Chapter 10

Socio-economic research in the coastal oases of Tunisia (Mareth)

by Youssef Moumni (Institut des Régions Arides, Médenine, Tunisia)

10.1. General Description

10.1.1. Geographical and administrative structure

The coastal oasis of Mareth is located in the province of Gabès in the southeastern part of Tunisia. It is formed of numerous oases. The oldest and most traditional ones are those of Mareth-Lakhmas and Mareth-Sedria, which have been chosen as research sites. Mareth stretches over an area of more than 100,000 ha, along which are scattered the most important oasis enclosures of the Gabès coastline.

The region of Mareth is a delegation that includes two towns (Mareth and Zarât) and several rural localities, of which the most important is Kettana. The county town is the village of Mareth, headquarters of the delegation, which is divided into 14 sectors (*Imada*). The agglomerations relevant to the research sites are:

* *The town of Mareth*

Mareth is the most important town within the delegation, containing 9,315 inhabitants in 1994, which represents approximately 4.6 percent of the communal population of the province of Gabès. It also represents 16.25 percent of the total population of the delegation. Located along the national road RN1, it is considered a centre of attraction for neighbouring localities and towns. It is the administrative headquarters of the delegation. The large and traditional oasis of Mareth extends on the northeast side of this agglomeration up to the limits of Zarât.

* *The town of Zarât*

The town of Zarât was created in 1985. In 1994 it had a population of 4,533 inhabitants, representing approximately 2.2 percent of the communal population of the province of Gabès and 7.9 percent of the total population of the delegation. It covers an area of 150 ha, with a density of 30 inhabitants/ha. It is located about 2 km from the coastline where the fishing port of Zarât has been created. The old oasis of Zarât is found in the Southern vicinity of the village. It is a very ancient oasis irrigated traditionally by a thermal (natural) spring, known in the local argot as "Aïn Zarât."

10.1.2. Historical background

The oases of Mareth are surrounded by steppes which have been used by nomads and populated by tribes or tribal fractions. Some agglomerations (villages) have always been created on water springs. The Carthaginians and the Romans favoured strategic zones devoted to agricultural activities for the creation of agglomerations in Antiquity. The ruins of cities are

found in these strategic points, permitting the control of roads and the supervision of fertile zones (DESPOIS, 1949: 120).

This type of Roman settlement has probably given impetus to the exploitation of territories without interfering with native populations. This style of colonisation has been based on a policy of controlling desert regions (DESPOIS, 1949: 119) while ensuring the export of agricultural commodities moving towards the coastal cities, the principal crossroads of trade. Whether in Antiquity they were Punic trading ports or Roman cities, these agglomerations have played an intermediary role in the exchange network that developed between the Tunisian coastline (before, Libyan and African) and the other Mediterranean shores (DESPOIS, 1949: 121).

10.2. Methodology

10.2.1 The environment of the survey

The survey conducted in the region of Mareth concerned the population of two oases: the oldest oasis of Mareth or the core of the oases called Lakhmas (Mareth 1), and Sedria (Mareth 2), a more recent oasis created in the 1930s. The populations of these oases -- occupying 4 out of 14 sectors in the delegation -- represent the most important number of inhabitants in the region of Mareth. Moreover, they form nearly half the population and more than 40 percent of households within the delegation. The populations of these oases have traditionally remained in the neighbouring villages close by the oases. In such a manner, they have lived outside the oases located in the villages of Mareth, Zarât and Alaya.

10.2. 2 Sampling

The techniques adopted for selecting the survey sample are via probabilistic processes. In these processes, 'controlled random techniques' formed the required material for the sample choice. For this controlled random technique, the name list of farmers (*fellahs*) or 'plot list' of oases represented the basic background for each operation of the sampling procedure. However, before starting the choice of lists and proceeding to the drawing of lots, a previous treatment was made.

This 'previous treatment' consists of making the exhaustive list of *fellahs* homogeneous. The objective of this 'rational intervention' in the random process has been to break up the real survey environment into homogeneous strata so as to avoid the risk of sample population heterogeneity. This first stratification operation was executed according to identification sheets provided by the territorial extension service (C.T.V) of Mareth [belonging to the regional agricultural department (C.R.D.A) of Gabès] within the framework of the presidential project concerning all *fellah*s in the region of Mareth.

In order to group the *fellahs* into categories, grown crop types have been chosen as selection criteria. Subsequently, a first sampling was made on the basis of selecting a number of *fellah*s who grow different crops, represented by small, medium and great farmers. There are also those who grow only one crop (mono-cropping) and those who make combinations (multi-cropping).

As this survey concerns both migrants and non-migrants, the distribution of farmers in each group is first made according to the migration status of households. Then, a randomised choice was made on each of the household-farmer groups: about 20 to 25 percent

for non-migrants and 20 to 40 percent (and sometimes up to 100 percent) for migrant households.

10.2.3. Sampling results

Mareth 1[7]*:*

Category*	Non-mig. Pop.	Non-mig. Sample	Migrant Population	Migrant sample	Total Pop.	Total sample
PPISAF	0	0	2	2	2	2
PPISA	23	5	0	0	23	5
PPISAEF	19	4	8	8	27	12
PMISA	2	2	1	1	3	3
PPIA	0	0	0	0	0	0
PPISA	16	3	0	0	16	3
PPISAM	91	18	45	9	136	27
PPISAE	34	8	5	5	39	12
Total	**185**	**39**	**61**	**25**	**246**	**64**

Mareth 2 :

Category*	Non-mig. pop.	Non-mig. sample	Migrant Population	Migrant sample	Total Pop.	Total sample
GPISAME	7	2	6	2	13	4
PPISA.MF	14	3	6	2	20	5
PM.I.AM	6	1	9	2	15	3
PMISAM	5	5	2	2	7	7
PPISA	68	14	42	9	110	23
PPIAMF	8	2	5	1	13	3
PPIA	0	0	0	0	0	0
PPSA	11	3	3	1	14	4
PPSAE	21	4	10	3	31	7
PMA	4	1	3	1	7	2
Total	**144**	**35**	**86**	**23**	**230**	**58**

[7] Abbreviations: GP-PM-PP: Large, middle, small; I: Irrigated; S: Rain-fed; A: Fruit tree cropping; M: Garden cropping; F: Fodder; E: Livestock breeding

10.3. Population and migration

10.3.1. Population development

Table 10.1 Population and households of Mareth (distribution by main sectors)

Sector	Population 1984	Population 1994	Households 1984	Average size of household
Mareth (Marteth1)	12,791	18,872	2,081	6.1
Zarat, Alaya (Mareth2)	6,151	8,132	971	6.25
Other sectors	24,497	30,304	4,289	5.62
Total Mareth	43,439	57,308	7,341	5.77

Source : INS 1994

Figure 10.1 Population growth in Mareth 1950-2000

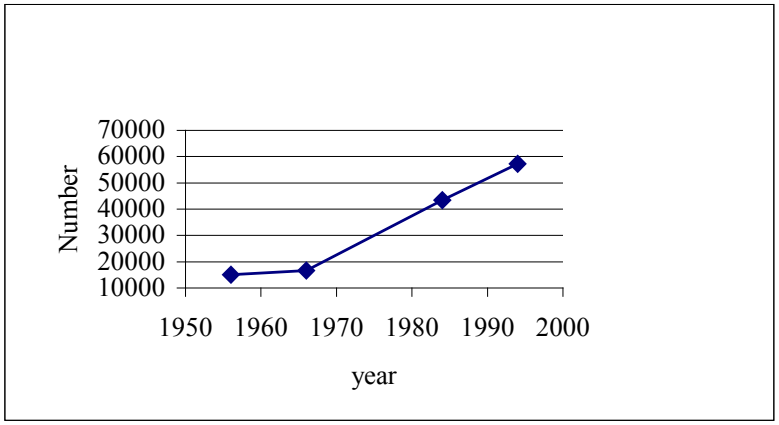


Table 10.2 Households and farmers of oasis research sites in the province of Gabès (1984)

Designation	Housholds (1)	Farmers 1984 (2)	% (2) / (1)
Province of Gabès	41911	13283	32
Delegation of Mareth	7341	3908	53
Mareth (Mareth1)	2081	760	36
Zarât (Mareht2)	971	484	50

Source: INS 1984

Table 10.3 Households and farmers in the main sectors of Mareth (1984)

Sector	Population	%	Households	%	Farmers	%	Far./house.
Mareth (Mareth1)	12,791	29.44	2,081	28.35	760	19.45	36 %
Zarât, Alaya (Mareth2)	6151	14.16	971	13.23	484	12.38	49.8 %
Other sectors	24,497	56.40	4,289	58.42	2,664	68.17	62.1 %
Total Mareth	43,439	100	7,341	100	3,908	100	53.2 %

Source: INS 1984

There are 324 farmers in the oasis of Mareth-Lakhmas (Mareth 1) and 574 in the oasis of Mareth-Sédria (Mareth 2), representing 15 and 59 percent of households within their respective sectors (Mareth and Zarat-Alaya).

10.3.2. Migration

** Internal migration*

Most observers have agreed on the fact that internal migration in Tunisia appeared during the period immediately following the economic crises of the 1930s (Kraiem 1996: 15). Internal migration thus corresponds with the influx of Tunisian labour into the mining centres of Gafsa and the appearance of 'djebalia' migration as well as nomadic elements moving in all directions of the country. Since then, internal migration in the arid regions and in Tunisia has developed regularly. It resulted first in the expansion of Tunisian cities. However, it is worthwhile noting that this exodus has gone through multiple fluctuations, but the numbers have remained accurate over a long period (table 10.4). It has been estimated that the migratory (internal migration) balance for the delegation of Mareth was 4,346 between 1984 and 1994, representing 7.5 percent of the total population.

Table 10.4 Evolution of the rural exodus in Tunisia (1926-1975)

Periods	Number of migrants / year
1926-1936	1000
1936-1956	14000
1956-1966	17000
1966-1975	36000

Source : Signoles 1985

** International migration*

The international migration of Tunisians, particularly to France, occurred for the first time in 1916: "It is with the creation of the colonial labour service in 1916 that the first contingent of Tunisian workers, about 10,000 men, has been recruited and sent to France" (Cedetim 1975: 116). Most Tunisian migrants were forced to leave France (metropole of the colonies) to be replaced, especially in industry, by French workers who had left for their military service. So, Tunisian migrants did not stay for a long period and eventually returned home. In fact, "only 1,700 men remained in France in 1920, 500 in 1930 and no one in 1935" (Ceditim 1975: 116). Scholars have explained this fact as a result of a failure of adaptation to paid work as well as living conditions in the colonial Metropolis. Thus, this international migration flow came to an end approximately 20 years after it began.

The second international migratory period for Tunisians was re-established a few years before achieving national independence in 1956[8]. This migratory flux had two different destinations: the first was to Europe, particularly towards France, and the second, occurring at a lower rate, was in the direction of Libya. The evolution of international migration to France, the main destination country for Tunisian labour migrants, is shown in table 10.5. Concerning international migration, Mareth has the highest migration rate (29.5 percent) in the province of Gabès (7,015 out of 23,680 migrants originated from Gabès in 1998) followed by El-Hamma, which provides 28.3 percent.

---

[1] For a thought-provoking analysis of this migration, see A. Belhadi: l'émigration extérieure, mobilité, réajustement socio-spatial et reproduction de l'ordre spatial. *in* " Cahiers du CERES " série géographie n° 15, Tunis 1996.

Table 10.5 Evolution of the Tunisian population in France (1956-1973)

Year	Size	Year	Size
1956	5,570	1965	52,159
1957	6,715	1966	62,903
1958	17,974	1967	70,274
1959	22,153	1968	73,261
1960	25,393	1969	89,181
1961	29,116	1970	96,821
1962	34,443	1971	107,046
1963	39,517	1972	119,546
1964	46,749	1973	149,274

Source: Gildas, 1979

** Return migration*

After this wave, the migration of Tunisians experienced a turning point in 1973 as this migration flow became characterised by restriction and stagnation, especially towards Europe (Belhadi 1996: 58). This phenomenon has been witnessed in the Maghreb as well, having been observed in Morocco by El Mrabet (1990)[9], who attributed this regression to "the European country decision to stop and/or limit the importation of foreign labour because of the energy crisis of the first half of the 70s. France, as a major destination country for Maghreb migrants, implemented such a decision in July 1974."

Table 10.6 Selective importance of regional return migration (1979-1989)

Zone	% returns 1979-89	% migrant Colony	Deviation
Tunis	38.2	16	22.2
Northeast	11.15	10.2	1
Northwest	5.7	12.5	- 6.8
Centre west	4.75	7.9	- 3.15
Sahel	20.05	17.6	- 2.45
Sfax	6.2	7.6	- 1.4
Southeast	10.8	17	- 6.2
Southwest	3.15	11.2	- 8.05

Source : INS 1989, Otte 1991, Belhadi 1996: 52

Following the closure of European borders since the 1970s, international migration took on new forms. First, this closure "was relieved by the alternate and uncertain opening of the Libyan and Arabic job market, on the one hand, and by the development of illegal migration, on the other hand" (Belhadi 1996: 48). Subsequently, return migration has accelerated, as shown in the table 10.6.

In arid regions where there is "recorded the highest migration rate with more than 11% of the regional population living outside the borders" (Belhadi 1996: 51), the return flow remained low when compared to other regions. Although this phenomenon is developing, it is

[9] B. El-Mrabet, Approche du phénomène migratoire dans la montagne Sud Rifaine (pays de Taounate) in " Dirâsât " n° 4, 1990, Faculté des Lettres d'Agadir, Maroc.

clear that the arid regions continue to provide the largest number of international migrants. In 1991, 29.67 percent of the population of these regions were living in other countries: 3.7 percent for the Central west, 13.27 percent for the Southwest and 12.7 percent for the Southeast. Collectively they represent 36.1 percent of the total of the Tunisian international migration colony, with 7.9 percent for the Center West (Kairouan: 3.3 percent; Kasserine: 2.4 percent; Sidi Bouzid: 2.1 percent), 17 percent for the Southeast (Médenine: 6.9 percent; Gabès: 5.1 percent; Tataouine: 5.1 percent) and 11.2 percent for the Southwest (Kebili: 8.3 percent; Gafsa: 2 percent; Jérid: 0.8 percent) (Belhadi 1996: 49-50)[11].

For the Southeast region, which includes Mareth, the population size of migrants is 79,120 out of a total population of 725,600 in 1989, increasing to 763,100 in 1991 to represent 9.16 percent of the global population of Tunisia, which counted 8,331,154 (Belhadi 1996: 51). As far as migration status in the two oasis study sites (Mareth 1 and Mareth 2) is concerned, non-migrants declare that they have never left their village to go to work. In Mareth 1, 68 percent of migrants are still migrants and 32 percent have already returned. In Mareth 2, migrants are 100 percent migrants who definitely return to their places of origin. All surveyed migrants chose France as a destination country for permanent stay. All respondents surveyed had a regular migration permit obtained either by contract and/or via a regularised tourist visa.

10.4. Agriculture

10.4.1 General description

The geographical landscape of Mareth was for all time devoted mostly to agriculture. Of the total area (105,800 ha), 95,800 ha (or 90.54 percent) are agricultural lands. Within this geographical landscape agriculture has "traditionally been based on pastoral activity, with its different forms of adaptation to climatic risks" (URAM 1997-98). This tradition was associated with cereals cropping, which depends heavily on the scarce and variable rainfall of arid zones.

In parallel, there has been the development of oasis agriculture based on traditional water resources management and the farming of small size holdings (Gâba). According to this agricultural model, farming activities are carried out via traditional techniques whereby only animals (ploughing, transport etc.) and simple agricultural tools are used by *fellah*s. This model is dictated by the very nature of oasis agriculture, characterised by a limited area and water potential. In this system, irrigation channels are traditional and mechanisation is absent. Moreover, drillings are artesian and an association of *fellah*s ensures water management.

[10] For more details on international Tunisian migration, see "Cahier du CERES ", série Géographie n° 16, Tunis 1996.

10.4.2. Recent agricultural changes

Following a recent acceleration of sedentary movement, there has been on the one hand an extension of rain-fed fruit tree groves (particularly olive and almond) on the steppes of Jeffara, and an increased pressure on water and soil resources in the oasis on the other. The technological progress introduced in the cropping system, on the one hand, and changes in the living behaviour of populations on the other, have induced modern farming models that are supposed to be adapted to arid climatic conditions.

Furthermore the region has known the introduction of new agricultural techniques, such as greenhouses, tunnels and drip irrigation. Modes of land appropriation have also experienced some changes. Although in the past the ranges dominated land occupation in Mareth, only 27.52 percent remained in 1992. Land ownership status has subsequently become increasingly private (rather than the former collective status).

** Water management*

With new water management schemes, oasis farmers are subject to a collective irrigated perimeter regime. In this collective drilling exploitation model, farmers have easy access to water rights because the water is managed by *associations for collective interests* (AIC). In Mareth 1, this concerns drilling which produces 30 l/s for an average of 19 hours per day. It irrigates the plots for 5 hours per hectare. The water round, which is determined by the AIC, is 14 days. In Mareth 2, two drillings yield 27 l/s and 15 l/s for an average of 20 and 16 pumping hours per day, respectively. Parcels are irrigated with 5 hours/ha and the water tour is 16 days.

** Soil management*

The total area of the Mareth 1 oasis is 108.7 ha (356 plots). The average plot size is approximately 0.3 ha. The parcels of surveyed households (20.37 percent) have an average size of 0.86 ha in the oasis and 2.8 ha for the whole study area (rain-fed as well as irrigated). The total area of the Mareth 2 oasis is 181.2 ha (577 plots). The average plot size is about 0.3 ha. The plots of surveyed households (10.1 percent of the total) have an average size of 0.66 ha in the oasis and 7.8 ha for the whole study area (rain-fed and irrigated, in and outside the ancient oasis). In these oases, drainage canals have been installed by the state, particularly as a means of preventing salinisation.

** New agricultural techniques*

The introduction of new agricultural techniques such as greenhouses and drip irrigation has encouraged the modernisation of oasis agriculture. Formerly earthen irrigation channels have been transformed into concrete canals, and paths in the oasis have been improved in such a way that they are now accessible to motorised vehicles. Nevertheless, many new techniques are not well adapted for oasis agriculture, as most modern farm equipment is mainly developed for large farms rather than for small-scale holdings occupied by several crop layers. Nevertheless, ancient and labour intensive techniques are gradually disappearing. Oasis farmers are in clear need of equipment that is adapted to the size and cropping patterns of their farms.

10.4.3. The role of the state

Traditionally, land and water management in oases was ensured by the farmers without any intervention of the State. Nowadays, in addition to the management of resources, the AICs become stakeholders for development planning and the introduction of new techniques and farming practices. The interventions of the state are significant; the state does not only proceed in the creation of central drillings, but it subsidies also all other necessary facilities for the sound management of water and soil resources (i.e., installation of motor-pumps or electro-pumps, construction of irrigation canals and rural roads, etc.).

In addition, the state assures and regulates the daily management of land and water resources. It helps the farmers to be self-relying on all matters related to the management of their farms. It encourages them to create associations or groupings of collective interest and supports the institution of developed supervising structures. It contributes continuously to agricultural development by offering educational and technical support for growers as well as providing subsidies or credits. The state supervising structures are well developed. In addition to the AICs, the *fellah*s are members of the National Union for Agriculture and Fishing (UTAP), farming co-operatives and represent target groups in the development of projects undertaken by the state in their regions.

Moreover, the state also contributes to agricultural development through the intervention of other bodies, such as the Agency for the Promotion of Agricultural Investment (APIA) and the national agricultural bank (BNA). Officially, the promotion of agricultural investments is also sustained by state subsidies and credits. However, due to the fragmentation of oasis holdings, bank credits in the research sites are almost absent.

10.5. Migration impacts

10.5.1. General socio-economic characteristics of households

The individual characteristics of surveyed households is as follows: Mareth1: 388 individuals made up of 56 percent males and 44 percent females. These households are comprised of 17 percent family heads, 16.5 percent wives and 66.5 percent children. Mareth2: 271 individuals made up 56 percent males and 44 percent females. These households are comprised of 20.9 percent family heads, 20.5 percent wives and 57.9 percent children. It is important to note that this population is formed in the majority by the young and adults: 34.1 and 57.7 percent for Mareth1, and 40.6 and 46.1 percent for Mareth2, respectively.

The minimum and maximum age of heads of household is 25 - 85 years for Mareth1 and 26 - 82 for Mareth2, respectively. The average age is 53 and 58, respectively. In Mareth1, 92.7 percent of non-migrant heads of households are married, whereas this is 100 percent for migrant households. Almost the same rates are found in Mareth2: 91.2 and 100 percent. For both Mareth 1 and 2 the main activity of the population is agriculture. Many (80 percent), however, also work outside agriculture in diverse professions. Unemployment is low.

Approximately one-quarter of the research population declared never to have attended school (25.1 percent for Mareth1 and 28.4 percent for Mareth2). The remainder are distributed between koranic, primary and secondary schools and the university. The respective percentages are in the order of: Mareth 1: 6.4, 43, 20.4 and 5 percent. Mareth 2: 0.7, 39.2, 28.7 and 3 percent. Concerning levels of schooling, there is a differentiation between non-migrants and (international) migrants. In Mareth 1, 30.8 percent of non-migrants have attended school, compared to 48 percent for migrants. Some of the latter have gone to

koranic school (32 percent), 12 percent went to primary school and only 8 percent attained the secondary school level. Inversely to this almost illiterate migrant population, approximately 70 percent of non-migrants have frequented a modern school (primary: 41 percent; secondary: 25.6 percent; and university: 2,6 percent) and have never attended koranic school.

In Mareth2, the schooling level of non-migrants is rather low (Koranic: 29.4 percent; primary: 50 percent and secondary: 20.6 percent). As for Mareth1, migrants are predominately illiterate: 73,9 percent have never gone to school, 4.3 percent made the Koranic school and 21.7 percent have attained the primary school level.

10..5. 2. Impact on general living conditions

** Housing and standard of living*

Both non-migrants and international migrants in Mareth 1 and in Mareth 2 are in possession of their own house. Each house share a modern habitat type (villa) and traditional type (*Hûch*). All housing is equipped with a kitchen and a bathroom. They are mostly constructed of concrete. The average surface area is nearly the same for the two migration categories. However, in Mareth 2, it is slightly higher for migrants (433 m²) against 361 m² for non-migrants. The number of rooms is nearly the same, 5 to 6 rooms per house. International migrants also tend to possess more houses than non-migrants.

Table 10.7 Percentage of households possessing more than one house

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	92,0	13,0	36,0	47,9	35
Nonmigrants	25,6	5,7	19,4	17,7	25
Total	51,6	8,6	23,9	28,0	60

** Other equipment and means of transport*

All houses (for international migrants as well as non-migrants) are connected to national electricity and running water networks (STEG & SONEDE). Each household owns a television and a refrigerator. However, the migrants tend to possess more luxury goods than non-migrants, such as video and telephone; almost half of the migrants are in possession of these facilities. On the other hand, only 15 percent of non-migrants in Mareth 1 and 8.6 percent in Mareth 2 have a telephone at home. Twenty percent and 2.9 percent responded affirmatively for the video. The satellite receiver (dish) is owned by 42.5 percent of migrants, against 80 percent for non-migrants in Mareth1 and 34.3 percent against 43.5 percent in Mareth2, respectively.

Concerning means of transport, international migrants are also positioned ahead of non-migrants. In Mareth 1, 40 percent of international migrants (against a few more than 20 percent of non-migrants) possess bicycles or motorcycles. Similar figures are found in Mareth 2. Migrants are also largely ahead of non-migrants in the possession of private car transport, but they share the same tendency to own a utility vehicle.

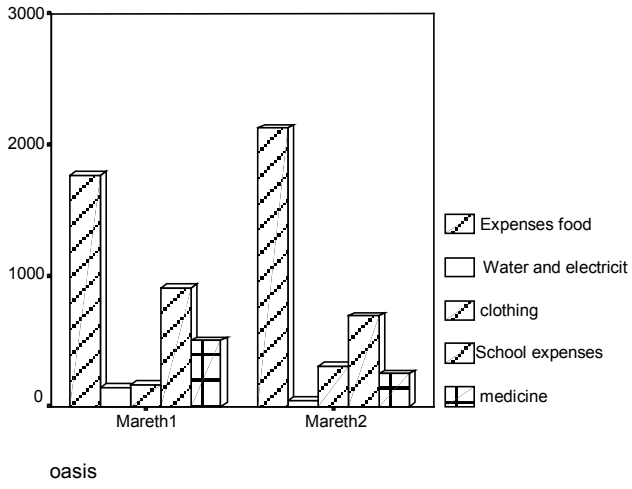
10.5.3. Socio-economic impact and investments

** Income and expenses*

It is evident that migrants have higher incomes than non-migrants due to their access to migration remittances. The mean annual income of migrants (16,398 DT) is almost double that of non-migrants (8,465 DT). These numbers have been obtained from 35 of 48 migrants, whereas they are calculated for almost 100 percent of non-migrants: 73 of 76 heads of household. The main source of monetary income for farmer households is derived from agricultural and extra-agricultural activities, as well as migration remittances. Surveyed households do not benefit from any significant incomes derived from renting. Remittances of international migrants in Mareth 1 are more important than in Mareth 2. However, remittances by internal migrants only exist for Mareth 1 and are completely absent for Mareth 2. The average yearly income is slightly higher for Mareth1.

Migrants spend much larger amounts of income than non-migrants on food, school and health expenses. It is for this reason that their average total annual expenses are significantly higher when compared to non-migrants. Yearly average expenses for the two oases are 3,257 DT. Contrary to incomes there, it is slightly higher for Mareth 2. The higher expenses concern food, farming expenses, education and health. They are less important for clothing, electricity and drinking water.

So-called durable expenses consist mainly of expenses on electric household appliances, essentially in Mareth1. Concerning so-called 'durable expenses', migrants spend much more on electric household appliances than non-migrants. The large expenses of migrants are observed in the acquisition of means of transport, as well as the construction and maintenance of housing. Average total durable expenses (for the last five years) are approximately 8,500 DT for migrants and 2,500 DT for non-migrants.



** Investments*

Investments are equally frequent for both migration categories. Only half of each group (35 out of 76 for non-migrants and 30 out of 48 for migrants) declared making investments. Most investments are made in agricultural equipment (well drilling and equipment, tractor acquisition and plantations). However, migrants show a high tendency to invest in the

schooling of their children. Average investments in this category are much higher when compared to non-migrants, both in Mareth 1 and Mareth 2.

Fifty-two percent of surveyed households declared investments. In Mareth 1, investments mainly concerned schooling (47 percent of investments in Mareth1), drilling or erection of a surface well (38 percent) and farm plantation (21.4 percent). In Mareth 2, 39.6 percent of households have invested in the following domains: 52.2 percent on schooling, 34.7 percent for tractor purchase and 47.8 percent on other investments. Average investments over the last five years have been 1,972 DT in Mareth1 and 3,020 DT in Mareth2.

Table 10.8 Percentage of households that invested in the purchase of a well or pump in the five years prior to the survey

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	24,0	4,3	0,0	9,6	73
Non-migrants	15,4	8,6	6,0	9,2	141
Total	18,8	6,9	4,3	9,3	214

Table 10.9 Percentage of households that invested in the purchase of fruit/date trees in the five years prior to the survey

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	20,0	4,3	72,0	32,9	73
Non-migrants	10,3	5,7	61,2	33,3	141
Total	14,1	5,2	64,1	33,2	214

10.5.4. Agricultural impacts

** Agricultural equipment and other capital inputs*

The analysis of data provided by the household (sample) indicates that oasis study sites are little equipped with farming instruments. Since households are not in possession of private wells, private motor pumps are almost totally lacking. The level of mechanisation is also very low. Agriculture is practised in a largely traditional manner; 84.6 percent of the surveyed sample does not possess a tractor, owned only by 10.6 percent, whereas 4.9 percent rent. It is important to note that small plot sizes and the fragmentation of plots are major factors behind the generalized absence of mechanisation.

Table 10.10 Percentage of households possessing water pump

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	12,0	0,0	40,0	17,8	73
Non-migrants	2,6	5,7	25,4	14,2	141
Total	6,3	3,4	29,3	15,4	214

Table 10.11 Percentage of households possessing tractors

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	0,0	17,4	0,0	5,5	73
Non-migrants	0,0	11,4	1,5	3,5	141
Total	0,0	13,8	1,1	4,2	214

As regards agricultural inputs, only 23.4 percent of farmers buy organic manure. This is probably due to the practice of raising family livestock in the oases. Chemical fertilizers are very little used; only 26.6 percent buy it. Frequent use is made of NPK (23 percent). Fungicides and insecticides are almost unused; 1.6 percent use the former, and 3.2 percent the latter. The same situation is valid for the purchase of improved seeds, which are bought only by 4.8 percent. Less than half of farmers (44.4 percent) do not make use of paid farm labour. Both migrants and non-migrants demonstrate nearly the same type of purchasing patterns concerning fodder, fertilisers and seeds. They also show affinities in the shared exploitation of paid labour (see tables below).

Table 10.12 Percentage of households using organic manure

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	24,0	30,4	48,0	34,2	73
Non-migrants	15,4	28,6	37,3	29,1	141
Total	18,8	29,3	40,2	30,8	214

Table 10.13 Percentage of households using fertilisers

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	12,0	47,8	96,0	52,1	73
Non-migrants	2,6	48,6	73,1	47,5	141
Total	6,3	48,3	79,3	49,1	214

Table 10.14 Percentage of households employing paid agricultural labourers

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	28,0	73,9	88,0	63,0	73
Non-migrants	28,2	57,1	83,6	61,7	141
Total	28,1	63,8	84,8	62,1	214

Table 10.15 Percentage of households cultivating alfalfa

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	48,0	17,4	40,0	35,6	73
Non-migrants	56,4	40,0	50,7	49,6	141
Total	53,1	31,0	47,8	44,9	214

** Cropping patterns*

Concerning annual crops, the survey indicated that cash cropping is only engaged in by a minority of farmers (15). The most prevalent (semi-) annual culture is alfalfa, which serves as a fodder crop (see table 10.15). Fruit trees are highly important, which is reflected in the large size of fruit tree groves. The highest level of production is obtained with grenadines, which are almost in their totality destined for markets. The date harvest, which is relatively less important (compared to Fatnassa, for example) is shared between domestic consumption, (particularly as fodder for animals) and the market. Olives are destined more for family consumption than for marketing. Concerning productivity, harvests are nearly the same for both categories of farmers. However, livestock-raising is practised more by non-migrants (12 to 14 heads of ovine and 4 to 6 goats) than by migrants (7 to 8 heads of ovine and 2 to 3 goats).

Table 10.16. Percentage of households cultivating and harvesting dates

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	76,0	69,6	100,0	82,2	73
Non-migrants	92,3	77,1	98,5	91,5	141
Total	85,9	74,1	98,9	88,3	214

Table 10.17. Percentage of households cultivating and harvesting olives

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	72,0	60,9	0,0	43,8	73
Non-migrants	59,0	48,6	0,0	28,4	141
Total	64,1	53,4	0,0	33,6	214

Table 10.18. Percentage of households cultivating and harvesting grenadines

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	92,0	78,3	0,0	56,2	73
Non-migrants	82,1	85,7	0,0	44,0	141
Total	85,9	82,8	0,0	48,1	214

* *Land possession*

As far as the possession of agricultural lands and the plantation of new farms are concerned, migrants and non-migrants show almost identical figures. It is difficult to note any significant differences here; analysis of parcel size by migration status did not yield any particular observations (tables below).

Table 10.19 Percentage of households possessing land in the ancient oasis

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	92,0	78,3	56,0	75,3	73
Non-migrants	84,6	88,6	77,6	82,3	141
Total	87,5	84,5	71,7	79,9	214

Table 10.20 Percentage of households possessing land in new irrigated agricultural extensions

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	8,0	0,0	92,0	34,2	73
Non-migrants	7,7	0,0	59,7	30,5	141
Total	7,8	0,0	68,5	31,8	214

Table 10.21 Percentage of households possessing non-irrigated land outside ancient oasis

	Mareth 1	Mareth 2	Fatnassa	Total	N
International migrants	48,0	91,3	4,0	46,6	73
Non-migrants	43,6	91,4	11,9	40,4	141
Total	45,3	91,4	9,8	42,5	214