Public-private partnerships in irrigation management: socioeconomic, political and environmental concerns

Paper presented at the ECPR General Conference, Bordeaux, 2013, in the Panel Privatisation and Pricing in Water Supply and Treatment: What Impact do New Management Forms (such as Public-Private Partnerships) have on Water Prices, Policy Outputs and Outcomes?

Bordeaux, September 5, 2013

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Abstract

Public-private partnerships (PPPs) are a relatively recent phenomenon in the irrigation sector; the El Guerdane project in Southern Morocco is the first of its kind worldwide, and includes water mobilization, supply, and management. Implemented in 2008, it now provides water to 10,000 ha of highly lucrative citrus fruit plantations. International development banks present this project as a success story, but results in terms of local development have been mixed. While some farmers have benefited from the initiative, most small-scale farmers around the project area have experienced increased marginalization from water, fertile land, and development.

Based on extensive field research in the El Guerdane area between 2006 and 2013, the present paper identifies three key critical issues posed by PPPs: partly negative effects on livelihoods and socioeconomic development within and beyond the project area; an unequal sharing of costs, benefits and risks between public and private partners; and uncertain environmental impact. All three factors have led to the widespread perception that national authorities are unable to guarantee their welfare responsibilities, while ignoring the 'small people's' needs in times of growing uncertainty.

Based on an analysis of the policy outputs and outcomes from this case, this study explores the links between resource governance and social stability both in the area studied and in a broader regional perspective. The Arab Spring and increasing social unrest in the MENA region have given access to water for livelihoods and human well-being a key role for social stability. As the present analysis shows, unintended socioeconomic and environmental consequences from PPP projects need to be addressed in order to improve the chances of socially inclusive and environmentally sustainable development. This study closes with key recommendations on this topic, including how projects should be designed and implemented.
1. Introduction

Investments in agriculture are crucial to food security, given the increasing world population, highly volatile food markets, and growing concern about the impact of climate change on food production. Food security is also closely linked to sociopolitical stability as witnessed by protests against increasing food prices in the Arab Spring as well as the government coup in Madagascar after foreign investments in agriculture exacerbated the local food crisis.

Agricultural production and related natural resources are gaining in importance as economically and politically strategic issues for governments and the private sector, often leading to heated debates on governance and regulation. The current wave of large-scale foreign and domestic investment in land has been heavily criticized for its negative impact on local populations and the environment. Many cases have seen local agricultural production exported at the expense of local livelihoods and food security; despite past and ongoing approaches and instruments towards regulating this type of investment, implementation is still in its infancy (Brüntrup et al., 2013).

Debates on this phenomenon echo those controversial discussions on the private sector’s role in the drinking water supply. In either case, local or foreign private companies often take on much of the investment with international finance agencies, or with state involvement in public-private-partnerships (PPPs) encouraging and facilitating the process. International finance institutions such as the World Bank see great potential for the private sector in agricultural investments including irrigation, reason enough for PPPs to support such projects (Darghout et al., 2007). However, experiences from the drinking water sector have shown a number of problems warranting public regulation in order to secure water supply as a public good while making sure that the benefits from service delivery are not restricted to certain population groups. Complete or partial privatization of drinking water services has often led to problems with increasing water tariffs, and private companies have shown limited interest in long-term investment in infrastructure and service delivery for less profitable population groups and regions. This trade-off between quality and cost-cutting has threatened the water supply itself in many cases, resulting in potentially serious risks to health and the environment (Peroo, 2013).

International guidelines exist for the construction of dams and have recently been developed for large-scale investments in agriculture (Brüntrup et al., 2013). However, case studies have shown that these guidelines are often poorly implemented, so regulating the private sector is still a challenge. The present study argues that PPPs for investments in agriculture provide an opportunity to improve the regulation of private sector involvement in the interest of the public and of the environment. Stronger regulation would benefit political stability – and thereby also political decision-makers – in the long term, even if public partners sometimes have little interest in stronger regulation in the short term due to factors such as local elites benefiting from the status quo.

As this case study on a PPP project in Southern Morocco will demonstrate, failure to take negative externalities of such investments into account may not only lead to increased poverty, migration and conflict potential, but may also directly undermine the legitimacy of political leaders at local and national level. This may contribute to social unrest, possibly even culminating in a government coup in situations that are less than stable at the outset. The MENA region is a case in point – not only is the overall political situation still unstable in many MENA countries in the aftermath of the Arab Spring, but pressure on the agricultural sector is high with access to water for livelihoods and human
well-being playing a key role in social and political stability. Moreover, several PPP projects in the irrigation sector are already being implemented (Darghout et al., 2007).

The aim of the present study is to analyze the experience from a PPP project for the construction and operation of an irrigation scheme in Southern Morocco in terms of socioeconomic, environmental and political impact, and to derive policy recommendations from the results. This paper is based upon extensive desk and field research carried out by the two authors between 2005 and 2013\(^1\), including more than a hundred and eighty interviews as well as a systematic quantitative and qualitative assessment of effects of the project for different categories of farmers (see also Houdret, 2010a). The paper will identify three key critical issues from the PPP: partly negative effects on livelihoods and socioeconomic development within and beyond the project area; unequally shared costs, benefits and risks between public and the private partners; and probable negative environmental impact. All three factors have led to the widespread perception that national authorities have been unable to fulfil their welfare responsibilities, ignoring the needs of the ‘small people’ in times of growing uncertainty.

This paper is structured as follows: Section 2 introduces the project, summarizing the project’s general technical and financial concept; subsections analyze the environmental, socioeconomic, financial and sociopolitical impact and risk arising from the project. Section 3 summarizes the main results, and formulates policy recommendations for PPP design and implementation in the irrigation sector.

2. The El Guerdane project: concept, impact and risks of a PPP project in the irrigation sector

2.1 The emergence of the project and its technical and financial concept

The Souss Massa Draa region is Morocco’s second most important economic province due mainly to its high-value agricultural production. The province is home to a large share of the country’s lucrative export agriculture, as about half of the vegetable and citrus fruit production stems from here (Maroc des régions, 2010), amounting to 75% and 55%, respectively, of the country’s exports in these sectors (Baroud and El Fasskaoui, 2008). What many view as a success story began with the first plantations in the 1940s followed by broad expansion in agriculture – partly under French colonial rule – in the 1950s and 1960s. Eight large dams have been built on the Souss, Massa and Issen rivers since the mid-1970s, an initiative in line with former King Hassan II’s policy of dam construction all over the country. This hydraulic infrastructure modernization drive plus agricultural intensification has made important increases in production possible, but not without increasing degradation of water and land resources (Bouchelkha, 1996). The effects of climate change such as more severe and frequent droughts and decreasing rainfall have already taken their toll on the region, further increasing pressure on natural resources (Askassay and Najib, 2008).

Water scarcity alone caused the abandonment of at least 11,900 ha of for merely cultivated land in the Souss valley, and particularly around the city of El Guerdane, up to 2008. Wells dried out due to the sinking water table, often leaving entire villages without drinking water. The annual water deficit

\(^1\) Annabelle Houdret would like to thank CIRAD, Montpellier, for their support in a field study carried out between 2005 and 2008.
with regard to water use is estimated at 233 million cubic meters in the Souss valley alone (ABHSM, 2011). A study by the FAO and other initiatives called for a prohibition on further irrigation expansion to preserve the aquifer as early as in the 1980s (Baroud and ElFasskaoui, 2008). Awareness regarding the fall of the groundwater levels was indeed high, but control remained weak and the local 'water police' in charge of controlling illegal boreholes was largely under-equipped. In 2006, an aquifer contract framework convention was signed between many water users and public authorities with the aim of improving groundwater resources use and management. Controls on illegal drilling did progress in the first few years after the convention was signed, but things soon returned to the status quo with largely uncontrolled groundwater withdrawal. Apparently, influential farmers had obtained “informal consent from the staff of either the Catchment Management Agency or the Ministry of the Interior” (Faysse et al., 2012).

The El Guerdane project was initiated by the Moroccan authorities in 1995 to address the problem of decreasing water availability and its effects on local livelihoods and high water demand. The project was aimed at delivering water from a complex of two dams (Aoulouz, inaugurated in 1991 and Mokhtar Soussi, inaugurated in 2002) located in the upper Souss Valley to an area of private citrus fruit exploitations near the locality of Sebt El Guerdane a hundred kilometres South. This irrigation system sees 45 Mm$^3$ of water per annum transferred through 90 km of pipeline, and a 300 km gravity-pressurized network distributes this water in the El Guerdane irrigation scheme (see Figure 1). The project has been operational since the end of 2009, supplying 597 citrus fruit exploitations totalling 9,600 ha spread over an area of 30,000 ha with 4,000 m$^3$ of water per hectare and year.

The choice of the El Guerdane area was not a coincidence – groundwater resources degradation was particularly severe here, and the sinking aquifer seriously endangered the lucrative production of citrus fruits concentrated around the locality. From 1968 to 1993, the aquifer in El Guerdane sank more than 40 m on average (Askassay and Najib, 2008) at a pace sometimes exceeding 2.5 m/year (El Guedarri, 2004). Over-exploitation of groundwater resources has been identified as the main trigger of the development (Popp, 1986; Ait-Hssaine, 2004; El Mahdad et al, 2005), and groundwater exploitation has benefited socioeconomic development very unequally among local farmers – farmers owning more than 15 ha represent approximately 20% of all farms in the region and use 80% of the pumped groundwater (Faysse et al., 2012).

The El Guerdane project’s financial concept was innovative in that it was the first irrigation system worldwide to be built and operated in a public-private partnership (PPP). Two other concepts have been proposed since the initial planning phase for the project in 1995, including an entirely public structure and a financing concept combining public funds and individual contributions from farmers. However, the World Bank’s International Finance Corporation (IFC) strongly advocated the PPP option as the most economically viable concept for both the state and the users$^2$ (IFC, 2002). Allocation of infrastructural construction and operation to a private actor was also seen as a means to counter strong rivalries between different regional and national politicians reportedly attempting to exploit the project for their personnel interest$^3$. The importance of water allocation and

$^2$ The IFC provided technical, financial and legal advice to the Moroccan government in the preparation of the project and was involved in the bidding process. See IFC, 2010.

$^3$ See Bonnet, 2013, for more details on the project genesis and how the PPP option was chosen.
agricultural production in power relations in the valley and beyond hence became clear as early as in the project’s design phase.

In 2003, the Moroccan government opted to launch the project as a PPP and issued a call for tenders, with one of the two responding consortia selected in 2004. This consortium was led by Omnium Nord Africain (ONA), which merged with Société National d'Investissement (SNI) in 2010. SNI consists of several enterprises involving strategic interest such as mining, agribusiness, distribution, financial services, telecommunications, and renewable energy, and is by far the most important economic player in Morocco's economy as it accounts for 30% of the national stock market (Iraqi and Michbal, 2010). The Moroccan royal family is SNI's main stockholder (Vermeren, 2011). Other members of the consortium financing the project are Morocco's Caisse de Dépôt et Gestion, France's Compagnie Nationale d'Aménagement de la Région du Bas-Rhône et du Languedoc, and the Saudi-Arabian
branch of the Austrian firm InfraMan (Infrastructure Development and Management). ONA founded Amensouss to design, operate, and maintain the El Guerdane project.

The total investment costs to the tune of USD 80 billion were shared between the users at 8%, the Moroccan State at 48%, and ONA at 44% (MADPRM, 2009, El Gueddari, 2004). However, Fondation Hassan II, a foundation acting under the direct auspices of King Mohamed VI (initially created with capital from selling licenses for mobile phones in the country) financed most of the public share. The predominance of the Moroccan royal family in public and private aspects of the project blurred the line between both stockholders; in a sense, the project had less in common with more conventional PPPs than it did with projects in post-1990 Eastern Europe with politically influential private investors benefiting from the rapid privatization of formerly public companies (Windolf, 1998).

2.2 Project impact and risk assessment

The following section assesses the impact of the project already visible on the ground, highlighting key risks associated with this impact in the short and longer term. We have distinguished between environmental impact and risk, socioeconomic concerns, impact and risk from the financing scheme and sociopolitical impact to bring clarity to the various trends.

2.2.1 Environmental impact and risk

The present risk assessment starts with the environmental concerns because – as important as financial or socioeconomic implications may be – they are the most crucial element in the viability of the initiative, the sine qua non of the entire project. As mentioned above, the PPP was initiated as a response to the degradation of water and land resources used for the local citrus fruit production around the locality of El Guerdane, where the aquifer levels have since sunk to 200 m depth or more (see Figure 2).

However, instead of restoring the aquifer, the project threatens to cause severe environmental deterioration in the irrigation area itself and its surroundings for four main reasons.

First, water provided by the project corresponds only to 50% of the volume needed for the plantations. The rest needs to be drilled from private boreholes, although this contradicts the official aquifer preservation strategy. In addition, formerly illegal boreholes now legalized are part of the irrigation scheme, sending a risky signal in an environment where enforcing official rules on water use is already very difficult. According to the authors' interviews, the irrigation scheme not only preserves existing plantations, but has also expanded the land area irrigated, a development formally prohibited by the catchment management agency and aquifer contract.

4 For further details on the partnership agreement and its implications see Houdret, 2010.
Figure 2: Examples of wells in the El Guerdane irrigation scheme with respective depths in meters

Second, the project exacerbates pressure on groundwater resources in the valley while contributing to agricultural intensification – such as a shift from olive plantations to highly water-demanding citrus fruits – and extending the land irrigated in the upstream region. Partly anticipating limited water availability in the El Guerdane scheme, many citrus fruit farmers have moved upstream where the aquifer is still accessible. Although the aquifer contract formally forbids expansion in citrus fruit cultivation, many public irrigation authority (ORMVA) agents as well as Lahoucine (Lahoucine, 2006) have reported this development in the Ouled Berrhil and Aoulouz sectors (see Figure 1). So the government and local authorities tacitly encourage expansion in citrus fruit cultivation against the official rules in place (see also Faysse et al., 2012). As Perennes (1993) rightly points out, farmers exploit groundwater resources until their complete depletion, and then often move to another area where water is still available. This corresponds with “mining logic” detrimental to ecological sustainability.

Third, the project is likely to have a severe environmental impact beyond the irrigation scheme itself. Although thorough assessments on the issue are lacking, observations on the ground point to increasing erosion risks, desertification and further water-table sinkage. Farmers have reported that they were able to use water from the first dam to irrigate their fields before the transfer pipe to El
Guerdane was laid, others reported that drinking water wells had either dried up, or that water was only available from deeper boreholes drilled in the villages (Houdret, 2010a). Farmers around the El Guerdane area made the same claims, further corroborating a preliminary study on the El Guerdane project commissioned by the World Bank’s International Finance Corporation (IFC) (SFI, 2002). According to that study, the project would not help prevent further water-table sinkage, which would continue at the same pace. Subsequently, the land area irrigated by the project would have to be reduced, which might again reinforce migration to upstream regions or other areas. Scientific models predict that the aquifer may be entirely depleted by 2020 if water extraction continues at the present pace (Askassay and Najib, 2008).

Fourth, the strategic orientation of the project towards cultivating citrus fruits – the scheme forbids irrigation for anything else – is lucrative due the high export value of citrus fruits, but does not benefit the environment. Instead, the traditional cultivation of argan trees, but also other products such as olives, would be much more suited to the climatic conditions and far less water-intensive. According to the Moroccan Water and Forest Agency, pipe construction from the dam to the irrigation scheme has also destroyed several hundreds of Argan trees (source: interviews in 2013). A replanting program negotiated with the government had not yet been implemented as at the time of writing this article.

The present analysis of environmental concerns from this PPP project points towards high risks not only for the viability of the project itself, but also with respect to long-term degradation of the whole region including upstream areas. These results also contrast sharply with statements from international development organizations and finance institutions, including the IFC, that have praised the project that has supposedly "mitigated the risks of depleting groundwater resources" and "safeguarded a citrus industry" (IFC, 2010).

### 2.2.2 Socioeconomic impact and risk

Official presentations by Moroccan authorities and international development institutions such as the World Bank have claimed that the El Guerdane project benefits socioeconomic development in the Souss region (IFC, 2010). The following analysis critically reviews the socioeconomic implications of the project on individual farmers and on the region as such.

**Individual costs and associated risks**

Costs to individual farmers for joining the project, including connection fees and partially subsidized investment in obligatory drip irrigation, have been estimated at around €17,000 for a 15 ha field (Houdret, 2012). Besides the costs of irrigation water, farmers also have to bear the costs of renewing trees that may have aged or sustained damage from long years of water scarcity. Irrigation water was initially sold for 1.69 Moroccan Dirham (Dh) per cubic meter, which has since risen to around 1.9 Dh/m³ due to inflation. The IFC argues that the project "made surface water available to

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5 Besides a small region in Algeria and parts of Israel, the Souss valley is the only region in the world where this species of tree grows, and has become a UNESCO Biosphere reserve. Argan oil is exported as a high-value product, but other agricultural uses of the land, industrial activities, and urbanization have contributed to substantial reductions in argan forestation over the past twenty years.
farmers at an affordable price” (IFC, 2010), but the current rate is at least twice as high as the average paid in public irrigation schemes in Morocco, where water price rarely exceeds 0.7 to 0.8 Dh/m³ (interviews with ORMVA and ABHSM, 2013).

Additionally, farmers have to bear the costs of the remaining irrigation water since the transfer pipe only provides half to two-thirds of the water needed, depending on the quality of the irrigation systems and climatic parameters. However, boreholes for pumping groundwater to supply the shortfall entail significant additional cost. According to a 2002 IFC survey, drilling water from a 200 m depth (a common situation nowadays in El Guerdane) would cost about 15,000 Dh/ha/year for citrus fruits. Even after deducting water provided by the project, the farmers are still facing high annual water bills at an estimated range of 12,500 to 15,000 Dh/ha, whereas the added value would be 32,000 Dh/ha (Plan Maroc Vert, région Souss-Massa-Draa, 2009).

Only financially well-positioned farmers have the means to stomach these high water costs, and the uncertain ecological situation and likely rapid degradation of water supply as previously described create a very risky situation at an individual level. Moreover, the limited return on sales – especially taking the initial investment costs, maintenance and salaries into account – also favours large farms. Adding investment costs, technical implications of drip irrigation and running costs into the equation, farms smaller than 3 to 5 ha would hardly break even, let alone benefit from the project (Houdret, 2012; El Aydi, 2011). Recent reports about a sharp decline of the production and export of citrus fruits during the 2012/2013 season (including a decline of 50% in the Souss region) further corroborate this impression (Belouas 2013).

Socioeconomic impact beyond the project area

The 10,000 ha of irrigated land in the El Guerdane project are spread over a total surface area of 30,000 ha and seven rural districts. Beyond this area, six other districts with a total of over 48,000 inhabitants are concerned by the project, for example because the transfer pipe crosses its territories. Beyond the impact and risk to individual farmers from the project itself, two major concerns point towards negative externalities for the population in the irrigation area’s surroundings.

First, only a few of the farmers located close to the project are involved in the initiative, most of whom own large plantations. The 597 farms involved represent only 11% of the total number of farms in the seven districts while occupying more than a quarter of the total cultivated area, so a small number of landholders control a large share of land and also benefit from integration into the project. The ratio is even more striking in some districts – 22% of the farms representing 57% of the total cultivated area in the Sebt El Guerdane district itself are involved in the project.

Most of the farms involved in the project are relatively large – the average size is 16.1 ha, more than five times the average in the Taroudant province where the project is located (Bonnet, 2013). Only 13% of the farms included are smaller than 3 ha, and 25% are smaller than 5 ha. But a closer look at these figures reveals that many of these "small" farm owners actually own several farms, and cannot be classified as small-scale farmers. Additionally, the size of the farm according to the project only

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6 Number of inhabitants of the communities of Tazzemourt, Bounrar, Tiout, Arazane, El Faid and Aoulouz according to the 2004 population census.
7 More details on the typology of the farms involved in the project can be found in Bonnet, 2013.
includes that part of the farm cultivating citrus fruits, so the actual sizes of these farms are probably much larger.

Second, the population surrounding the project area – farmers or not – do not benefit from the project in terms of access to irrigation water, and may even suffer from negative externalities. Most farmers near the project farms and in the region have had to contend with worsened access to water, and sometimes even complete exclusion from water supply, since project initiation. To be sure, this is not the fault of the project alone in view of the aquifer's overuse and climate changes, but the project has further intensified water scarcity for these farmers forced to rely more on rain-fed agriculture, which is far less profitable than speculative crops such as citrus fruits. Representative studies have shown that pre-existing disparities between farmers in terms of crops cultivated, income and access to water have deteriorated after the transfer scheme was built (Houdret, 2010a, Houdret, 2012) with negative direct and indirect effects on small and medium-sized farmer incomes. Many of these farmers will not be able to cultivate their land any more in the short and medium term due to factors such as rising production costs for deeper drilling, and some of them will sell their land to larger investors – often members of the El Guerdane project. The same may happen to financially weaker farmers within the project area. This trend seems all the more predictable given that this project will not put an end to aquifer over-exploitation according to the IFC (IFC, 2002).

Although the IFC claims that El Guerdane "provides direct and indirect jobs for an estimated 100,000 people" (IFC, 2010), it seems unlikely that those taking the brunt of the project's environmental and economic impact will benefit from these jobs. Moreover, research on the quality of employment in the local agribusiness indicates serious problems, including a large share of informal jobs without any written contract or insurance, high seasonal fluctuations and often low wages (Raimbeau, 2009).

Even without any large-scale representative studies on the El Guerdane project's socioeconomic impact beyond the irrigated farms, the phenomena analyzed here paint a largely negative picture. The project may serve the short-term economic interests of a few, but it disregards the long-term concerns of the majority and the ecosystem at large, including ecosystem services such as water provision. Concentrated public and private investment has been granted to a privileged group of farmers at the expense of the larger region, which is suffering from severe water scarcity and insecure livelihoods.

At regional scale, the El Guerdane project seems to serve the Moroccan government's strategy of valorising small, highly productive agricultural perimeters geared around exportation (El Jihad, 2001). These perimeters drain a large proportion of the public funds intended for agriculture in the government's Green Morocco Plan of 2008. The local implementation strategy of the national plan foresees investments of 4855 million DH for 23 projects within the first pillar consisting of predominantly export-oriented “highly-productive or high added value modern agriculture” including livestock, the so-called “lever for growth”. The second pillar of the strategy supports the so-called “solidarity agriculture”, i.e. traditional, small-scale farmers representing 70% of all farms in Morocco (70% are smaller than 5 hectares). The budget for supporting these farms is only 1542 million DH for 56 projects. Once again, supporting already well-established agribusiness firms receives more support than the majority of the farmers, whose livelihoods are at much greater risk.
2.2.3 Impact and risk from the financing scheme

Closer analysis of the project’s financing scheme and its implications demonstrates broad inequality in how the benefits and risks have been shared between public authorities, the private company and the farmers involved. Four major issues reflect this concern.

First, as mentioned in section 2.1, the financing scheme for the initial project investment includes public subsidies of 237.5 million dirham (MDh) and a 237.5 MDh loan from the Hassan II development fund at a 1% interest rate. Together, these public funds represent around half of the total investment. The Hassan II development fund is administered by the Fondation Hassan II, an institution founded under the direct auspices of King Mohamed V for allocating public budgets to development activities without any parliament or government control. This gives the PPP an unusual quality since the owner of the private company is the same person controlling the public entity subsidizing the project, involving public investment to secure the high risks of a largely private project with benefits going to the private company owned by King Mohamed VI.

Second, the concession contract reflects the unequally shared risk if the company is not able to deliver water. The contract stipulates that the concessionaire and the farmers share the risk; the corporate concessionaire carries the costs from revenue losses at up to 15% and the farmers pay an extra water fee for losses at between 15.0 and 22.75%, while the public partner compensates the company for losses in excess of 22.75%. Interviews with the local irrigation authority (ORMVA), the water catchment agency (ABH), and water-user associations (AUEA) have revealed that charging users in case of water shortage is not a realistic option in most cases since the users would already have financial problems from production losses. Apart from that, the user contract states that the concessionaire cannot be held responsible for water delivery cuts in cases of absolute necessity without providing any clear definition of absolute necessity, so the concept could cover a number of reasons. The contract gives no indication as to who would define this type of case and implement subsequent measures.

Third, the cost-effectiveness of the project is questionable, indicating further financial risks. In interviews carried out in 2013, the director of AmenSouss emphasized that the project’s water price and connection fees were too low to cover the concessionaire's investment. Indeed, the 1.69 Dh/m³ in addition to the connection fees of 8,000 Dh/ha are far below the IFC’s recommendation for guaranteeing the project’s viability as a going concern. The IFC recommended fees of 2.2 Dh/m³ and connection fees of 10 000 Dh/ha (IFC, 2002).

The environmental threats to the project’s viability (including sinking water table and drought) and financial risks associated with the fees place doubt on the capacity of AmenSouss to operate and manage the project in a financially sustainable way and repay the initial loan. Apart from that, the complex infrastructure requires continuous maintenance, which is also costly. Whether or not the project will still be able to deliver water after the concession period of thirty years and how negative impact within and beyond the project area will be handled during and after this period appear to be highly uncertain at present. The private partner will be putting up a rehabilitation fund of 160 MDh from the twenty-first year of operation, which may cover costs for maintaining the irrigation scheme and transfer pipe. However, whether this amount will be enough, what exactly the fund will cover, and who is administering the fund all remain open to doubt.
These three concerns regarding the PPP's financing scheme and its associated risk show the highly unequal distribution of benefits and risks between the public and private partners. Indeed, public authorities and budgets allow for securing a private investment that is not financially viable even according to its own representatives, let alone able to benefit local communities. The following section on sociopolitical implications will shed some light on why this apparently highly insecure investment was entered into.

2.2.4 Sociopolitical impact and risk

The risk assessment in the World Bank’s publication on the future of PPPs in irrigation only refers to potential problems of the staff of public or private institutions involved and which need to assume new assignments and accept new relationships in this context. Political risk is reduced to a potentially changing government’s attitude towards PPPs or changes in the clients’ payment behaviour (Darghout et al., 2007). However, as this subsection analyzes, there are at least three major issues involved in the sociopolitical impact of the project at local and national level: increased water conflicts, privileged access to the project, and resulting problems of political legitimacy.

Developed in years of severe drought at the centre of a region heavily affected by water scarcity, the El Guerdane project raised high expectations in the area and beyond. The involvement of a private company owned by the king as a major player in the investment was largely seen as a guarantee against supposedly inefficient and corrupt public institutions (source: interviews in the Souss valley, 2006), and was also interpreted as a sign of the monarch's commitment to the future of the valley and its inhabitants, who had felt politically neglected since the water crisis started over twenty years ago.

However, the very small number of final beneficiaries – 840 farms on the first list in 2002, 670 beneficiaries announced in the first official presentations and 597 farms belonging to 371 farmers only today; a waiting list of several hundred other farmers – has deeply disappointed the majority of those denied access to water. A growing feeling of frustration, but also of injustice is particularly perceptible within the project area and its periphery (source: interviews 2006-2013 and Houdret, 2010b). Many farmers along the project pipeline thought that a huge open "seguia" – a traditional irrigation canal – would be laid, which would benefit all of the farmers from Aoulouz to El Guerdane; the choice of an underground pipeline has provoked disappointment and anger. Water distribution in Morocco has always been spatially organized, giving priority to upstream areas (Perennes, 1993; El Jihad, 2001); this project inverts the arrangement, exacerbating the upper Souss valley farmers' sense of being denied access from water originally belonging to them.\(^8\)

Several conflicts over access to water have also emerged, and have either been reinforced or provoked by the project. These include conflicts between small-scale and large-scale farmers, within water-user associations, between agricultural and drinking-water users such as from deep private boreholes further depleting the water table and drying out wells used for drinking water, and

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8 Only farmers of a 5000 ha sector in the upper Souss (known as the G1 sector, see figure 1) have managed to secure their water needs of 18 million cubic meters; however this will only be allocated once the sector will be equipped with drip irrigation.
between farmers and the irrigation authority or AmenSouss\(^9\). Some of these conflicts have led to violence – farmers blocked the El Guerdane construction site when their plantations were destroyed and their land confiscated without notice or compensation, and AmenSouss employees reportedly had stones thrown at them during project construction (source: interviews in 2007). Moreover, conflicts among water users or between users and public authorities have frequently led to acts of sabotage against the water infrastructure, causing serious damage in many cases. A detailed analysis on the region has shown that those farmers already marginalized in terms of income, financial capacity, and access to credit are also usually more excluded from the water supply, and are more often involved in conflicts over water access. The project hence seems to reinforce existing marginalization leading to increased conflict potential (Houdret 2010a).

Privileged access for local elites to water from the El Guerdane project has been reported in the field, and is also obvious after analyzing the largest farms in the project. Many of these farm owners have additional regional and/or national political offices along with business interests in various sectors (see Bonnet, 2013, for a detailed overview). These observations confirm statements by interviewees reporting a biased selection process for beneficiaries, many originating from the local rural elite or investors from other regions of the country often closely involved with the political sphere surrounding the monarch.

![Image of citrus fruit plantations integrated and not integrated into the El Guerdane project]

Figure 1. Citrus fruit plantations integrated (green) and not integrated (red) into the El Guerdane project

\(^9\) For a more detailed analysis of these conflicts please see Houdret 2010a and Houdret 2012.
3. Conclusion

This study has analyzed the concept and implementation of the world's first public-private partnership in irrigation supply and management. Many international development agencies and the World Bank Group have praised the project as a success story, but our analysis has revealed serious concerns regarding the project's social, economic, and environmental sustainability.

Environmental impact and risk from the project seriously endanger its sustainability, and not only from an environmental perspective. The likelihood of further aquifer sinkage in spite of – or rather due to – the project is likely to threaten livelihoods as well as the local community drinking and irrigation water supply within, but also far beyond the project area. The probable effects of climate change leading to more frequent and longer droughts will also negatively affect water availability and soil fertility. The strategic decision to cultivate and subsidize highly lucrative, but also very water-intensive citrus fruits instead of traditional local agricultural products such as argan and olive trees will further increase pressure on water resources.

Socioeconomic impact and risk from the project affect individual farmers that have had to make a considerable investment to integrate into the project, but also farmers in the surrounding areas. Our analyses demonstrate that the project mostly serves large-scale farmers, contributing to and reinforcing existing inequalities between them and small-scale farmers. The rapid degradation of water resources in the region threatens local livelihoods that mostly rely on agriculture, a trend reinforced by the project. Considering the employment structure and low job quality in the agribusiness sector, it is unlikely that small farmers – who are most of the local inhabitants – will find adequate income opportunities by working for the "happy few" that benefit from the irrigation project. Instead, these groups will far more likely reinforce the existing migration trend to urban centres within the country or emigrate to Europe, often as illegal immigrants.

Our analysis of the financing scheme and its implications reveals the largely unequally shared risk between the private partners and public authorities, who not only provide the necessary subsidies but also the largest share of financial guarantees if the project should fail. Moreover, even the director of the operating company acknowledges that the PPP is not economically viable considering the investment costs, running costs, and risks from the project.

The broader sociopolitical implications indicate that conflicts over access to water resources are increasing in the region with an overall sense of despair and disappointment broadly shared. The trust originally bestowed on the monarch as the main shareholder of the El Guerdane initiative is also eroding, now that the planning phase is over and reality has set in. A local survey has demonstrated that small and medium-scale farmers in particular do not trust local political parties or authorities, or the king to contribute to resolving local water conflicts or giving support needed to solve their water problems (Houdret 2010a). There is a lack of legitimate arbitral institutions for conflict resolution, which may prove even more dangerous in a fragile political environment as has arisen during the Arab spring.

Our research results reveal that the El Guerdane PPP serves the short-term economic interests of political and economic elites while ignoring the basic needs for water and livelihoods of the majority. Apart from that, the project reinforces environmental degradation, which is detrimental to the whole region – including the project itself.
In spite of the heavy financial and economic risk from the project, its implementation makes sense when taking the political economy at play into account. The project actually illustrates the continuous alliances between the Makhzen (the political, economic, administrative leaders around King Mohamed VI) and the influential elite, alliances that have determined relationships between rural elites and the monarch since national independence. Water and land allocation have always served as an incentive towards securing these elites’ loyalty (Leveau, 1976, Pérennès, 1993, Swearingen, 1987). Historically, farms in the El Guerdane region were partly integrated into public irrigation systems that were often deficient, and mostly relied on private drilling, which permitted some economic independence from central power. Today, however, the project bolsters the power of the monarch and his entourage over the area, and over lucrative citrus fruit production. This phenomenon confirms a trend observed at national scale (Vermeren, 2010) with the royal family’s influence increasingly transitioning from traditional political control to economic control. This includes the dominance of royal companies in strategic sectors such as agribusiness, mining, insurance companies, banks, and now water distribution. Water (and land) control have always provided the means of exercising power in Morocco, and more generally in Maghreb (Chiadmi, 1974; Pascon, 1977; Leveau, 1976; Perennes, 1993; Houdret, 2010b); the El Guerdane PPP project represents a new, possibly less obvious tool in preserving this power. However, if this trend of decreasing political legitimacy and sense of abandonment by the monarch prevails, the increasing conflict potential analyzed above may also pose a threat to political stability.

Finally, this case study also highlights the potentially negative effects of PPP projects. Given that international organizations and local governments are increasingly pushing for this method of financing and operating development projects, increased efforts should be made to design and implement these projects in such a way as to support sustainable and inclusive development. Based on the example of El Guerdane, we argue that the following concerns should be integrated into such projects as early as possible in the planning process:

- Understanding the impact of intervention in the water sector – or of those potentially affecting water resources – on sociopolitical stability and development, including the political economy of different stakeholders, trade-offs and conflict potential\textsuperscript{10}.

For far too long, water projects have been considered as merely technical interventions or, as this example shows, they have been motivated solely by political or economic interests. However, their long-term sustainability depends on their social legitimacy with everyone concerned sharing the benefits and on their environmental sustainability. Taking the stabilizing and destabilizing effects of water policies into account project planning and management is essential towards ensuring sustainable development. This includes understanding the interdependencies between projects and other ongoing sociopolitical, economic and environmental processes and policies; analyzing the direct and indirect conflict potential in a project and its design; and taking action to address these issues.

\textsuperscript{10} For a more detailed explanation of these recommendations, and especially on conflict aspects see Houdret 2010.
• Improving local capacity for public water management. As examples in the drinking water sector have shown, private companies do not necessarily have greater capacity for efficient water management than public utilities. However, the latter lack the capacity needed to improve performance. A range of actions may reinforce public companies towards improving performance while providing a credible alternative to PPPs. Increasing capacity in public institutions may improve their management, while the availability of credits may allow them to invest in strategic domains, improve their position on the market, and otherwise play their assigned roles.

• Improving public control of PPPs. Democratic control of PPPs is often weak, and not only in developing countries. Enforcing parliamentary control, transparency in concession contracts, and legal advice on formulation may considerably improve benefit and risk sharing in the interests of the population, the environment and the public sector.

• Improving transparency in project planning, operation and management. Independent authorities with stakeholder involvement should be responsible for impact assessment, as proposed by the World Commission on Dams. The environmental and social impact assessments should obviously include a thorough analysis of all possible effects inside and beyond the project area, taking long-term effects into account.

• Setting up an independent arbitrational authority for settling disputes and dealing with compensation claims already in the design phase to deal with possible conflicts in the design, operation and post-implementation phase.

• Independently evaluating project performance during the concession period and afterwards, and taking the above environmental and social sustainability issues into account. Superficial evaluation of a project design, as in the present case, should not serve to give a project an international reputation as a successful model to be followed in other countries.

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