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Learning to Voice? The Evolving Roles of Family Farmers in the Coordination of Large-Scale Irrigation Schemes in Morocco

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ABSTRACT: In Morocco, large-scale irrigation schemes have evolved over the past twenty years from the centralised management of irrigation and agricultural production into more complex multi-actor systems. This study analysed whether, and how, in the context of state withdrawal, increased farmer autonomy and political liberalisation, family farmers currently participate in the coordination and negotiation of issues that affect them and involve scheme-level organisations. Issues related to water management, the sugar industry and the dairy sector were analysed in five large-scale irrigation schemes. Farmer organisations that were set up to intervene in water management and sugar production were seen to be either inactive or to have weak links with their constituency; hence, the irrigation administration and the sugar industry continue to interact directly with farmers in a centralised way. Given their inability to voice their interests, when farmers have the opportunity, many choose exit strategies, for instance by resorting to the use of groundwater. In contrast, many community-based milk collection cooperatives were seen to function as accountable intermediaries between smallholders and dairy firms. While, as in the past, family farmers are still generally not involved in decision making at scheme level, in the milk collection cooperatives studied, farmers learn to coordinate and negotiate for the development of their communities.

KEYWORDS: Farmers' organisation, large-scale irrigation scheme, negotiation, water management, Morocco

INTRODUCTION

In Morocco, large-scale irrigation schemes have evolved over the past twenty years from a central parastatal coordination mode of water management and agricultural production into more complex multi-actor systems, an evolution paralleling more general changes taking place in Moroccan rural areas. In the past, the state presence in rural areas was nowhere more evident than in these large-scale irrigation schemes. There, as elsewhere, the state incorporated the local *notables* (local rulers) in the administration of rural areas, following a strategy that had been set up during colonial times (Hammoudi, 1997). In exchange, these rural elite provided political support to the central administration (Leveau, 1985). In particular, they controlled state-initiated rural and farmers' organisations, remaining in office for very long periods.

These rural notables have always been able to influence irrigation scheme administration. However, the large majority of family farmers had little say in decisions that had a direct bearing on their farming. Strategic decisions related to crop choice, water allowance, prices of agricultural inputs and commodities were determined in offices by engineers without their involvement. The state assumed it knew best for these farmers' welfare: "peasants were considered as beneficiaries rather than as actors" (Pascon, 1980) and state technicians took important decisions on their behalf. To cope with this situation, family farmers learned to be adaptable, to create local margins of autonomy and to negotiate informal arrangements with state technicians (Errahj et al., 2009; Lees, 1986).

In the 1990s, the state partially dismantled its administrative control of large-scheme irrigation systems. Farmers were able to choose their cropping patterns and water user associations were created; later on, the sugar industry was privatised. The state intervened less in the internal management of rural and farmers' organisations, which became more autonomous. The withdrawal of the state occurred in parallel with a limited move towards more democratic practices. Elections are now generally considered to respect legal procedures (Desrues and Moyano, 2001; Storm, 2008), even though this has not resulted in increased accountability between those who are elected and their constituency (Bergh, 2009). The profile of rural leaders has become more diversified with, in some areas, the involvement of educated young people who invest in local development activities (El Iraki, 2002; Narjisse, 2007).

After a ten-year hiatus in management reforms, irrigation schemes are once more on the verge of facing major transformations. In particular, the state has initiated a plan to replace much of its surface and sprinkler irrigation infrastructure with drip irrigation, and plans to devolve scheme management to private operators through public-private partnerships. In 2008, the government launched the 'Green Morocco' Plan that put agriculture back high on the political agenda, with in particular the reform of public institutions in charge of supporting agriculture and scheduled large increases in investments in the sector. This plan divides farms into high productivity agricultural enterprises, whose capacity to export will be supported, and small-scale farming, for which support will consider above all its social role.

In this multi-actor system, an increasing number of issues thus involve family farmers' stakes, which need some form of coordination between family farmers on the one hand, and water management organisations and agro-business industries on the other. This article analyses whether, and how, in a context of state withdrawal, increased farmer autonomy and political liberalisation in rural areas, family farmers participate in the coordination and negotiation of issues that both affect them and involve scheme-level organisations. Do they have an empowered voice in the decision-making or do they remain mere clients for the water provided by irrigation authorities and the suppliers of agricultural products to private agribusiness companies? The paper does not attempt to compare the efficiency of various forms of management; rather, it aims at assessing whether new opportunities appear for farmers to voice their opinions, and how they react to such opportunities, or the lack thereof. The analysis will not only be limited to water management issues, but also will encompass the same analytical grid issues related to agricultural production, in particular sugar and dairy production. The analysis presented here focuses on five of the nine large-scale irrigation schemes in Morocco: Doukkala, Gharb, Loukkos, Souss and Tadla.

The article is organised as follows. The first three sections provide a theoretical background and describe the analytical framework, the research methodology and the case studies. The results of the analysis are then presented, followed by a discussion of the enabling factors for the vitality of farmers' organisations, and possible ways to support negotiation and coordination arenas.

IRRIGATION AUTHORITIES, AGRIBUSINESS INDUSTRIES AND FARMERS: INSTITUTIONAL SET-UPS FOR PRODUCING AND SHARING RESOURCES

The production and distribution of resources that involve interaction between farmers and private or public organisations, such as water or agribusiness, are politically contested. This means that analysis should pay particular attention to power relations and the way that decision-making processes are embedded in larger social processes (Mollinga, 2008). In order to assess the way such resources are produced and distributed, the present study chose first to identify some key stakes at play for family farmers, and then to analyse the coordination and negotiation arenas where the production of these resources is organised and where either the resources or their derived benefits are distributed.

Two main means of coordination between agribusiness industries and irrigation authorities on one side, and farmers on the other, may be identified, although in practice there may be a continuum between the two (Pinkerton, 1994). One means of coordination is centralised, which requires either the industry or the irrigation authority to dispatch local agents to coordinate with each farmer individually, or to go through other channels such as the local rural elite. This coordination mode was common in former member states of the Soviet Union (Lerman, 2001), as well as in North Africa (Pérennes, 1993).

In the second common means of coordination, the industry or irrigation authority may coordinate with a farmers' organisation (at community or scheme-level), which is in turn in charge of coordinating individual farmers and representing them in possible negotiations. In such a form of 'co-management' (Carlsson and Berkes, 2005), farmers' organisations become partners in the decision-making, which by no way implies that decision-making will be less political or, in particular, less dependent from power relations. The co-management form of coordination may take the form of a multi-stakeholder platform, which has been increasingly heralded as a means of improving conditions for coordination and negotiation around problems involving multiple stakeholders (Steins and Edwards, 1999). These platforms have proved their efficiency in solving complex coordination issues among multiple stakeholders, and also in creating social bonds between participants (Verhallen et al., 2007). However, where there are high power asymmetries among participants, there have been several cases where these platforms have been ineffective, or even manipulated to the detriment of weaker participants (Edmunds and Wollenberg, 2001; Faysse, 2006). In particular, a number of studies have shown the difficulties and shortcomings of including small-scale water users in multi-stakeholder platforms set up to manage water resources at catchment level in developing countries, after the examples of developed countries (Shah et al., 2001).

Issues of coordination and negotiation between farmers and agribusiness industries, and between farmers and irrigation authorities, have generally been studied separately. Firstly, the purchase of smallholder farmer production by agro-industrial firms offers marketing opportunities for farmers, even though it often entails coordination problems and power imbalances (Bowen and Gerritsen, 2007; Herrold-Menzies, 2009; Singh, 2002). In these agribusiness chains, farmers' organisations are a key element in levelling these imbalances and building trust between industries and farmers (Sartorius and Kirsten, 2007); when strong enough, farmers' organisations can have real decision-making power in the whole agribusiness chain (Ochieng, 2007). Secondly, since the 1980s, the key policy proposed to improve coordination between farmers and large-scale irrigation scheme authorities has been farmer participation in management through the creation of water user associations (WUAs). However, studies have shown that this policy was not overly successful in the many situations not meeting the usual conditions for effective reform (Vermillon, 1997; World Bank, 2007), such as strong political commitment and empowered WUAs that are able to raise financial resources (Merrey et al., 2007). This occurred especially where smallholder WUAs were set up at the tertiary canal level in large-scale irrigation schemes that were still managed by a public agency (Faures et al., 2007; Mollinga and Bolding, 2005). Alternative models such as public-private partnership (Vidal et al., 2006) have yet to yield proven results in large-scale irrigation schemes involving numerous family farmers.

When co-management is pursued (of either water management or agribusiness), the healthy functioning of farmers' organisations is critical in empowering farmers' voices in decision-making. Many studies have focused especially on natural resource management, leading to several sets of factors for the performance of farmers' organisations. However, research settings usually do not allow for the comparison of results (Agrawal, 2001), so any identified factors for the performance of farmer collective action usually remain specific to certain types of collective action and/or specific areas (e.g. Bernard et al., 2008). In particular, Shah (1995, 1996) studied a large number of farmers' organisations in India, across regions varying in terms of vitality of rural organisations, and around several resources. He argued that, if there is indeed a business opportunity for the farmers' organisation to flourish, the most critical factor for the organisation's good performance is members' control over the management committee. In post-socialist countries, where former state control over farmers' organisations has lasting impacts on how much farmers trust these organisations (Theesfeld, 2004), farmers may nevertheless engage in new forms of cooperation (Lerman, 2004).

RESEARCH METHODOLOGY

Analytical grid

The analysis focuses on the assessment of three main issues/sectors requiring coordination and negotiation between farmers and scheme-level organisations: water management, the dairy sector and the sugar industry. Some of the coordination and negotiation issues actually take place at a level higher than scheme level. For instance, water resource management takes place at different levels, starting from the catchment level. Moreover, while milk is produced mainly in the irrigated areas of the large-scale irrigation schemes, limited amounts of milk are also produced in the rain-fed areas adjacent to the irrigation schemes. Sugar cane and sugar beet are nearly always grown in irrigated areas. Not all farmers who belong to large-scale irrigation schemes need to interact around such issues, as they may not produce sugar crop or milk or may have shifted to rain-fed farming or to using groundwater and have consequently stopped using water delivered by the irrigation scheme.

Land management and agricultural products other than milk or sugar were not analysed because they do not require as much coordination between family farmers and scheme-level organisations. Other crops such as citrus, wheat or sunflowers are produced in large areas of the schemes studied, but they were not analysed because coordination around these crops mainly involves large-scale, capital-based farms. Market crops were not analysed because the majority of family farmers either deliver to local markets or sell directly from their fields. Finally, apart from land consolidation procedures, coordination around land takes place at local level, mainly between farmers working community-held land.

For each of the three issues considered here, the analytical grid includes the four following elements: i) the main issues requiring negotiation and coordination between family farmers and scheme-level organisations; ii) the arenas in which discussions take place and the role of farmers' organisations; iii) the type of management (centralised or co-management); and iv) the strategies of farmers faced with existing opportunities (or lack of opportunities) to participate in decision-making. First, negotiation can be typified as being distributive (when a given amount of wealth is to be divided) or integrative (when stakeholders work together to increase the wealth to be distributed) (Leeuwis, 2000). Obviously, in many situations, negotiation is both distributive and integrative. Coordination can be considered a component of integrative negotiation, and can be set up not only between the various stakeholders in the irrigation scheme, but also, often as a precondition for such multi-stakeholder coordination, between the farmers themselves.

Second, we focus on the arenas for coordination and negotiation, which include both formal institutions and the organisations set up to manage coordination and negotiation, as well as informal time-specific and location-specific coordination and negotiation networks or events (adapted from

Saravanan et al., 2006). We examine: i) the formal organisational setting; ii) the way this setting functions in practice; and iii) possible coordination and negotiation arenas that do not have an organisational setting.

Third, we assess farmers' organisations that play a role in addressing the issues identified. We looked at each organisation's legally defined role and the activities undertaken in practice. When farmers' organisations involved both local (community or block irrigation) and scheme-level elements, relations between the two levels were diagnosed.

Finally, we tried to qualify to what extent farmers actually participate in decision-making with respect to the negotiation and coordination issues analysed, and their reactions to existing opportunities (or to the lack thereof). To this end, Hirschman's (1970) typology of "exit, voice and loyalty" strategies was used, with the addition of 'neglect', i.e. maintaining a relationship, but investing less effort and developing negative attitudes to the partner or relationship (Dowding et al., 2000).

The analytical framework does not encompass informal coordination at local level, even though this often takes place. For instance, many farmers who do not own tube wells gain access to groundwater through informal arrangements (Bekkar et al., 2007), while the access to agricultural markets is facilitated by informal middlemen. This type of coordination is not included because it does not involve scheme-level organisations.

The analysis focused on family farms. Family farming may be defined by: i) production activities organised around the family, which provides the bulk of the workforce; and ii) the importance given to the continuity of family ownership and management of the farm from one generation to the other (adapted from Mercoiret, 2007). Such a definition encompasses a large diversity of farms, in particular in terms of land size and access to capital. For the purpose of this study, what is of importance is that each of these family farms shares, to a large extent, the same stakes in relation to scheme-level organisations, and that they are lastingly inserted in local communities. In the studied schemes, they clearly differ from large-scale capital-based farms, with specific interests with regards to water resources and agribusiness and much fewer links with neighbouring farms.

Data collection

Data was collected from 2002 to 2008, using four main sources: first, case studies were conducted on farmer-level analyses, water management and agribusiness production chains. Each of these studies involved interviews with an average of 50 family farmers in a scheme. Second, we interviewed irrigation authority staff, farmers and members of management committees of milk collection cooperatives in all schemes and of WUAs in the Tadla and Souss schemes. Third, a survey of 296 farms was undertaken in the Tadla scheme. Fourth, the results were quoted from research work undertaken in the Wademed and SIRMA projects, in which the authors took part.¹

RESEARCH AREA

Moroccan rural areas

Moroccan rural areas are characterised by extremely heterogeneous farm sizes. The last census (in 1996) found that 71% of farms were less than 5 ha in size, and made up 23% of the arable land in Morocco, while less than 5% of the farms were more than 20 ha in size and made up 30% of the arable land (Akesbi, 2006). A similar trend is found in large-scale irrigation schemes. Farms are typically either family farms or large-scale capital-based farms, usually larger than 20ha. The survey undertaken in the Tadla scheme confirmed this heterogeneity in farm sizes (table 1).

¹ The main goals of these two projects were: i) to study the dynamics at play in irrigation schemes in Morocco, Algeria, Tunisia and France; and ii) to enhance networking amongst researchers, farmers and irrigation authorities in those areas. See www.eau-sirma.net for further details.

Local administrative units come in the form of rural municipalities, but their role is limited to local infrastructure development (Zniber and Kharoufi, 2006), and they suffer from clientelism and lack of management capacities (Bergh, 2008). In the studied areas, the traditional rural community-based institution, the *jmaa*, used to be in charge of grazing land, but their role declined with time. The *jmaa* now only has a role to play in the management of land in the limited areas that are collectively owned (Bouzidi, 2007).

In the past, numerous formal farmers' organisations were created by the state. Agrarian reform cooperatives were set up in the 1960s, and used to be active in obtaining credit and sharing agricultural machines. However, most of these cooperatives have now very few activities and farmers have initiated a process to obtain individual land titles (Mahdi and Allali, 2001). Notable exceptions in the five irrigated schemes studied are the agrarian reform cooperatives of the Souss region, some of which still manage agricultural machines held in common, and engage in contract farming with a large-scale wheat seed company.

In addition, during the 1970s, the state initiated many farmers' organisations to serve its own development purposes. It set up what was, on paper, a complete inter-professional organisation of industrial agricultural production (e.g. milk and sugar). In irrigated areas, most of the farmers' organisations, both at the scheme and local level, date from this time. However, family farmers generally consider that there are very few organisations or social movements that represent their interests as professionals. The representatives of the agricultural chambers responsible for agricultural interests at regional level have few links with grassroots farmers, have a tight budget for their activities and are usually controlled by the local rural elite (Desrues, 2005). Therefore, in the schemes studied, coordination and negotiation take place only for sector-based issues such as resource management or a specific agricultural product.

Large-scale irrigation schemes

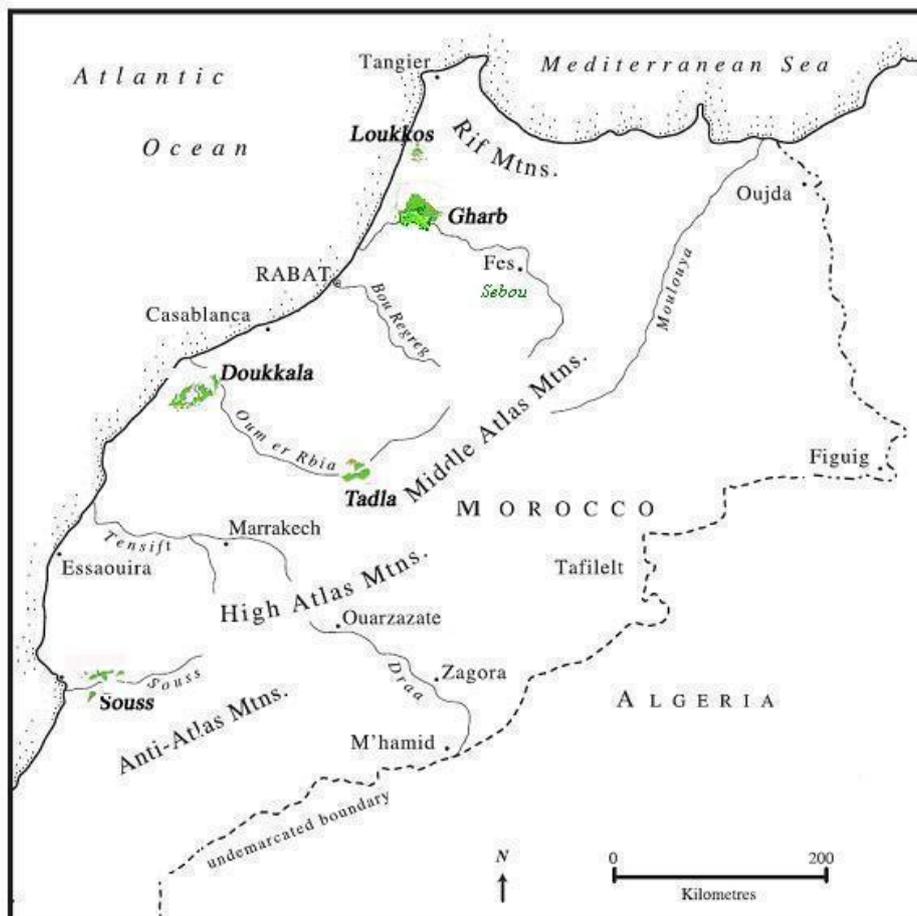
In Morocco, the setting up of large-scale irrigation schemes dates back to colonial times at the beginning of the twentieth century. In the Gharb region, the first scheme was built in 1934 for French settlers, after the drainage of floodplains formerly used by herders (Le Coz, 1964). In the Tadla (1939) and Doukkala (1954) regions, the first schemes were built to be used by Moroccan farmers (Préfol, 1986; Schmidt, 1970). The aim was to modernise the farms of the Moroccan peasantry by introducing irrigation, agricultural machinery, new farming practices and – progressively – industrial crops (such as cotton and later sugar cane and sugar beet). In the Souss, the first infrastructure was built in 1953 for settlers (Pérennes, 1993). The geographical location and basic data concerning the five schemes studied are presented in figure 1 and table 2 respectively.

After independence, the Moroccan state decided to expand these initial projects by increasing the development of infrastructure in order to reach a target of one million hectares under irrigation. From 1967 to 2004, the area under large-scale irrigation increased from 133,000 ha to 682,000 ha, and nine large-scale irrigation schemes were built (Akesbi, 2006). In the Gharb, at the end of the 1960s, the Sebou Project involved the development of an ambitious infrastructure, and was originally intended to create local 'village development cooperatives' based on traditional communities. However, the central administration refused this option, because it did not want to create local counter-powers to the rural notables, who were the main supporters of the political system, especially since the scheme was located close to the Moroccan capital, Rabat (Bouderbala, 1999; Leveau, 1985). In the Souss valley, the Massa scheme, which was the main component of the irrigated area, was completed in 1971, initially for market crops. The most recent scheme is the Loukkos scheme, which started functioning in 1978. Gravity systems were installed initially, and sprinkler irrigation was added in the 1970s. Due to the high operating costs of sprinkler systems, when the Gharb and Loukkos schemes were extended in the 1990s, gravity systems were used once again.

The Moroccan state maintained tight control of these large-scale irrigation schemes from the 1960s to the 1980s, mainly by means of the Code for Agricultural Investments, which was set up in 1969 for the day to day running of the schemes (Doukkali, 2005). Farmers had to accept land consolidation and the irrigation infrastructure. They were compelled to grow the crops planned by the administration (Pérennes, 1993). More than 80% of the land in the Tadla, Souss, Loukkos and Doukkala schemes is now private property, while in the Gharb the land is divided approximately equally between state ownership, collective land and private land. The state created several plans to launch and organise the production of industrial agricultural products such as sugar in 1974 and milk in 1975.

The schemes led to considerable technical innovation in rural areas, but never managed to break-even financially (Pérennes, 1993). In the 1980s and 1990s, because of state economic difficulties and in a worldwide context of limitation of state activities, the state withdrew from agricultural and marketing activities. This change amounted to a decrease in support to farmers, especially family farmers. The bulk of the remaining state subventions in irrigation schemes relate to drip irrigation projects, which benefit mainly large-scale farmers (Bekkar et al., 2007). The effects of the recently launched Green Morocco plan have yet to materialise in the field.

Figure 1. The large-scale irrigation schemes studied in Morocco.



Adapted from Davis, 2006.

These schemes are all managed by an autonomous administrative agency, the Regional Agricultural Development Authority (*Office Régional de Mise en Valeur Agricole*), which is responsible for two main activities: it carries out the whole irrigation service, from the day to day management of sluice gates

and water fee recovery to maintenance; and it is in charge of extension and supporting agricultural activities. However, scheme authorities have decreased their extension budget so that limited numbers of farmers benefit from extension activities.

Table 1. Distribution of farm size in Tadla.

	Less than 2ha	2 to 5ha	5 to 20ha	More than 20ha
Farms (%)	35.9	37.3	21.4	5.4
Share of total area (%)	6.4	19.1	31.9	42.6

Table 2. Basic data on the Moroccan large-scale irrigation schemes studied (2007-2008).

Irrigation scheme		Doukkala	Gharb	Loukkos	Souss	Tadla
General data						
Equipped area (ha)		94,000	106,350	30,400	39,900	98,300
Public irrigation infrastructure (1)	Surface (ha)	61,000	87,200	5800	5800	98,300
	Sprinkler (ha)	33,000	19,150	21,400	34,600	0
	Drip (ha)	0	0	3200	0	0
Number of water user associations (functional ones between parenthesis)		39 (0)	48 (0)	19 (0)	31 (13)	36 (36)
Sugar chain						
Number of farmers producing sugar crops		21,155	7300 (sb) 6900 (sc)	3400	0	6000
Sugar crop	Sugar beet (ha)	18,500	11,600	2966	0	9285
	Sugar cane (ha)	0	12,500	4189	0	0
Dairy sector						
Numbers of farmers members of milk collection cooperatives		16,000 (2)	3974	7200	14,000	18,000
Milk processed (million litres/yr) (3)		135	96	55	169	120
Number of milk collection cooperatives within the scheme		58	77	57	69	84

Source: Moroccan Department of Agriculture (2007) and the Regional Agricultural Development Authorities of the studied schemes. (1) This data does not take into account drip irrigation systems installed by farmers. (2) Plus 8,000 who provide milk but are not members of cooperatives. (3) The dairy sector also collects milk from rain-fed areas close to the irrigated scheme area.

RESULTS

The results are presented in the following order: water management, the sugar industry and, finally, the dairy sector.

Water management

Increasing coordination issues

Coordination and negotiation issues extend from access to water resources to the day to day management of the irrigation service.

Two issues relate to dynamics at catchment level. First, the volume of surface water received by farmers depends on the overall allocation at catchment level. For instance, in the Oum Rbia catchment,

available water has to be shared every year between the Tadla, Doukkala and Haouz² large-scale irrigation schemes, in addition to supplying drinking water to cities such as Casablanca. Farmers within the Tadla and Doukkala schemes have received much less than the theoretical water allocation per hectare since the 1990s. In these two schemes, surface water use requires permanent negotiation between irrigation authorities, industries and farmers over the allocation priorities. For instance, in Tadla, farmers prefer to irrigate alfalfa, while the irrigation authority gives higher priority to citrus orchards and sugar beet. Second, groundwater beneath irrigation schemes is used increasingly, with rising overexploitation patterns. In the Tadla scheme, for example, farmers have installed more than 8300 tube wells in response to a dearth of surface water (Hammani and Kuper, 2007). Combined with a lower recharge, this has led to a rapid decrease in the water tables of the aquifers, as elsewhere in Morocco. In the El Guerdane sector of the Souss region alone, groundwater overexploitation led to abandoning the cultivation of 11,953 ha by 2003 (Houdret, 2008).

In what relates to water distribution, the Gharb scheme is made up of several irrigation sectors, each with its own pumps. In the surface irrigation sectors, pumps are started only if the total demand for irrigation reaches 400ha, which requires coordination to have enough farmers demanding irrigation water at the same time. In all the schemes studied, the number of staff in charge of the day to day management of sluice gates has decreased, because of the nationwide implementation of plans for voluntary departure in public administrations and no replacement of retired staff. This lack of staff in the field has led to increasing difficulty in organising distribution, maintenance and surveillance. Moreover, in the early 1990s, farmers were formally allowed to choose their cropping patterns (some farmers were already choosing them before, but in an informal way), which led to major water distribution problems in the sprinkler sector of the Gharb scheme, where an irrigation outlet distributes water to an average of five farmers, who have to obtain permission from the other farmers to install irrigation pipes across their property. Furthermore, because there are no water meters, water consumption is estimated by the local gatekeeper, often resulting in local disputes about the amounts of water actually used.

Weak Water User Associations

In 1990, in line with worldwide policies at that time, the Moroccan state enacted a WUA law. The irrigation authorities then created almost all the existing WUAs. The planned activities of a WUA were: i) facilitating communication between farmers and the irrigation authority; ii) maintenance of canals falling within its area; and iii) collecting fees on behalf of the authority.

In the Tadla scheme, WUAs were inactive for years, but they recently became more active because a younger and more informed generation got involved and because the irrigation authority invited them to participate in several decision-making processes. The WUAs now take part in planning water distribution and canal cleaning at secondary canal level, and three area-based WUA unions are involved in decisions on general water allocation. WUAs and WUA unions are also involved in the annual planning of maintenance, especially in choosing the areas where intervention is the most urgent. A federation of the three unions was created in 2007, and participates in the regional catchment management agency governing board. However, lack of finance prevents WUAs from undertaking other tasks; they do not undertake water distribution and canal maintenance and they do not collect fees. General assemblies are rarely organised, and the overall link between grassroots farmers and WUA representatives is weak. According to a WUA union representative, this weak link hampers the negotiating power of the WUA unions and federations with other organisations.

In the Souss scheme, WUAs are active only when they have full control of the water infrastructure, i.e. when they are in charge of managing autonomous infrastructures using water from a borehole.

² The Haouz scheme is located in another catchment area in the Marrakech region, to which water from the Oum Rbia catchment is transferred via a canal.

Some of these WUAs successfully manage the operation and management of irrigated areas (300 to 500 ha for each WUA), and are even modernising the irrigation infrastructure by replacing the gravity irrigation with drip irrigation. These WUAs have asked for full control of those schemes, but their request faces legal difficulties to date. In the Doukkala, Gharb and Loukkos schemes, the WUAs exist only on paper.

Several reasons for the general apathy of WUAs can be put forward. First, most were set up according to scheme design, without taking into account local communities' social structures. Second, van Vuren et al. (2005) identified a lack of political will for the real transfer of irrigation management. For instance, at the outset of the WUA implementation programme, the Tadla irrigation authority initiated a policy of devolving 20% of collected fees back to the WUAs, which was communicated to farmers on the different schemes. However, the central administration later decided that the rebate was based on an inaccurate interpretation of the Code of Agricultural Investments, so it had to be cancelled (Doukkali, 2005) (although the 1990 WUA law does not impede WUAs from undertaking production-related activities, it is not yet clear which activities are acceptable for raising funds). WUAs were therefore prohibited from receiving a rebate from the irrigation authority in exchange for their activities. The limited enthusiasm farmers showed at the beginning completely vanished when they learnt that they had to fund the WUA on top of what they were already paying to the irrigation authority.

There is no debate in Morocco about how to revive WUA activity, or about other ways of including farmers in decision-making for the management of large-scale irrigation schemes, although, in small- and medium-scale schemes, many WUAs are active and are fully responsible for the management and the maintenance of their schemes. This is particularly true for the Moyén Sebou irrigation schemes, where WUAs manage an area totalling 6500 ha (Kadiri et al., 2009).

Centralised coordination

At catchment level, in compliance with the Water Law enacted in 1995, the Moroccan state established catchment management agencies (*Agences de Bassin Hydraulique*), which are still in the process of setting up, managing upstream dams and carrying out studies on the different aspects of river basin management. The governing boards of catchment management agencies are legally obliged to include representatives of water users. However, there is no specific organisation to represent farmers on the boards. The involvement of family farmers at this level is obstructed by the difficulty involved in setting up multi-tier organisations (i.e. with at least local and catchment levels) able to nominate representatives both capable and accountable to the farmers they represent. At present, little information gets back to farmers about the issues and outcomes of catchment management agency board meetings. In the Souss, two existing mechanisms were set up to cope with the overexploitation of groundwater: the Guerdane project and a groundwater management multi-stakeholder agreement. In the Guerdane project, a public-private partnership built a pipeline to bring water from an upstream dam to the Guerdane area. It was co-funded by the Moroccan state and a private company, and managed by the latter, with the intention of selling water to farmers (Houdret, 2008). Both initiatives involved limited family farmer participation in the decision-making process.

At scheme level, apart from the limited activities of water user associations in Tadla and some of the WUAs in Souss (which are not part of the state-managed irrigated area), coordination is achieved directly by the staff of Regional Agricultural Development Authorities. Farmers sometimes manage to *voice* in an informal way, for instance by lobbying the regional irrigation water authority to release water in the Gharb (Bouzidi et al., 2010), but many of them, when facing inadequate or insufficient water supply, choose *exit* strategies. In the sprinkler section of the Gharb scheme, difficulties in irrigation service provision, added to the high water production costs and tariffs in this sector (€0.03/m³, twice the tariff in the surface irrigation part) (Doukkali, 2005), caused many farmers to stop using water from the scheme; they reverted instead to rain-fed irrigation or invested in private pumps. From 2002

to 2005, on average only 60,000 ha of the 100,000 ha with irrigation equipment were irrigated in the Gharb scheme. Many other farmers, who wish to irrigate and who do not have access to groundwater resources, choose rather to *neglect*; they keep asking for water, but they put no efforts in improving their relationships with the irrigation authority.

At scheme level, to overcome the above-mentioned coordination problems, the Moroccan state put forward two initiatives based on centralised management. First, the administration considered the Guerdane project as a pilot project, which, if successful, could be expanded to other parts of Morocco. However, the project was set up in a place with: i) high value perennial crops; ii) an existing organisation to export citrus produce; and iii) large-scale farmers who were willing and able to pay for water. It would therefore not be easy to extend the experience to the other Moroccan irrigation schemes, which involve small-scale farmers and a much lower capacity to pay for irrigation water. The second initiative was a shift to drip irrigation. The Moroccan state hoped that a shift to drip irrigation would solve the country's increasing imbalance between water resources and uses. The state provided incentives for farmers to individually equip their farm with drip irrigation (60% of the cost reimbursed). However, only a minority of family farmers decided to adopt this technique (Bekkar et al., 2007). The state therefore decided to start converting whole irrigation blocks to drip irrigation. In the long-term, a National Programme for Water Economy plans to shift 450,000 ha to centrally-managed drip irrigation systems, mainly in large-scale irrigation schemes. In these two upcoming policies, discourses calling for improved efficiency (in management and water use) have superseded earlier discourses centred on farmer participation in the schemes' management. In that sense, they correspond to "depoliticised narratives" (Molle, 2008).

The sugar industry

In the Doukkala, Gharb, Loukkos and Tadla schemes, sugar crops are produced and processed locally. These schemes produce sugar beet or sugar cane, or both (see table 2). The previously state-owned sugar mills were privatised in 2005. Prices paid to farmers are based on sugar yields and their content in sugar and waste, and are fixed at the beginning of the agricultural year. Coordination between the industry and farmers is essential to organise harvesting calendars and to assess the above-mentioned sugar yields and content at the entrance to the mills. Distributive negotiations relate to the price paid to farmers for their sugar.

The state set up farmers' organisations in the past, following the same pattern in each of the schemes that produce sugar crops, by creating a producer organisation at scheme level, with no intermediary organisation at community level; farmers sign a contract with the sugar industry, which requires them to become members of the scheme-level sugar association, and the producer organisation receives a fixed percentage of the amount paid by the industry to the farmers.

The producer organisations have almost no contact with local farmers and offer them limited services such as providing seeds, cuttings and fertilisers. In practice, centralised coordination between the industry and the farmers is achieved by local sugar industry agents, each of whom is responsible for coordinating a specific group of farmers. This, however, debilitates the farmers' negotiation powers. For instance, in 1996, farmers in the Gharb scheme wanted to obtain better prices, and so collectively attempted to refuse to plant sugar crops. However, because there was no coordination between villages, sugar industry agents managed to stop the strike by convincing each village that others had already started planting.

Farmers are paid according to the quality of their product, i.e. the proportions of sugar and waste in the sugar deliveries. Measurement of these quality parameters is undertaken at the entrance to the plant, with no supervision from either an accountable professional organisation representing the farmers or a neutral inter-professional laboratory. As a consequence, many farmers in the Tadla, Gharb and Doukkala schemes do not trust the quality parameters calculated by the industry.

On the whole, farmers do not *voice* their interests with regard to sugar production. They behave as clients and decide to grow sugar crops, or adopt *exit* strategies by growing other crops. In practice, many actually choose to *neglect*, as they grow sugarcane on a small area in order to receive irrigation water, but later dispatch part of this water to other crops. Such a strategy will be more difficult to maintain in the future, as the sugar industry is now private and attempts to implement more selective recruitment of farmers who obtain satisfactory yields. These changes run counter to the original ambitions, where industrial crops such as sugar cane and sugar beet were planned to enable the large-scale modernisation of family farms (Popp, 1984).

The dairy sector

The dairy sector is organised broadly according to the same pattern in all schemes studied: the industries collect the milk directly from large-scale farmers, and then get milk from smaller farmers through the intermediary of milk collection cooperatives. Milk production must be coordinated to control quality (mostly fat content, hygienic milk quality and the presence of antibiotics), and to organise artificial insemination and the importation of heifers. Distributive negotiations relate mostly to milk prices paid to farmers.

In all schemes (with the exception of the Souss region), the industry pays premiums for milk quality to the milk collection cooperatives. Dairy processing industries are operated either by cooperatives or by private companies. In the 1980s, dairy processing units managed by farmer cooperatives were installed in the Doukkala, Gharb, Loukkos and Tadla regions. A private operator entered these four areas at that time and took over the plants of the poorly managed cooperatives in the Doukkala and Tadla regions, which resulted in the disappearance of the dairy processing cooperatives at scheme level. In the Souss region, the COPAG cooperative was created in 1987 by large-scale farmers, initially to support citrus commercialisation. It was created to solve the constraint of exportation after withdrawal of the parastatal main exportation organisation. It later became involved in milk collection and commercialisation, and 69 milk collection cooperatives became members of COPAG. These cooperatives encompass 14,000 family farmers and cater for 80% of processed milk.

Functioning cooperatives at local level

The bulk of milk collection cooperatives (different from the above-mentioned dairy processing cooperatives) were created in the 1970s by the state and members of the local elite. At that time, there was weak control from grassroots members, and local politics affected management. However, these cooperatives evolved differently. Milk collection cooperatives are generally active at local level in the Doukkala, Loukkos, Souss and Tadla schemes, but their level of activity varies greatly. The majority offer services beyond mere milk collection. For instance, twelve Tadla cooperatives provide many types of services (Oudin, 2006), mainly related to dairy production such as the provision of milking machines (100% of studied cooperatives) and animal feed (83%). The cooperatives also provide commercial services: crop inputs and machine rental (25%), grocery shops (33%), gas stations (16%) or phone stations (25%). Finally, given the lack of activity of rural municipalities, the cooperatives studied are involved in social activities such as medical insurance (100%), credit to farmers (41%), support for a pilgrimage to Mecca, grants for investment (91%) or grants to local development associations (75%).

The milk collection cooperatives in the Gharb scheme are generally very weak compared to their counterparts in the Tadla and Souss regions. Most do not control milk quality, so farmers take off the cream before delivering the milk, or even dilute it with water. This results in penalties imposed by the industries on the cooperatives, which in turn impedes the cooperatives' development. None of the cooperatives supports local development or provides extra services, apart from animal feed and coordination with the industry to import cows. One of the reasons for this weakness is a tough environment. Indeed, two main dairy industries operate in the Gharb region: a dairy processing cooperative and the same private operator who took over in the Doukkala and Tadla regions. When the

latter entered the area in the 1980s, it created private collectors, i.e. private businesses that collect milk from farmers' doors and deliver it to the industry. In order to keep functioning, the dairy processing cooperative was compelled to accept milk from the private collectors too. These private collectors gather more milk for both dairy industries than the milk collection cooperatives, and by operating in the same area as the cooperatives they create tough competition for them. The cooperatives also face competition from informal buyers, who buy raw milk from farmers and sell it directly in the neighbouring cities.

In all the schemes studied, producer unions at scheme-level have been created that encompass the large-scale farmers who deliver their milk directly to processing plants and the dairy collection cooperatives. A part of the price paid by the industry to farmers goes to these unions to pay for artificial insemination and sometimes other services such as supporting the importation of pure-race heifers. The level of activity of dairy producer unions in the Doukkala, Loukkos, Souss and Tadla schemes varies greatly. In the Tadla and Doukkala schemes, dairy producer federations provide few services beyond artificial insemination. In the Souss region, the COPAG provides support to local cooperatives and family farmers through its development of a series of initiatives to support farmers' milk production, such as a cattle feed manufacturing plant and a nursery for calves. It also supports the creation of multi-activity complexes for its member cooperatives, which include outlets for groceries, farming machinery, fuel distribution and capacity-building. The state subcontracted the national campaign for the vaccination of tuberculosis to the COPAG. Overall, this cooperative has given strong impetus to rural development in the whole Souss region. In the Loukkos scheme, local milk collection cooperatives have united into five federations. The cooperatives are free to choose the federation they want to join, which provide some incentive for the unions to act efficiently. The largest federation supports its cooperative members in accounting, in negotiation with the milk industry and in the introduction of the silage maize technique. In the Gharb region, the state created the two regional farmer-based organisations (one for each of the main industries in the scheme) in the dairy sector. However, private collectors have majority membership in these two organisations, with cooperatives remaining a minority, and the extension provided by both associations is very limited.

Differing capacities to voice among the schemes

Farmers' capacities to *voice* are very different from one case to the other. There are few direct relationships between family farmers and the industry, as almost all information circulates through the cooperatives. With the exception of the COPAG, though, discussions between farmers, local cooperatives and the industry on how to improve the productivity and efficiency of the whole milk production chain are not actively pursued. Apart from the COPAG (and, to a lesser extent, the dairy processing cooperative in Loukkos), relationships are characterised by a lack of trust. In all the schemes studied, there is no independent laboratory to check the quality parameters of local cooperatives' milk collection tanks, so the cooperatives have to accept the measurements taken by the industry. In 2007, almost all Tadla dairy collection cooperatives organised an eleven-day strike in protest against the price paid by the industry. Because of the widespread lack of confidence in the milk quality measurements taken by the industry, these cooperatives proposed a fixed price with no premium on milk quality, providing the milk fell within given standards (eventually, they obtained a small increase in milk prices, but no change in the premium/penalty system).

The stronger milk cooperatives in Tadla, Doukkala and Souss also became involved in coordination and negotiation with other public institutions in the course of local development projects related to health, education and roads. Some cooperatives were seconded by affiliated rural development associations and demonstrated solid negotiation capacities to improve the social services in the villages where their members live. Negotiations with the drinking water authority, the departments of Public Health or National Education often resulted in local 'public-professional' partnerships that impact directly on the livelihoods of these villages. The success of these initiatives that go beyond mere dairy

production management confirms Shah's (1995) analysis of Indian cooperatives, which showed that well functioning cooperatives tend to diversify their activities in order to remain 'salient' to their members' day to day needs.

DISCUSSION

Exit, voice... and neglect

For the three themes studied, the main issues requiring coordination and negotiation are actually the same for all family farmers, whether they have small or large farms. For water management and sugar production, family farmers are unable to voice their opinions. Many of these farmers, when not satisfied with their relationship with a scheme-level organisation, choose *exit* strategies, for instance, by shifting to groundwater through private or collective boreholes, or by refusing to plant sugar crops. Farmers do not show any attachment to scheme-level organisations that may provide a basis for *loyalty* strategies, i.e. putting trust in organisations and remaining quiet while waiting for the situation to improve. When they do not choose *exit* strategies, they rather opt for the *neglect* course of action. The situation, though, is radically different in the dairy sector. Despite a high diversity in the strength of local cooperatives, they all play a key role as an intermediary for milk collection between thousands of small producers on the one hand and a few large dairy industries on the other.

On the whole, the diversity in farmer participation in coordination and negotiation issues reflects the diversity in farmers' organisations' vitality. Therefore, after an analysis of some factors that strengthen or debilitate these organisations, we discuss ways to support the functioning of the coordination and negotiation arenas studied.

Factors influencing farmers' organisation vitality

Four factors may explain the differences observed in the vitality of the farmers' organisations, three of which were identified and compared by Shah (1995, 1996): a history of state involvement, the type of activity pursued by the farmers' organisation and the accountability relationship between the farmers' organisation and its grassroots members. The last factor, farmers' attitudes towards collective action, has been given more importance in studies of collective action in post-socialist countries.

History of state involvement

A gradient can be observed among the schemes: the stronger farmers' organisations are in the Souss, while the weaker organisations are found in the Gharb. This gradient correlates also with the degree of past state involvement in these schemes, i.e. state presence was very strong in the Gharb region, but much weaker in the Souss region. In all schemes, state disengagement and political 'opening' in the last ten years have enabled the farmers to initiate some form of re-appropriation of their organisations. This re-appropriation has fallen into very different patterns, even though still along the same gradient: the COPAG in the Souss region, although the newest of the large-scale dairy industries in Morocco, is now second in terms of milk production, and has initiated an impressive record of activities to support family farmers in the past ten years.

Farmers' attitudes towards local collective action

In the Gharb scheme, decades of state interference with cooperative management and control by notables have had lasting effects on the way the farmers see collective action in general, and cooperatives in particular (a result similar to that found in Bulgaria's irrigation sector by Theesfeld, 2004). One survey showed that, in the Gharb region, farmers outside the scheme have a more positive attitude towards collective action than those inside the scheme (Bouzidi, 2007). Moreover, many Gharb farmers associate the concept of 'cooperative' with poor management and decisions taken by the elite.

They often do not differentiate between cooperatives and private sellers, or they approach their cooperative more as a client than as a member. Nevertheless, there is a slow re-appropriation of collective action structures at local level in a few villages in this region, with the setting up of drinking water associations and new milk collection cooperatives.

Activities undertaken by the cooperative

With the exception of the Gharb scheme, numerous milk collection cooperatives are active and helpful to their members. This may be explained by the characteristics of the milk production channel: i) the milk is processed by large-scale plants, which need intermediaries to collect the milk from family farmers; ii) milk commercialisation ensures incomes to farmers through the cooperative all year round; iii) farmers regularly meet during milk collection; iv) milk collection cooperatives are certain to sell the milk collected at a given price (unlike organisations that market cash crops, for instance) and thus are in a safer position to invest in services related to farming or local development activities; and v) services brought to farmers can be paid for out of the milk price. Moreover, milk (and sugar) production does not involve competition between farmers; the commercialisation of one farmer's products will thus not harm the commercialisation of another farmer's products. Consequently, it is easier to build cooperation around these products than around water distribution or cash crops.

Farmers' organisation accountability to local communities

Farmers' organisations were created by the state at regional or scheme level, with no practical link with family farmers, and were taken over by local rural notables. This enabled them to network with the irrigation authority and to receive a rent through compulsory tax on products such as milk and sugar. Against this background, in the Doukkala, Loukkos, Souss and Tadla regions, the milk collection cooperatives that provide active support to farmers have become progressively more accountable to local communities. This dynamic towards improved accountability is, so far, taking place mostly within farmers' organisations that were set up at community level.

Supporting farmers in getting an empowered voice?

Different means, with short-term and direct impacts or more indirect and longer-term repercussions, may be proposed to support family farmers' empowered voices in decision-making at scheme level.

Improving multi-stakeholder processes

Overall, opportunities for multi-stakeholder processes exist, but are currently limited to certain topics and regions. In the irrigation schemes studied, there were only three cases of multi-stakeholder platforms involving family farmers: i) the meetings to decide water allocation, initiated by the Tadla irrigation authority; ii) the negotiation process around milk prices in the Tadla, which involved representatives of the eighty-four dairy cooperatives, the industry and representatives of the administration; and iii) the catchment management agency governing boards. In the last case, weak links between family farmers and their representatives make it all the more difficult for this type of coordination to make a difference, compared to centralised coordination, a result found in other multi-stakeholder platforms for water resource management (Wester et al., 2007). Nevertheless, based on international experience (Faysse, 2006), multi-stakeholder processes may be of interest: i) if genuine representation of family farmers is implemented; and ii) if negotiation power asymmetries are levelled, especially to enable organisations representing family farmers to challenge the arguments of other parties. In places such as Tadla, where dairy cooperatives have shown the capacity to negotiate at scheme level, such multi-stakeholder processes may prove fruitful, particularly in terms of building farmer representatives' capacity to enter negotiation arenas. In the Gharb scheme, the two proposed

preconditions are far from met, and the implementation of these multi-stakeholder platforms in the short-term might be detrimental to family farmers.

Supporting farmers' organisations

The study of factors influencing farmers' organisations' vitality, which are described above, provides many suggestions to support farmers' organisations, for instance in terms of improving accountability towards their members, setting up community-based organisations as an intermediary between farmers and scheme-level farmers' organisations, or farmers' organisation capacity to measure the parameters by which farmers are paid for their products (e.g. milk quality, sugar rate and waste). The issue is, rather, who could support these farmers' organisations? Indeed, the latter receive only minimal support from scheme-level organisations (with the exception of the COPAG). A first reason is a belief shared by many of the staff of irrigation authorities that farmers lack 'cooperative spirit', which would explain the failure of WUAs and the difficulties that milk cooperation cooperatives face in the Gharb scheme. Secondly, based on past experiences of state planning, many staff members claim that irrigation authority intervention is bound to debilitate farmers' organisations. As an engineer from a Regional Agricultural Development Authority commented: "[t]he farmers' organisations that work are the ones we do not interfere with". Thirdly, dairy and sugar industries claim they do not support farmers' organisations because of their lack of institutional legitimacy to intervene in those organisations.

Cross-sector learning opportunities

From the 1970s to the 1990s, the state set up professional farmers' organisations that were compartmentalised: one for milk, one for sugar, one for irrigation. (An organisation with multiple activities was proposed in the initial development plans for the Gharb plain in the 1960s, but later put aside in favour of a top-down, sector-based approach). According to this vision, farmers' organisations are disconnected boxes: the WUA are in a dead end and there is no reason to consider any improvement in farmer capacity to become a 'partner' in a water management and irrigation service. However, learning processes for collective action are not sector-specific, as group success in one theme in a large-scale irrigation scheme may trigger initiatives in another theme. In the Tadla and Souss schemes, farmers have managed to create additional coordination and negotiation arenas for local development issues (drinking water, health, education, roads, etc) by building on organisational capacities developed through the dairy cooperatives.

CONCLUSION

The study assessed coordination and negotiation arenas in Moroccan irrigation schemes. Analysis of three major themes showed that family farmers do have stakes to defend in large-scale schemes, from the day to day organisation of irrigation turns to sharing added value with agribusiness industries and the planned shift to centralised drip irrigation. With the exception of the dairy sector in some schemes, farmers, who used to be considered as beneficiaries, are now considered above all as clients. They still participate in coordination and decision-making on a minimal basis, and individually adapt to a system managed in a top-down way. Against that rather static result, the analysis showed a high diversity of situations and dynamics amongst farmers' organisations. While WUAs are mostly dormant, milk collection cooperatives appear generally to be active, contributing to improving farmers' everyday lives and, in some places, representing them at scheme level. In these cooperatives, farmers learn to voice their opinion, both in an individual way (with regards to cooperative management, for instance) and collectively (when they negotiate with local state administrations to organise community development). In these schemes, although the state gave much importance to the functional role of family farmer participation in decision-making (at least at community level) and not to its transformative role (Hickey

and Mohan, 2004), such transformative impacts can be seen locally, inasmuch that farmers learn to develop "political capabilities" (Whitehead and Gray-Molina, 2003) and to behave as citizens.

While the state approach to organisation was mainly *sector-based* (water, sugar, milk), our analysis showed the opportunity for a *farmer-based* approach to understand local dynamics. This is because our chosen analytical point of view decentralised the traditional focus on water management alone. Indeed, an analysis merely of stakeholders involved in water resource management (as is usually done when studying irrigation institutions) would merely have ended in the recognition of the present WUA dead end and would not have seen the dynamics at play around milk collection cooperatives in Tadla and Souss especially. Moreover, in twenty years, farmers have evolved from a position close to a status of farm workers on their own land, with heavy support from the state, to being independent producers with very limited support. Given such a strong transformation, an analysis of relationships between farmers and other stakeholders has to acknowledge the importance of the dynamics at play.

The development of industrialised agricultural products such as sugar and milk has, in the past, been a tool to force farmers into achieving state objectives. It could now provide opportunities for farmers to engage in multi-tier (at local and scheme levels), professional organisations that would enable them to learn to negotiate at scheme level, and may in the long-term also enable them to secure a voice in water management.

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