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LAND POLICY AND LAND MARKETS ON THE AGRICULTURAL FRONTIER IN ARID ALGERIA

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Abstract

This paper provides an analysis of Algerian land development programs launched since 1983 in arid regions (steppe and in Sahara). To promote land development in these regions, public authorities implemented a number of legal and economic incentives for national private operators. Public land access was simplified by a new legal matrix (the 1983 APFA law for total propriety transfer and the Decree 97-483, 15/12/1997 for 40-year concession rights) and important public investments in infrastructure (roads, electrification, and collective boreholes) and direct farmers subsidies were applied.

Whereas the overall picture of the implementation of this policy is mixed, we focus on some success stories in order to decipher the conditions for successful intensive land development. In a context where most initial beneficiaries of perimeter lands lacked resources, we show the combined effects of (i) the surge, on state-developed irrigation perimeters, of informal sale and above all lease markets, and (ii) of the arrival of farmers coming from northern Algeria, who introduced intensive vegetable cultivation on leased-in land and diffused their know-how. Some local farmers adopted then intensive vegetable cultivation, once accumulated capital and/or technical and managerial expertise. The agro-ecological sustainability of such path to land development remains an open question.

Key Words: Algeria, arid areas, land development, land market, land policy.

Land Policy and Land Markets on the Agricultural Frontier in Arid Algeria

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Introduction

This paper provides a general overview of land policies in Algeria since Independence (1962) and identifies current and future key challenges concerning land issues in Algeria. It then focuses on the development of public lands in the steppe and in the Sahara, as a key component of land and agricultural policies in the past thirty years. Development in these areas is crucial to overcome constraints in the northern regions. Algerian agriculture indeed faces a major challenge: meeting increasing domestic demand for agricultural products (linked to population growth and rising standards of living) under strong land and water constraints. The average workable agricultural land per inhabitant fell from 0.6 ha in 1962 to 0.2 ha in 2015, i.e. a decline of 300% versus an increase of 100% in the yields of wheat.

Three main agro-ecological areas can be distinguished: (i) agricultural lands in the north, estimated at between 7.5 and 8 million hectares, with more than 300 mm of rainfall; (ii) rangelands in the steppe, estimated at 30 million hectares, with between 150 and 300 mm rainfall; and (iii) Saharan agricultural lands (no available data on their extent), with less than 150 mm rainfall which are thus fully dependent on irrigation. Whereas in the past, land in the northern region formed the basis of Algerian agriculture, steppe and Saharan lands are being increasingly used for agricultural production and represent the country's only real potential for extension of agricultural land.

1. Overview of Land Policies since the Independence

1.1. Sketching Fifty Years of Land Policies

Several land-use changes and reforms were implemented in Algeria in the fifty years that followed independence, reflecting both economic changes and changes in political power (figure 1).

The first wave of land reform in independent Algeria concerned land in the colonial sector. In 1963, the State nationalized all land belonging to French colons. At that time, 17,000 former colonial farms (2.3 million ha[1]) were consolidated into 2,200 'self-managed' estates (*domaines autogérés*) whose average size exceeded 1,000 hectares, granted to collectively-organized former workers, under the very close supervision of the administration. The self-managed estates employed 250,000 permanent farm workers and 100,000 seasonal workers (Bessaoud, forthcoming). The option for such large-scale public farms was motivated by a productivist rationale, aimed at facilitating the intensification of production and benefiting

[1] 150,000 hectares belonging to Algerians who were considered to have been collaborators of the colonial power were also nationalized.

from economies of scale (Chaulet, 1991). A private sector covering 6 million hectares existed alongside this new public sector (Guichaoua , 1977).

At the end of 1971, the State launched an 'agrarian revolution' (*Révolution Agraire*) (RA) targeting both private and communal lands. The agrarian revolution' was planned in three stages:

- all communal lands, potentially cultivable tribal collective lands (*arch* land), and public *habous* (mortmain, *biens de main morte*) were converted into state land (1,300,000 ha in total);
- all land belonging to absentee owners, and part of the land owned by large owner-operated farmers (according to a threshold based on the capacity of owner's family labor force), were nationalized (500,000 ha in total);
- *Arch* range lands were incorporated in the State public domain, and access to these lands was to be regulated by the State; the agrarian revolution planned to limit the size of herds, but the implementation of this measure was blocked by the ranchers' lobby (Bessaoud, 1980).

The 'agrarian revolution' land were reallocated mainly to farm workers and landless peasants, who were organized in 35,000 'agrarian revolution agricultural production cooperatives' (*Coopératives Agricoles de Production de la Révolution Agraire*, French acronym CAPRA), whose average size was 200 hectares. Beyond the objective of social justice, the choice of the large-scale cooperative model was motivated by the productivist argument, like the 'self-managed' estates (Chaulet, 1991). Until the 1980s, the implementation of land policies thus led to close and continuous State control of the agrarian reform sector, thereby creating a peasant-worker status in both self-managed estates and AR cooperatives.

A second wave of reforms began in the 1980s, when more liberal politicians came to power. These reforms gradually rehabilitated private farms, but without going as far as privatizing former colonial lands.

Despite major technical, financial and institutional support, the self-managed estates and CAPRA only achieved poor outcomes (Chaulet, 1991; Le Coz, 1991). In 1982, dualism in the public sector ended, when self-managed estates and some CAPRAs were merged into 3400 'socialist agricultural estates' (*domaines agricoles socialistes*, DAS) covering 2,481,000 ha, with an average size of 730 ha, Baci, 1999), again under strict monitoring by agents (technicians and engineers) representing the administration. Most CAPRAs, i.e. accounting for nearly 700,000 ha, were allotted to individual members of the cooperatives (Chaulet, 1991).

The first results of this reform were promising, but another, more liberal, reform was launched in 1987, emanating directly from the presidency (Chaulet, 1991). This reform (Law 87-19), without radically calling into question the basic principles on which the agricultural public sector was based, i.e. (public

ownership of land and collective organization of the production)[2], led to the breakdown of DAS into small groups of 3 to 10 workers in 'collective farms' (*Exploitations Agricoles Collectives*, EAC), the new farms created in this way were granted full autonomy in terms of management. For technical reasons (such as isolation), certain parcels were granted to individual members of DAS, thereby constituting 'individual farms' (*Exploitations Agricoles Individuelles*, EAI) (Le Coz, 1991; Aït Amara, 1999). This reform radically shifted the status of the actors from de facto farm laborers (members of so-called self-managed estates, and then DAS, or of CAPRAs), to farmers, 'beneficiaries' (*attributaires*) of EAC and EAI. By the end of 1992, the implementation of the 1987 reform had resulted in the creation of 22,356 EACs, grouping 56,348 beneficiaries on 2,232,588 hectares, and 5,677 EAI on 55,969 hectares (Baci, 1999). These farms had collective (EAC) or individual (EAI) perpetual rights of use, the land remaining the property of the State (still with a prohibition of tenancy). They received full ownership of the equipment, buildings, plantations, livestock, of the DAS. The number of farms created by the 1987 reform evolved over time, and reached 66,522 EAC and 30,298 EAI at the time of the implementation of the 2010 Law (according to A. Maatalah, former head of ONTA, *Office National des Terres Agricoles*). These data reflect the importance of the individualization triggered by the 1987 Law.

Two other key policies illustrate the shift to liberal concepts even better. First, in 1983, the 83-18 APFA Law (*Accès à la propriété foncière agricole par la mise en valeur*, Accession to land property through land development) marked a turning point in Algerian land policies, as, through this law, the State grants a private property right to any farmer who develops previously undeveloped public land in the Sahara or the steppe (former *arch* land). Second, in 1990, private lands nationalized under the 1971 RA were returned to their owners, in a context of a political crisis that encouraged a surge of claims by landowners who had been affected by the AR.

Lastly in 2010, the perpetual right of use granted to the beneficiaries of the 1987 reform, was converted into 40-year concession contracts (Law 10-03). The State remains the owner of the land, but the law abolishes the restrictions regarding the individualization of farm production, and the commodification of the right of use.

[2] The 87-19 Law, which maintained collective lands, strictly restricted the transfer of right of use (up to making it almost non-transferable), and prohibited tenancy, reassured the public who feared that the new reform would "implicitly lead to restoring capitalism in rural areas… which could rapidly lead to the concentration of land ownership"(Bedrani, 2010).

1.2. The Development of New Agricultural Lands: the Backbone of Land Policies of the Past Thirty Years

Since the 1970s, Algeria has been facing an ever-increasing structural agricultural and food deficit. This structural imbalance is the result of the rapid changes in domestic demand, driven by a population boom and increased purchasing power made possible by strong growth outside the agricultural sector (in the service and industrial sectors), and public subsidies for food products (Bedrani and Guermat, 2015) Meanwhile, the agricultural sector is struggling to find the path of intensification, particularly in the north, including on the best lands (former colonial lands, now EAC or EAI lands belonging to the State's private domain).

Increasing urban demand, particularly for fresh produce (fruits and vegetables, meat) and the rehabilitation of private initiative from the 1980s, favored the emergence of a category of small agricultural entrepreneurs who accessed land mainly by leasing. This dynamics is mainly observed at the agricultural frontier in arid areas. The exploitation of the high (but mostly non-renewable) water potential of the Saharan aquifers through irrigation and encouraging agricultural entrepreneurship, is seen by policymakers as a solution to land and other agricultural constraints in the northern regions.

The first act in this new agricultural policy was the 1983 APFA law, which is a key component of the legal matrix of the new steppe and Saharan agriculture. It paves the way for appropriation (by Algerian nationals) of the State's private domain after the land has been developed – 'land development' being understood here as introducing irrigation on hitherto untapped lands, or land previously used for extensive pastoral livestock systems.

The APFA law implemented the transfer of ownership of these lands through the development of irrigation perimeters by public authorities and then the installation of beneficiaries, or at the request of candidates who pledged to develop, on their own, land outside irrigated perimeters. Inside the perimeters, the State created the infrastructure (roads, electrification, and collective boreholes); the beneficiaries provided the labor, paid the production costs, irrigation equipment and other productive investments. In both cases the beneficiaries had to develop the land at the plot scale within five years of obtaining access to the land. The APFA law was implemented in 1984 in the Sahara and the steppe, before being extended to some northern *wilayas* in 1990[3], but we will come back to its recent evolution later.

[3]. A *wilaya* is an administration division including many municipalities. Algeria is divided into 48 *wilaya.*

In the late 1990s, the State started another land development program, still targeting the steppe and the Sahara (Decree 97-483, 15/12/1997), based on heavy investments in infrastructure and on redistributing developed land to private operators, this time through 40-year concession rights.

Subsequent changes in land policy (Law 08-16, August 3, 2008) included new allocations of the State's private domain in the form of concessions for land developed by the State and under APFA (establishing a right to private property) to those 'enlivened' by individuals (Ahmed Ali, 2011). The latter possibility was then restricted to land in the Sahara by inter-ministerial instruction 402 in 2011. In the steppe, ongoing APFA records will be finalized by granting a title of private property, but new land allocations will be under concession rights.

In 2011, another ambitious concession program (Inter-ministerial Circular 108, February 23, 2011) was launched by the government, with the target of developing one million hectares of land in the steppe and the Sahara by 2019.

In these AFPA and concession programs, the authorities have favored the creation of small farms (from 3 to 10 ha) for the benefit of the inhabitants of the rural areas concerned, in which unemployed youth has priority. A smaller share of land devoted to development was attributed to large-scale Algerian investors. The allocation of farmland to investors, as part of the APFA, concerned only the Sahara, with areas ranging from 50 to 5,000 hectares (Otmane, 2010).

1.3. Key Stakes

Six key features make it possible to assess the current situation concerning land in Algeria and the limits of the land policies, and thus the challenges to be faced.

- The issue of **joint-possession** of private land (due to family law). Joint possession, which concerns 43.6% of farms on private land (63.8% of their area) (RGA, 2001), is often a source of tension within the family. It discourages agricultural investments, and hinders the development of the sales market (but may stimulate the leasing market).
- This issue of the **legal status of private land**. Around 60% of these lands have no title (RGA, 2001).
- The issue of **informal individualization and commoditization** (i.e., privatization) of collective range lands in the steppe (formally State property) (Bedrani, 1993; Abaab *et al*., 1995; Daoudi *et al*., 2013 and 2015). The informal privatization of range lands, due to the pressure of the increase in population but also stimulated directly or indirectly by the land policy (APFA and concessions), raises a number of questions, including its potential impact on sustainability (over-

exploitation of the rangelands, the on-going process of individualization turning collective lands into open access lands).[4]

- The issue of **land markets**. Most land transactions in the private sector remain informal because of the frequent absence of a land title, because of joint-possession, and on public lands (EAC, EAI, concessions) because the sale or leasing of land is illegal or restricted. The 2010 Law does open the way for the sale of the rights of use of such lands, but fixed leases – by far the most common – remain prohibited. The law is in fact ambiguous, as it allows for partnership contracts, but the limits between a partnership and a lease remain unclear. Another shortcoming of the legal framework is the absence of a text regulating tenancy contracts. These shortcomings show that public authorities do not view the market as an allocation mechanism, which is one of the missing components of the land policy. At the same time, recent empirical investigations highlighted the dynamism of the land lease market, whatever the legal status of the land and the region, from the old agricultural areas in the north, to the 'agricultural frontier' created by the development of irrigation in the steppe and in the Sahara (Imache *et al*., 2009; Imache, 2008; Belarbi *et al*., 2010; Amichi *et al*., 2011, Bouchaib and Jouve, 2010; Daoudi *et al*., forthcoming a & b).
- The issue of **agrarian structure** and the **balance between small family farms, commercial family farms, and entrepreneurial production units**. Small farms dominate: one million farms accounting for a total of over 8 458 680 hectares were counted during the last agricultural census (2001), i.e. 8.4 hectares per farm on average; 52.3% were less than 5 hectares, 31.7% were between 5 and 20 hectares, 10.6% between 20 and 100 hectares, and 5% more than 100 hectares (RGA, 2001). Numerous field observations point to the emergence of very dynamic small or medium agricultural entrepreneurs in recent decades. The dynamism of the lease market is largely explained (and sustained by) this surge (Daoudi *et al*., forthcoming b; Bessaoud, 2013; Amichi *et al*., 2015).
- The issues of **use conflicts**, with (i) in the northern regions, the extremely rapid, and most often illegal, disappearance of high-quality (and already scarce) agricultural land, due to urbanization; and (ii) in the steppe, the 'classical' use conflict between agriculture and extensive livestock farming, exacerbated by the development of irrigation in these areas.
- The issue of **water use and water rights**. Land rights that farmers acquire through land policies (APFA or concession) implicitly refer to a right of access to groundwater. Water rights linked with land rights given by the government to new land users are not clearly defined (validity, the duration of authorized pumping, pumping volume, license fee, etc.). Illicit boreholes are increasing dramatically, and the long-term future of the aquifer is seriously threatened (Khiari,

[4] See Fitzpatrick (2006) for a stimulating general analysis of such an issue.

2002; Bensaâd, 2011; Côte, 2011; Lakhdari and Dubost, 2011). The policy of developing agricultural lands in the south questions the coherence of water and land policies.

2. The Land Markets as Catalyst of Land Development in Arid Areas

Since the launching of land development programs in the steppe and in the Sahara in 1983, 1.32 million hectares have been allocated to tens of thousands of beneficiaries: 810,000 hectares under APFA and 510,000 under concession programs (1997 and 2011 circulars). However, only a relatively small proportion of these areas has actually been developed. Indeed, the balance sheet established in 2013 by ONTA for areas under APFA showed that only 17.7% of the 810 000 hectares allocated have actually been developed, and 17.5% have been formally recognized as not developed at all (leading to cancelation of the program), but little information is available regarding the remaining areas.

These quite low figures bear witness to the difficulty of developing land in arid areas and give a glimpse of the limits of the ambitious programs launched by the authorities. However, in areas where the development has been successful, the results are quite spectacular. True agricultural hubs have emerged in some places (Biskra, El Oued, El Mniaa, Rechaiga, Ouessara, Aflou, El Maadher), leading to a change in the geography of agricultural production in Algeria (table 1). Biskra, consolidating its initial focus on date palms, now also specializes in greenhouse vegetable crops, and ensures 37% of national production; in a decade, El Oued became the first wilaya in potato production, and Rechaiga (wilaya of Tiaret) in onion production. Market gardening, orchards, and to a lesser extent cereals and fodder crops are gradually relocating to arid regions, rather than to the north, thanks to a comparative advantage in access to water (groundwater) and to land, transport costs being offset by large public investments in road infrastructure and the very low cost of fuel.

[Table 1]

Our aim is to interpret these agricultural dynamics by deciphering the iterative relationships between the individualization and commodification of land on the one hand, and its valuation through irrigation on the other.

Our analysis is based on field work conducted in 2012/2013 in two areas, one Saharan region, the municipality of El Ghrous (*wilaya* of Biskra) (Ouendeno *et al*., 2015), the other located in the high steppe plateau, the Aflou region (wilaya of Laghouat) (Derderi *et al*., 2015). The two sites were selected based on the importance of both land market dynamics and vegetable production – market gardening in the greenhouse in El Ghrous, field irrigated potatoes in Aflou.

- Located west of Biskra, the municipality of El Ghrous has experienced a remarkable agricultural dynamism in the two last decades, driven by a boom in market gardening in plastic greenhouses ('*plasticulture*') and a significant renewal and extension of date palm plantations. El Ghrous has a quarter of the total area of greenhouse market gardening of the *wilaya* of Biskra, whose production increased 3.5 times between 1990 and 2011, from 155,200 quintals in 1990 to 542 101 quintals in 2011 (DSA 2012). During the same period the area under plastic greenhouses increased from 285 to 1,048 hectares.
- The region of Aflou (municipalities of Aflou and Oued Mora) is located in the northern part of the *wilaya* of Laghouat. The study targeted the three irrigated areas in the two municipalities. Total workable agricultural land in these two municipalities is 11,500 hectares, of which 2,250 are irrigated. Nearly 60% of irrigated land is devoted to growing potatoes, whose production increased sevenfold, from 57,770 to 377,990 quintals, between 1990 and 2011 (MARD, 2011).

The survey covered a total of 208 'native' (originating from the municipality) and 'non-native' farmers (landowners or tenants). Our sample covered market gardening and hence only part of the problem connected with the development of new agricultural land. The status of the land in the farms we surveyed is listed in Table 2.

[Table 2]

Due to space constraints, we do not present all the empirical findings supporting our analysis here; for details see Daoudi *et al*. (forthcoming a & b), Derderi *et al*. (2015), Ouendeno *et al*. (2015).

2.1. Land Markets: Actors and Main Features

2.1.1. The Rental Market

Tenancy is very common and accounts for 87% of the area under plastic greenhouses in El Ghrous and 82% of the area under field vegetable production in Aflou, mostly through fixed lease contracts (table 3). Cost-sharing contracts exist but are not common in the study areas, consequently, we focus on fixed lease rentals.

[Table 3]

Main features of fixed lease contracts

The fixed lease contract concerns only land, or links access to land and water, or to land, water, and greenhouses (table 4).

[Table 4]

Access to water is usually included in the contract. In El Ghrous, the contract sometimes includes the greenhouse – in those cases, the tenant is usually a small farmer starting plastic greenhouse production (Ouendeno *et al.*, 2015). When the contract only concerns the land, access to water is by drilling a borehole by the tenant, or buying water from a neighboring farmer (see Daoudi *et al.*, forthcoming a).

The duration of the contract is based on the assessment of land fertility, the needs of the crop and the need, or not, to drill a borehole (Daoudi *et al.*, forthcoming a). For plastic greenhouse production in El Ghrous, the lease is usually for three years and for one year (renewable) for potato production in Aflou (from February to October), except if the tenant pledges to drill a borehole (table 5).

[Table 5]

In El Ghrous, the rent for a plot including access to water varies between 20,000 and 35,000 dinars (DZD) (current official exchange rate for 100 DZD is US$ 1) for a 400 square meter greenhouse, depending on soil conditions and the proximity of a city; without water, the rent is reduced to 5,000 to 10,000 DZD/greenhouse/year for the land, plus 15,000 to 22,000 DZD/greenhouse/year for water. Rent is paid in installments, the first at the beginning of the harvest and the last at the end of the cropping season. In Aflou, the rent varies between 55,000 and 75,000 DZD/ha/year for linked land-water contracts, and between 15,000 and 20,000 DZD/ha/year for land only. In the case of one-year contracts, the rent is usually paid early in the season.

The lease market remains informal with verbal agreements, and often involves partners who had no previous relationship (87% in El Ghrous, 97% in Aflou). In El Ghrous, witnesses are sometimes present (in 37% of the contracts); we documented only two cases (3%) of contracts formalized by a private agreement drawn up by a, notary public (*écrivain public*). In Aflou, 23% of the contracts took the form of private agreements in the form of a written letter – mostly for contracts that included drilling a borehole by the tenant.

Despite the informality of the contracts, the farmers did not fear major contractual insecurity. The literature on agrarian contracts mentions a number of possible risks, such as loss by the landlord of his ownership of the plot, or the risk of delay or default in the payment of rent. Neither risk was mentioned by respondents. At El Ghrous, adapting the terms of payment to the harvest period considerably reduces the risk of inadvertent failure to pay the rent, and the greenhouse (most often the property of the tenant) is considered as a collateral in case of default. In Aflou, requiring ex ante payment of the rent in the contract is an effective way to avoid any delay or default in payment of the rent.

A lease market boosted by non-native tenants

The landlords are mostly natives: respectively 86% and 100% of the landlords leasing out in El Ghrous and Aflou (table 6). On the demand side, 56% of the tenants in El Ghrous originate from other municipalities in the *wilaya* of Biskra, but in the majority of cases, from other northern *wilayas*: Tipaza, M'sila, Djelfa, Sétif, Chlef, Media, Batna, Bouira, Mila. In Aflou, 91% of the tenants are 'non-natives' (Derderi *et al.*, 2015).

[Table 6]

The socio-professional profiles of the non-native tenants in Aflou differed from those of non-native tenants in El Ghrous. They were usually 'itinerant farmers' and had successively rented at different locations before reaching Aflou, motivated by the search for new irrigable land, preferably lands that have not previously been intensively exploited, and thus are not infested by potato parasites and whose fertility is not exhausted. For these 'mining' farmers, tenancy is the most suitable mode of access to land and water, as it allows them to exploit a plot for a number of campaigns and then abandon it once fertility is depleted and the pressure from potato parasites becomes too strong. Et quid profile El Ghrous ?

2.1.2. The Sale/Purchase Market

The first documented purchases/sales in the two study areas took place in the early 1990s. However, it was not until the 2000s that this market really expanded, stimulated by the increase in vegetable production.

The surveys provide clear indicators for the active character of this market: 57% of the parcels owned by the respondents in El Ghrous, and 19% in Aflou, were purchased. The difference between the two regions, in terms of the number of purchases, is, among others, linked to the timing of the agricultural dynamics, the rationale of the actors (leasing-in land in Aflou, rather than purchasing it), and the prospects for sustainability of the activity (Derderi *et al*., 2015; Daoudi *et al*., forthcoming b).

With a few exceptions, the sellers were native; the buyers were also mostly native, but in El Ghrous non-natives represented 30% of buyers (table 7) – we saw that in Aflou, non-native farmers favored leases. There was no entry barrier to the land market at either site: our surveys and numerous discussions with local people showed that access to land ownership through purchase is open to all, regardless of origin in Algeria[5].

[Table 7]

[5] This observation is not exceptional in the steppe (authors' field observations), but this finding should not be to generalized – the situation is indeed different in the municipality of Doucen, neighboring El Ghrous, where the market appears to be much less open. Future empirical investigations should provide data for interpretation.

Because of data production conditions (focus on producers, who most often are tenants), we collected little information on the sellers.[6] A large number of vendors were qualified as 'unemployed' by respondents – probably linked to the fact that unemployed youth were among the priority beneficiaries of land in the areas developed by the State (table 8).

[Table 8]

Farmers accounted for just over half of the buyers. In Aflou, they were very much a minority. In El Ghrous, those who purchased land were mostly date-palm growers (26), there are also five livestock farmers, and tenants (10 renters, two sharecroppers), and plastic greenhouse growers. These trajectories from tenants to landowners are a good illustration of the role of tenancy on the agricultural ladder (Ouendeno *et al*., 2015). The other buyers were involved in non-agricultural activities (tradesmen, entrepreneurs, civil servants) before purchasing land, and were therefore 'new farmers'.

Types of land sold

In both El Ghrous and Aflou, land transactions concerned land whose property rights were well established in terms of social recognition, even though they were not always formalized. In both sites, the sales can be qualified as outright sales, as the transaction ensured the transfer of the entire bundle of rights to the buyer. Once the sale has been made, the buyer is released from all obligations to the seller.

Compared to land status (table 2), purchases of off-perimeter land (42% of the parcels and 55% of the areas) were more frequent than sales inside perimeters (29% and 20% respectively) (table 9). Price and availability provided the explanation. Plots located outside irrigated perimeters were most often sold prior to their development at the plot level and thus at a low price. They are also, by definition, many more plots available outside the perimeters than on, where they are limited in number, and also cover a limited area (a few hundred ha).

[Table 9]

Perimeter land is usually not fully developed at the time of the transaction; as mentioned above, the development of the perimeter by the State did not extend to the plots.

The price of land without a borehole varies depending on the quality of the soil and the location: from 400,000 to 1,000,000 DZD in El Ghrous, from 350,000 to 500,000 DZD in Aflou (around 3 million DZD in El Ghrous and 1.5 million in Aflou with a borehole).

[6] Our investigations focused on actors currently present on the sites: owner-operators who inherited the land, purchased it or developed it, and tenants. Information concerning the people who sold land was collected from the buyers and from resource persons.

Securing land purchases

In the case of APFA plots, the sale should legally be made only after the deed has been issued (and include the transfer of ownership by registered deed). In practice, this is rarely the case, as, at the time of our investigations, the procedure had only been completed (issue of the title) in a minority of cases. No transactions of titled APFA land was documented.

From a legal point of view, the sale of concession lands concerns the concession right and not the land itself, which belongs to the State private domain. Even if this right is legally marketable, at the time of our surveys, the administrative procedures for such transactions had not been established and all the transactions we documented were consequently not officially recognized.

Despite the informality of land sales, only one case of dispute was documented in Aflou; in El Ghrous a few minor problems were mentioned, particularly regarding the establishment of the boundaries of the plots that had been sold, especially land located outside the perimeters.

In Aflou, if the seller does not hold any formal document,[7] the transaction is usually conducted in the presence of *Djemaâ* (a group of witnesses) recognized by both actors. In some cases, in addition to the presence of the *Djemaâ*, the transaction is 'formalized' by a private agreement produced by a notary public (Daoudi *et al*., forthcoming b). In El Ghrous, all transactions are 'formalized' by a private agreement prepared by a notary public. This document contains information which identifies the plot and the parties in the transaction. It also mentions the approval of other claimants in the case of land belonging to a family property in joint ownership. According to the farmers in the survey, the widespread use of written documents in El Ghrous helped stimulate the sales market by securing the transactions.

At Aflou as El Ghrous, in the case where the sellers have a provisional formal document (order of transfer, lifting of the condition subsequent), the establishment of two notarized documents, a debt of gratitude and a promise of sale, is a widespread practice.

2.2. Interpreting Land Development: the Key Roles of Land Markets and Itinerant Farmers

As mentioned above, very little of the land allocated by the State from its private domain since 1983 has actually been developed. This obviously raises questions regarding this policy, including the ambitious program of one million hectares announced by the government for the current five-year period (2015-2019).

[7] 'Order of transfer' (*Arrêté de cession)*, which is the document received by the beneficiary as soon as he obtains access to land, before developing it, or 'End of the suspensive conditions' (*Levée de la condition résolutoire)*, corresponding to acknowledgment, by the administration, that the land has been developed, which automatically opens the right to the ownership title.

While the need to develop intensive irrigated agriculture is indisputable in Algeria, including in arid regions where the availability of groundwater resources makes it possible, the conditions for success are not yet established. Thirty years after the launch of this policy, a multidimensional assessment of implementation and results of the various programs, failures as well as successes, is needed to better design future programs.

In this section, we provide an interpretation of the actual process through which land development programs could succeed in the sites concerned – see Daoudi *et al*. (forthcoming a & b), Derderi *et al*. (2015), Ouendeno *et al*. (2015) for detailed empirical evidence. We do not wish to imply that our interpretation would apply to a wide range of empirical situations. It is partly grounded on observations, and partly on insights gained during the surveys we conducted and which will be taken into consideration in future investigations. The aim of the interpretation is to sketch a coherent yet dynamic picture. By analyzing the highlights that marked the key stages of land development in our study areas, we propose a simplified reconstitution of the land development process. The objective is to draw some conclusions concerning the conditions for success.

In light of the Algerian political and economic orientation, land development in arid regions means developing intensive irrigated crops on previously uncultivated land (or, in the steppe, on land that might have been cultivated very extensively and episodically). This process is very demanding financially: investments in pumping and irrigation equipment, agricultural material, production costs, labor requirements and technical and managerial skills, including those relating to access to production factors and to markets for products.

By opting for the development of the so-called marginal lands belonging to its private domain in arid regions, the State gradually established an institutional matrix (AFPA Act, 1983; 1997 and 2011 circulars regarding concessions; the 2008 agriculture orientation law) to facilitate access to this land by private farmers. In addition to these legal and regulatory instruments, the State mobilized major financial resources to support land development. It launched a large number of investment programs to develop irrigated perimeters in several *wilayas* (rural electrification, drilling of collective boreholes, opening unpaved agricultural roads) and at times, subsidized inputs and private investments at farm level, and facilitated farmers' access to credit.

As mentioned above, land development occurred in two ways, one, initiated by the State, through APFA or concessions in irrigated perimeters, two, initiated by individuals, under APFA law, on former *Arch* land to which they had acquired the right of use through inheritance or purchase.

In practice, the process of land development involved different categories of beneficiaries. The State's main objective in developing arid land was to increase agricultural production, targeting natives, farmers, agro-pastoralists, and above all unemployed youth, as a way to legitimize the development policy. Thus the beneficiaries of the plots in irrigated perimeters developed by the State were mostly chosen among the inhabitants of the localities in which the perimeters are located. In addition to unemployed youth, farmers and agro-pastoralists, veterans of the War of Independence and civil servants also benefited from access to such land.

Considering the initial endowment in production factors and occupational activities, different types of actors have different perceptions of how to make use of the land and how to overcome different constraints. Whether or not the actors were previously involved in agricultural production also affects their goals, leading them to opt for different short-term and long-term objectives. Those already involved in agriculture or agro-pastoralism see the development programs as a way to secure traditional rights of use, and also to obtain individual rights to family or collective lands they farmed. For natives who were previously not involved in agriculture (the unemployed, civil servants, tradespeople, professionals), the aim is to get obtain a patrimony they will use directly as owner-cultivators, or to make money by selling or leasing it out.

Among the beneficiaries, only a small number – those with more production factors at their disposal – undertook land development (at the plot level), with varying success. Most beneficiaries did not, because they lacked resources or had no valid agricultural project. In this case, they sold their plot, or leased it out (i) temporarily, while accumulating capital and/or technical and managerial expertise in order to later start their own production, or (ii) structurally, the land development program providing them with a source of regular income, in a 'rentier rationale'.[8]

This range of land uses was only possible because land markets emerged in these regions. Indeed, given the existence of potential suppliers representing certain categories of beneficiaries of irrigated perimeter lands, the first demand on the land markets came from farmers located in the northern *wilayas* of the country, who were attracted by the low cost of land and water, and the existence of infrastructure that would facilitate their activities (roads, electricity, and sometimes boreholes), and by possible access to land through the market – mostly the tenancy market.

Among these 'non-native farmers', it is possible to distinguish between 'sedentary' and more numerous 'itinerant' farmers. Both types of producers share an entrepreneurial rationale (maximizing profits); what distinguishes them is how they obtain access to the land: sedentary farmers seek to purchase APFA or concession land (sometimes combined with leasing land in), whereas itinerant famers mostly access land

[8] Systematic empirical data still need to be collected to confirm these intuitions.

through short- or medium-term leases. These latter, specialized in vegetable crops, are generally well equipped in agricultural machinery (tractors, plows, greenhouses, harvesters), irrigation equipment (pumps, sprinkler and/or drip irrigation kit) and transportation (trucks and vans) (Derderi *et al*., 2015). Sedentary farmers invest more in purchasing the land, drilling boreholes and installation of permanent crops (date palms, olive trees, in some cases large irremovable greenhouses).

The itinerant farmers are usually small or medium-size agricultural entrepreneurs specialized in producing one type of vegetable (potatoes or onions) or a set of vegetable crops (early vegetables produced under plastic) (Derderi *et al.*, 2015). They may settle in a particular region for some years, but change plots every three or four years. During their stay, through their relations with the landowners who lease them land and relations with other local farmers, they disseminate their know-how and connect their local partners to their own networks of input suppliers and clients in other parts of the country.

The tenancy market, which was originally boosted by the demand coming from these itinerant farmers and more broadly from 'outsider farmers', enabled some of the beneficiaries of land development programs who originally leased land out due to the lack of resources and know-how, to later move on to owner cultivation.

In addition to their direct impact on the dynamics of land markets, itinerant farmers thus played a key role in a type of 'guidance' in the professionalization of local producers thanks to their better mastery of production techniques and marketing. The success of some of these local farmers in intensive agriculture marked the transition to the second step in the land development process, characterized by a surge in local demand on the land market and further stimulation of these markets.

The limits of the land development system applied by the State in APFA and concession perimeters, based on allocating bare land equipped with collective boreholes but usually without pumping equipment, to unemployed youth or agro-pastoralists (who themselves were responsible for acquiring the complementary production factors), bec ame obvious in many arid regions. In the sites we surveyed, 'outsider farmers' helped to technically and economically unlock this system. They dynamized a transitory stage prior to land development at the plot level.

Our surveys show that agricultural dynamics are currently driven by a range of actors, including outsider farmers: 'entrepreneurs', i.e. farmers employing structurally farm workers on their own land and/or on leased-in land, as well as market-oriented family farmers, who mostly depend on family labor (table 10).

[Table 10]

3. Discussion and Conclusion

The overall picture of the implementation of land development policy in arid regions is mixed. The areas effectively developed are relatively limited and their contribution to so-called strategic agricultural productions (wheat first and foremost) remains marginal (table 1). This shows the limits of a model consisting in the development of irrigated perimeters allocated to beneficiaries lacking who generally lack the technical and economic resources required for an ex nihilo development of intensive agriculture in arid regions.

However, the analysis of some success stories provides lessons regarding the conditions for intensive land development in such regions. The availability of land, water and infrastructure (roads, electricity) is a necessary but insufficient condition. The gradual combination of four other factors largely explains the positive outcomes in the perimeters we studied: (i) the choice of high-value products (early or off-season vegetables); (ii) the arrival of agricultural entrepreneurs from northern *wilayas*, who helped diffuse their knowledge of intensive vegetable cultivation; (iii) the emergence of local farmers (family- or entrepreneur-types) who adopted and adapted the cropping system (Derderi *et al.*, 2015); (iv) the emergence of local markets and services (wholesale market for vegetables, suppliers of agricultural inputs and equipment, mechanized agricultural services, etc.) (Ouendeno *et al.*, 2015).

This dynamic is directly linked to the surge of informal land markets. These markets initially facilitated, and, in turn, were stimulated by, the arrival of itinerant farmers, after which the land was reallocated among local actors under different socio-economic conditions. Shifts from the status of agricultural worker to that of landowner via an agricultural ladder has also been documented (Ouendeno *et al.*, 2015). The inclusive functioning of the tenancy market offers a positive view of initial reverse-tenancy market configurations:[9] some of the beneficiaries who initially leased land out to itinerant entrepreneurs started owner cultivation once they had accumulated the resources they needed to do so, and many small 'outsiders' arriving as farm workers settled as tenant vegetable growers.

The informal functioning of land markets has not given rise to any major difficulties. It appears to be quite suited to the actors' needs (e.g. the duration of lease contracts and the means of payment), and ensures their flexibility – in other words, based on the cases we analyzed, we consider these markets provide actors with reliable coordination devices.

These findings lead us to make some general recommendations:

[9] On the often negative implications, in terms of equity, of reverse tenancy configurations see Colin (2014).

- There is a need to recognize the existence of the land markets and their role in agricultural development, especially in land development areas, and thus to authorize land leases, which today are prohibited in the case of land belonging to the State's private domain;
- Considering the high cost of land development in arid areas, the current public policy of favoring cereal and fodder production is debatable. High added-value crops such as vegetables are not only profitable for the farmers, but also make better use of water as a scarce resource.
- We documented success stories concerning small and medium size entrepreneurial farms and small market-oriented family farms. Although we have no data at present to discuss whether these types of farms are better than much larger farms, it is clear that small and medium-scale production structures are technically and economically viable and should be encouraged.

Nevertheless these findings and recommendations should be considered with caution. Despite the rigor we applied in our empirical investigations and the range of situations we observed, our study did not cover the whole range of situations and nor all the issues related to land development.

Major grey areas still exist:

- The present study focused on irrigated perimeters where land development has succeeded. What about less successful cases, or outright failures? Why has no dynamic land market emerged and why did no 'outsider' vegetable growers settle?
- The surveys focused on the actors involved in agricultural production; we have no precise data on land assignors (beneficiaries who sold the land or were leasing it out at the time of the survey).
- The process of development of the perimeters has not been systematically studied, particularly effective criteria and conditions for the selection of the beneficiaries (some potential beneficiaries may have been excluded by the administrative procedures).
- We did not document land conflicts in our study areas, or issues such as exo-inalienability. This is of course a key issue in the role of 'outsiders' in agricultural dynamics, and things may have been less smooth in other locations.
- Last but not least, we did not consider the agro-ecological sustainability of the Saharan neo-agriculture – including, but not only, the agricultural practices of itinerant farmers.[10] This type of agriculture, implemented in fragile ecosystems, will indisputably generate soil and water pollution, water shortages and erosion and salinization of the soil. All these key issues require multidisciplinary investigations, mobilizing the expertise of soil scientists and hydrologists.

[10] Itinerant farmers do exploit intensively land during a few years and then move, but they mostly benefit from the initial lack of parasite pressures, not from a fertility potential of those steppic and Saharan soils, poor in terms of organic matter – they bring in huge amount of organic matter. Qualifying their tenancy practices as pure 'mining agriculture' might thus be questionable.

Considering the research already done and the limitations we underlined, the research we are considering now will aim to rigorously test the first insights and intuitions we presented in the second and this sections of this paper through collecting systematic data. The research will especially include areas where land development through high-value intensive crop production was not as successful as in the cases we studies, and/or is more conflictive, and will give much more attention, in more successful situations, to those actors excluded from the success stories. If the conditions allow it, we will also try to bring in expertise from soil sciences and hydrology in order to get a sound understanding of the agro-ecological sustainability of the dynamics we described.

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Tables

Table 1. Contribution of steppe and Saharan *wilayas* to Algerian agricultural production in 2013

	National production (millions of quintals)	Production in steppe and Saharan *wilayas* (millions of quintals)	% steppe and Saharan *wilayas*	Production in leading steppe or Saharan *wilayas* (millions of quintals)	% of national production byleading *wilaya*
Wheat	33	1.8	5.4	0.65 (Biskra)	1.9
Potatoes	48.9	15	30.7	11.7 (El Oued)	23.9
Tomatoes	9.7	3.8	39	2.5 (Biskra)	25.6
Onions	13.6	4.9	29.4	2 (Tiaret)	15

Sources: Agricultural statistics, MADR 2013.

Table 2. Land status of surveyed farms and developed areas

	Off perimeter		Within the perimeter			
	Private property or in the process of accessing private property (APFA)		Private property or in the process of accessing private property (APFA)		Concession	
	Number of parcels	Area (ha)	Number of parcels	Area (ha)	Number of parcels	Area (ha)
Aflou	81	551	34	164	61	515
El Ghrous	52	440	51	204	26	130
Total	133	991	85	368	87	645

Table 3. Types of tenure in El Ghrous and Aflou

		Owner-cultivation	Tenancy		Total
			Fixed-lease	Share contracts	
Number of contracts	El Ghrous	-	118	4	122
	Aflou	-	82	13	95
Total area (ha)	El Ghrous	6.3 (10.9%)	50.3 (87.2%)	1.1 (2%)	57.7 (100%)
	Aflou	158 (17.9%)	653 (74.1%)	70 (8%)	881 (100%)

Sources: authors' surveys, 2013

Table 4. Types of fixed-lease contracts as a function of the object of the transaction

		Land	Land + water	Land + water + greenhouse	Total
El Ghrous	Number of contracts	11	46	4	62
	%	17.7	74.2	6,5	100
Aflou	Number of contracts	25	57	-	82
	%	30.5	69.5	-	100

Sources: authors'surveys, 2013

Table 5. Duration of the lease

	El Ghrous		Aflou	
	Number of contracts	%	Number of contracts	%
3 years	45	72,6	18	22
2 years	7	11,3	0	0
1 year	10	16,1	64	78
Total	62	100	82	100

Sources: authors'surveys, 2013

Table 6. Origin of lease market participants

		El Ghrous			Aflou		
		Assignors	Tenants		Assignors	Tenants	
			TOL	LLT		TOL	LLT
Municipality of the study		74	13	14	82	4	3
Originating from	other municipalities, Biskra *wilaya*	4	2	4	-	-	-
	Tipaza *wilaya*	2	2	12	-	-	-
	Mascara *wilaya*	-	-	-	-	-	21
	other *wilayas* in the north-central region	-	-	-	-	-	10
	other *wilayas*	6	2	13	-	-	-
Total		86	19	43	82	4	34

* TOL: tenants owning land locally; LLT: landless tenants (locally). Sources: authors' surveys, 2013

Table 7. Origin of participants in land purchase/sale land markets

	Sellers			Buyers		
	Native	Non-native	Total	Native	Non-native	Total
Aflou	33	-	33	26	2	28
El Ghrous	59	4*	63	39	17	56
Total	92	4	96	65	19	84

* sellers who had previously purchased the land. Sources: authors'surveys, 2013

Table 8. Professional activity of participants in land purchase/sale markets

	sellers			buyers					
	farmers	unemployed	total	farmers	tradespeople	civil servants	entrepreneurs	other	Total
Aflou	20	13	33	4	1	11	11	1	28
El Ghrous	36	20	56*	43	7	4	1	1	56
Total	56	33	89	47	8	15	12	2	84

* No information for 7 sellers. Sources: our surveys, 2013

Table 9. Land status of purchased land, developed areas

	off perimeter (APFA)		In the perimeter			
			APFA		Concession	
	Number of parcels	Area (ha)	Number of parcels	Area (ha)	Number of parcels	Area (ha)
Afflou	20	176	13	59	0	0
El Ghrous	36	368	32	118	5	25
Total	56	544	45	177	5	25

Sources: authors' surveys, 2013

Table 10. Types of farmers surveyed

	El Ghrous			Aflou (ha potatoes)		
	Entrepreneurs		Family farmers	Entrepreneurs		Family farmers*
	total	leasing in land		total	leasing in land	
Number	35	20	65	50	34	46
Average area	1.1 (19s)	1.1 (20s)	0.3 (6s)	15	19	2.5
Minimum area	0.6 (10s)	0.6 (10s)	0.1 (2s)	3	5	0.5
Maximum area	12 (132s)	12 (132s)	0,5 (9s)	89	89	10
SD	1.16 (26.7)	1.48 (21)	0.1 (1.8)	17.5	17.5	2.1

* Excluding 12 farmers who were not cultivating potatoes at the time of the survey. (Xs): number of greenhouses, area estimated based on the local norm of 18 greenhouses/ha. Sources: authors' surveys, 2013.

Figure

Figure1. Evolution of agrarian structures since 1962