

## Recommendations of the LIFE MEDACC Project

Manuel de Pedrolo said that time gets up and just flies away. This is a fitting quotation from a writer who was born in 1918 in L'Aranyó in the county of Segarra, by the River Ondara, in the Segre basin, one of the three basins under analysis, together with the Muga and Ter basins. And indeed, time does fly: we are now in the home stretch of LIFE MEDACC. It seems like only yesterday when, with laudable enthusiasm that still persists, the project team began work in June of 2013. It is now time to face the final six months and begin a process of reflection open to all of those who, to a greater or lesser extent, have followed us over the past five years.

This process of reflection is the consequence of the results obtained from the pilot tests in forestry and agricultural management, from analyses of the past and from future projections. This includes the evaluation of environmental conditions in the three basins (climate evolution, soil use and water use), the construction of specific socioeconomic scenarios that we have developed for the three basins, the establishment of projections for water resources in a scenario of climate change and global change, and the establishment of indicators to determine the efficacy of the measures adopted. Some of the results are objective and therefore not open to discussion, such as the reduction of water flow rates in the three basins in recent decades. Another matter is the evaluation of the consequences of this reduced water availability in the region and the activities carried out there, and how this region and these activities must be made less vulnerable to the impact of climate change.

We believe, however, that it would be unfair to the goal of LIFE projects to base the reflection process on the results obtained from the project without setting them in the socioeconomic context of the basins studied and in the context of the evolution of climate policy in Catalonia. The goal of the LIFE Programme for the Environment and Climate Change, the European Union's funding instrument for the environment for the 2014-2020 period, is to act as a catalyst for changes in policy development and implementation by providing and disseminating solutions and best practices to achieve environmental and climate goals and by promoting innovative environmental and climate change technologies.

For this reason, as members of the LIFE MEDACC team, we are making the following recommendations in the context of this process of reflection that we would like to share, discuss, expand on and agree with you, the members of the project Monitoring and Management Committee. These recommendations are based on an evident premise:

“Climate change is a proven fact of which there can be no doubt. It continues to increase pressure on regions, agricultural and forestry systems, and water management. The impact of climate change in the Muga, Segre and Ter basins thus increases their current level of vulnerability. The reduction in water flow over the past six years and future projections indicate a clear reduction in water availability for ecosystems and the human activity that depends on them”.

## Recommendations for changing policy development and implementation:

i) It is essential to focus adaptation to the impact of climate change on agricultural, forestry and urban systems as a real opportunity to achieve what we are certain must be done but are not doing intensively enough or have not yet started doing. The opportunities provided by the process of adaptation to climate change and, by extension, to global change are opportunities for the systems (and region) and must be implemented to ensure the future profitability and viability of these systems (and the region).

ii) The abandonment of agricultural and forestry activity, which began in the late 1950s and early 1960s as a result of the shift to fossil fuels, has had consequences on the use of land. According to the [Atlas de la Nova Ruralitat \(2008-2015\)](#), only 60,000 of the almost 120,000 farms that existed in 1989 remained in 2013, and 60% of villages with fewer than 1,000 inhabitants [saw their populations decline](#) between 2008 and 2015. Only 25% of the different forestry management tools are actually being used. Forestry water management cannot be considered separate from the management of land use: both aspects are so intimately linked that land management must be considered from the perspective of water management and vice versa.

iii) Global change factors such as depopulation, abandonment of crops, loss of extensive livestock farming and the lack of forestry management only increase our exposure and sensitivity to the impact of climate change and, therefore, our vulnerability (increased risk of fire, episodes of forest decay, loss of agricultural and forestry resources such as pastures, reduced generation of runoff, more severe impacts during droughts, increase in pests, loss of ecosystem regulation and provision services, etc.). The worst measure for adaptation to the impact of climate change in relation to the availability of water resources is the lack of land management policies; it is essential to include this in instruments for regional and sector planning.

iv) The mechanization of agriculture has, for a long time, been accompanied by the globalization of markets and a considerable reduction in the work contributed by family members, whereas salaried work has increased – a clear sign of increasing farm sizes. The active population dedicated to agriculture accounts for only 1.7% of the total active population of Catalonia (first quarter of 2017); an active population that depends on industries linked to the sector in a context with fewer and fewer family farms and more and more industrial farms. Access to land is a bottleneck. Which model should be chosen? A cooperative model in a living region managed with care or a pyramid structure, managed based on macroeconomic criteria dictated by the markets? Both are possible, but each produces opposite results in terms of vulnerability. Regardless of the structure of the primary production sector, there must be a commitment to making environmental, social and economic sustainability a top-priority and determining factor; otherwise, the system will collapse in the mid-term.

v) More than 85% of the population of Catalonia live on the coast and are often oblivious to everything that is not urban to the extent that the disconnect between part of this

population and the physical territory in which they live is increasingly wide. However, more than 90% of the total area of Catalonia is forest and agricultural land. Forests are one of the most important providers of ecosystem services. Thanks to their biodiversity, they regulate the climate, the water cycle and erosion; they act as carbon sinks, provide food, wood and firewood, culture and well-being. Likewise, agriculture provides food, and generates services such as fire management and regulation of the flow of water, nutrients and pollutants from both agriculture and urban systems; it also fixes carbon to a similar extent to pine forests, and generates economic value, which is essential for maintaining the landscape, the population and culture. Managers, social and regional agents and the general population of coastal cities need be aware that the provision of services, culture, well-being and food comes at a cost and, for reasons of resilience, the urban world must contribute to the provision of these services and food. Any urban agenda on adaptation to climate change will not be complete if regional and sector planning do not contribute to the resilience of the region that provides water, food and services.

vi) Determining the impact, associated risks and vulnerability (climate diagnosis) depends on the system/sector and the physical and socioeconomic size of the region studied. The same is true for determining the adaptation measures and actions to be taken. As a result, both evaluation of the impact of climate change and adaptation have a local/regional component that distinguishes them from mitigation. Success in adapting to the impact of climate change will depend on the accuracy of the climate diagnosis and, more importantly, on the discussion of the measures and actions to be taken with local and regional agents. Global evaluations and recommendations must therefore be adapted to the regional and even local level, given the notable environmental and socioeconomic idiosyncrasies of each region.

vii) It is essential to create spaces where agents in the region, public authorities and research/technology centres are represented to agree on the adaptation measures that must be implemented and to manage any conflicts that may arise. These spaces (communities of water users, sector-based and/or regional discussion tables, social labs, sustainability committees, basin councils, etc.) must be multilateral for two reasons: a) because reality is complex and cannot be simplified; and b) because the result of a traditional bilateral approach is that measures are only implemented based on the ability of specific agents or entities to influence the authorities. A new form of governance is therefore needed to carry out active, efficient adaptation policies. This new form of governance will also facilitate monitoring of the adaptation measures.

viii) Relying on technology to shield our vulnerability is a necessary but insufficient condition. We have shown that the use of technology for efficient water use in irrigation can be successful, with savings of up to 35%; nevertheless, this technology has not been implemented by all users due to a certain fear of losing historical water rights. A new form of governance in water use is also required, and the environmental aspects indicated above, such as those related to water and energy, must be taken into greater account. There is still room for improvement in forestry management; for example, the application of new approaches to forestry management is a promising area for dealing with the impact of climate change.

ix) Relying on the efficient use of water (which is necessarily linked to energy efficiency and the gradual implementation of renewable energy) to shield our vulnerability to reduced water availability is a necessary but also insufficient condition. There are many cases where the gain in efficiency has resulted in an increase in the absolute volume of water captured from the environment compared to the previous situation. As stated in Section c) of Article 16 of Act 16 of 1 August 2017 on Climate Change, “the priority use of water resources obtained with improved savings and efficiency to meet the quality targets of aquatic ecosystems”. Based on climate projections, failure to do so may result in mortgaging the implementation of maintenance or ecological water flows in our river basins.

x) Our current ability to combat climate change exceeds our regional scope. For the fight to be effective, it should be managed globally. Nevertheless, at the local and regional level, we must add our small piece of the puzzle. Furthermore, without question, any recipes for adapting to this change must be local, given the aforementioned diversity and the environmental and socioeconomic idiosyncrasies of the regions. It is therefore necessary to consider developing not only technological but also environmental and social solutions, with the necessary political support, that are sustainable over time and allow for greater integration of different systems (water, forests, biodiversity, agriculture, livestock, etc.) in local communities.

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