

Case Study Aquifer Contract Morocco

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Aquifer Contracts in Morocco : a way to reduce groundwater over-exploitation? The case study of the Souss aquifer

Groundwater in Morocco

Pressure on groundwater resources in Morocco has been increasing over the last decades, due to increased water demand as well as droughts. Groundwater has increasingly been used as a strategic resource to expand irrigation and improve the resilience of farmers, supported by improvements in drilling and pump technologies. But as a consequence of this increase in groundwater abstraction, groundwater levels have started to fall in many aquifers, because the rate of abstraction is exceeding the rate of recharge.

Since a new Water Law in 1995, the Moroccan government has made efforts to promote sustainability in groundwater management. Some of the measures put in place include:

- decentralising regulation and governance of water to local levels;
- initiating licensing for borehole drilling and abstraction, administered by river basin agencies and

regional agricultural development agencies respectively; and

- modernising irrigation strategy and procedures, such as the 'Green Morocco' plan to promote land aggregation and drip irrigation.

However, regulation and practice in promoting sustainable groundwater use has not always been coherent. For example, river basin authorities and regional agricultural development agencies both administer different types of permits for groundwater use, but may not communicate with each other. Or farmers granted groundwater abstraction permits can also obtain subsidies to support new borehole drilling and increase their abstraction further.

What is an aquifer contract?

Aquifer contracts in Morocco are voluntary agreements between government and multiple stakeholders, aimed at regulating and improving the technical and financial management of groundwater at the local level. Groundwater stakeholders include river basin authorities, water user associations and farmers.

The first aquifer contract in Morocco was introduced in 2006, for the Souss aquifer. This aquifer was prioritised because it has seen significant falls in groundwater levels that are largely attributed to over-exploitation of groundwater, and it lies in a river basin system that is affected by an overall water deficit.

The Souss aquifer

The Souss aquifer is one of three aquifers in the Souss Massa-Draa river basin, an important agricultural area with extensive irrigation abstraction, which contributes 60% of Morocco's agricultural exports. Groundwater contributes at least 95% of total water use in the basin. The Souss aquifer is estimated to have an average water deficit (how much more groundwater is abstracted than is recharged each year) of around 228 million m³/year.

There is significant inequality in groundwater abstraction across socio-economic groups in the aquifer. A small minority (6%) of large scale farmers, with farms of 20 ha or more, use 32% of the total groundwater abstracted from the Souss aquifer. Small scale farmers, with farms of 0.1 to 3 ha, account for 62% of all farmers but cultivate only one third of the land and abstract only 13% of the total groundwater used from the aquifer. As groundwater levels continue to fall in the aquifer due to over-abstraction, deeper boreholes are needed to reach the water table, and only the larger farmers can afford to drill such deep boreholes. Many smaller scale farmers have been squeezed out of the sector because they can no longer afford to deepen their boreholes.

There is also widespread avoidance of water user fees, with only between 4 and 14% of farmers declaring that they use groundwater and paying the fees, despite the almost total reliance on groundwater by most farmers.

In 2004, a move by the Souss-Massa-Draa River Basin Authority to close two illegal boreholes led to protests by agricultural unions, and prompted authorities to form a commission to examine sustainable water use in the basin. This eventually led to the development of an aquifer contract called the 'Framework Agreement for the Protection and Development of Water Resources in the Souss Massa Basin', which was signed in 2006.

Signatories to the Souss Aquifer Contract

One of the strengths of the Souss aquifer contract was the number and breadth of stakeholder organisations that were involved:

- The Souss-Massa-Draa River Basin Authority
- The Souss Massa-Draa regional government
- Three presidents of regional councils in the river basin
- Office National de l`Electricité et de l`Eau Potable, the national public water utility
- Federation of Associations of Users of Agricultural Water
- Chambers of Agriculture of Taroudant-Agadir-Tiznit
- Professional Association of Well Drillers of Souss
- Two national research institutions

Six parts of the overall agreement are framed as specific bilateral partnership agreements, and some of the parties signed only selected specific partnership agreements that advantaged them. Complex negotiations were necessary to design the agreement. For example, the farmers' union only agreed to decreases in cultivated area after the inclusion of the plan to regularise some illegal wells.

After signing, responsibility for implementation was transferred to the River Basin Authority.

What was in the Souss Aquifer Contract?

The contract included the following measures to be implemented across the aquifer:

- Limit further increase in the area cultivated with citrus and vegetables (these are crops favoured by large scale farmers, and are particularly water-intensive).
- Increase water user fees for farmers with land areas larger than 15 ha, to fund other measures; and exempt smaller scale farmers from user fees
- A program to convert gravity-fed to drip irrigation on 30,000 ha of land, financed in part by the regional government from groundwater abstraction fees.
- Develop an infrastructure programme to increase surface water supplies, and by doing so relieve pressure on groundwater supplies
- Investigate the feasibility for using desalinated water for irrigation in some coastal areas.
- A research programme aimed at improving irrigation water efficiency (e.g. developing

climate-smart agriculture practices)

- Regularise some illegal boreholes

How much will the aquifer contract cost?

It is estimated that the measures initiated under the Souss aquifer contract will cost US\$ 2,246 million from 2006 to 2020. Most of this is due to be paid for by increased water user fees for larger scale farmers.

Limitations of the aquifer contract

The negotiation and implementation of the Souss aquifer contract has faced a number of limitations, particularly the following:

- A lack of consensus on the central problem. Some stakeholders did not agree that groundwater was being over abstracted, but rather saw the problem as one of a lack of resource allocation from the central state. This was exacerbated by a lack of reliable data, such as monitored water abstraction rates, to provide evidence for the degree of groundwater abstraction.
- A lack of consensus at ministerial level about what measures to take. Various ministries did not agree that water fees should be increased, or specific areas protected from further groundwater abstraction.
- Reliance on supply-side solutions: the aquifer contract relied on the supply of additional surface water to substitute for reducing groundwater abstraction, but this meant a lengthy infrastructure programme, which was delayed due to budget constraints, and these delays were used by farmers' associations as a reason to postpone installation of groundwater abstraction water meters.
- Smaller scale farmers were less well represented in the contract, because they do not have organised worker associations. By contrast, the larger scale farmers were already well organised into cooperatives and associations, and could use the contract to further their vested interests. Conflicts between larger and smaller scale farmers predated the contract, and were not directly addressed or ameliorated by the contract measures.
- There was duplication between laws and consensus structures related to the contract, which led to uncertainty in implementing measures. For example, boreholes can be legalised under the 1995 Water Law, as well as under the contract framework, so it is unclear which rules to use.
- At the same time as increased water user fees were implemented, farmers also received subsidies, which largely negated the desired effect of the increased fees to conserve water.
- The agreement is voluntary, and the River Basin Authority has low enforcement capacity, so that non-compliance was not dealt with effectively.

Conclusion and future outlook

Aquifer contracts in Morocco have been seen as a model of decentralised water governance, but as the example of the Souss aquifer shows, successfully implementing an aquifer contract is difficult. At the top level, the balance in policy between groundwater conservation and agricultural development is fraught: strategies such as subsidies designed to support one objective can undermine the other. In practice on the ground, processes that seek the participation of multiple stakeholders must include genuine representation of all, or they risk making existing inequalities and conflicts worse – for example, further marginalising small scale farmers who are poorly represented. Finally, reliable data are needed to provide an evidence base for the various conflicting visions of development.

So far in Morocco, other aquifer contracts are in development, but none have yet been signed by all stakeholders and implemented. Lessons learned from the Souss aquifer contract example may improve the success of future contracts. For example, training and capacity building programmes with different types of farmers (small, medium, large) could be included to support the participatory process, alongside the development of stronger farmer or community associations. Another improvement could be to the collection of reliable scientific data, such as groundwater level monitoring, and critically, making such data accessible to all stakeholders, to promote consensus over the issues and potential solutions.

Sources

Closas A and Villholth K G. 2016. [Aquifer contracts: a means to solving groundwater over-exploitation in Morocco?](#) Colombo, Sri Lanka: International Water Management Institute (IWMI). 20p. (Groundwater Solutions Initiative for Policy and Practice (GRIPP) Case Profile Series 01). doi: 10.5337/2016.211

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