COSTEA
ENSEMBLE POUR RELEVER LES DÉFIS DE L'AGRICULTURE IRRIGUÉE

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POLICY BRIEFS

Structuring Action: Irrigated Land in the Maghreb

Major challenges for the sustainable management of groundwater-irrigated land in the Maghreb countries: food security, resource conservation and social justice

The management of land and water rights has become a crucial issue in the Maghreb, where the commodification and individualisation of these resources are increasing. Policy makers are therefore faced with a major challenge: how can we encourage dynamic irrigated agriculture while guaranteeing its long-term sustainability? The over-exploitation of resources due to the individualisation and commodification of land rights has accentuated this challenge. It is therefore essential to clarify and secure women and men farmers' rights to land and water, while ensuring the responsible and sustainable management of these natural resources.

KEY MESSAGES

1/ The constitution, importance and management of public agricultural land in the Maghreb countries reveal (i) a similar historical legacy resulting from the introduction of modern law and the influence of standards inherited from colonisation and local traditions, and (ii) divergent post-independence political choices and sectoral priorities linked to national agricultural policies and the choice of agrarian reforms.

2. The liberal land reforms in the Maghreb are marked by a hesitant/slow move towards the institutionalisation of land markets, including the market in rights of use.

3. The development of irrigated land has led to remarkable production performances but the emerging production models are manifestly unfair and unsustainable.

4. It is necessary to harmonise land extension policies and water policies to preserve groundwater, for the sustainable and equitable agricultural development of the arid zones of the Maghreb.

5. It is essential to rethink the policy on irrigated land in order to meet the current and future challenges facing the agricultural sector, by promoting the sustainable management of natural resources and equitable access to irrigated land and water.

ISSUES AT STAKE AND OBJECTIVES OF THE ACTION

The major challenge currently facing policymakers in the Maghreb (Algeria, Morocco and Tunisia) is how to ensure that irrigated agriculture, which is dynamic but largely informal, is sustainable. To this end, one of the issues at stake is to strengthen the security of farmers who hold rights to land and access to water, depending on the types of rights they hold or to which they refer, and according to the formal and informal transactions that take place concerning these resources.

The aim of the structuring action on irrigated land tenure in the Maghreb was to address the issue of securing rights to state-owned land and to the land of ethnic communities that is administered by the State, where processes of the individualisation of rights of use and ownership are underway. These latter are accompanied by increasing access to groundwater and the development of land transactions.

The specific objectives of this action were as follows:

1. Characterise the modes and rights of access to land and water, and understand the interactions between the range of rights and practices in force on the ground, between individuals and collectives on the one hand, and that are formal and informal on the other;
2. Evaluate the economic, social (equity) and environmental efficiency of land access methods for the development of irrigation in the context of the accelerating individualisation and commercialisation of land and water rights;

3. Analyse the ways in which transactions involving these resources are regulated in different land and water access configurations.

METHODOLOGICAL APPROACH OF THE STRUCTURING ACTION AND ELEMENTS OF ANALYSIS

The study adopted a global approach to analyse the land tenure systems and their historical evolution, examining the impact of public policies on these latter. It also presented a detailed panorama of modes of access to land through an analysis of diverse representative practices, characterised by significant differences in terms of land and water resources. The choice of case studies focused on groundwater-irrigated land incorporating different types of water table (fossil, renewable, coastal) and land tenure systems (collective land, private domain of the State and melk land) in the three countries. Finally, the study culminated in informed conclusions on trends, whether in favour of land concentration or in favour of facilitated access to land for new actors.

Countries of intervention of the structuring action on irrigated land in the Maghreb

Country	Case study
Algeria	Mitidja plain
Morocco	Saïs plain
Tunisia	Governorate of Zaghouan

The study was carried out on behalf of COSTEA by the consultancy firm Agrconcept, responsible for regional coordination, and by several national operators from the three countries of the Maghreb (Algeria, Morocco and Tunisia). In the three countries where the action was implemented, the study involved local institutions in the diagnostic and result-sharing phases. The COSTEA study also placed the subject of irrigated land tenure in the debate with the national authorities and the CTFD. To do this, feedback and discussion workshops were organised at regional or national level depending on the approaches adopted by the countries[1]. The objectives of the workshops were to:

- inform institutional actors of the ongoing agrarian dynamics and trends, but also of less visible evolutions;
- discuss the issues at stake in relation to the ongoing agrarian dynamics in terms of sustainability, efficiency or equity, from a forward-looking perspective.

The work carried out in the Saïs plain highlighted a crisis in the groundwater resource management model due to a lack of alignment of sectoral policies in Morocco, but this observation also applies to the other two countries. An agricultural policy focused on high value-added irrigated farming has led to an increase in agricultural GDP and exports, an extension of irrigated areas and an intensification of abstraction from already over-exploited water tables. Furthermore, agricultural development has been achieved by disconnecting ownership from the farm, affecting women and creating insecure jobs and statuses. As far as land is concerned, there is a disconnection between the price of agricultural land and agricultural productivity, a concentration of farming in areas with large farms, urbanisation and urban sprawl on agricultural land on the outskirts of towns.

RESULTS OF THE STUDY, KEY MESSAGES AND RESPONSES PROVIDED

The analyses resulting from the action on irrigated land in the Maghreb have enabled COSTEA to formulate a number of messages. Their general aim is to provide inputs to strengthen the economic and social development of irrigated areas by securing land tenure for farmers. They also seek to highlight the need to take into account the environmental sustainability of irrigated agriculture by promoting a more sustainable management of natural resources.

1/ The constitution, importance and management of public agricultural land in the Maghreb countries reveal a similar historical legacy and divergences in post-independence political choices. The countries of the Maghreb have a heritage of public or state-administered[2] land that they use as land reserves for their agricultural policy. This land heritage has been forged from the past, and is characterised by the introduction of modern law, which has established tenure systems for land whose rules of appropriation, use and exploitation were previously determined by the relationships that the populations had with their territories. These land tenure systems are diverse and often mix standards and institutions inherited from colonisation with standards derived from local traditions.

After independence, the States' land reforms aimed to mobilise public or state-administered land (public property or property under the State's responsibility for its management and use) to intensify agriculture on land that was already cultivated,

1. Due to the health context, the regional workshops in Tunisia were replaced by individual interviews with regional managers using an interview guide.

2. The main difference between public land and state-administered land lies in the question of ownership. Public land belongs to the State, while state-administered land belongs to other entities and is simply managed by the State.

or to extend irrigated agriculture on pastoral or desert land. Although all three countries attempted to introduce agrarian reforms, these were quickly abandoned or put on hold.

The political choices of the countries in the region are influenced by their geography and sectoral priorities. In Algeria, oil revenues and food imports are favoured. In Morocco, the surface water resources of the Atlantic plains have allowed the development of commodities and the preservation of cash crops for export. In Tunisia and Algeria, however, water resources are limited, and other priorities, such as education, sub-contracting and the development of the maritime coastline, have taken precedence over agriculture. The region's historical heritage is marked by different land tenure systems, such as 'melk', 'habous', collective and state-owned land. The divergences between the countries are also reflected in the public management of recovered land in Tunisia and Morocco, and in the self-management of nationalised land in Algeria. The agrarian reforms in the three countries were relatively limited and abandoned in favour of transfers and grey transactions.

From 1962 to 1983, Algeria nationalised and collectivised agricultural land, creating state-controlled cooperatives and socialist agricultural estates (domaines agricoles socialistes, French acronym: DAS). However, these policies led to insufficient results despite state support. The State merged the self-managed estates and some cooperatives into DASs under its control in 1982, while most of the Agricultural Production Cooperatives of the Agrarian Revolution (Coopératives Agricoles de Production de la Révolution Agraire, French acronym: CAPRA) were allocated individually to members of the cooperatives.

In Morocco, colonial lands were placed under public administration from 1956 in order to preserve their productive potential and export agreements. The agrarian reform was transformed into a redistribution programme in 1974, and land ownership was highly concentrated. Collective land has also been under state administration since 1919 and its surface area remains large.

The Tunisian State acquired a significant land heritage through the nationalisation of colonial lands from 1964, and the liquidation of public and mixed habous in 1956. It also created the Office des Terres Domaniales (Office for State-Owned Land, French acronym: OTD) to manage the colonists' farms. On the other hand, unlike Algeria and Morocco, Tunisia has recognised the collective ownership of communities that exploit land in steppe and pre-desert areas, but has privatised land intended for agricultural purposes.

2/ The liberal land reforms in the Maghreb are marked by a hesitant/slow move towards the institutionalisation of land markets, including the market in rights of use. During the 1980s, agricultural investment promotion policies converged towards concessions. This led to the liberalisation of public property, the 'melkisation' of collective land and the emergence of markets for rights of use. Concessions on public land have taken different forms depending on the configuration of each country. This evolution has led to an intensification of farming and an expansion into arid zones. Capital investment has increased to this end, enabling a rise in labour productivity. However, this race for groundwater resources with virtually unrestricted access has posed challenges in terms of environmental sustainability.

In practice, the land reforms have led to the emergence of a market for the indirect exploitation of land, taking a variety of forms. After a period of collective management in Algeria and of direct management by public companies in Tunisia and Morocco, the land reforms have led to the generalisation of concessions on public land or state-administered land. These concessions make it possible to grant exploitation rights that are regulated (for example, by specifications or restrictions on transactions) without transferring ownership, which remains collective or state-owned.

The land reforms have thus led to the dissociation of land ownership and use, affecting not only state-owned land and state-administered land, but also private land, for various reasons, such as undivided ownership or restrictions on ownership rights in irrigation areas.

In Algeria, a new phase of land reforms to rehabilitate private exploitation began in 1980, but without completely privatising public agricultural land. Two categories of reform were undertaken: the privatisation of the right to use the public land of the former DASs, and the development of previously uncultivated public land. Law 87/19 of 1987 restructured the DASs into smaller collective or individual farms under private law, but ownership of the land remained public. The 2008 agricultural orientation law (loi d'orientation agricole) extended these developments by opting for concessions as the only means of accessing public land, and enabled the decollectivisation of the collective farms (referred to as exploitations agricoles collectives, French acronym: EAC) and the commercialisation of rights of use. The reforms aimed to facilitate access to land and water to encourage the development of arid land for agriculture.

Morocco introduced an agricultural policy focused on rationality and centralised decision-making, as reflected in the Green Morocco Plan. This plan is based on the long-term leasing of state and collective land, the reform of land tenure systems, and the allocation of collective land to those entitled to it. Policies on access to water resources are characterised by a liberal approach, with flexible procedures for authorising and regulating private drilling, but also by policies supporting drip irrigation equipment and surface water transfer and desalination projects to safeguard water tables. Faced with the difficulties encountered by the public companies in charge of managing state-owned agricultural land, the reform of state-owned land aims to promote agricultural investment and employment through long-term leasing to private actors through public-private partnerships (PPP). Between 2002

and 2013, 95 000 hectares of state-owned land were allocated under PPPs, for 600 projects. Land leasing by invitation to tender concerns large farms, and projects must explain the investment plan and yield targets in line with the priorities of the Green Morocco Plan.

In Tunisia, land tenure policy has been marked by the privatisation of collective land (granting to any member of a community a parcel of land that they have developed, mainly by planting), and the transfer then concession of state-owned land. Since the 1980s, the government has implemented a policy of privatising collective land by accelerating the process of allocating non-pastoral collective agricultural land in a private capacity. In 2016, a new law was enacted to better protect collective land from grabbing under the pretext of vivification, and to update the distinction between types of collective land. State-owned land was transferred or sold to members of cooperatives in the 1970s and 1980s, and since the 1990s, has been granted by way of concession to agricultural development agencies (sociétés de mise en valeur et de développement agricoles, French acronym: SMVDA). The law of February 1995 prohibits the State from selling state-owned land and establishes the principle of separating the ownership of property by the State and the delegation of its management. Today, 40% of state-owned land is leased to private actors.

3/ The development of irrigated land has led to remarkable production performances but the emerging production models are manifestly unfair and unsustainable. The processes of privatisation, ownership and use of land, and their impacts on agricultural and territorial dynamics in the Maghreb countries, highlight similar trajectories that are leading to a water crisis and a precarious situation for rural populations. The modernisation of agriculture can lead to the excessive exploitation of water resources and the deterioration of soil fertility. The trajectories of the irrigated areas and countries can be placed in the chronology of the different stages of the evolution of groundwater-irrigated farming in arid zones. This evolution goes through an initial phase of the emergence of new pumping technologies, a boom in pump-irrigated agriculture, over-exploitation of the water resources, and finally, a decline in areas, where irrigated crops are abandoned due to a lack of water resources.

According to macroeconomic indicators, investments to mobilise water and public land have encouraged agricultural growth. All three Maghreb countries have seen sustained growth in agricultural GDP since the early 2000s. The agricultural policies have used public, collective or state-administered land to intensify agriculture or extend irrigation to varying degrees depending on the country.

Tunisia has experienced a relatively limited increase since the 1980s, while Algeria has been in a catch-up process since 2000, and Morocco has undergone massive investment in 'modern' agriculture since 2008. These policies have led to an increase in agricultural added value and created opportunities for a variety of actors, but they have also depleted water and soil resources, and not everyone can keep up with the pumping race. This fact can lead to precariousness for rural populations in contexts where the dynamics of agriculture and territorial recomposition do not benefit the most vulnerable local actors, including women.

In Algeria, many market gardeners practise itinerant market gardening on irrigated public land in the Mitidja plain. This land is often acquired on the illegal indirect tenancy market, without official authorisation. These professional tenants practise hyper-intensive market gardening in constant rotation with an average of three years' production, and use chemical inputs, which raises questions about soil health and sustainability. Although the market garden areas are relatively concentrated among the largest market gardeners, small-scale tenants can also cultivate plots depending on their financial capacity and the available labour.

In Morocco, the intensive cultivation of early-season crops and fruit trees is moving to areas with better water resources, while the large farming groups are moving from the well-endowed plains to the pre-Saharan territories in the south of the country. The reforms of the 2000s have attracted new investors, particularly investment funds looking for projects with high financial returns in fruit tree and date palm cultivation. Sales and rentals have increased following the reform of the land release procedure in the agricultural reform centres, with strong demand for intensive open-field market gardening, which consumes a lot of water. However, the race for water resources has led to the first signs of depletion, even affecting some major PPP investment projects.

The development of irrigation in Tunisia intensified from the 1970s, with economic and social development plans. Irrigated agriculture began with public irrigation schemes before private initiatives took over to develop private irrigated schemes. However, overexploitation of the water table has led to 'illicit' drilling and signs of depletion of the water resources. In heavily exploited aquifers, this irrigation crisis is manifesting itself in a gradual return to non-irrigated farming for family farms unable to keep up with the race to pump, and agricultural intensification for the large farms.

This diversity of farms and actors is highlighted by the trajectory of the race to exploit groundwater resources, which can be characterised by intensification or extension depending on the country and the area. This excessive exploitation leads to a fall in groundwater levels at different paces. Although sectoral regulation, such as pumping authorisations and groundwater contracts, has certain limits, new territorial responses are emerging, such as the example of the Zagora watermelon[3] and the redefinition of property rights over land and water by

3. In the arid Drâa valley in south-east Morocco, watermelon cultivation has expanded rapidly due to the arrival of major investors. Young local women and men farmers have taken steps to solve the problems of overproduction of watermelons and a shortage of groundwater by establishing rules for sharing irrigation water and selling their produce.

local collectives. These territorial responses can also take the form of claims, as is the case in the Jemna oases in southern Tunisia.

4/ It is necessary to harmonise land extension policies and water policies to preserve groundwater, for the sustainable and equitable agricultural development of the arid zones of the Maghreb. The development of arid regions through irrigation poses challenges for the sustainability of water resources, due to the increase in illegal drilling and the growing pressure on the aquifers exploited, raising questions as to the coherence of land and water policies.

Water regulations in the Maghreb countries have been influenced by the region's colonial history, but there are notable differences in the way each country has regulated water since that period to ensure equitable access to water for all, in line with the system of public ownership of water resources in the three countries.
The privatisation of irrigated land has led to a 'de facto' privatisation of water, as the landowners or farmers can control access to and the use of water on their land. This can limit the access of other water users to this vital resource.

In the absence of any real policy for monitoring and controlling abstractions, the intensification of irrigated agriculture using groundwater has led to the over-exploitation of water resources and a general fall in groundwater levels in the three countries. In an attempt to save jobs and the local economy, costly public projects have been launched, such as deep drilling, water transfers and non-conventional water mobilisation. Despite these measures, some areas are experiencing a marked decline and irrigation is being abandoned, leading to the decapitalisation and devaluation of the investments.

In Algeria, the drop in drilling costs has facilitated access to groundwater and enabled the development of a new form of Saharan agriculture, while in Tunisia, the Plan de Développement des Eaux du Sud (Southern Water Development Plan) has been put in place. In Morocco, the boom in date palm plantations on collective land supplied by a deep aquifer with limited renewability in the Meski-Boudnib area raises the question of the sustainability of this type of agriculture, which will depend on limiting the area planted and the amount of water abstracted, as well as on the anticipated mobilisation of additional resources by a dam on the Wadi Guir. Equity is also a concern, as small-scale farmers could be excluded if operating costs rise or if the water table runs dry. The question of income from this irrigated agriculture is also raised.

In Tunisia, the governance of water resources raises complex questions due to the different superimposing legal and institutional references. Although water resources are part of the public water domain and come under the authority of the State, their exploitation varies depending on their nature and the region in which they are located. In the oases, water remains attached to the palm groves and the old institutions of sharing, despite the introduction of modern forms of governance. The expansion of oases in the south includes traditional oases and modern oases with single-crop farming

of Deglet Nour[4]. Public investment in the 1980s was followed by private investment in the 1990s, with the expansion of areas under date palm based on the availability of and access to groundwater resources through drilling. Private actors gain individual access to collective land on the basis of the El Ihya law (vivification or development) and once planted, the land is automatically privatised.

5/ It is essential to rethink the policy on irrigated land in order to meet the current and future challenges facing the agricultural sector, by promoting the sustainable management of natural resources and equitable access to irrigated land and water. With climate change underway, rising prices for agricultural products and inputs, and the economic disruption caused by the Covid pandemic, current agricultural models are being called into question. There are major concerns about the sustainability of water resources, the capacity to promote food sovereignty and social equity. It is therefore crucial to reconsider these models and adopt more sustainable and equitable approaches to meet current and future challenges. These challenges are closely linked to irrigated land policy, which should evolve towards the sustainable and equitable management of the use of irrigated land for agricultural production. To ensure sustainable and equitable land management in the Maghreb countries, it is recommended to take into account the diversity of the systems and actors involved in agriculture and their links with the natural resources. The preservation of the peri-urban irrigated melk land and the adoption of new forms of regulation in large irrigated schemes are essential to guarantee food security and job creation. It is also recommended that the specifications for public land concessions be renewed to include clauses to protect the environment and encourage the participation of local actors. For a more equitable and participatory form of land management, a new territorial governance and governance by local authorities for public land or collective land administered by the State are also necessary.

4. Date variety.

Limits of the approach

The study on irrigated land in the Maghreb was mainly confronted with the complexity of bringing to the fore general avenues for improvement in response to the problems currently observed and described in this brief. This was made difficult by the diversity of the cases studied in the three countries and by the high sensitivity of the subject in each of the contexts. In addition, the approach and implementation of the study did not allow for a detailed analysis of the gender aspect to the extent initially expected. This specific point will therefore need to be addressed in future studies.

COSTEA OUTPUTS IN RELATION WITH THE STUDY

- An inception report (www.comite-costea.fr/actions/foncier-irrigue)
- The Algeria country report (www.comite-costea.fr/actions/foncier-irrigue)
- The Morocco country report (www.comite-costea.fr/actions/foncier-irrigue)
- The Tunisia country report (www.comite-costea.fr/actions/foncier-irrigue)
- A final regional synthesis (www.comite-costea.fr/actions/foncier-irrigue)
- A documentary database (www.comite-costea.fr/base-documentaire-eau-et-agriculture)
- The first articles of a special issue have been posted online for Cahiers Agricultures (www.comite-costea.fr/actions/foncier-irrigue)