Resilience of agricultural subsector dependant on groundwater: the case of fresh onion in Saiss (Morocco)

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Abstract

This abstract is part of the special session "Resilience of the groundwater economy in developing countries".

The use of groundwater enables considerable agricultural development, especially in developing countries (Shah et al., 2003; Shah, 2008): intensification of existing farming systems, introduction of high-value crops, thus compensating for declining surface water resources and making farming more resilient in the face of recurrent drought. Groundwater offers a reliable and flexible access to water that irrigation canals can hardly match. Many farmers and the large set of downstream operators (processors, retailers) who depend on their farm products, have now become dependent on this resource. But, the possible decrease in available groundwater resources for irrigation raises several questions: what could be the impacts on local farms and downstream operators? What strategies and adaptations could farmers and operators apply to secure their revenue and to market their products? More largely, how could we assess the resilience of the whole production chain? Resilience is nowadays a widely used concept concerning ecological and socio ecological systems. The concept is interpreted different ways, but commonly it implies flexibility and ‘the ability to move to a new desirable state after being disturbed’ (Folke 2006). In terms of supply chains, resilience refers to the chain’s capability of preparing for unexpected events, responding to failure in distributions and supplies, and recovering from crises. Supply chain resilience is a new area of management research (Christopher, 2004; Petit, 2010) and few researches concerns agri-food chains.

In this study, we focus on the fresh onion supply chain in the region of Saiss in Morroco, from the initial farm product through intermediaries and middlemen to consumption of the product. This region produces 50% of the Morrocan national onion production and is highly

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dependant on groundwater exploitation. Firstly, we define what is meant by supply chain resilience. Then, we identify the key actors involved in the onion chain, their own objectives and outputs along the chain. Finally, we assess the income and repartition of added value throughout the chain. 80 interviews have been realized, in the local markets and in the fields, to understand how the chain is organized and how added value is shared.

We show that the fresh onion subsector is highly informal and involves a huge number of intermediaries. Many stakeholders are still attracted by this booming sector although lots of them can be excluded rapidly and the distribution of value along the chain is very inequal. According to our data, it seems that farmers and wholesalers are more threat by prices decrease than by water resources depletion. The diversification, both in farms crops and in intermediaries’ activities, can increase stakeholders’ capacities to adapt to environmental perturbations. On the other hand, most of wholesalers and farmers are not willing to change their field of works or products.

**Keywords:** water management, groundwater economy, supply chain, developing countries