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When integrated water resource management stands too far away: supporting stakeholders in planning alternatives to adapt the groundwater crisis in Morocco

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Introduction

In many regions of developing countries where agricultural water use led to aquifer overexploitation, policies to directly or indirectly control farmer water use are difficult to implement. There is no “blue print” approach to deal with such situations. In particular, adaptive strategies are increasingly acknowledged as having to look beyond integrated water resource management. Moreover, many possible adaptive actions face what may be called a “water productivity dilemma”: In a situation of lack of control over groundwater use, any action that aims at improving the adaptation of farms to the groundwater crisis by improving the irrigation-based cropping system capacity to adapt such crisis (e.g. increased water productivity, use of crops tolerant to water salinity in coastal areas) is likely to trigger a non-decrease or even an increase in groundwater use, and in that way weaken the sustainability of the whole agriculture-natural resource system.

The present paper analyses an action research process, which aimed at developing and testing a method to support a reflection between local stakeholders over alternatives for sustainable development of an area facing a strong groundwater crisis, where there is no perspective in the short term for control over groundwater use. The study was carried out in the 1200 km² coastal Chaouia region in Morocco. Since the 70s, groundwater has been used there intensively for irrigation, initially for growing citrus and later for vegetable and forage. Groundwater overuse led to sea water intrusion in littoral land and decreasing groundwater levels in in-land areas. Since the 80s, farmers had to adapt to such groundwater stress, with strategies such as deepening boreholes, bringing fresh water to their farms or renting fields in groundwater fertile areas, either more in-land or in other regions. Groundwater stress has been the prime factor that led the region from a very intensive export-oriented agriculture to a current situation of crisis and fragility. The coastal Chaouia aquifer is under the responsibility of two catchment management agencies, whose actions are limited to a follow-up of the aquifer dynamics. No groundwater use management mechanism is implemented in practice.

The study was carried out in the framework of the Aquimed project, which aimed at developing methods to support stakeholders in undertaking foresight analyses to assess interrelated agricultural development and groundwater management strategies in Mediterranean coastal regions involving intensive groundwater use, taking into account climate change (see <http://aquimed.cirad.fr>).

Methodology

The implementation of the method was two-pronged. First, an initial diagnosis assessed farms' trajectories, farmers' perception of groundwater dynamics and the local institutional setting. It appeared that there was a strong lack of communication between farmers and public institutions, and that most stakeholders described the current situation as one of decay compared to the past "golden age" and faced difficulties to imagine possible alternative development pathways for the region. Three sub-zones were defined, based on farm types and groundwater issues.

Second, a reflection was engaged with local stakeholders. Two workshops were organized with three farmer groups from each of the sub-zones. During these workshops, a diagnosis of the area was undertaken, as well as an analysis of the main change factors, of possible scenarios depending on the future evolution of these factors and of possible actions to achieve the preferred scenario. Later, a workshop gathered representatives of the three farmers' groups. Group works were shared and a role-playing session was organized where farmers played the roles of the main public and private institutions involved in the area. In the same time, a similar work was made with staff from the Department of Agriculture (DoA). This work was completed by a workshop involving representatives of different public institutions (catchment management agency, DoA staff, local municipality), during which, after a diagnosis of the region, a role-playing session also took place where participants played the roles of farmers. A last workshop at regional level gathered farmers and DoA staff, and previous works were presented and discussed.

Results

All proposed actions should improve farms' adaptive capacity to the groundwater crisis, at least in the short term. A first type of actions, such as development of rain-fed tree farming, poultry and implementation of alternative water supply systems are likely to lead to decreased groundwater use. A second type of actions aimed at : i) improving the profitability of existing water-intensive vegetable production systems, such as improvement of vegetable marketing (e.g. thanks to the creation of a local market place) and the improvement of the input supply chain; or ii) developing crops tolerant to salinity.

Participants put forward the quality of dialogue, especially in the last workshop. Farmers linked the success of the process to implementation of discussed actions while DoA staff gave more importance to the process per se. The experience showed the opportunity of a multi-stakeholder dialogue to create a social learning environment and explore innovative development pathways to cope with a groundwater crisis, and in particular to define adaptive strategies, in a context where integrated water resource management approaches and methods seem too far away, at least in the short term. In the local context, it enabled also to shift from a position where the only reference for development was the market crop based agricultural system of the "golden age" in the 1980s, to the definition of alternative development pathways.

However, proposed actions did not include anything with regards to groundwater management, and the second type of proposed actions face the above-mentioned water

productivity dilemma. It could be possible to implement the first type of actions in the short term, and to link implementation of the second type to some form of groundwater management, such as impeding the digging of new boreholes and the deepening of existing ones. Policies may be designed thus that both support rural activities and provide incentives towards reduced groundwater use, while in the same pave the way for implementation of the opportunities offered by integrated water resource management tools and approaches in the longer term. But this will need adequate coalitions of public organizations and farmer's organizations to be crafted.