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## An experience of community monitoring of borehole: The Bsissi farmer association in tunisia

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**In brief** – In North Africa, many aquifers are overexploited, mainly due to intensive irrigated agriculture. Public policies have generally focused on state control of borehole drilling and use, with often-limited effects. In Gabes Region - South of Tunisia -, the Bsissi farmer association has a central role in groundwater resource management. The farmer association operates on an area of approximately 3500 ha. The association monitors the drilling of boreholes and contacts authorities if farmers try to drill boreholes illegally. Moreover, it provides an opinion to the local administration when farmers members want to drill a borehole, for instance because another borehole has dried out. The association faces some challenges, especially as it is financially fragile. Still, the association has been operating for more than 20 years and thanks to its activities, groundwater levels have remained broadly stable.

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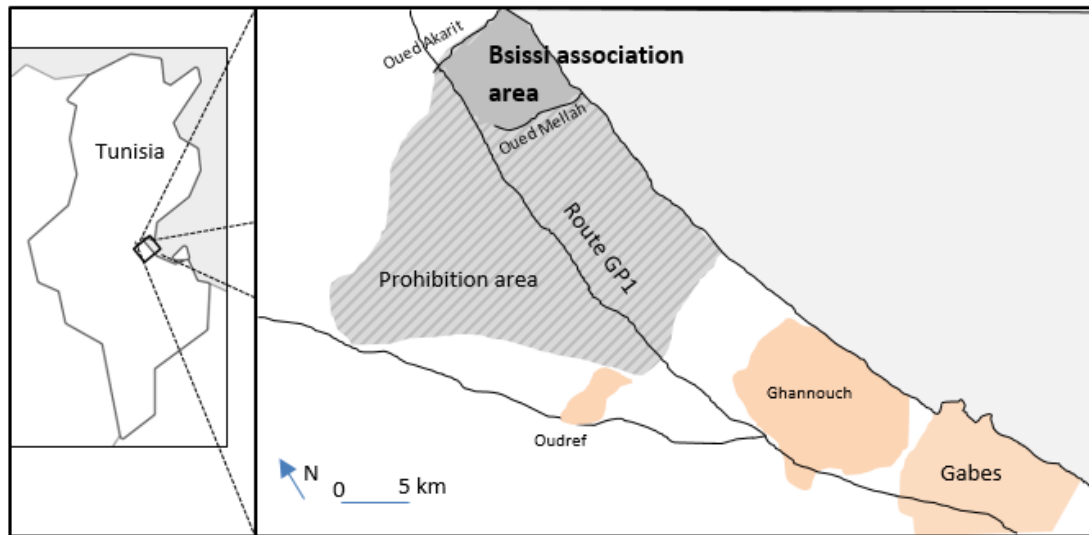


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## Presentation

The Bsissi farmer association (formally the Agricultural Development Group of Bsissi Oued Akarit) is in charge of groundwater resource management in the South of Tunisia. This association controls the drilling and operation of boreholes within its area, so as to limit risks of groundwater overexploitation. Apart from very few traditional irrigation systems in oases<sup>1</sup>, the Bsissi association is a unique case of farmer-managed control of groundwater use in North Africa.



Location of the Bsissi Farmer Association (from Frija et al., 2016).

## Monitoring by the farmer association

In 2022, the Bsissi farmer association operates on 5500 ha, of which approximately 3500 ha are irrigated. There are 299 registered boreholes in the area, which is located in Gabes Region (the president of Bsissi association does not know actually how many farmers belong to the group: what counts is the number of boreholes. Some boreholes belong to several brothers, and some farmers have several boreholes). The farmer association has two main roles: to monitor the drilling of illegal boreholes and to give an opinion to the local administration when farmers members want to modify their borehole (e.g, replacing it, installing electricity, maintenance). The farmers' association is the unique representative of farmers for these issues when interacting with the administration.

The main rules for water management are as follows. In Bsissi area, officially it is not possible to get an authorisation to drill boreholes to irrigate new areas. Sometimes, farmers want to replace a borehole that has dried out. The Bsissi farmer association controls that indeed the borehole dried out and then delivers an opinion to the Water Resource Direction. The latter belongs to the Gabes Agricultural Development Regional Office, which is the regional office

<sup>1</sup> In some oases of North Africa, inhabitants built *foggara* (or *khattara*) systems: these are tunnels that drain water from aquifers and then lead to artificial springs that provide water to oases located downstream. In some of these systems, farmers make sure that no borehole is drilled in the area of the *foggara* or *khattara*.

of the Ministry of Agriculture, Water Resources, and Fisheries. The Water Resource Direction accepts to deliver an authorisation for the new borehole only if the farmer association has provided a positive opinion.

Farmers have also officially a quota of 50,000 m<sup>3</sup> of water that can be pumped for each borehole per year. Compliance with this rule is estimated in relation to the power of the pumps (no farmer has a water meter). In the 2000s, when the Bsissi farmer association was created, the farmers generally used 10 HP pumps, providing about 12 l/s. The president of the association puts forward that the volume pumped by these pumps were below the quota considering irrigation calendars usually practiced in the area. Then, farmers switched to smaller pump (3 to 5 HP), both because of increased electricity costs and because they switched to less water consuming crops (mostly from market crops to tree crops).



Photo 1. Olive trees irrigated in the Bsissi Area

## Emergence of the initiative

### Emergence

Farmers came to the Bsissi area in the 1970s because of the low cost of land and easily accessible groundwater. In the 1980s, farmers started drilling in the confined Jeffara aquifer, leading to steep increase in groundwater abstraction. In 1987, the administration noted the risk of seawater intrusion. A prohibition zone was set up covering the whole northern part of Gabes (Figure 1): no borehole drilling was allowed anymore in this area. Still, some farmers kept on drilling illegally, leading to the seizure of drilling equipment, legal proceedings, and tense relations between farmers and the administration.

In 1998, the Water Resources Direction organised meetings with farmers to raise awareness of the problem and to find a solution. In parallel, this direction conducted an inventory of wells and boreholes in the area. In each farm, the Direction looked at the adequacy between the irrigated area and the number of wells and boreholes: if a farmer had more wells or boreholes than necessary, some of the latter were closed.

### **Creation of the farmer association**

The Water Resources Direction proposed to organise an Agricultural Development Group that would focus on groundwater use. Specific by-laws were written and the Bsissi farmer association was officially created in 2001. Farmers committed not to increase the number of wells and boreholes. Moreover, the group of farmers was given an allocation of 200 l/s of continuous flow, equivalent to 50,000 m<sup>3</sup> per farm per year. Following the agreement, the farmers obtained subsidies for drip irrigation and to plant olive trees, and new roads were made in the area (farmers had not access to such support before the creation of the farmer association).

Members of Bsissi farmer association are required to pay a fee of 50 Tunisian Dinar (approx. 13 euro) per well or borehole per year. However, less than half of the total amount that should be paid is actually paid because members do not see in everyday life the service provided by the farmer association. Many farmers only come to pay when they need to get membership in order to receive subsidies from Gabes Agricultural Development Regional Authority.

This farmer association has been functioning for more than 20 years and has successfully prevented groundwater depletion. According to its president, groundwater levels have on average decreased by only between 1m and 1.5m over the past 10 years.

### **Overall functioning...but uncertain future**

Although in theory the official irrigated area should remain stable, it did increase in the past years (it increased from 3000 ha in 2016 to 3500 ha in 2022). Indeed, the Regional Agricultural Development Authority sometimes provides new authorisations. Moreover, interviewed farmers mentioned the existence of illegal boreholes. However, farmers having illegal boreholes cannot be members of the Bsissi farmer association and thus cannot get some agricultural subsidies delivered by the Regional Agricultural Development Authority. Moreover, the farmer association does not have a map of legal boreholes and wells. The president only knows by memory the location of authorised boreholes. Such a map only exists at the Water Resources Direction.

Some farmers in the area have recently installed solar energy. According to the president of Bsissi farmer association, the use of solar energy is not a problem because the flow rates are lower than with diesel energy and the pumps run at full power for less time (as there is no irrigation by night).

Despite these limitations, interviewed farmers confirmed that the farmer association was operating and they underlined their trust in the president of the farmer association. They mentioned that they would like to know more about the use of collected fees. However, at the same time, apart from the president, very few people are interested to spend time running the farmer association. Even official members of the management committee of the association show very limited eagerness to get involved. Thus, the Bsissi farmer association appears as fragile as its functioning relies on willingness of the president, who “embodies” the association in daily activities and who works on a voluntary basis.

### **Lessons learnt**

Several actors (staff of the Ministry of agriculture, farmers' associations) from other regions of Tunisia came to learn about the experience of Bsissi farmer association. Despite the changes in rural areas in Tunisia after the 2011 Revolution (e.g, the decrease in the ability of state

administration to implement regulations) and the difficulties inherent to such type of initiative, the Bsissi farmer association was able to resist and to maintain its activities.

However, to date the experience was not replicated in other regions of Tunisia, which face the same issues with regard to depleting groundwater levels. One exception is an initiative, started in 2021, by the Regional office of the Ministry of Agriculture in Gabes and Cirad, so as to replicate the Bsissi experience in Lyamoua area, located in the southern part of Gabes Region. There, in April 2023, the farmer association was about to be created.

This lack of replication of the Bsissi experience can be related to the presence of several factors of success, that have not been met elsewhere or later:

- 1) in the 1990s, the Water Resource Direction was able to put pressure on farmers so that they enter the collective management scheme. The local authorities convincingly threatened farmers to close their boreholes if they did not accept to enter the scheme. Later, and in particular after the 2011 Revolution, local authorities lost their capacity to exercise such pressure on farmers.
- 2) Initial members of Bsissi association were mostly from the same social group.
- 3) The skills and legitimacy of the leaders that managed the association since its creation have also played a key role.
- 4) At the time of the inception of the farmer association, many farmers moved from highly water consuming crops (cash crops) to olive tree farmers, which helped decrease the pressure for new borehole drilling.



Photo 2. Office of the Bsissi Association

The farmer association has been working successfully. However, its success is only seen in terms of the absence of groundwater depletion, i.e. in a negative way. Thus, when the association works properly, farmers members do not see its positive impact. This explains the limited willingness of members to pay the annual fee. Thus, one option to strengthen Bsissi farmer association could be that the farmer association expands the services offered to farmers, so that farmers see that actions of this association positively affect their daily activities. Another option would be to organize some payment to committee members for the time spent in managing the association.

These two topics have been discussed at length with regard to irrigation farmer associations in Tunisia for the past two decades, with authorities providing a negative answer. This may

not be such a problem for the many existing water user associations, which provide an irrigation supply service to members and whose daily activities are mostly undertaken by permanent staff. However, the situation is different in the case of Bsissi farmer association, whose sustainability is at risk. Thus, new forms of governance for farmers' associations involved in groundwater monitoring have to be identified, if the case of Bsissi is to be reproduced elsewhere in Tunisia.



Photo 3. Workshop to prepare a groundwater management farmer association in Lymaoua area, December 2022.

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