



ASSESSING IMPACTS OF LAND POLICIES ON THE PRODUCTION SYSTEMS AND LIVELIHOODS IN THE SOUTH- EAST OF TUNISIA

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SOMMAIRE

INTRODUCTION

I. METHODOLOGICAL APPROACHES AND TOOLS USED

- 1.1. Data collection methods
- 1.2. Used tools
- 1.3. Data collection
- 1.4. Data entry
- 1.5. Study site

II. HISTORY AND EVOLUTION OF LAND POLICY AND LAND TENURE IN TUNISIA AND JEFFARA

- 2.1. The french colonization and land tenure
- 2.2. The complexity of the land tenure and land policy after independency
- 2.3. Land tenure
- 2.4. Land privatization policy

III. EVOLUTION OF THE LAND OWNERSHIP AND STATUS IN THE SOUTH-EAST OF TUNISIA AND IMPACTS ON PRODUCTION SYSTEMS

- 3.1. Brief review of the land status in tunisia and in the governorate of médénine
- 3.2. The evolution of land status in jeffara (zeuss-koutine): a first analysis based on mapping
 - 3.2.1. *The period (1901-1964): in search of a status*
 - 3.2.2. *The land situation during the period (1964-1974): toward the privatization of collective lands*
 - 3.2.3. *The land situation during the period (1974-2014)*
- 3.3. Impacts of land status changes in jeffara: major trends of evolution and characterization of the production systems
 - 3.3.1. *Demographic characterization of the population*
 - 3.3.2. *Analysis of structures and stratification of land ownership*
 - 3.3.3. Impacts of evolution of structures and stratification of land on the production systems
- 3.4. Differences in significant benefits between small, medium and big farms
 - 3.4.1. Differences in term of land and farm management
 - 3.4.2. Differences in term of land productivity and crop production
 - 3.4.3. Differences in term of opportunities and income generation possibilities

CONCLUSION

REFERENCES



Acronyms and abbreviations

Avr	Average
BS	Baseline Survey
COR	Code of real rights
CRDA	Commissariat Régional au Développement Agricole
CRP-DS	CGIAR Research Program on Dryland Systems
CTV	Cellule Territoriale de Vulgarisation
DG/ACTA	Direction Générale de l'Aménagement et de la Conservation des Terres Agricoles
EU	European Union
FAO	Food and Agriculture Organisation,
GDA	Agricultural Development Grouping
ICARDA	International Center for Agricultural Research in the Dry Areas
INS	Institut National des Statistiques
IRA	Institut des Régions Arides
Max	Maximum
MEDD	Ministère de l'environnement et de développement durable
Min	Minimum
NGO	Non Government organization
ODS	Office de Développement du Sud
PASA	Agricultural Structural Adjustment Program
ROSELT/OSS	Réseau d'observatoires de surveillance écologique à long terme / Observatoire de Sahara et du Sahel
SAP	Structural Adjustment Program
TND	Tunisian Dinar
UCP	Production cooperative unit
UGTT	Tunisian General Labor Union
WAHARA	Water Harvesting for Rainfed Africa: investing in dryland agriculture for growth and resilience
WANA	West Asia and North Africa



INTRODUCTION

The present report try to analyze the results of the activity titled: “Policies analysis : Land consolidation and fragmentation in Tunisia” conducted by the IRA team with the collaboration of ICARDA in the area of Beni Khedache, Oum Zessar watershed located in the Governorate of Medenine, south-east of Tunisia (CRP-DS Beni Khedache site). It was elaborated within the framework of the CGIAR program CRP-DS on Dryland Systems led by ICARDA¹.

There is no consensus on whether small farms can be efficient or not compared to the medium and large farms. In many countries there is a process of land fragmentation that some blame as the main factor for inefficiency, migration, deterioration of natural resources and lack of incentives for modernization. Yet, most farmers in the WANA region hold small farms, which provide livelihoods for the household. Some countries like Belgium and Turkey have decided to embark into a land consolidation strategy as a mean to improve efficiency, equity, rural development, food security and conservation of natural resources. Land consolidation involves redistributing land ownership so that individual farmers own fewer, larger, more compact and more contiguous land parcels.

The reforms in terms of land use policies in Tunisia, especially in the twentieth century, were in coherence with national policy as a hole. These land use policies are a central element of development policies, poverty and inequality reduction in particular by ensuring the security of access to land. In fact, access to land is considered as one of the determinants of the development of agrarian structures.

Land use policies were accompanied, especially in the dry lands of Tunisia, by profound mutations (sedentarization, privatization and fragmentation of land, decline of pastoral activities and rangelands, agricultural development, extension of irrigated perimeters, liberalization of the economy, modernization of agriculture and pressure on natural resources) that affected the social and economic dynamics of local populations. These mutations have seriously affected the traditional lifestyle of local population and their strategy of adaptation to climatic aridity, and have radically transformed the landscape.. Natural resources degradations and socio-economic mutations have affected the vulnerability of production systems. Indeed, several vulnerability indices becomes apparent among other; decrease land productivity, water and wind erosion, soil loss and decrease in vegetation cover, problems of salinization especially in irrigated perimeters, migration, etc.

The long processes of land privatizations have leads to land fragmentation, which caused a barrier to meaningful land and agricultural development. Indeed Tunisia government decided since 1977 to adopt a land consolidation strategy to improve efficiency, equity, rural development, food security and conservation of natural resources. Land consolidation process consists of land reorganization and reallocation. The land consolidation goal are the agriculture development, the livelihoods improvement, access to credits and subsidies, farmers encouragement to use new and better technologies and market access improvement.

¹ CRP1.1 aims at improving the wellbeing of the poor rural communities, conserve vital natural resources, and empower smallholder farmers and pastoralists to cope with inherent climatic variability and climate change. In North Africa and West Asia, research will improve technology transfer to farmers and agro-pastoralists to achieve better food security, health practices, and livestock using better policies, market access, financial tools, and extension systems.



This work aims to analyze and assess how land fragmentation and consolidation contribute to agricultural productivity, sustainability of natural resources, and livelihoods improvement.

First, we will assess the impacts of land privatization on agriculture production systems in Jeffara region located in the southeast of Tunisia in particular we will focus on Beni khdeche study site. Secondly we will analyze the problems of land fragmentation and their impacts on incomes/livelihoods of farmers.

This report consists of four sections:

- First section: presentation of the methods, approaches and tools used to understand and assess how land fragmentation and consolidation contribute to agricultural productivity, sustainability of natural resources and livelihoods improvement.
- Second section: presentation of Tunisian land use policies and the history of land privatization (policies, laws, legislations, governance, etc.)
- Third section: presentation of the evolution of land status in Jeffara
- Fourth section: analysis of impacts of land privatization and land fragmentation on agriculture production systems in Jeffara



I. METHODOLOGICAL APPROACHES AND TOOLS USED

The methodological approach is based on the outcomes of previous research projects and programs, data collection from regional statistical data base, field investigations (field visits, surveys, focus group and semi structured interview with the main local and regional actors), and cartographic treatments.

1.1. Study site: Oum Zessar Watershed, Tunisia

Oum Zessar Watershed, occupied by around 24,000 inhabitants, is located in south-east of Tunisia in Medenine governorate with 36,000 ha surface area (Figure 1). This site is part of the Jeffara of Tunisia that presents a lower arid Mediterranean climate and a 160 to 220 mm average rainfall per year with an average of 30 days of rain. Water resources are a major constraint for pastoral (sheep and goats) and agricultural (cereals and tree cultivation) activities. This site is a typical agro-pastoral interlocked area with the gradual and in some areas accelerated expansion of cropland at the expense of the natural rangelands. In fact it has very significant eco-environment vulnerability, degraded vegetation in rangelands, intensification of agricultural use in plain areas which have led to water resources overuse and to land degradation (Ouessar, 2007). This region has been a target area of the main national strategies for natural resource and combating desertification (water and soil conservation, water resources, pasture and rangelands, sand encroachment, rural development).

Main desertification issues are anthropic pressure having markedly increased in recent years due to changes in socio-economic policies (Sghaier et al., 2009). The effect of this has been an increasingly irrational use of natural resources, and as a consequence a state of severe degradation: i) Accelerated expansion of rainfed agricultural (especially olive tree and annual crops, cereals, etc. and irrigation system, ii) Significant change of agrarian system and land use, and iii) Development of multi sectors activities for income generation (urbanization, services, migration etc.).

The study site is under IRA's areas of work and it is part of ROSELT/OSS observatory network, involving a large network of researchers, policy-makers and communities, as well as national, sub-regional, and regional institutions. Other institutions involved in research and management in Oum Zessar Watershed are DG/ACTA (Direction Générale de l'Aménagement et de la Conservation des Terres Agricoles), ODS (Office de Développement du Sud), IRA Medenine (Institut des Régions Arides) and CRDA (Commissariats Régionaux au Développement Agricole).



collect information concerning the dynamic of land status in the study site. A focus group meetings were also carried out by the team of IRA during August 2014, within the CTV (Cellule Territoriale de Vulgarisation) of Beni Khédache and the relevant actors in the management of the rangelands of Dhahar and in the management of agricultural private lands in Jeffara (the leader of the CTV, a representative of the forests direction, an engineer from the CRDA, a representative of of the GDA Béni Khédache, a member of the Management Board). Actors of development have actively participated in the creation of a specialized database that concern land status, land users and the types of rangelands, etc. using Participatory GIS approach. These meetings were followed by a transect made on the field together with a member of the GDA and member of the Management Board. During this transect, landscapes (rangelands, vegetation, agricultural systems, sand bars, degraded areas, wells, cisterns, herds, livestock farmers, guards, etc.) of the Dhahar and Jeffara regions have been localized. GPS points of the household's settlement, some plots and the main water points (wells, drinking fountains, large underground storage tanks or "fesguia ", majels, etc.) have been used to come-up with spatial information layers. .

✓ **Primary Basic survey**

The characterization of production systems in Jeffara region is mainly based on information gathered directly from the study field (basic surveys (BS)). The basic surveys adopt the methodological proposal of the CRP1.1 program (baseline survey). Its main objectives are to analyze the production systems and their vulnerability. This survey is carried out at Oum Zessar watershed. A stratified sample of 127 households is selected in the study site.

A second level of field investigation was carried out with farmers who have benefited from the land consolidation project. This investigation aims to analyze the impact of the land consolidation on livelihoods and production systems.

○ **Information and mobilization of local and regional actors**

Step of data collection has been preceded by the mobilization of local and regional actors to ensure their engagement and participation in the whole process. The regional authorities have been informed on the objectives of the work and invited to support the survey process.

○ **Questionnaires, surveys**

The basic questionnaire developed by IRA team, is adapted from the questionnaire conceptualized by ICARDA within the research activities on vulnerability analysis, integrating the parts that deal with the gender aspects, local knowledge and innovation. This questionnaire consists of 9 parts:

- General information of households localization
- Households identification
- Demographic characterization of the household
- Financial, physical and social capital characterization (access to land, plots, farm systems, livestock, productions and needs of the family, main sources of income, etc.)
- Agricultural production and the system vulnerability (general production and marketing, animal feed, food security and sustainability of the pastoral system, system vulnerability and coping strategies used by local communities)



- Local knowledge and innovation regarding agricultural practices and management of livestock, the transfer of knowledge, the food security and the sustainability of the system in general
- Gender aspects (man, woman, young people) in order to identify their main roles in household management
- Agricultural policies and agricultural and rural development
- Agricultural practices, animal husbandry, prices, etc. and access to credits

○ **Sampling method for the basic surveys**

Several considerations have been taken into account on determining sample size mainly the spatial distribution, production system typology and gender. The structure and the spatial distribution of the sample are presented by table 1 and figure 2.

Geophysical areas	Man	Women	Total Sample
Upstream (Beni Khedache district)	37	30	67 (53%)
Middle stream (Medenine North district)	24	7	31 (24%)
Down stream (Sidi Makhlouf district)	24	5	29 (23%)
Total	85	42	127 (100%)

Table 1: Sample structure by region and sex

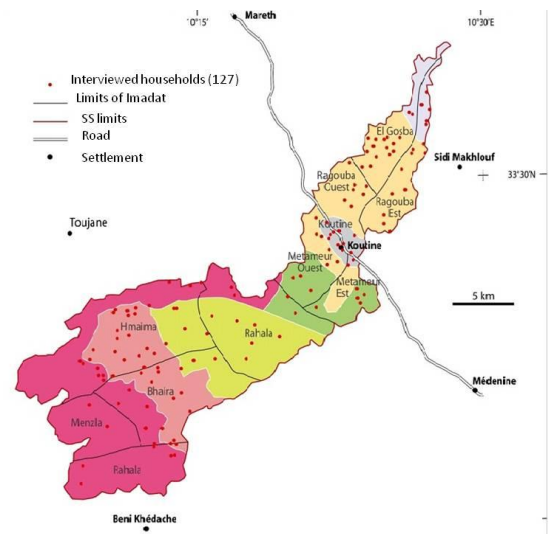


Figure 2: Spatial distribution of the sample of households (basic survey)



II. HISTORY AND EVOLUTION OF LAND POLICY AND LAND TENURE IN TUNISIA AND JEFFARA

2.1. Introduction

A large part of the Tunisia was dominated by Arab tribes living in arid and semi-arid. These tribes enjoyed a degree of independence with respect to the “Bey” power. Settled agriculture and private property called Melk were only well represented in the northern Great Plains, the region of Tunis and Cape Bon, the Sahel, the southern oases and mountain hamlets of Tell. Melk (property) is transmitted in different forms, the main ones succession, donation, sale and Mogharsa; association contracts through written documents called “Ouquod”. On the other hand, and next to an increasingly microfundia due to the strict application of Islamic law on inheritance, a kind of feudal landed appeared by purchasing large tracts of land. From the thirteenth century and although the Sultan Ottoman was theoretically the absolute manager of his extensive empire, it was virtually powerless to impose regulations to distant countries (the Bey in Tunisia and Day in Algeria). Thus, the Bey of Tunisia was a true sovereign, almost independent of the central authority. Towards the end of the thirteenth century, the financial resources of the regency fatally decreased probably because of wars and conflicts. A series of epidemics, food shortages and famines in 1784, 1805 and 1818 led to the disappearance of nearly half of the population. This demographic disaster, at a time when man was the main labor force, was reflected in a sharp drop in planted land. Adding to this the country was systematically looted by government officials and European business men and became increasingly poor. Once a major exporter, the country became an importer of cereals and its trade balance became negative. The colonization of Algeria in 1830 contributed also to the worsening of economic situation in Tunisia, as the eastern Algeria who lived economic symbiosis with Tunisia was separated by a strict trade border. The arrival of Mohammed Sadok Bey (1855-1859) was accompanied by a great effort to renovate institutions network in Tunisia. Bowing to pressure from the consuls of France and Great Britain, the Bey of Tunisia bestowed September 10, 1857 a fundamental pact inspired from Ottoman charters of 1839 and 1856. This agreement granted to all Tunisians equal rights and to aliens the right to access to property and to operate in the regency. Spurred on by a group of reformers, mainly Ben Dhiab and Khéreddine, a set of reforms succeeded. This attempt to modernization, which required a lot of human and material resources, exacerbates the financial crisis. The government was thus obliged to borrow first locally, then in Europe with usurious conditions.

Concerning land ownership, during this period marked by violence and war, we note an extraordinary confusion. The property (Melk) was the exception, the great fiefs and “habous” that stretched hundreds of thousands of hectares had only eminent propriety right, and hereditary occupants keep the enjoyment of their land. Tribes occupied large collective territories without clear legal status.

At the end of 1880, French government imposed the Treaty of Bardo May 12, 1881, providing for temporary occupation to restore order and security. Two years later, the Convention of Marsa signed in June 1883 formally established a French "protectorate" in Tunisia.



The French colonization and land tenure

While the population objected vigorously to the invasion of the country, the Bey called to bid. During the first years of the occupation, the colonial administration was concerned mainly by setting and control populations, organizing their administration and taxation. Indeed France tried to implement in Tunisia a sustainable colony system as well as large corporations and businessmen bought huge areas without intent to directly exploit it. In 1892, the French had 402 000 ha of land with 246,000 distributed among 114 properties.

This large absentee colonization began to falter around 1895 when, for economic and political reasons, the colonial administration decided to facilitate colonization by more direct assistance: the era of official colonization was open. Thus, it was easy to purchase lands through various ways and especially after the enactment of appropriate legislation. After easily ownership of land “Melk” in the north and coastal areas, the colonial administration seek even in Muslim law legitimacy to get their hands on collective land to meet the growing demand for new settlers. The decree of Bey of 15 January 1896 which stated that “the Tunisian dead land; vain and waste lands, waste mountains; belonged to the state» was largely used by for the implementation of the settlement in the central and south of the country, assimilating the collective land to dead lands.

It is in this atmosphere of accelerated settlement of farmland that was issued the famous decree of Bey January 14, 1901 on collective land. By this decree, the colonial administration denies the right of property to the tribes. By the same decree, it recognizes the existence of three million hectares of communal land in the center and south and encourages the administration to the delimitation of the land. Traumatized by colonization and dispossession of their lands, people react with violence.

The insurrection of 1906 and especially the emergence of a resistance movement more or less organized prompted the legislature to enact two decrees in 1918 and in 1935, ruling in favor of the tribes. The decree of 30 December 1935 confirms tribal ownership and collective status of tribal lands “collective land is exempt property, inalienable and commonly owned under the administrative control by a group, each family head entitled only a proportionate share of enjoyment. In addition, the decree provided including the attribution of legal personality to the tribe by creating a management entity called management council, replacing the traditional structure “the Myaad”, council of notables appointed by the leaders of the tribe. The members of the management council are elected by the heads of families (including widows) and chaired by an elected head.

In 1956, the European land settlement extended over 850,000 ha of which 774,000 ha for French settlers. The French land ownership was highly concentrated: in fact, each family of three thousand farming families had 250 ha, while the Tunisian peasant family had an average of 6 ha per farm.

2.2. The complexity of the land tenure and land policy after independency

Since independence, several rural development policies have been adopted to consolidate state authority and to promote socio-economic development. The rural development policies were characterized mainly by a top-down approach and extensive use of scarce natural resources. The principal constraints on these policies were the increasing costs for the public sector and the degradation of natural resources. All these constraints led to the adoption of a new, local and participatory, form of land use governance. The adoption of a structural adjustment program and the



liberalization of the economy induced a profound transformation in state intervention patterns and a strengthened role of local organizations in natural resource management and development activities. Different types of formal and informal associations at local level have the task of managing natural resources such as irrigation and drinking water (Grouping of Agriculture Development; GAD), water and soil conservation, and forest resources management. Coordination between all these institutions is the responsibility of the Regional Administration of Agriculture Development called CRDA. There is a development council at the regional level. Each delegation has a local development council and many rural types of council related to the different economic sectors. These councils offer advice, and are composed of local elected and civil society representatives. The land privatization process was conducted through a management council inherited from colonization period under the governor. Among the tasks managed by the regional council was the land privatization process (MEDD, 2006).

Land use policies in Tunisia include resource-oriented policies, such as the land privatization policy, (implemented in 1964), and the Agriculture Development Strategy and territorial policies such as the rural development program which has been implemented since the 1990s.

Since independence three periods related to the policies implemented can be identified.

1950–1970: an extensive use of natural resources, but a relatively low pressure on the environment characterized this period, in which both people and herds were mobile. This stage was accompanied by low intervention of the State. The most important policy was the agrarian reform which started during the 1960s. The agrarian reform concerns mainly the public irrigated areas and was intended to reduce land fragmentation. The aim was to create viable farms with optimal sizes adapted to new technical developments. The new forms of agricultural exploitation were to ensure efficient irrigation water use, and better execution of the crop rotation plan, and as a consequence enhance agricultural productivity.

But the agrarian reforms faced many problems, including opposition from landowners, and these reforms were abolished during the late 1960s.

1970–1990: this period was characterized by a huge agrarian transformation through a rapid expansion of rainfed agriculture by conversion of natural rangelands. The model of development was characterized by the mobilization of natural resources and the development of industrial activities using the agricultural surplus. The intervention of the Tunisian government was important, supporting many development programs (infrastructure, health, education, and so on). From 1986, the Tunisian government started a very important Structural Adjustment Program (SAP) supported by the World Bank.

1990–2010: this period is characterized by the implementation of natural resource management strategies. The aim has been to increase the efficiency of natural resource use and to alleviate the high pressure on these natural resources. The 'Rural organizations promotion policy' aims to solve problems of divergence and conflict between different actors involved in natural resources, and hence promote local sustainable development. Institutional reforms and regulatory issues have been put in place to empower these



organizations to ensure good local governance (Elloumi, 2006). This policy has encouraged the emergence of a set of local institutions that aims to represent local people in development and natural resource management.

Like the rest of Tunisia, the governorate of Medenine has a local institutional framework that covers all activities (industrial, agricultural and tourism sectors) and manages the natural resources.

Since 1990 several policies related to natural resource management and the modernization of the agriculture has been implemented. The objective of these policies was to reduce the pressure exerted on the natural resources, mainly land and water, and access to the resources was indeed reduced by several instruments (economic instruments such as water pricing, and legal instruments).

Also, the privatization of collective land, in order to integrate this land into the market and to increase agricultural and economic production, has been an important policy in Tunisia. Land tenure has changed from collective range land to private land ownership. A land title allows the provision of subsidies and credits that are supposed to transform agriculture into a profitable and commercially oriented activity. In practice, however, because of many factors, such as absence of land title, absence of rural credit institutions, and farmers being 'unaccustomed' to make use of credit, the provision of credit has remained low.

These changes are occurring in a context of economic liberalization and rapid integration of the national economy into the global economy, for example through agreements with the WTO and EU. The policy changes related to globalization have affected natural resources and land use in the case study. As an example, the increase of agricultural prices related to the liberalization in the international market during the last period has influenced the production system in the region. Breeding activities decreased, and farmers preferred other agricultural activities such as irrigated crops and arboriculture. Technological development, mainly water extracting techniques, irrigation techniques, water and soil conservation and ploughing techniques, put strong pressure on natural resources. Several policies, including land use policies, have been implemented to alleviate the pressure exerted on natural resources, and ameliorate the socio-economic situation of the local population. These policies can be divided into two groups, namely 'resource-oriented policies', and 'territorial policies'.

In the following section we will focus on the land privatization policy, the water and soil conservation policy will be also presented.

2.3. land tenure

The Tunisian tenure, inherited from the colonial period, is very complex.

Private lands (melk)



According to Ben Amara (1991), "the melk is determined by the extent of the property, its consistency and its nature. It derives its basis for a possession in good faith, peaceful, public, continuous and prolonged for at least ten years. These items can be authenticated by an act called melkia which establishes the property. "

At present, three types of private property can be distinguished as follows:

- Lands which are registered and recorded in the land registry and whose owners have a blue title
- Unregistered lands, but whose owners have a certificate of possession or green title
- Lands whose owners have only a notarized title, "rasm" in Arabic. These lands are much less accurate because the title don't mentioning the area but generally mentioned only the origin of the property, its boundaries and all the changes that have occurred on it. In practice, the majority of private lands are a family ownership.

Collective lands

The notion of collective land is very old in Tunisia, its origins date back to the periods where the desperate insecurity prohibited any form of private property. It is also due to climatic factors. Collective ownership mainly encountered in the steppe regions where natural conditions are unfavorable to the development of private property. The isolated person cannot make use of the land in these arid regions, because it does not have the means to act on nature, then it is forced to seek support and forced to join a group.

Land of Habous

The habous is a legal act by which a person is stripped of one or more of its property, generally lands or buildings and puts them out of the trade by assigning them, during their work life, for a pious, charitable or social goals, is an absolute exclusive for a public use (public habous) or by reserving the use of such property to one or more specific persons (family habous). Upon termination of the beneficiaries of the right of enjoyment, habous family becomes a public habous "(Coret, 1957). The deed by which the owner transfer property to habous is called Wakf, Arabic verb wakafa that means stop. Habous are classified into three categories: private, public and mixed habous. Private habous are made for the benefit of descendants of the constituents, but with their extinction the habous will return to a pious works. Public habous are made in favor of pious works such as mosques, shrines, etc.. Finally mixed habous consist partly in favor of private and partly for the benefit of the pious foundation. In Tunisia, the use habous status became widespread in times of insecurity (rebellion, famine, etc.) and especially during the colonial period, when large landowners feared being expropriated. Thus, "nearly 2 million ha property were habous before independence, more than one million hectares of agricultural land" (Moussa, 1988).



Public land

Public land become from various sources:

- Different Franco-Tunisian agreement especially during the period 1956- 1963
- The application of the law of 12 May 1963 on the nationalization of land owned by foreigners,
- Liquidation of public Habous.

This entire heritage has been entrusted to the offices of development (the first created 1958) and especially the office of public land established in 1961, whose mission was to ensure the management of agricultural land, their development and their conversion.

2.4. land privatization policy

If we state different paths followed by Tunisia since 1956, we distinguish first of all, the liberal regime (1956-1960), a cooperative socialism regime based on a reform of agricultural structures (1961-1969), a liberal regime (1970-1985), and finally a more frank liberalism marked by the implementation of structural adjustment program that started from 1986 in which the agricultural sector has been at the forefront in the process of economic reforms.

The period 1956-1960: the establishment of the framework of the agricultural sector

Succeeding the colonial period, the Tunisian authorities have been forced in the early years to the consolidation of national unity and the establishment of the state apparatus and the design and implementation of economic policy. This period can be qualified as a liberal period, the agricultural sector, despite the absence of a comprehensive agricultural policy, has benefited from significant legislative and institutional measures.

The young Tunisian government aims to consolidate land privatization and individual land use through land reform focused on Habous properties and communal lands. Public Habous were abolished and integrated into the private domain of the State by the decree of May 31, 1956. For collective land, the law of September 28, 1957, as amended by the Act of 21 July 1959 that states that the right to collective enjoyment shall, subject to certain conditions, be converted into the right to full enjoyment. This reform of the status of collective and habous land has resulted in a major disruption of social and economic structures and patterns of land use.

At the institutional level, the creation of public development offices remains the most important measure of the young Tunisian state. Thus, the office of lands, created September 30, 1961 to manage 100,000 ha of public lands, played a key role for the production of staple foods and especially for the stabilization of commodities prices on the Tunisian market until the mid-80s. In conclusion we can say that during this period of the establishment of the



framework of the agricultural sector, there has been no overall development strategy well-defined, but a policy characterized by specific interventions.

The period 1963-1969: an attempt to land reform

During this period, after the Congress of Bizerte in 1963 that established a socialist orientation and like all the national development policies, agrarian structures and land politics were completely disrupted.

In fact, the international environment after the Second World War is characterized by the independence of several third world countries and especially the success of the socialist model in many of these countries. Thus, the cooperative model was agreed by international organizations, mainly the United Nations Food and Agriculture Organization (FAO) as a privileged way of agricultural development in Third World countries.

At the national level, and after 1956, the economic weight of agriculture sector caused awareness of the vital role that it should play in economic and social development. In September 1956, the Tunisian General Labor Union (UGTT created in 1946), led by Ahmed Ben Salah, clearly opts for giving priority to agricultural sector in the Economic Report of the Sixth Congress. This report outlines concrete action for the development of agriculture by the creation of cooperatives in all forms. Thus, the option for the cooperative movement has become very clear and its implementation appears to be an emergency. Also in 1960, Tunisian officials Neo-Destour party and the government decided to follow the socialism path by implementing the union. Indeed the development of agriculture sector required significant structural reforms.

Thus, the option was taken in favor of a rigorously planned development and decadal prospects 1962-1971 gave prominence to agriculture sector, with the following basic objectives:

- Increase in the annual growth rate of agricultural production;
- Food sovereignty of the country;
- Radiance of agricultural sectors on other economic sectors;
- Raising the living standards of the rural population.

To meet these objectives and to remedy defects in the fragmentation of holdings, the solution lay in partial or total pooling of means of production. It was mainly to improve the exploitation structure and not the property having in fact a secondary economic importance. The best solution was to group the farms having a reduced size in production cooperatives and organize the larger farms in cooperative service in which the land use would be individually but where services would be provided collectively following the needs. Production and services cooperatives, in addition to their main target of increasing production and economic growth, are created to raise the technical and intellectual level of the rural population.



The vocation of different cooperatives was clearly specified by the first fundamental law No. 63-19 of 27 May 1963, which will be repeated and clarified by the Laws No. 67-4 of 19 January 1967 and 22 September 1969. Two types of cooperatives were distinguished:

- Production cooperatives: it consists of the production cooperative units of the North (UCP), livestock production cooperative and development cooperative of polyculture of the center and the south.
- Service cooperatives: This is a grouping for the purchase of supplies and the possible acquisition of equipment and organization for packaging and marketing the products of the cooperatives members.

Cooperatives were organized in a complex vertical administrative structure: local units, regional units and national units headed by the Secretary of State of National Economy Plan. In reality, the role of cooperatives was limited to the distribution of tasks and the execution of plans. Moreover, these cooperatives were mandatory, which means that the owners did not want to join the cooperative were required to sell or lease their land to the cooperative.

In 1968, the created 348 production cooperatives covered 37 8674 ha, about 1,080 ha per unit and gathered 29,649 cooperators, which amounted to slightly less than 13 ha per household. At the same time, service cooperatives covered 42,000 ha. In the center and the south of the country, where land ownership was collective (except oasis), cooperative development does not involved individual farmers (fellahin) but one or more fractions tribe.

The failure of the experience of collectivization

Given the small size of the properties of small farmers, their contribution on the cooperative was less than 50%, the federal contribution on cooperatives was estimated at 40% on average, 10% were composed by rented land. Indeed the limit of 5 ha per cooperative was not respected; it would have excluded 90% of members. Because of the small propriety other cooperators members were added. The high number made very acute problem of employment. The number of cooperators is higher than requested by the production cooperative, cooperators who were not working in the cooperative and whose lands were added within the cooperative lands were forced to lease their land and many farmers found themselves without work.

This situation is compounded by the fact that land rentals have never been paid by cooperatives and the minimum income provided by decadal development prospects has never been observed. The farmers had the feeling of having lowered in the social categories and switch from the state of owners to the state of the workers. In early 1969, began circulating the rumor of the extension of the cooperative to livestock sector and big land owners who had not yet been affected by production cooperatives, which increased and widespread discontent.



Given the gravity of this situation, the government invited the cooperative to meet and choose freely to remain cooperators or to leave the cooperative. Almost total cooperators decision was to leave the cooperative. Thus, after a short experience (1963-1969), the policy of collectivism resulted in a total failure and Tunisia fell back into liberalism.

The period 1970-1985: the return to liberalism

The third phase was marked by the return to liberalism and thus the privatization of lands began in September 1969. Many cooperatives were dissolved, the redundant workers are laid off, and equipments were sold at public auction. Cooperators have recovered their land, but many poor farmers found themselves without the means of production, which push them to rent or sell their land and to immigrate. The early 70s saw the highest rural exodus rates in the history of Tunisia. Privatization of public lands and the remaining cooperatives started gradually. With the law of 19 May 1970, that concerns public lands for agricultural purposes, the privatization process was started slowly. In April 1974, the Department of Agriculture reports that about 3000,000 ha of public land will be retained. The rest must be subdivisions to be sold to young farmers or sold in a public auction.

Privatization of communal lands

According to the legislation, the Tunisian government with the privatization policy tries to put out collective land, located in areas with untapped agricultural potential, from the status quo which they were submitted by their former status. It was by converting public land to private ownership, recognizing the property right to community members and to acquire ownership title. Ownership title can be used as credit guarantee. Several laws and regulations have been promulgated to provide collective land a new status. The latest texts are Law No. 64-28 of June 4, 1964 as amended by Act No. 71-7 of 14 January 1971 and No. 79-27 of 11 May 1979 and Law No. 88-5 of 8 February 1988 and Decree No. 65-327 of 2 July 1965 amended and supplemented by Decree No. 81-327 of 10 March 1981 and Decree No. 88-894 of 29 April 1988.

However, it was noted that the land privatization as it has been practiced, is a purely legal approach. In practice, the allocation doesn't take into account neither the viability nor the ability nor the fragility of the soils, thus exacerbating desertification.

Allocation procedures

Private allocation or "Al Tamlik" option chosen by the legislature since 1971, target the consolidation of ownership and the access to agriculture credit. The recommended procedure for the private appropriation of collective land varies by agricultural land use:

- The planted land: The assignment will be attributed to a community member or a family group who will use the land. We have here a typical example of the application of the principle of Islamic law under which the land reverts to the one who gives life;



- Not planted land: the operation of a collective land for at least five years and the residence during the same period in the region where the earth is the occupants benefit from the conversion of usufruct law private property.
- Rangelands: and they are still used in common by members of the community. The collective term is defined by a regional commission where communities are represented, then it is under the forest regime.

Analysis of award procedures reveals a trend towards administrative simplification which aims to accelerate the privatization movement. The management board is the decision maker in allocating communal land for private purposes, is required to bring to the attention of others having rights of the community concerned the opening date of allocation of land transactions by reviews posted one month in advance seat regional and local administrations (governorate delegation Imada, CRDA ...). After this period, the allocation for private members satisfies the conditions of ownership is decided by the Management Board on the basis of site plans and surveys the scene. After completion of assignment operations, the Management Board invites interested parties by posting the seats of government mentioned above, to read the results of operations of sharing and introduce appropriate representations within a period of one month from the date of posting. After this period no claim will be accepted. Once approved by the Governor, these decisions become unassailable and cannot be renewed examination. Thus, privatization of communal land increased primarily due to the allocation formula called "fast track" which was the subject of a circular from the Minister of Agriculture dated 2 May 1973. This is a method practice and especially fast, based on simple investigations by boards of management. This formula has replaced the formula "normal" which is based on parcel lifted, which made precise but also slow and expensive (photo-aerial surveyor ...).

However, "the establishment or restoration of free and total ownership (...) remains insufficient and limited if it was not continued until the end" (Moussa, 1988), that is to say, the establishment of title Melk. However, this title known as' blue title can be determined only after the registration of the property in question. The system of land registration in Tunisia was established by the colonial administration by the Decree of 1 July 1885 to facilitate the implementation of colonization on the Tunisian land. This registration was optional and expensive and sufficient to ensure the security of tenure of the settlers. After 1956, the Tunisian government wanted to cover the whole territory of the republic by a cadastre for secure property and land rights, which is a logical result of the liquidation of traditional land tenure.

Code of real rights (CDR) promulgated by Act No. 65-5 of 12 February 1965 clarified the role of each of the bodies responsible for land registration: this is the real court, service of land conservation and topographic service. The mission of the property court is to rule on applications for registration. The service of the Land Conservation, its role is to register and establish title to the land on the basis of the final judgment of the court estate. Finally, the



Survey Department's primary mission is to support the housing court in its task. It is mainly involved in carrying out the work recognition, demarcation and subdivision necessary for the implementation of the land law.

Because this registration work is far from complete, a temporary solution is in force: it is the system certificate of ownership. This scheme was introduced for the first time by the colonial administration (Decree of 30 August 1951). Convinced of its usefulness, "young" Tunisian state has maintained this system in order to allow farmers to have a document justifying their right and allowing them to have access to credit and benefits granted by the state "(Abaab, 1999).

Management boards

As provided by legislation, collective land management is ensured by the management council that is controlled by the parent council. The Management of collective land has not been around the time the same name or the same powers. As we have seen, replacing the traditional structure Myâad, the colonial administration was established by the decree of 30 December 1935, "Management council and has retained the election (for all farm managers including women) as the mode of appointment of council members. Thus, the Management has become more representative. Decree of 2 July 1965 Text application of Law No. 64-28 of 4 June 1964 laying down the system of collective land has expanded qualified elector and candidate for any member of the community aged 20.

But in reality, it is unlikely that a young man not head of household and even less a woman or member of a council of management. The management council is elected for a period of five years from the confirmation of elections by the governor. It consists of members and alternate members whose number can not be less than six and appointed by the governor.

In fact, the composition of the management council builds custom allowing each lineage (Orf) to be represented by one or more members, as the lineage is considered minor or dominant. In general elections of these representatives have not paid too much in dispute, but it was not always the case, and things seem to have gone better in small communities than in large-stakes and power relations were more powerful.

The new missions of the management council, established by the Law of 14 January 1971 are as follows:

- Undertake any operation intended to encourage the development of land collective,
- Ensure maintenance of plantations and land improvements made in the implementation grazing and the organization of the course reserved areas,
- proceed with the allocation of collective land privately to members of the community under the conditions specified above,



- administer the heritage of the community and have under the conditions determined by law,
- stay proceedings on behalf of the community,
- hold a summary accounting of financial transactions of the community,
- represent the community in all these acts.

However, despite these awards, the acts of the management council are subject to the administrative supervision of the State. The right of state supervision is exercised by the local board of guardianship, wardship regional council, the governor (who is the direct guardian of collective land depending on its governorate) and the Minister of Agriculture and since 1992 Minister of State Domain and Land Affairs.

In conclusion, we can say that theoretically management boards are fortunate to be able to very extensive and play a crucial role in economic and social life of the group. But in practice, as we will show below, several factors (including administrative supervision) have combined to limit the role of management boards in one operation sharing communal lands.

The period after 1985: the disengagement of the State

Since 1956, and as we noted above, the options for economic development has been based mainly on the idea that industrialization and the development of non-agricultural sectors favored a more rapid economic growth. From the 80s, the situation has changed. Indeed, the dramatic drop in world oil prices and other commodities exported by Tunisia, particularly phosphate, is added to an increase in domestic demand for food and manufactured goods. Strong overvalued dinar encourages imports become cheaper in the domestic market and discouraging exports become uncompetitive on the world market. This period is marked by easy access to loans from international monetary institutions (the International Monetary Fund and the World Bank). Thus, and to continue its policy of meeting the food needs of the population, Tunisia found in indebtedness immediate way out of the crisis.

In the mid 80s, and pressure deficits and the need to negotiate external financing needed in an international context of crisis when lending becomes increasingly difficult. Tunisia was forced, as are virtually all the countries of the Third World, to apply a series of measures from July known as "structural adjustment program" (SAP) 1986. The establishment of this program coincided with the start of the eighth plan for economic and social development (1987-1991).

And the importance of the agricultural sector which has always given impetus to other sectors and continues to occupy a strategic place in the Tunisian economy, it was the first sector to achieve its restructuring program known as the "agricultural structural adjustment program "(PASA). The objectives set for this program are very ambitious. Thus, the agricultural sector has, according to the Tunisian planners, hire a qualitative change its



development model to promote the advent of modern agriculture faces the strict management, rational use of all natural forces and human innovation and agribusiness and market-oriented and export. Thus that like most countries in the world Tunisia has chosen the path of private initiative in farming and re-imposition of economic regulation by the market. The State, producer and guardian, must give way to the regulatory state.

However, none of the main objectives of the Seventh Plan (1987-1991) and the Eighth Plan (1992-1996) for economic and social development have been achieved neither food self-sufficiency nor an increase in exports of agricultural products, or the balance of the food trade balance.

On the land plan for example, the eighth plan included the completion of the operation property clearance of collective land with the end of the plan in 1996. Yet 380 700 ha to be cleared, only one-third has been completed. It remains to share about 300,000 ha and 900,000 ha to manage non-delimited collective journey. The hard part is to do as it is of disputed lands. In order to complete the division of communal lands during the Ninth Plan, Tunisian officials decided the return to form "normal". This formula based on fragmentary survey is supposed to solve the problems of disputes and conflicts. In current disengagement of the State, the work is entrusted to private consulting firms, which requires the provision of a huge budget.

For the first time, the State, in order to involve farmers in the process of restructuring land, organized a national consultation in Tunisia major in March 1998, which was attended by over 25,000 people (farmers, technicians, researchers, legislators, managers ...). However, referring to the published document, nothing was discussed outside of land issues, which shows their importance and the caution with which the State deals with land issues. In terms of public lands, which have been restructured, the Ninth Plan will see the completion of the final installment covering one hundred thousand hectares. This contrasts the last part of cooperative production units covering 28,000 ha, the rest will consist of agro-industrial complexes and other farms within the office of public lands totaling 72,000 ha.

It is important to note that until the end of March 1999, the restructuring of public lands affected 296,000 ha of 500,000 ha out.



III. Evolution of the land ownership and land status in the South-East of Tunisia and their impacts on production systems

3.1. Brief review of the land status in the Governorate of Medenine

As results of the land tenure policies and especially of sharing of collective lands in Tunisia, we can underline three main observations:

- The sharing and allocation of approximately 1.3 million ha of collective lands. It remains to share approximately 200,000 ha.
- The delimitation and the submission under the forest regime of approximately 600,000 ha of rangelands.
- It remains to manage more than 1 million ha of non-delimited collective rangelands especially in the South of Tunisia.

At the regional level, private lands, which cover 377,124 ha, represent 42% of the total area of the Governorate of Medenine. Almost 120,000 ha of these private lands have been allocated and approved by decree between 1973 (date of authorizing the allocation of collective lands) and 2005. The collective lands cover 526,219 ha of which 7,830 ha are in the way of privatization, and the public lands cover only 8,355 ha.

In addition to the private rangelands, which cover more than 100,000 ha, it exist a collective rangelands which represent 496,000 ha (50% of the total area of the Medenine Governorate). Among these lands, 56% (257,708 ha) are delimited and transformed to the forest regime managed by pastoral planning.

Located in large part in the Delegations of Ben Gardane and Béni Khédache, the rangelands transformed to the forest regime are as follows: El Ouara: 164,000 ha; Dhahar: 45,854 ha; Béni Khédache: 33,870 ha; Choucha: 13,984 ha.

Table 3: Land status in the Governorate of Medenine

Regime	Land status	Area (ha)	% of total gouvernorate	
General situation	Total gouvernorate	916 698	100	
	Total of agricultural land	Operated lands	229 718	25.05
		Rangelands	600 740	65.53
		Forest	4 340	0.47
Private domain	Private lands	257193	28.05	
	Assigned collective lands	119931	13.08	
	State lands	8355	0.91	
Collective regime	Collective lands	527009	57.48	
	Assigned lands	7 830	0.85	
	Collective rangelands not under forest regime	261471	28.52	
	Collective rangelands under forest regime	257 708	28.11	

Commissariat Régional au Développement Agricole, 2011

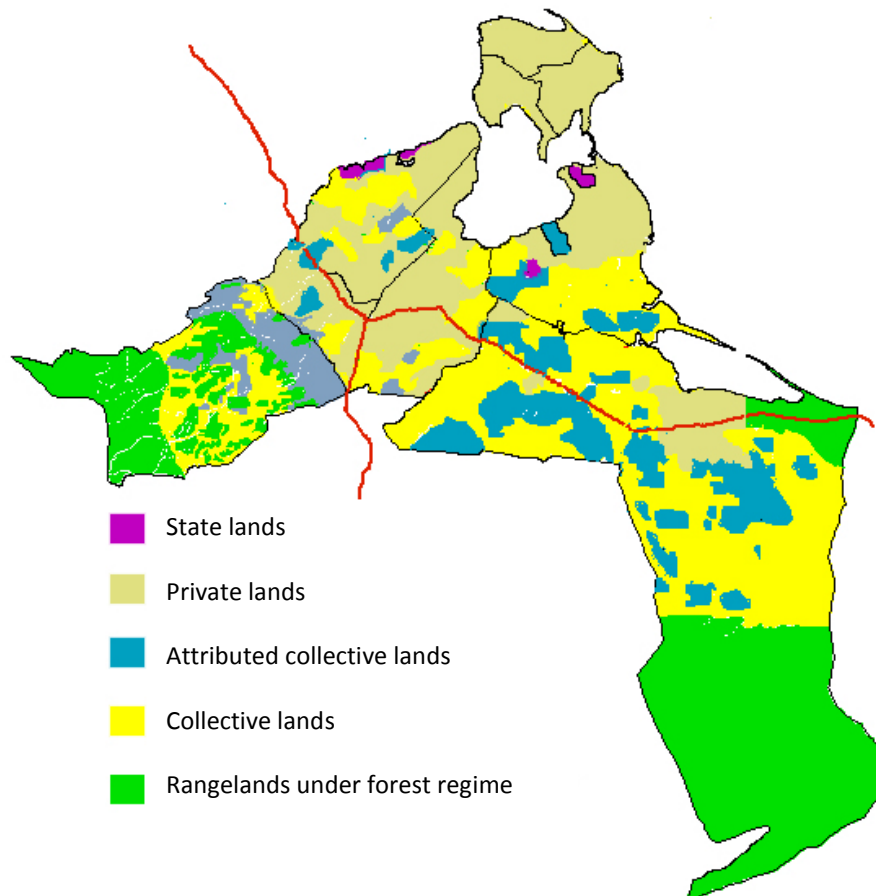


Figure 3: Land status map in Medenine gouvernorate

Source: Direction Régionale des Affaires Foncières Medenine (2005)

3.2. The evolution of land status in Jeffara (Zeuss-Koutine): a first analysis based on mapping

In this section we will analyse the dynamic of land status in Jeffara region from 1901 to 2014. This study is carried out in concordance to three time periods corresponding to the major transformation of the land situation (1901-1964, 1964-1974 and 1974-2014).

Spatial dynamics of the land structure analysis is based on mapping, which is related to the data collected and analyzed from two regional offices of land affairs in Gabès and Médenine.

The period (1901-1964): in search of a status

During this period, the reforms were oriented toward collective lands. By Act No. 16 of 9/28/1957, the regimes of collective lands have been reformed. It has planned to allocated approximately 33 850 ha classified as collective lands to the members of the tribes in the governorate of Medenine.



On the other hand, the “State” lands, which cover an area of approximately 2,100 ha, and which belong to the governorate of Médenine, benefit from the contribution of public Habous and a part of colonial land. These lands will give also the possibility of access to private property through the change of their statute. Also, the collective rangelands in the south-west of the area have been planned to be transformed to the forestry regime. This part of the area covers approximately 10,800 ha located in the governorate of Médenine.

As showed by table 4, we can distinguish:

- Collective lands covering approximately 99 148 ha (83% of the total area);
- Private enclaves and lands of intensive crops covering 20 000 ha (17 %) ().

Table 4: Land status in Jeffara before 1964

	Collective lands (ha)	%	Private Enclaves (ha)	%	Total (ha)	%
Governorate of Gabès	20 300	53	17 900	47	38 200	100
Governorate of Médenine	78 850	97,4	2 100	2,6	80 950	100
Total Jeffara	99 148	83	20 000	17	119 150	100

Our own elaboration based on Arcview software

The land situation during the period (1964-1974): toward the privatization of collective lands

A new economic period, characterized mainly by the planning and the creation of cooperatives, has been put in place. The act of 5/12/1964 has concerned the nationalization of land which were under the ownership and management of settlers, which causes the brutal expansion of the area of the public lands. These lands will no longer assigned to private individuals but rather will be managed by the Office of State Lands (OTD) pending the establishment of cooperatives. It should be noted the existence of a problem that has arisen for the colonial land which is to maintain production at its high level. These lands will not be distributed to the small farmers because they are likely to return to the traditional sector, to be fragmented and see their productivity decline. It is as well as the agricultural cooperative, whose status is specified by the laws of the 5/25/1963 and 1/19/1967, seems to the manager as the best solution for integrating the colonial sector in the national economy on the one hand and to modernize the traditional sector on the other hand. Following these procedures, two problems have emerged: the fragmentation in certain areas and the concentration of land ownership in others.

The law no. 64-28 of June 4, 1964 has been modified by the law No. 71-7 of January 14, 1971 which made the Management Board as the principal manager of the collective lands. During the application of articles 13, 14 and 15 of the law 64-28 of June 4, 1964 relating to the delimitation of collective lands, the land situation is presented as follows:

Following the privatization of collective lands during the period from 1964 to 1974, the land situation of the study site has known an spectacular evolution, characterized by the privatization of collective lands in Medenine and Gabès that concerned around 24 000 ha, i.e



an increase of private lands by 71 %. These lands represent approximately 58 % of all the collective lands in the two governorates (approximately 99 148 ha before 1964) and cover 48 % of the total area of the study site (table 5).

Table 5: Land status in Jeffara in 1974

	Collective lands (ha)	%	Enclaves (ha)	%	Private lands (ha)	%	State lands (ha)	%	Rangelands under forest regime (ha)	%	Total (ha)	%
Gabès	14 170	37	17 900	47	6 130	16	0	0	0	0	38 200	100
Médenine	16 350	20	0	0	51 700	64	2 100	3	10 800	13	80 950	100
Total Jeffara	30 520	26	17 900	15	57 830	48	2 100	2	10 800	9	119 150	100

Our own elaboration based on Arcview software

The land status during the period (1974-2014)

The privatization of collective lands have affected approximately 22 380 ha during this period, which has led to an increase of 39 % of private lands. At this stage, these lands represent approximately 80 % of the total collective lands in the two governorates (approximately 99 148 ha before 1964) and cover 67 % of the total area of the study site. The collective lands in 2014 cover approximately 8 140 ha that represent only 7 % of the total area. The rangelands under the forestry regime, the State lands and the enclaves remain constant.

The current land statute of the catchment of Zeuss-Koutine in 2014 is presented by the table below:

Table 6: Land status in Jeffara in 2014

	Collective lands (ha)	%	Enclaves (ha)	%	Private lands (ha)	%	State lands (ha)	%	Rangelands under forest regime (ha)	%	Total (ha)
Gabès	4 730	12	17 900	47	15550	41	0	0	0	0	38 200
Médenine	3 390	4	0	0	64660	80	2 100	3	10 800	13	80 950
Total Jeffara	8 140	7	17 900	15	80210	67	2 100	2	10 800	9	119 150

Our own elaboration based on Arcview software

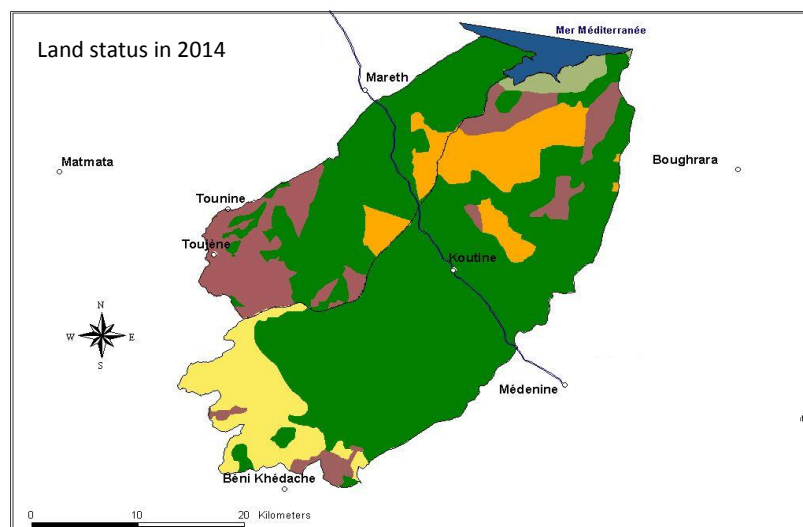
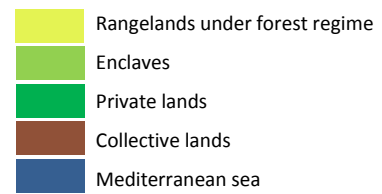
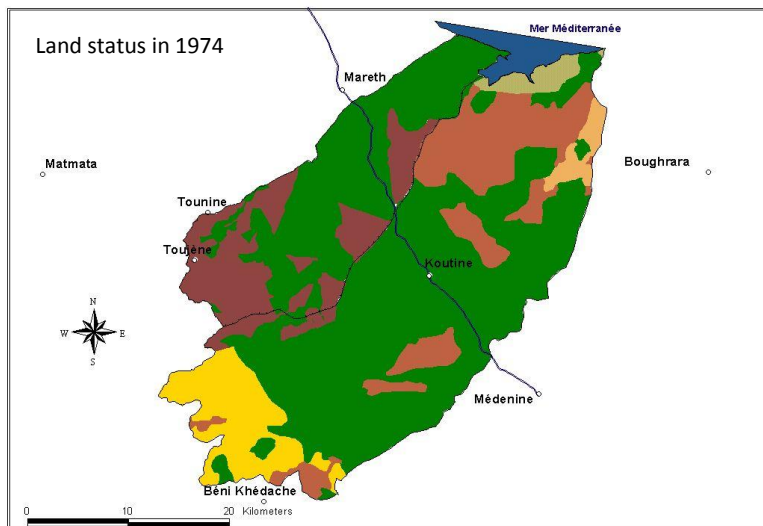
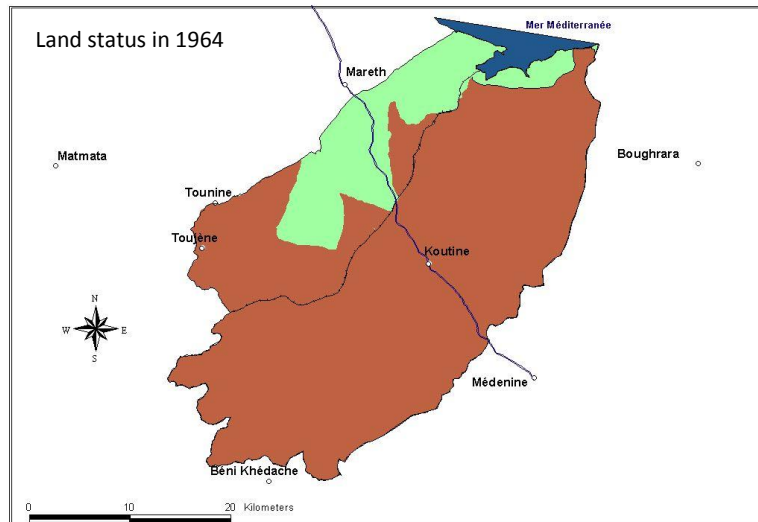


Figure 4: Evolution of the land status in Jeffara (1901-2014)
Source: IRA, IRD (2003) and our elaboration



3.3. Impacts of land status changes in Jeffara: major trends of evolution and characterization of the production systems

Demographic characterization of the population

The socio-demographic analysis has concerned the population density, the size of households, the average age of heads of households, the level of education and the global activity rate.

The density of the population may give an idea on the human pressure on the resources, but it cannot explain this pressure alone. The average population density in the study area is 44 inhabitants per square kilometer.

The average household size is 6.39 people in the whole study area. This size is higher than that observed at the census of 2004 in Tunisia (5.16).

Data analysis reveals that the average age of heads of households is significantly high in the study area (54.7 years). This shows the persistence of patriarchal authority within extended families in this area.

Insofar as educated farmer is more able to access to information on sustainable production techniques, agricultural markets and on the effective management of water resources, knowledge of the level of education of farmers is important. Analysis data shows that 80 % of valid sample, are educated. The results further show that 79 % of the interviewed sample had attended or completed primary education.

The global activity rate is the proportion of people in activity in the total population. It represents 53.9 % in Jeffara region. The proportion of the economically active women reaches 28.4 % of total active population. Rural women contributed significantly to the activities made within the agriculture production systems (preparation of the soil, harvesting, irrigation, storage...). The majority of the active population has a professional status linked to the non-agricultural sector (35.7 %) and with less importance to the agricultural sector (30.7 %) (table 7).

Table 7: Socio-demographic characteristics in Jeffara

	Population density (inhab/km ²)	Size of households	Average age of heads of households	Level of education (%)	Global activity rate (%)	Agricultural active population
<i>Jeffara</i>	44	6,39	54,7	78,9	53,9	30,7

Baseline survey, 2014

Analysis of structures and stratification of land ownership

Land ownership

Data analysis revealed a significant variability of land ownership (table 8).



In fact, results show that small farms (less than 10 hectares) dominate the farm count, making up 57,4 % of the entire study site. In addition, medium farms (between 10 and 20 hectares) make up more than 32.2 % of the study site farms while farms more than 20 hectares represent only 10.6 %. Farmland structure is more or less typical cross study site compartment. The fact that most farms are small has negative implications for mechanization and economies of scale

Table 8: The land ownership (average in ha)

	Land ownership ha/household	Number of plots /household	Plot's size (% of plots/household)				
			< 1 ha	1,1-5	5,1-10	10,1-20	>20 ha
Total Jeffara	8,6	3,1	5,7	12,3	39,4	32,2	10,6

Baseline survey, 2014

Land ownership and inheritance

The analysis of the evolution of the mode of land ownership reveals a regression of the inherited land by approximately 5 ha per household.

Forms of land transaction

The analysis revealed that the dominant forms of land transactions are, by order of importance, the inheritance, the acquisition of new lands, privatization of collective lands and the purchase of lands. The analysis shows the weakness of second type of operations (acquisition) which seems to be a real trend in the region. In fact, 36 % of households are involved in land transaction. However we have to take in our consideration the non-declaration by some interviewed farmers of their land transaction for mainly two reasons: first to not pay a tax and secondly to avoid the bad reputation (the sales of the land are in general badly perceived by the rural populations).

The land fragmentation

Table 9 shows that 45 % of farms in Jeffara hold 3 plots and more. Those who have a single parcel, represent 25 % of the population and hold an average of 2 to 10 ha (with an average of 3 ha). Farmers having 2 plots represent 30 % with an average of 2 ha per plot (from 0.5 to 7.5 ha). The farmers having 3 to 4 plots represent 20 % and hold in average 2.16 ha per plot. Farmers having 5 plots and more, represent 25 % of the total population with an average per plot of 2.46 ha (table 9).



Table 9: Land fragmentation in Jeffara

	1 plot	2 plots	3-4 plots	5 plots and more
% of farmers	25	30	20	25
Average area of the plot (ha)	3	2	2.16	2.46
Min area	2	0.5	0.75	1.2
Max area	10	7.5	5	6

Our elaboration based on Baseline survey, 2014

Impacts of the dynamic of land statute and land tenure on the production systems

In this section we will try to assess the impact of land fragmentation on the agricultural yields, on labor and on income generation

Agricultural development and productive choices of households

Agriculture activities undertaken showed clearly that the first goal of farmers is land appropriation and delimitation. In fact, traditional rules within the study site imply that land becomes the property of him who first brings it into cultivation. Often, trees cultivation (olive, almond, fig trees) is synonym of land ownership confirmation. It also represents the more adapted culture in the SS. In wet years, farmers cultivate annual crops mainly barley and wheat that generated a high incomes.

Data analysis show that arboriculture represent 31 % of the total cultivated area it consist of 69 olive trees, 69 figs, 28 almond and 18.9 other fruit trees (apple, pear, grapes, pistachio, palm tree). Cereals, irrigated and non-cultivated areas represent respectively 29 %, 2 % and 38 %.

The local populations take also a small size livestock activities. Herds conducting are characterized by a relatively restricted mobility on the small rangelands surrounding the farm. Depending on the season and the year, herds conducting can be outside the study site (Dhahar, Ouara and other).

In fact, livestock sector within the study site has known profound changes affecting the proportion and the strategies of farmers for drought and climate changes adaptation. This sector has suffered from the consequences of land privatization. The pastoral resources, on more and more reduced spaces, are increasingly degraded because of the animal pressure.

The perception of households on the evolution of the numbers of animals during the last decades reveals a general trend toward the regression. During the last decate the number of animal known a drastic decline .Despite this decline, the rural population is experiencing its commitment to maintain livestock activities, which is considered as traditional activity inherited from the nomadic behavior.



Generally, small ruminants , mainly sheep and goats, represent the major livestock species. The average herd size per household is 18.6 heads. The composition of the domestic herds is clearly dominated by the sheep, with an average per household equal to 14.2. The average number of goats is not accessing the 7.4 heads. Livestock represent a subsistence farming activity to ensure the self consumption

Impacts on agricultural yields

Table 10 shows that olive represent 63 % of the total agricultural productions, followed by the cereal production (23,2 %) and vegetable (6,8 %).

Further, table 10 shows that farms with one plot have the highest olive oil yield and cereal yield. These yields decreased significantly when the number of plots by farm increases.

Table 10: Olive oil and cereal yields by number of plots by farm

	1 plot		2 plots		3-4 plots		5 plots and more	
	Max	Avr	Max	Avr	Max	Avr	Max	Avr
Olive oil yield (litter/ha)	223	82.5	100	45	125	62	67	28
	Max	Avr	Max	Avr	Max	Avr	Max	Avr
Cereal yield (qx/ha)	1.7	1.1	1.3	0.8	1.6	0.7	0.4	0.3
	Max	Avr	Max	Avr	Max	Avr	Max	Avr

Our elaboration based on Baseline survey, 2014

Impact on agriculture mechanization

Data analysis show that the rate of machinery use is very low within the SS. meanwhile, the used machine (tractor, pump set, van etc.), which are limited in number, have contributed significantly to increasing the yields of certain crops. In the area of Jeffara, only 4.4 % of the households have their one tractor. In fact, 82 % of farmers rent tractors because they have small farms (as consequence of privatization and heritage) and they don't need to own tractors. The rate of ownership of motor pumps seems too low and does not exceed the 3.4 %. These can be explained by the low number of private wells.

The proportion of farmers who use phytosanitary products is relatively large compared to the chemical fertilizers. In total, 25.7 % of farmers use phytosanitary products while 9.4 % only use chemical fertilizers.

Impact on labor

The number of family members, working on the farm, is estimated at 3 persons per households that represent 0.44 members per hectare.



Impact on income generation

The socio-economic changes caused by the privatization of collective lands have generated different impacts on the economic situation of the farmers in the study site, including the diversification of economic activities. In fact, the financial conditions of households have direct effects on the land-use patterns, the production, animals conducting and on the pressure on the natural resources. Table 11 shows that 71.5 % of households have two or more activities. But, this diversity is accompanied by certain instability in the constitution of the household income. It is an indicator of the weakness of the inputs of the different activities (agricultural, pastoral, forestry) to meet the needs of families.

Table 11 shows that the average income per household is equal to 3064 TND/year. The off-farm and farm activities present the main sources of household incomes. They contribute respectively by 41 % and 43 %. We can also note that the livestock activity contributed only by 17 % (table 11).

Table 11: Household's income (TND/year) and contribution of different activities

	Income/household (TND/year)	Contribution of farm activities (%)			Contribution of non-farm activities (%)	Other contributions
		Agriculture	Livestock	Total		
<i>Jeffara</i>	<i>3064</i>	<i>26</i>	<i>17</i>	<i>43</i>	<i>41</i>	<i>16</i>

Our elaboration based on Baseline survey, 2014

3.4. Significant differences between benefits generated by small, medium and big farms

In this section we will analyze the differences between small, medium and big farms in Jeffara in term of land and farm management, land productivity, crop production and opportunities of income generation.

Differences in term of land and farm management

The figures 5 and 6 show that in term of land use the major part of small farms is allowed to agriculture (87 % of the area). But only 45 % of households have agriculture as a principal activity and 59 % of their time is allowed to agriculture practices. These households are then less motivated to practice agriculture compared to the medium and big farms.

As shown by the figure 5, the agrarian structure is different among the type of farms. In the big farms, a great part (57 %) is allowed to pastoral activities. Indeed, the cultivated area is around 43% of the total. The small farms are much more dominated by cultivated area which represented 87%.

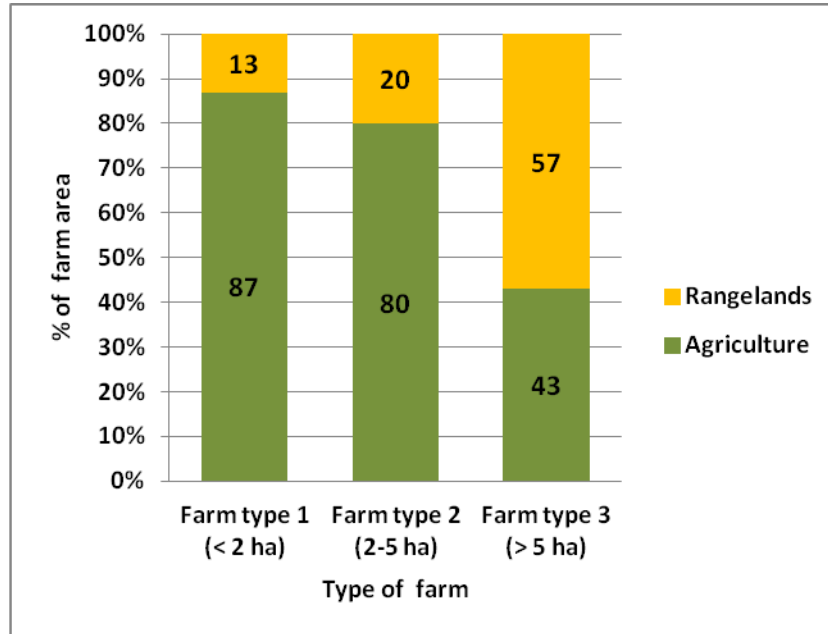


Figure 5: Land and farm management by type of farm

As shown in figure 6, the small farms, besides have a higher ratio of cultivated area, the proportion of farms who have agriculture as principal activity represent only 45%. The big farms are characterized by a higher ratio (100%) of agricultural activity.

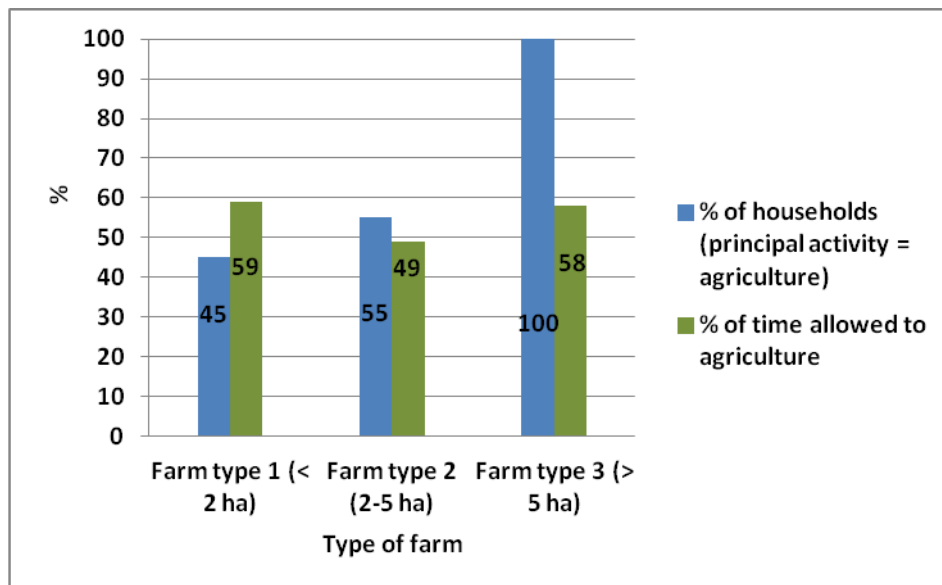


Figure 6: Percentage of households which have agriculture as principal activity and time allowed to agriculture by type of farm

Differences in term of land productivity and crop production

In term of productivity of the principal crops, the analyses reveal that small and big farms produce less of olive oil (respectively 23 and 53 l/ha) than the medium farms (67 l/ha) (figure



7). The same ascertainment for cereals yield (0.1 tons/ha) (figure 8). Indeed, we can conclude that medium farms are more efficient in term of productivity than the small and big farms. This ascertainment can be more explained by the way of spatial representation of the different type of farms and their specific socioeconomic and biophysical characteristics. It could be helpful for decision making within the land consolidation projects.

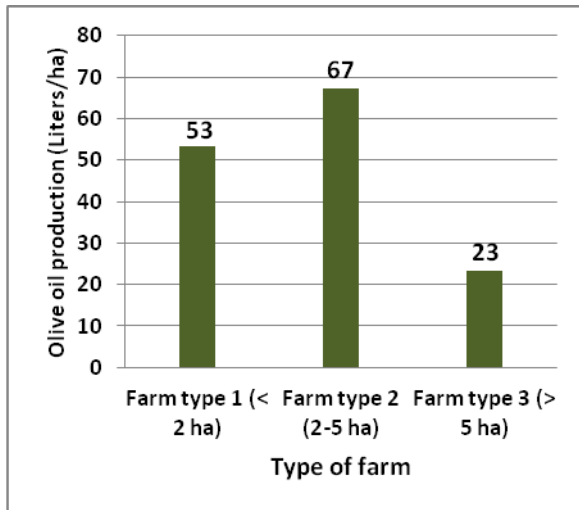


Figure 7: Productivity of olive oil per type of farm

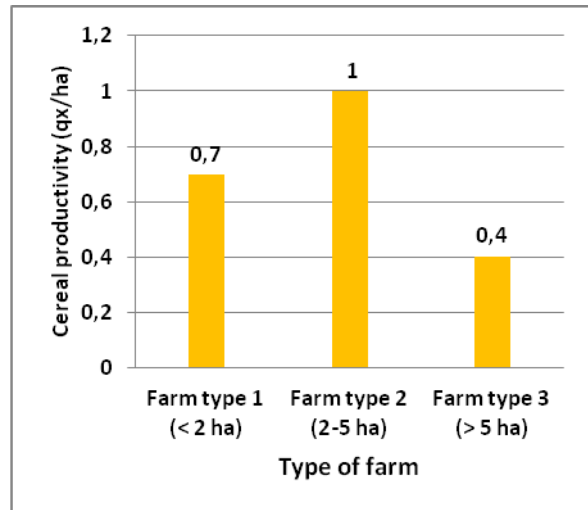


Figure 8: Cereal productivity per type of farm

Differences in term of opportunities and income generation possibilities

Figure 9 shows differences in household's income generation by type of farm. In the case of farm income, the medium farms (2-5 ha) reveal the most important income (780 TND/ha) (figure 9). This is related to the highest level of agriculture productivity in this case. For the livestock, the big farms (>5 ha) have the greatest income by head and this is related to the availability and the greatest area of rangelands allowed to livestock in this kind of farm (57% of the total farm area, figure 5) and also good financial conditions in this case (total income of households). In the case of non-farm income, the big farms show also the greatest income with 2100 TND per household. This can be explained by the fact that for 45 % of households in this case, the non-farm income generation is based on migration which is considered as the highest income in the study site.

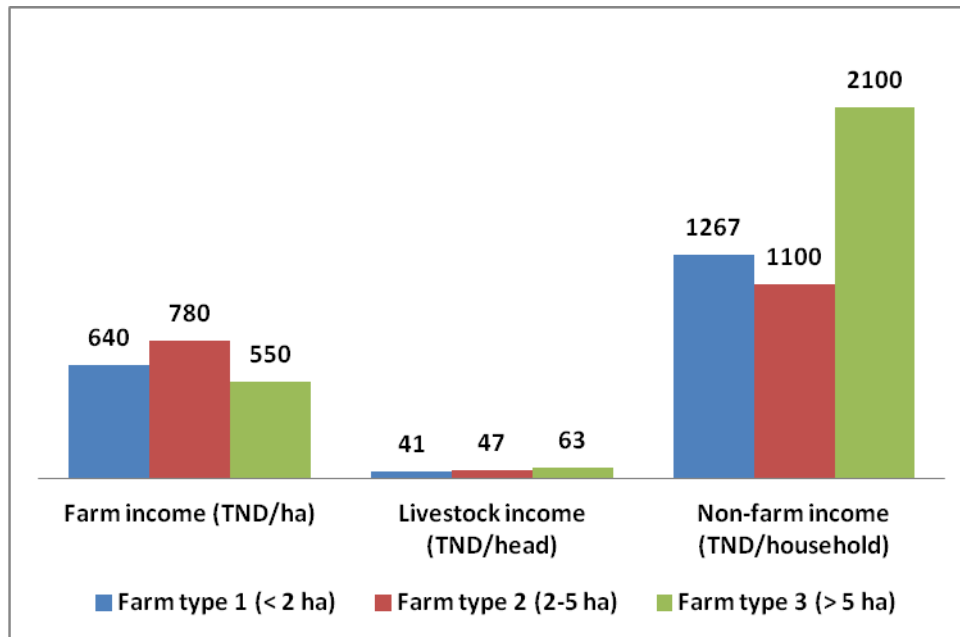


Figure 9: Household's income generation by type of farm

CONCLUSION

This research is based on the facts that the land use policies were accompanied in Tunisia, especially in the dry lands, by profound changes which affected the social and economic dynamics of local populations (sedentarization, privatization and fragmentation of land, decline of pastoral activities and rangelands, agricultural development, extension of irrigated perimeters and changes in uses of natural resources).

The fragmentation of land, as consequence of land privatization and land heritage, is considered as a brake on agriculture development. Related to these conditions and in the framework of CRP1.1 project, this work attempted to assess and understand how land fragmentation contributes to agricultural productivity, sustainability of natural resources, rural heritage and livelihoods.

To reach this purpose, we begin in this research by studying the history and the evolution of land use policies and especially the land privatization. This first part allowed, by the way of surveys, to assess the impacts of the land privatization on actual production systems in a study zone called Jeffara (south-east of Tunisia) and to analyze the problems of land fragmentation and the differences in significant benefits between small and big farms.

The main results of the analysis are as following:

- Land fragmentation, diversification of agricultural practices, decrease of livestock activities, and diversification of economic activities as impacts of privatization of collective lands



- Fragmentation of land to many plots (privatization and heritage) affects the crop yields
- Small and big farms produce less of olive oil (respectively 23 and 53 l/ha) than the medium farms (67 l/ha) (figure). The same observation is that the medium farms are more productive in cereals and generate the biggest farm income. This allows to think if medium farms are more efficient in term of productivity (taking on account the conditions and opportunities) than the other kind of farms and this may help decision in the land consolidation projects.

This research will be continued toward analyzing and assessing the land consolidation experience in the study zone and its impact on land productivity, livelihoods and the sustainability of the production system in general. In fact, Tunisia has decided thirty years ago, precisely in 1977, to embark into a land consolidation strategy as a mean to improve efficiency, equity, rural development, food security and conservation of natural resources. Land consolidation involves redistributing land ownership so that individual farmers own fewer, larger, more compact and more contiguous land parcels. The purpose of this research is to understand how land consolidation experience in Tunisia contributes to agricultural productivity, sustainability of natural resources, rural heritage and livelihoods.

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