



First Open Tender for Innovations

Case Study #5: Canary Islands

Supplementary Information

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The Case Study “Canary Islands”

In the Canary Islands, ARSINOE will focus on the ***ecological transition and vulnerability of aquifers in volcanic islands and will put further efforts to the primary production including agriculture, forestry, water management and clean energy infrastructure.*** ARSINOE will consider the interdependence between water and agriculture. The agricultural sector is the largest water user in the Canary Islands, where wine, potatoes and tomatoes are the main exports. Therefore, greater sustainability within the water will positively affect the agricultural sector and, therefore, the water and energy situation of the archipelago.

The Canary Islands are immersed in a process of Ecological Transition, where establishing the starting point from the energy point of view of the main sectors of the archipelago is key to implementing measures that affect in a transversal way. Therefore, the calculation of the carbon footprint and water footprint of the agricultural sector in the Canary Islands as well as the water sector, favours the knowledge of the energy situation in the archipelago to be able to establish effective measures of sustainable governance. In addition, a new challenge is opening up in the Canary Islands in terms of water and agriculture. The island of La Palma is suffering from a volcanic eruption that will have effects yet to be determined on the island's aquifer (and, therefore, on the availability of water resources) and on agriculture, as it has so far devastated more than 100 hectares, including banana plantations and livestock farms.

The Problem Statement

Following the project approach and focusing on the Canary Islands, the first Living Lab session resulted in the following Problem Statement:

"To have truthful and adequate information based on scientific and traditional knowledge, including environmental, agronomic, economic and social aspects and taking advantage of the opportunities provided by digital tools. All this aimed at facilitating participatory decision-making at all levels, for the adaptation of agriculture to climate change and for its ecological transformation, taking into consideration the social and, specifically, gender perspective."

This problem statement seeks to break down the barriers and problems encountered in the session, based on four main axes: (i) temperature increase, (ii) technology, (iii) water availability and (iv) applied to a specific territory such as the islands:

- The increase in temperature increases crop evapotranspiration, which is closely related to the availability of water that crops will need to maintain themselves.
- On the other hand, and in relation to water availability, in the midlands of the Canary Islands there is a natural process of capturing humidity from the trade winds, which allows rainfed crops to be maintained naturally. In a scenario of climate change, this situation could change, which generates an uncertain future where we could technify the plots to make a forced irrigation reach them, or we could change the type of crop, or variety, etc.
- Another of the alternatives presented to us due to climate change is the possibility of gaining height when cultivating, but this in turn generates various aspects to be taken

into account such as: (i) there may be a change of owner when changing height, (ii) it could be that the land to which we refer is contemplated in the planning as a different use, which does not allow us this solution, (iii) naturally, at least on the island of Tenerife, there is the limitation of the Teide National Park, iv) gaining height also means having to carry water to a higher point, which translates into greater pumping, which may in turn increase the carbon footprint in this aspect.

- The marked tendency to monoculture that exists in the Islands, favored by subsidies, is also noted. Monocultures do not give rise to research on what other types of crops can be grown better in a context of climate change, and the attendees suggest that the use of polyculture would provide tools for knowledge and diversification of the agricultural supply in the archipelago, which could have a very positive impact on the issue discussed in the session.
- In addition, the need to increase food sovereignty in the Canary Islands is highlighted, thus reducing imports (nowadays very important in the Islands) and exports, promoting a km0 agriculture and consumption.
- The important role that the tertiary sector could play in this aspect has also been highlighted, as hotels are large consumers of agricultural products, which would make a difference if they demanded the purchase of local products.
- With regard to subsidies, it was noted that these tend to favor the large producer rather than the small producer, which generates a certain uneasiness and abandonment on the part of the institutions, making the option of working in agriculture less and less attractive to young people. It is mentioned that there is no generational replacement in the primary sector in the Islands.

The water sector is a sector that is managed in a mixed way in the Islands, that is, with public and private funds. This characteristic endows the sector with a series of advantages and disadvantages, however, we will focus on the comments that arose from the state of the networks and the form of irrigation used by the farmers:

- On the one hand, the aquifer has been exploited in the Canary Islands since the 1920s, providing water resources especially to the western islands where, in addition, the largest consumer of water is agriculture.
- On the other hand, the state of the distribution networks is, in general, deficient. This leads to high losses of drinking water along the supply chain, resulting in over-drainage and over-abstraction of groundwater (with the associated energy and carbon footprint implications).
- Greater digitization of the network would help to detect where the most problematic points of the network are and would help to better manage and maintain it, but this must be accompanied by training for staff, who know how to integrate and treat the data derived from introducing technology into the network.

- In addition, we should not forget that the right to water is a universal right, and not all farmers and ranchers in the Canary Islands have access to water in their installations (for example, the case of the *medianías* mentioned above).
- With respect to the irrigation used by farmers, we also find a series of difficulties such as the following: i) lack of information when it comes to correctly managing the irrigation needed for their crops, ii) lack of digitalization of irrigation systems, iii) cultural practices instead of practices derived from a specific study depending on the location and crop used. Therefore, there is a need to promote farmers' knowledge so that they can have information that will help them make the best decisions. Evidently, this is a strategy that must be approached with a technological base.

Targets and goals of the Case Study in this first open tender

Therefore, these considerations lead us to the more technological area, where the following observations were made by the group:

- Virtual communities and social networks can be used to publicize local problems, and make people feel that they are part of a common problem.
- Information is key to good decision making, and data is a very powerful tool for good management of facilities, in this case, agricultural facilities.
- All the information that science deals with and extracts must be adequately communicated to society. Moreover, it is interesting that it is not only scientists who generate knowledge, it is necessary that farmers become "sensors of the territory" (as was rightly mentioned in the session), that they become involved in the process of doing science.
- Innovative solutions adapted to the Canary Islands specifically.

The idea is to participate in two open calls, so we would like to divide our budget in two. In this first call, the budget item would be smaller, as we would be launching it as a test, to see how it goes and to bet more on the second call. Furthermore, although our Living Lab focuses on how the increase in temperature will affect the main crops in the Canary Islands (bananas, vines, avocado, etc.), we are also interested in solutions focused on water resources, the rise in sea level, specific R&D solutions for the recovery of La Palma after the eruption, etc... so we will address these issues in the second call.