On the Path of Resilience to Climate Change in the Upper Akkar Watershed Lebanon

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) Egypt.

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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, CEOSS,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:

- MADA Association in Lebanon
- Society for the Protection of Nature in Lebanon

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INTRODUCTION

The Republic of Lebanon

Lebanon is a parliamentary democracy with a special system in an attempt to fairly represent the demographic distribution of different groups in the government. It is bordered by Syria to the north and east, Mediterranean Sea to the west, and Occupied Palestinian Territories to the south. The total landmass of Lebanon is approximately 10,452km^2 and is populated by 5.8 million.

Lebanon is characterized by a Mediterranean climate with precipitation mainly occurring between October and March. Lebanon has four dry months (June, July, August and September) during which water availability is limited due to the very low water storage capacity, the difficulty of capturing water close to the sea and the shortcomings of existing water delivery systems and networks, (UNFCCC, 2011).

Lebanon's topography allows for a wide distribution of precipitation. As a result, five distinct agro-climatic zones are present in the coastal strip, low and middle altitudes of Mount Lebanon, west, central and north Bekaa. Average annual precipitation ranges from 700mm in Beqaa to 1,210mm over Mount Lebanon, with the lowest and highest levels of precipitation of 80mm and 3,010mm respectively, (UNFCCC, 2011).

The total emissions in Lebanon in the year 2000 were estimated at 18.5 million tones, which shows an annual increase of 2.77% since 1994. Results show that the emissions from forestry, agriculture and land use changes represent 6% of the total CO_2 equivalent. Although these emissions are quite insignificant compared to the global level, the impact of climate change on Lebanon is huge especially in forestry and agriculture. The PRECIS model shows that temperature will increase by 1°C on the coast and 2°C in the mainland by 2040. Moreover, rainfall is expected to decrease by 10-20% and 25-45% by 2040 and 2090 respectively, (MoE/GEF/UNDP, 2011).

Climate change adaptation and natural resource management in Lebanon witnessed great advancement in the past decade on the government level. However, political

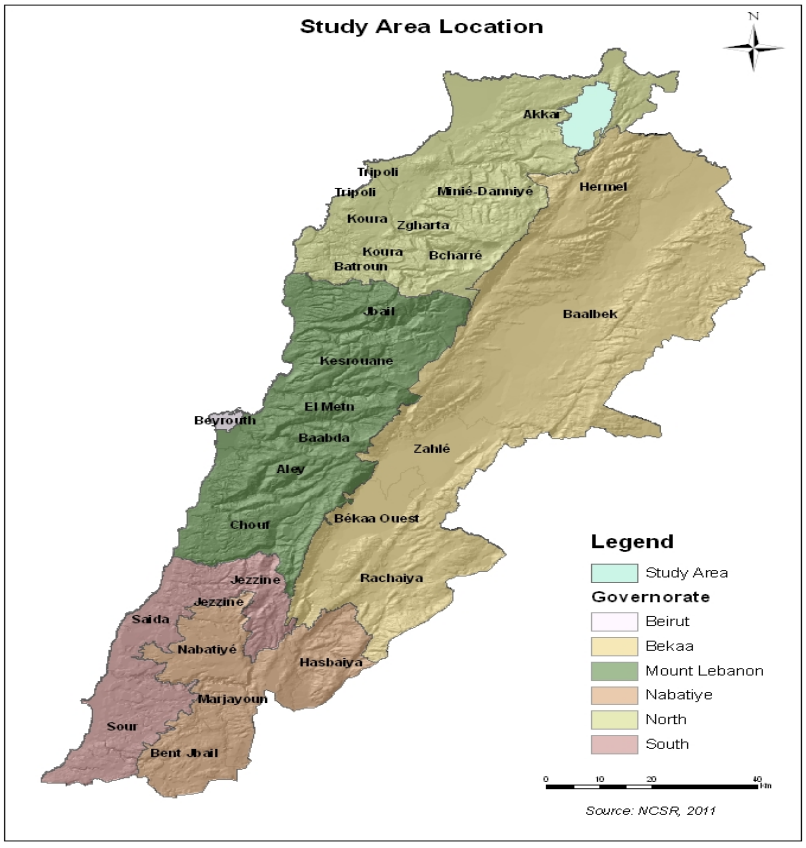

Figure 1: Location of the SEARCH area of study

instability in the country poses challenges in dealing with environmental issues. There is also little stakeholder involvement in decision making related to climate change. With low economic and livelihood diversity, the rural community has struggled to enhance their adaptive capacities to changes in the environment. When combined with low integration and availability of engineered and natural infrastructure, this causes high climate change vulnerability. The overlap in and fragmentation of responsibility among different entities in the rural areas has also caused poor planning and an emphasis on complaint management rather than strategic adaptive planning.

Akkar Watershed

Akkar is located in the far north of Lebanon and has a total surface area of 798km² and a population of more than 255,000. It is characterized by the presence of high mountains to the east and a relatively large coastal plain to the west, which makes it the second agricultural plain in the country in size and importance. The area is distinguished by its natural and cultural values, enjoying vast forests, springs and rivers. Furthermore, it is characterized by a typical rural community that highly depends on natural resources. Those facts add to the vulnerability of this region to climate change impacts, (Thomas, Khawlie, Kawass, & Cadham, 2004).

The basin of the El-Kabir El-Janoubi River in Upper Akkar region, which is a common water source between Lebanon and Syria, represents a major water resource for this region. However, this watershed is under severe stress, due to the increasing pressure from both countries. Those pressures include unsustainable use of water resources for agriculture, population growth and inadequate infrastructure for solid waste and wastewater network. All these pressures intensify the stress on water resources, where the river suffers from deterioration in its water quality. Adding to all these is the effect of climate change which produces unpredictable precipitation patterns along with increased occurrence of severe rain periods and a more extended dry season, (Preliminary Master Plan for Upper Akkar/Hermel Region, 2012).

Akkar extends over large areas embracing various Mediterranean life zones. The morphological differences between plains and mountains within the region lead to diversification of climate, hydrology, soil and vegetation, which is considered as an asset for agricultural production and tourism.

The area is home to most of the Lebanese flora thriving at altitudes ranging from 1200 to 2100 meters. Embracing all Lebanese forest types, the area calls for an urgent need for conservation and sustainable resources management. The area has a diversity of fauna species due to the presence of various forest communities such as Calabrian pine, mixed cedar, fir and juniper, mixed fir and cedar, pure fir and evergreen oak.

Figure 2: SEARCH Project Site in Lebanon

On a socio-economic level, Akkar is one of the most marginalized regions in Lebanon, with the highest overall poverty rates in which 63.3% of the families in the region are living in poverty (Socio-Economic Situation in Akkar in Light of the Crisis in Syria, 2011). Akkar has the lowest average individual income level where 22.7% of individuals and 16.6% of households live on a monthly

income of less than US$40. Akkar also suffers from having the highest illiteracy rate in Lebanon (30.5% for both sexes). In general, this area displays all the typical features of a poor and relatively isolated rural community including poor infrastructure, bad road network, lack of public transportation and low quality education and health services.

Figure 3: Source of income in Akkar

Climate Change in Lebanon

Lebanon is relatively rich in water resources; nevertheless, it still faces significant challenges in meeting the country's water demand both quantitatively and qualitatively. Increases in temperature and decreases in precipitation are putting stress on water resources, as temperature increases lead to both higher evapo-transpiration and shifting of snowfall to higher altitudes. While decreases in precipitation lead to a reduction in water resources resulting from both reduced rainfall and snowfall. During the dry season between June and September, water availability is limited due to the very low water storage capacity, correlated with the old deteriorated infrastructure and limited water storage systems, such as dams and water collection pools. This is further aggravated by mismanagement of water resources and conflicts on water, (MoE/GEF/UNDP, 2011).

In the Akkar region, the plodding effects of climate change are aggravated by anthropogenic pressures on natural resources (water losses, unsustainable agricultural practices, overgrazing, abusive logging, deliberate forest fires and uncontrolled urban sprawl) hence increasing their vulnerability. In view of these existing pressures, future expected climate trends will mainly exacerbate the consequences. This situation will increase natural resources vulnerability by impeding their intrinsic resilience capacity against any given human or natural incident that might lead to their eventual progressive demise.

The natural factors are intertwined with unsustainable communal practices such as forest overexploitation through illicit logging, overgrazing in highly vulnerable areas, uncontrolled harvesting of medicinal and aromatic plants, hunting, unmanaged recreational activities and agricultural encroachment on forested areas. There is also mismanagement of water resources (wastage, illegal wells and unsustainable irrigation practices) and unsustainable land exploitation (misuse of pesticides and fertilizers, quarries, etc.) leading to the deterioration of soil assets. These practices have led to water depletion and mismanagement, conflicts between stakeholders and degeneration of forests and valleys due to land reclamation for agricultural purposes, grazing, urbanization and forest fires. There is also an increased dependence of poor communities on agriculture and grazing due to the absence of sustainable income alternatives.

There is a need for an adaptation strategy to overcome the barriers and mitigate the socioeconomic and environmental costs of degradation caused by climate pressures.

Current coping demeanors from local communities in Upper Akkar reveal the need to provide them with basic awareness of ongoing variation in climate trends. However, the approach of managing changes doesn't match long-

term sustainable conservation objectives. For instance, their dependence on grazing and logging in Karmchbat undermines forests natural resources, whereas shifting towards annual perennial crops instead of seasonal harvests could constitute a sustainable alternative. Likewise, several illegal wells were dug in Qobayat to satisfy locals' water needs in periods of water shortage, threatening though groundwater sustainability, while rainwater harvesting stands as a more viable substitute. Basically, the root cause of such actions is lack of public environmental awareness in an area characterized by high rates of poverty. In addition, lack of law enforcement in the area leaves the management of natural resources in total chaos.

RESILIENCE TO CLIMATE CHANGE

To improve integrated natural resources management as to develop local community livelihoods against a backdrop of climate change, SEARCH (**S**ocial, **E**cological & **A**gricultural **R**esilience in the face of **C**limate **C**hange) project was implemented in partnership between the Society for the protection of Nature in Lebanon (SPNL) and Mada Association in Upper Akkar watershed.

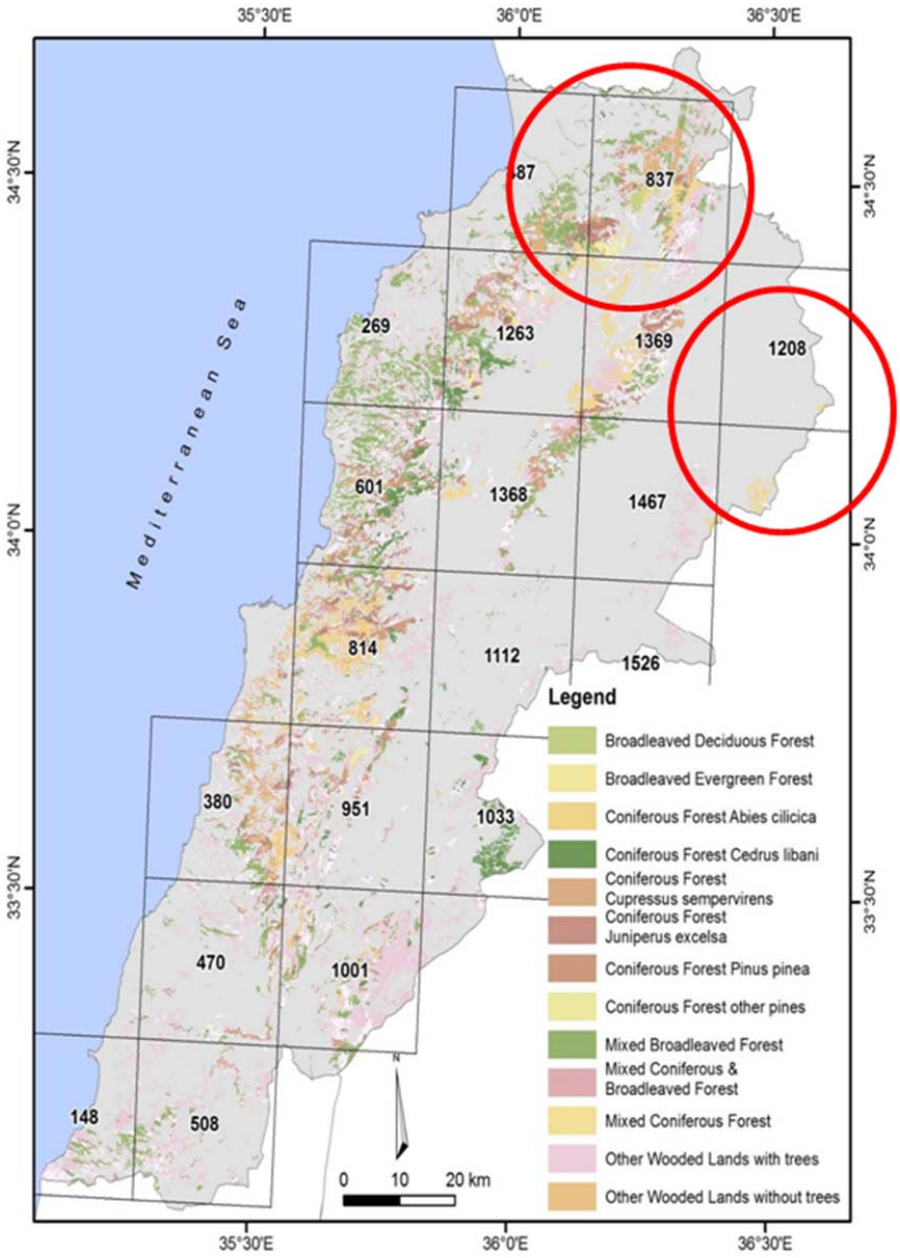

Figure 4: Areas (circled) expected to be the most impacted by climatic factors

The development of a resilience framework for this area required a detailed study of its social, economic and ecological attributes in order to identify its vulnerable aspects and allow for a better orientation of the resilience framework. In that respect, SPNL was appointed to lead and develop the social and economic components of the resilience framework while Mada Association was charged of the ecological part.

In order to insure effective implementation of the SEARCH project on the local and national level, SPNL and Mada

established partnerships with different local and national stakeholders. Local stakeholders represented the Jafaar tribe and three municipalities in the Upper Akkar watershed area: Andeket, Aydamoun and Qobayat, in addition to local NGOs working in the region including: AFDC Andeket and Council for Environment and Heritage in Qobayat. National level stakeholders represent the Ministry of Environment (MoE), Ministry of Agriculture (MoA), Ministry of Energy and Water (MoEW), Council for Development and Reconstruction (CDR), the Notre-Dame University (NDU) and the Balamand University. Effective partnership among stakeholders was consolidated through local and national committees to insure stakeholders' involvement and regular follow up.

The SEARCH team was in charge of facilitation between stakeholders, documentation of processes, findings and results and capacity building for local and national stakeholders through several workshops.

Approaches and Methodology

Participatory Approaches

Stakeholder identification and analysis were necessary in the early phase of the project to identify the key stakeholders and their roles in relation to the project activities. The project team organized a rapid assessment visit to the region to identify stakeholders and the main problems. Local and national committees were established to insure representation of all concerned stakeholders on the local and national levels and their effective involvement in the project implementation. Partnerships with municipalities, local and national NGOs, universities and governmental institutions were created to achieve sustainable collaboration and consultation between the local and institutional level and enhance participation and information exchange at all levels.

Cross-Scale Approaches

Several workshops and meetings were held at various levels serving a wide range of purposes:

1. **Introducing the SEARCH project** to the local stakeholders and identifying their priority concerns.
2. **Selecting target sites** (Aydamoun-Karmchbat, Qobayat and Andeket) with the local stakeholders for being the most vulnerable in terms of major threats and concerns of the local community. These villages reflect the different land uses and high vulnerability which includes (water usage, forest use and agriculture).
3. **Analyzing problems** with local committee members through problem tree exercises. These exercises showed lack of governmental role and presence in the region, lack of collaboration between national governmental authorities and local authorities, conflicts between different stakeholders on landownership due to the absence of land demarcation, lack of income generating alternatives and corruption. These problems have led to the major environmental problems of water shortage, grazing, hunting, cutting of trees and forest fires. The outcome was migration to cities, water shortage, loss of biodiversity, poverty, loss of underground water, deforestation and loss of old trees.
4. **Outlining an action plan** with local stakeholders from Andeket based on priority activities needed to conserve natural resources, including establishment of local committee

representing the different stakeholders concerned in forest and water management, establishment of a Hima in Andeket village, rehabilitation of the water networks, studying traditional water management practices and creating a knowledge sharing website.

5. **Assessing vulnerability** with the participation of local communities from Andeket, Aydamoun-Karmchbat and Qobayat to assess the effects of climate change on their livelihoods, factors increasing climate change impacts and behavioral changes due to climate change.

6. **Forming a national steering committee**, identifying roles and responsibilities of national partners and presenting resilience strategy and policy recommendations.

Methodology and Tools

The project **planning cycle** was used as the basic framework for achieving the SEARCH project objectives. Each phase of the cycle was accomplished through a set of tools involving stakeholders' approaches and field surveys:

Tools used included **RAAKS** to analyze stakeholders involved in the management of the Upper Akkar's natural resources, their responsibilities and impacts on decision making. Another tool used was **field ecological surveys** to assess forests vulnerability and adaptive capacity in the face of climate change and anthropogenic pressures analysis of forests inherent resilience. **Social surveys** were also used involving stakeholders to identify impacts on sustainability of forest resources. **Scenario building** and **strategizing** involved stakeholders in developing guidelines and action plans for sustainable resources management. These tools were successfully applied during the visioning process (PRAs, problem tree, RAAKS and stakeholders analysis), the assessing phase (field ecological surveys, livelihood asset index and social surveys) and the strategizing and planning phases (objective tree and clustering, scenario building and projects prioritization).

Figure 5: Project Planning Cycle

Achievements and Lessons

A vision was defined through several meetings with stakeholders stating that "Natural Resources in the Upper Akkar Region are sustainably managed through an active multi-stakeholder's participatory planning".

The vulnerability assessments identified the village of Aydamoun-Karmchbat as being the most vulnerable village on social and ecological levels and having the lowest

adaptive capacity compared to the other two villages.

A **clustered objectives tree** was built and led to the identification of five clustered objectives:

1. **Sustainable technologies:** A cluster combining the objectives aiming at using sustainable technologies to achieve proper management of natural resources in the Upper Akkar region.

2. **Livelihoods upgrading:** A cluster grouping the objectives related to livelihoods upgrading and poverty reduction by creating sustainable income generating activities for local communities along with women and local stakeholders' empowerment.

3. **Socio-political reform:** This cluster sets the objectives of conflict resolution amongst local and national stakeholders, law enforcement and capacity building for an improved resilience in the face of climate change.

4. **Awareness:** A cluster highlighting objectives related to raising awareness of local stakeholders about sustainable environmental management priorities.

5. **Environmental management:** This cluster pulls together objectives that tackle sustainable ecosystems and water resources management priorities in order to achieve the overall intended objective of the resilience framework.

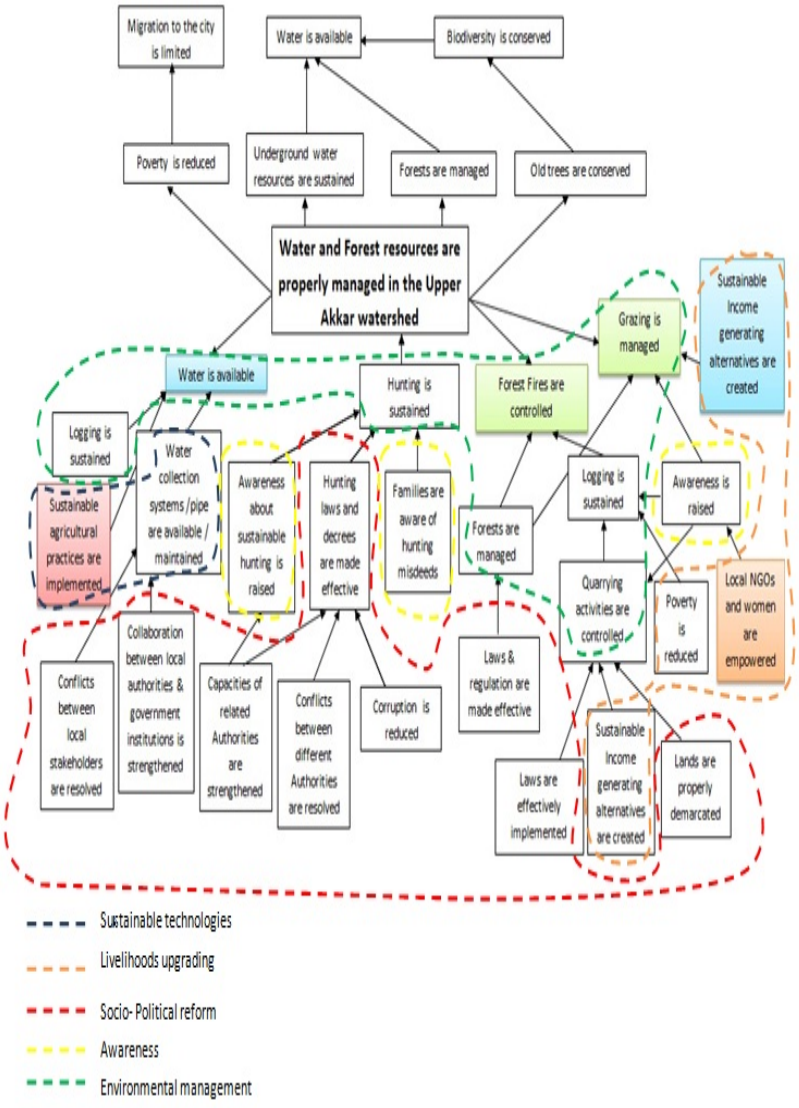

Figure 6: Clustered Objectives Tree

Based on the clusters and the strategies, several actions dealing with the different aspects were suggested upon specific criteria including: the needs of the local communities, constraints for implementation, budget, sources of financing, duration and responsibility for implementation.

The following projects were given the highest priority for implementation in the Upper Akkar region as to increase resilience of the social and

ecological systems in face of climate change:

1. Rehabilitate old water tanks and install and/or maintain water networks for irrigation in Aydamoun village.
2. Enhance livelihoods of local communities through the empowerment of local women grazers in Aydamoun.
3. Promote alternative income generating activities to upgrade livelihoods in Aydamoun through the provision of beehives to local men.
4. Establish Hima visitor center for Upper Akkar Hima as an awareness and ecotourism hub.
5. Develop a public garden in Andeket as a tool for forests conservation and community development.
6. Development of an Educational booklet to increase knowledge and awareness on water, forests and climate change targeting women, children and farmers.

The SEARCH project was a pioneer initiative in Lebanon which brought together local communities with national stakeholders to bridge the gaps and come up with a shared vision for combating climate change impacts on a local scale. It empowered communities through raising their awareness and educating them about climate change and its impacts while providing them with tools to adapt and build resilience in the face of global climate changes.

Among the key lessons learned was not to raise expectations of local communities that always tend to expect tangible results (concrete projects and activities) and actively involve them in all phases of the project to ensure their cooperation and interest throughout the whole process. There is also the importance of sustaining the participatory approach after project completion to obtain communities trust on the long-term. On the other hand, applied tools can be replicated in other projects and maybe on larger scales. Finally, SEARCH proved to be a learning experience where knowledge and experience are shared throughout all the levels and amongst all project partners.

INSTITUTIONALIZATION AND DISSEMINATION

The role of the facilitation team in institutionalizing the approaches for resilience was achieved through workshops and meetings with relevant institutions involved in the management of the Upper Akkar's resources on the local, national and regional level. The tools can be institutionalized on the municipal and district level. However, the up-scaling of these tools on the national/governmental level can be challenging.

The experiences and outputs of the participatory visioning and intervention planning processes were disseminated throughout the SEARCH project to all levels in Lebanon and were appreciated by all local and national stakeholders.

This initiative mainly encouraged the National Steering Committee members (representatives of the governmental institutions) to endorse the adopted approaches as they proved a concrete success on the local level. This will lead to further enhancement of policy and institutional reform at the national level.

The simplicity of the tools was the main factor of success of the whole SEARCH approach at the community level. Communities were able to easily apprehend the concepts of climate change resilience and adaptation and acquire needed knowledge to cope and address adverse impacts of external changes.

Although the SEARCH process was slow and time-consuming, it appeared that this was a key

feature of this project which enabled communities to smoothly grasp and engrain approaches and concepts related to building resilience in the face of climate change. As it is said “Slow is smooth, and smooth is fast”.

Dissemination was achieved throughout the SEARCH learning process, whether at the local or the national level through continuous meetings and workshops.

Lebanese partners are determined on replicating these tools in other projects and initiatives in order to further disseminate their effectiveness.

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