between Anjar and Kfar Zabad farmers, main lessons from the WUA in Anjar are assured to be transferred to the key people who are involved in the management of water resources in Kfar Zabad. The following exchange will lead to the establishment of a strong and sustainable governance in Hima Kfar Zabad which adheres to the Hima principles.

The establishment of a strong and sustainable governance will lead to the involvement of this institutional structure in the management of the water resources through handling several tasks which assure sustainable use including the establishment of a monitoring system for water quality and quantity, the identification of water allocation among farmers through a set water quota, in addition to the installment and operation of the water sluices within the wetland in order to manage water levels inside the wetland which assure rehabilitation targets and prevent flooding of surrounding agricultural lands. The development of an institutional platform for the management of water resources in Kfar Zabad is expected to lead to the sustainability of the water resource and the improvement of the management in water quality and quantity, due to the presence of a committee that overlooks and monitors agriculture practices (Figure 3).

However the development of good governance for water resources management in Hima Kfar Zabad will not be able to act effectively if not accompanied by the necessary awareness and education to improve farmer's knowledge and practices in relation to water resources and agriculture, and ecosystems appreciation. Accordingly, this project found that an awareness strategy is necessary in order to insure the achievement of the overarching objectives of this project. In which the implementation of this

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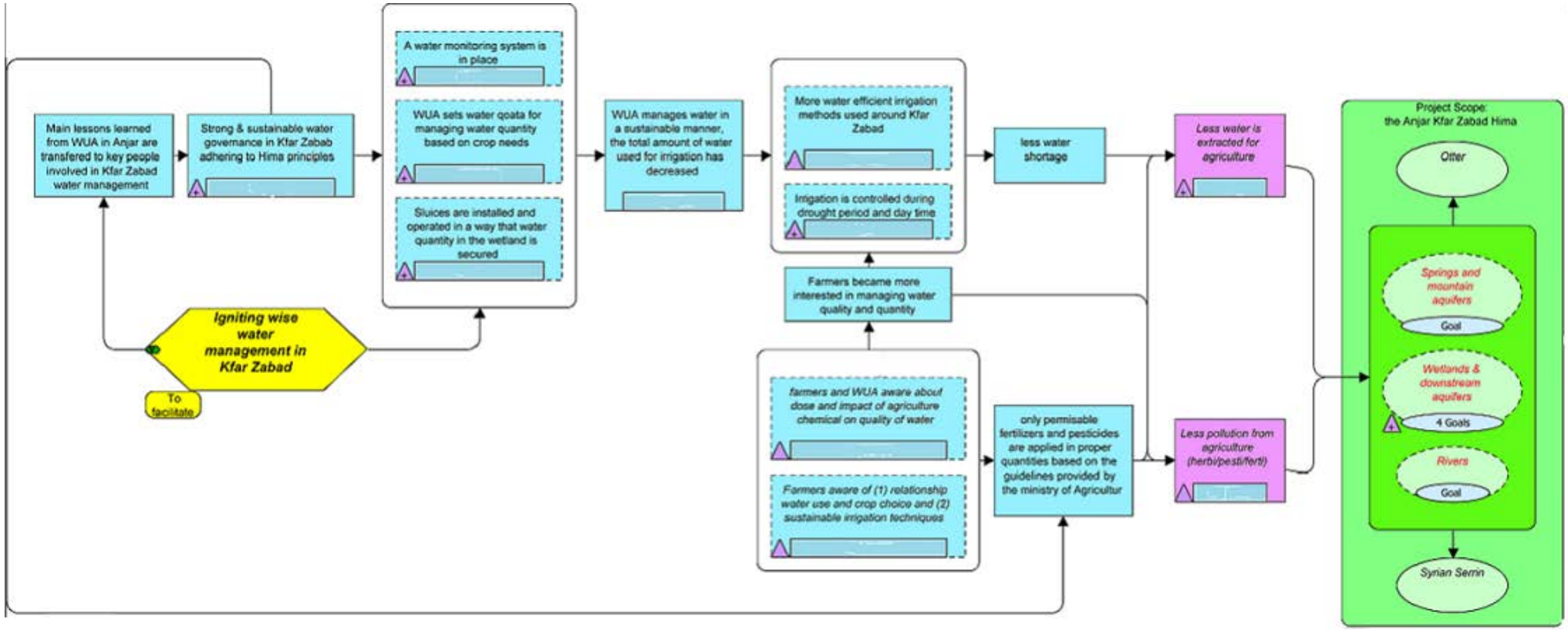


Figure 3: Strategy for Igniting wise water Management in Hima Kfar Zabad

[1] WUA: Water Users Association

strategy through awareness workshops, one to one extension services, and in kind support etc., is expected to support sustainable management of water resources, increase farmers' interest in managing of water quantity, and consider the impact of their practices on water quality. This will lead to less water shortage and pollution of water resources; and thus directly influence the threats which are affecting the Hima –IBA ecosystem (Figure 5).

Anjar village possesses an old canal water distribution system that was established in 1935 for providing water through gravity from the Anjar spring to the downstream agricultural lands. The following system has been managed since that time by the Water Users Association-WUA of Anjar.

The system is characterized by a strong governance structure which assured the distribution of water shares in an equitable manner. However, based on a preliminary study done by SPNL, and after consolidating with the Anjar municipality and the Anjar WUA about the effectiveness of the system, it was found that the following system possesses inefficiency problems due to the water losses caused by the open canal system which contribute to over evaporation of flowing water. Furthermore, half of the following canal infrastructure is characterized by earth canals which contribute to water losses through percolation of water into the soil. Also WUA identified high maintenance cost caused by the cleaning of earth canals on yearly basis. Adding to inefficacy problems caused by inadequate infrastructure, SPNL pin-pointed that the water distribution system depends on land flooding techniques regardless of crop needs; this is due to the absence of a management and monitoring system which limits water shares to fit crop needs and thus prevent water losses. Accordingly, this project brought an opportunity to improve the management structure of the agriculture canal system thus improving its efficiency in minimizing water losses and manage water quantities. This will take place through adopting a strategy for improving the infrastructure, management and monitoring in Anjar (Figure 4).

The effectiveness of this strategy will not be possible without tackling the management of water quality too which was identified to be another major problem in Anjar, in which under this strategy, water pollution policies will be adopted by the municipality. As a result of the application of a management strategy for Anjar canal system, the management of water for agriculture in dry lands is expected to improve due to the availability of extra money by the AWUA, in order to invest in the construction of public canal infrastructure for providing water for dry lands, thus less pumping from artesian wells will take place. This will provide farmers who possess agricultural lands outside the canal domain with an alternative irrigation source, which is cheaper than the current water source that they buy from distributors, thus farmers would pay less for irrigating dry lands, and would be able to invest in other environmental income generating activities. Also the ability of farmers to have another irrigation source from the spring/canal system will lessen the problem of over pumping for agricultural purposes, and lessen the negative impact of over drilling of water from downstream aquifer. Thus, this is expected to improve the status of the different ecosystems under Hima-IBA site.

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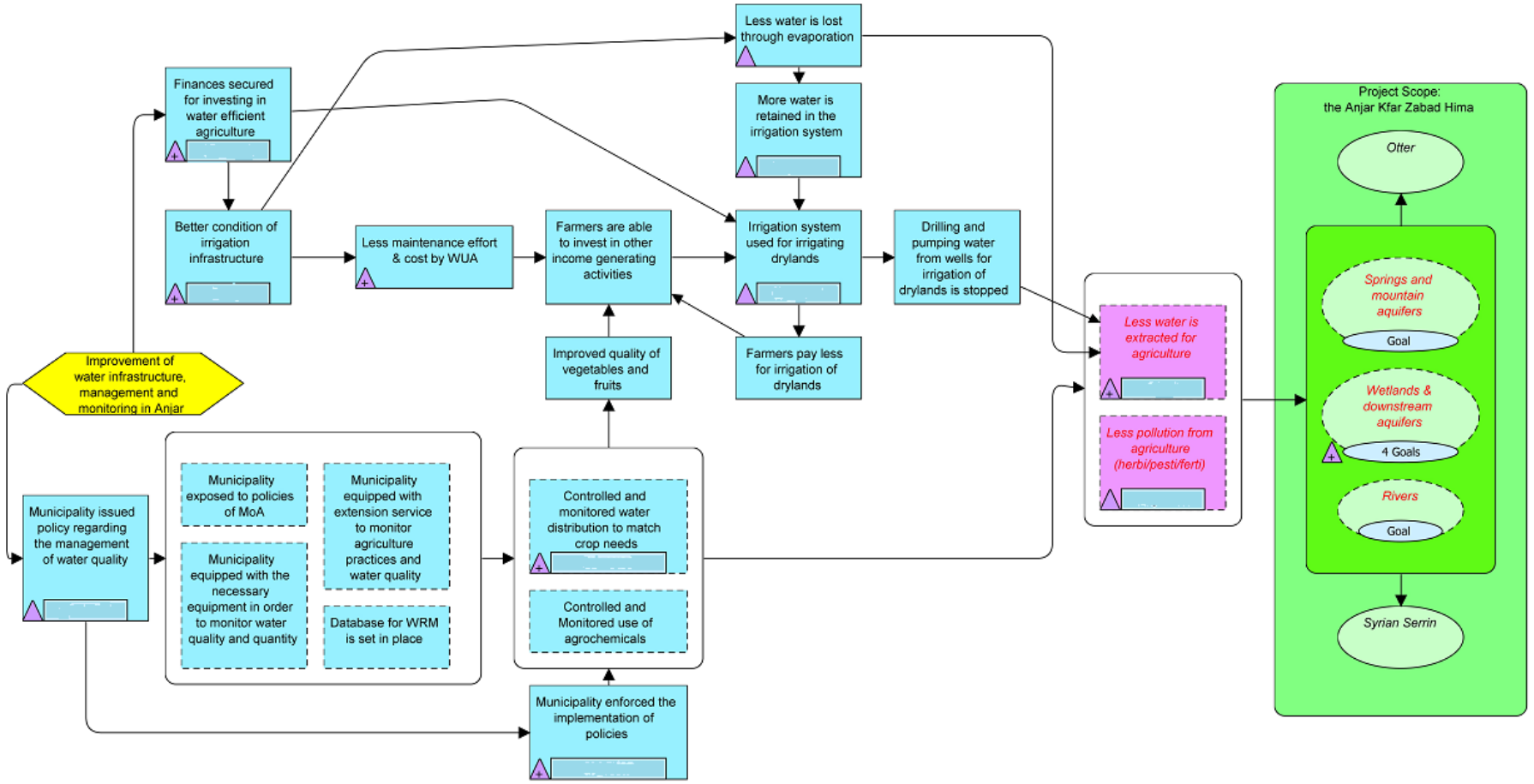


Figure 4: Strategy for Improvement Water Infrastructure, management and monitoring in Anjar

[2] **MoA: Ministry of Agriculture**

Other than the improvement and management of the canal system, the municipality of Anjar will have a major role in applying management policies on the ground to ensure the management of water quality and quantity. The project will support the municipality with the necessary information, man power and database in order to issue management policies. Through this strategy, the municipality will be exposed to the policies of the Ministry of Agriculture (MoA) for limiting agricultural pollutants; furthermore the municipality will be provided with the necessary equipment in order to monitor water quality and quantity in collaboration with the WUA of Anjar, and thus have a set database which allows it to issue policies accordingly. Also, the municipality will be supported by an extension service agriculture officer in order to guide and monitor water practices and provide recommendations for sustainable agricultural management. The enforcement of the municipality policies is expected to result in controlled use of agro-chemical and water use quantities based on crop needs. This is expected to influence the quality of agricultural products to be much more environmentally friendly. Farmers can benefit from this asset (environmentally friendly products) in marketing their crops and increasing their income. The municipalities policies will at the end undermine the threat on biological targets and thus improve water quality and quantity.

### Raising Capacities of local communities:

The unsustainable practices in relation to water quality and quantity in Anjar and Kfar Zabad Himas were found to be highly affected by the limited capacities of the communities in relation to sustainable management of natural resources, in addition to their limited awareness about the Hima ecosystem functions and its contribution to their livelihoods. Accordingly, the need for a strategy tackling Agricultural Environmental Awareness was raised (Figure 5). The application of an Agriculture and Awareness Campaign Strategy will raise the capacities and knowledge of a group from the local community (Site Support Groups-SSG) to lead on the awareness and capacity building process in the village. The involvement of the SSGs in raising awareness will result in having the SSGs as leaders on environmental awareness and education in relation to the agriculture community and other villagers. This is expected to improve farmers' awareness and education about agricultural pollutants and water quality management through several workshops, and awareness materials.

Furthermore, SSGs will have a lead role on highlighting the linkage between the water ecosystems, the world heritage site, and livelihoods, through raising awareness about the value of the water ecosystem and world heritage site for water management and flood control, and its implication on the livelihoods of farmers and people. Furthermore, SSGs will be involved in awareness through the ecotourism packages that will be prepared, linking Anjar and Kfar Zabad Himas together and thus, harnessing the value of biodiversity and its ability to contribute to boosting livelihoods, resulting in income generating activities. The result of the application of the awareness strategy and the ecotourism plan under it is expected to raise local's appreciation of their Hima ecosystem and contribute to better practices in relation to water quality and quantity.

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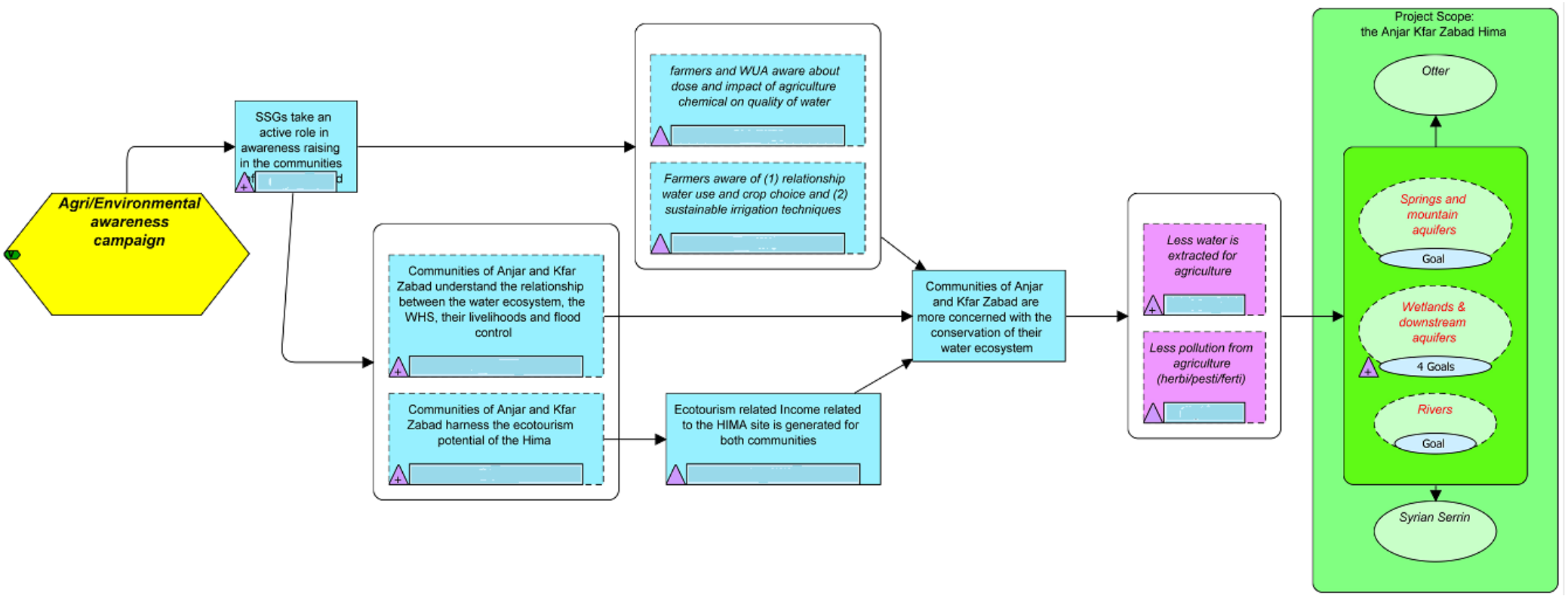


Figure 5: Agriculture and Environmental Awareness Campaign

[3] **SSG: Site Support Group**

## Management and Outcome:

One of the problems identified in this project is the misuse of water resources for agriculture due to the several defined challenges including:

1. Infrastructure (open gravity flood irrigation in Anjar & dirt canals which require maintenance)
2. Limited capacity of the farmers and water users association about water management (using scientific tools & technology)
3. Limited knowledge of the farmer & WUA about sustainable agricultural practices based on actual crop needs
4. Limited enforcement of water policies to manage water and agricultural practices in Kfar Zabad
5. Limited awareness of WUA and farmers about water conservation.

As a result of those problems the following project managed to address those concerns through improving the infrastructure by:

1. Rehabilitating the dirt canals to prevent water percolation through the soil
2. Promoting furrow irrigation as an alternative to flood irrigation through issuing local policy that adopts furrow irrigation and empowering farmers to apply it through providing the needed tools and creating incentives (deducting water fees for the farmers applying furrow technique). Furthermore, the project managed to address the capacity and knowledge gap through providing extension services to farmers and WUA about water management and sustainable agricultural practices, in addition to raising the knowledge of WUA about the water distribution based on crop needs.

Also the project insured to equip the WUA with the necessary tools to measure the water quality and quantity and give a complementary training on the use of these tools, thus improving management base on available data. Also, a WUA was established in Kfar Zabad aiming to improve the management of water resources. Several participatory workshops took place between Anjar WUA and Kfar Zabad newly established WUA, aiming to transfer the experience of Anjar traditional WUA to Kfar Zabad and provide the necessary guidance in order to improve water management.

Also the role of Youth, Children and Women was empowered in this project through establishing an awareness committee from the youth & women of both villages to lead on raising awareness about improved water resources management in the villages. Furthermore, an educational program was established (including hands on activities) to involve kids in nature interpretation and attract them to participate in water saving and biodiversity conservation. The municipalities' roles were highlighted from the beginning of the project in order to facilitate coordination between several stakeholders and assist in enforcing policies of water management on the ground.

## Sustainability of the project:

The **ecological sustainability** of the project will be guaranteed through building the capacities of the locals on sustainable practices and through monitoring the impacts of the project following set indicators which reflect on project outputs and outcomes. Also, an environmental fund will be developed along the project aiming to serve as an alternative income generation resource which will serve the sustainability of actions on the long run.

**Financial sustainability:** Farmers pay annual fees to WUA fund based on the size of land which supports the sustainability of WUA services especially maintenance of water network. Through this project, it is expected that maintenance costs will be decreased which will allow surplus fund for dry land network & to support farmers in good agricultural practices through loan system. This will ensure financial sustainability after the project period.

As for the **social sustainability**, the project will not only benefit nature, but also the people using the water resources. The project would improve the water quantity and quality; thus ensuring the availability of their needs from water in a satisfactory quality which raises the value of their crops. All this, would encourage farmers to adopt environmentally friendly practices and conserve the water resources.

Also, the project would emphasize **institutional sustainability** through the establishment of strong governance structure for the sustainable management of water resources. This is complemented by clear TORs, water allocation plans, financial plan, monitoring plan...that are agreed on within the local community.

## Project Partners:

- **Anjar and Kfar Zabad Municipalities**: Direct partners involved in the management of the site, where they are the local authorities and decision makers in relation to the policy and management decisions that will take place for the sustainable management of the site. Furthermore, they are the facilitators with the local communities in relation to the several actions proposed through this project.
- **WUA of Anjar**: Committee involved in the water resources management for agriculture in Anjar via the canal system. They have a strong institutional and government structure which assures the distribution of water allocations and shares, and the management of the system in an equitable manner. They will contribute in the development of the institutional management of water resources in Kfar Zabad and in the efficient management of the canal system in Anjar.
- **SPNL** is the main implementing organization responsible for coordination of project activities, providing technical assistance, and monitoring its progress. SPNL will be responsible for the proper implementation of the project and reporting on its progress (narrative and financial).

## Organizational Structure:

| Partners | Roles & Responsibilities |
|---|---|
| SPNL | -Facilitate Funding opportunity<br>-Provide technical guidance for managing the Hima site<br>-Ensure achieving biological targets. |
| Kfar Zabad and Anjar Municipalities | -Decision makers<br>-Issue policy decision<br>-Facilitate communication with stakeholders<br>-Overlook general management<br>-Follow-up on monitoring |
| WUA Anjar | -Manage canal system in Anjar for irrigation<br>-Monitor on project achievement of results<br>-Contribute to organization management of water system in Kfar Zabad |
| SSG of Anjar and Kfar Zabad | -Awareness committee representing different groups of the community will have a major role in environmental awareness and education in the village, and management of different events. |
| Agriculture Engineer in Anjar and Kfar Zabad | -Provide guidance for WUA and farmers in relation to sustainable agriculture practices and water use<br>-Collect data on water use and agriculture practices<br>-Establish the data base |

## Conclusion and Lessons Learnt:

Community based management represents an effective approach for improving the management of water resources which leads to affective tangible results. As long as the communities are trusted on the resources and provided with the necessary guidance and incentives they will be able to be the custodians of their own resources.

After about a year of the project implementation, a member of the Anjar Water Users Association who is in charge of the management of canal rehabilitation and water distribution, talks about the significant impacts of this project. He explains " This year I was able to sense the positive impacts of the canal rehabilitation on the management of water resources, where in the past year we used to recruit around 12 workers to clean those canals which caused us a lot of money. This year we were able to do a lot of saving, due to the canal rehabilitation work, this allowed us to invest the money we saved in doing other improvements in the other deteriorated pipe lines within the system". He also explained about the positive impacts of the furrow irrigation on the lands of the water users association. He says "through this approach we were able to save around 50% of water and get an improvement in production too. After applying this demonstration project successfully we took a decision to adopt it in our WUA policy and promote it on the ground in order to be applied by all the farmers".