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Tunisian Oasis System: Between the Traditional and the Modern, Case Study of Kébili Region, Tunisia

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Abstract:

It must be emphasized that the agrarian system the most common and important in Tunisian southern is the oasis system, with various types of oases. Despite this diversity, these oases are often classified into two categories according to many criteria to traditional and modern. In light of the sustainability of oasis society, it is necessary to assess the rationality of modern and traditional oasis in the context of both natural and economic environment. This paper aims to compare the assessment of two oases in Kébili region as a case study: Mouthabara as a modern oasis and Souk Baez as a traditional one. For that aim we exhausted farmers' survey was done in terms of organization, irrigation, culture system, yield, commercialization, varieties... so on, in order to verify the criteria of this classification.

The results show some criterion is not fulfilled, putting into question these criteria.

Keywords: Oasis system, Southern Tunisia, sustainability, assessment

1. Introduction

Southern Tunisia is characterized by the presence of various types of oases. However, despite their diversity, the oases are often classified into two categories according to the mode of cultivation; traditional and modern oases. According to Romdhane (2008) and Sghaier (2010), in terms of plantation, the modern oasis is characterized by the specialization in Deglet Nour variety compared to traditional oasis which includes other varieties of palm tree and fruit trees (Table 1). These characters are considered to be associated with labor and productivity. According to Lasram (1990), the traditional oasis is more labor intensive and has a lower productivity. By the above definition, 63% of surface area of oasis in Tunisia is modern oasis. Its proportion is highest in Kébili, covering 85% of total oasis surface area of the region. Moreover, the surface area of modern oasis has rapidly increased since 1990s (Sghaier, 2010).

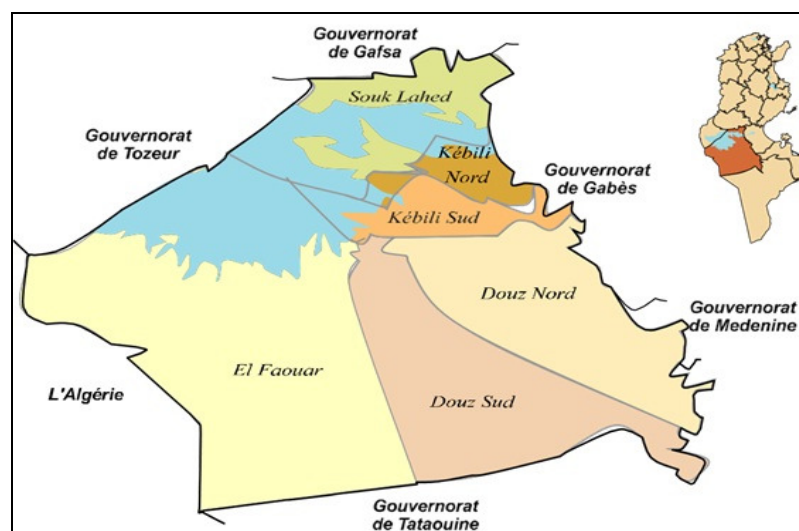


Figure 1: Location of Kébili region

Expansion of modern oasis is considered to be related with the development of non-agricultural activities, since agricultural management in modern oasis requires less labor, and sharecropping, known as khammessat, is diminishing with the education of young people (Fusiller et al, 2009). It is also in relation with the economic liberalization; since the liberalization of date commerce in 1974, the production of Deglet Nour has increased drastically. However, this monoculture is pointed out to be under many risks, being fragile to the climate change and to many sickness (Kassah 2002). It also causes the degradation of water quantity and quality, since it consumes large quantities of water compared to other varieties of dates. Moreover, it can affect the agricultural biodiversity in the oasis which has been the base of agro-ecological system of the region.

Traditional oasis	Modern oasis
Fragmentation of Land (Average 0.5 Ha)	Larger land size
High density of palm trees (more than 200 trees/Ha)	Low density of palm trees (100-150 trees /Ha)
Combination of varieties of palm trees	Predominance of Deglet Nour Variety
Irrigation by soil canal	Irrigation by concrete canal

Table 1: Characteristics of traditional and modern oases

Source: Sghaier (2010)

2. Description of the Area Study Areas

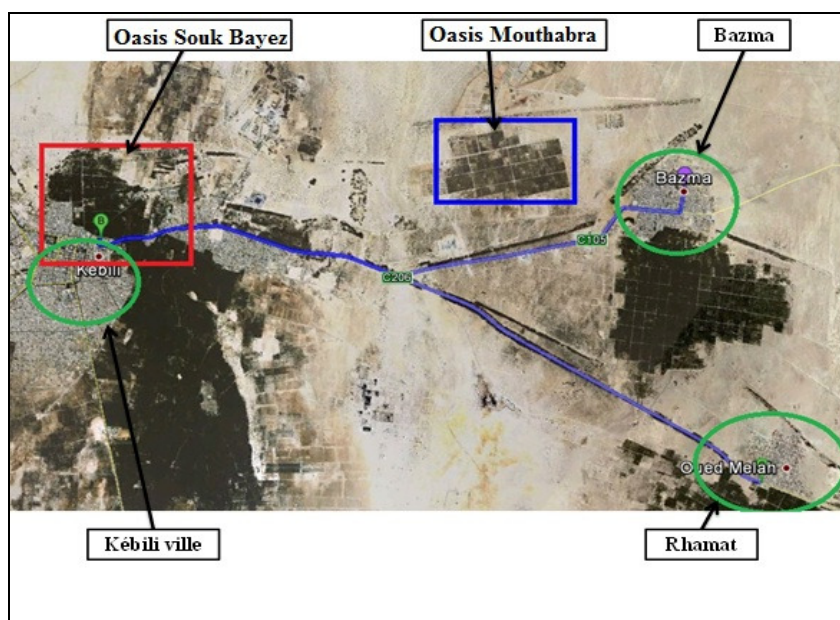


Figure 2: Location of the study areas

As shown in Fig 2, Mouthabara is located 500m to the village of Bazma, 6,2Km from Kébili city, and 6,7Km from Rahmat village. Most of the farmers in this oasis live in these two localities. The oasis was created in 1996 by public authorities, and has 90 Ha divided into 100 plots attributed to 136 farmers. The average area cultivated by each farmer is around 0.7 Ha. Water is drawn by a public well of 2.800m depth.

Souk Bayez is about 400m from city center of Kébili. The oasis was also created in 1939 by public authorities. Its area is about 70.2 Ha divided into 242 plots distributed to 195 farmers, which means that each farmer owns only 0.3 Ha in average. Water is drawn from water layer of 2580m depth, by two public wells and an artesian well. However, the water flows from these three wells are lower than Mounthabara (Table 3).

Also, the cost of water is 8 times higher in Souk Bayez, reflecting the fact that these two wells are run by electricity. Thus, it can be said that Souk Bayez is characterized by the lower availability of Water and fragmentation of land.

	Mouthabara	Souk El Bayez
Water sources	1 artesian well	1 artesian well, 2 electric wells
Irrigated area (Ha)	90	68
Water flow (l/s)	64	90 (32,32,26)
Cost of Water (DT/Ha)	108	865
Number of plots	100	242
Number of farmers	136	195

Table 3: Water characteristics and use in Mouthabara and Souk El Bayez oases (2011)

Source: CRDA.

3. Materials and Methods

In light of the sustainability of oasis society, it is necessary to assess the rationality of modern and traditional oasis in the context of both a natural and economic environment; which requires studying the oases from multidisciplinary perspective, economic, geographic and hydrographical. As a first step of such study, based on the farmers' survey. The farmers' survey was conducted during spring 2014 in two oases, Mouthabara as a modern oasis and Souk Bayez as a traditional one.

Total of 120 farmers, 60 in each oasis, were surveyed by the use of face-to-face questionnaire. The questionnaire is composed of 7 sections: 1) land structure, 2) factors of productions, 3) agricultural production, 4) investments; 5) credits and loans, 6) socio-demographic characteristics of farmers, 7) attitudes toward risks. The fieldwork was done during the period of March to May 2014. Random sampling of farmers has been undertaken. In the case of Mouthabara oasis, 60 farmers have been surveyed representing 44% of total population. In the case of Souk Bayez oasis, the 60 farmers surveyed represented 31% of total population.

4. Results

4.1. Socio-economic Characteristics of Households

The farmers surveyed are mostly on 50s, and are slightly older in Souk Bayez. The farmers in Mouthabara have relatively higher educational level, since the percentage of farmers who did not have schooling is 18% in Mouthabara against 30% in Souk Bayez. Farmers in Mouthabara have also slightly higher proportion of those who had training in agriculture.

As to the household size and number of children, the farmers in Mouthabara have relatively larger household size and more children. Households in Mouthabara have higher income from agricultural self employment than Souk Bayez.

However, total household income which includes nonagricultural income is similar to Souk Bayez (Table 4). This may be related to the prevalence of the nonagricultural activities. In fact, 47% and 45% of farmers respectively in Mouthabara and Souk Bayez declare that agriculture is their second activity.

	Mouthabara	Souk Bayez
Agricultural self-employment	6.358	5.371
Non-agricultural wage employment	2.521	2.445
Transfer	1.373	1.940
Nonagricultural self-employment	450	420
Total	10.702	10.176
Per capita income	1.994	1.957

Table 4: Household income and its sources (DT/year)

4.2. Cultivation

Average land cultivated is 0.5 Ha in Mouthabara and 0.6 Ha in Souk Bayez. Therefore, the later oasis has slightly larger land size (Table 5). However, it is noted that the later oasis has greater disparity of land size between farmers. As to the ownership of land, all the farmers in Mouthabara rent the land. The farmers in Souk Bayez, on the other hand, mostly inherited (63%) or purchased (35%) the land.

		Mouthabara	Souk Baez
Average land cultivated	Ha	0.46	0.58
Land size (%)	Less than 0.25 Ha	0.0	10.0
	0.25-0.49	20.0	43.3
	0.5-0.74	78.3	25.0
	0.75-0.99	0.0	11.7
	More than 1	1.7	10.0
	Total	100	100
Land ownership (%)	Purchase	0.0	35.5
	Inheritance	0.0	63.3
	Rent	100.0	1.7
	Total	100.0	100.0
Three- stage cultivation (%)	No	20.0	35.0
	Yes	80.0	63.7
	Total	100.0	100.0
Soil (%)	Clay	35.0	31.7
	Silty	50.0	40.0
	Sandy	15.0	28.3
	Total	100.0	100.0
Number of farmers		60	60

Table 5: Land and cultivation

4.3. Mode of Cultivation

95% of date trees in Deglet Nour in Mouthabara in contrast to 68% in Souk Bayez which is in concordance with the characterization of traditional and modern oases. In contrast to Mouthabrara which has younger Deglet Nour trees, the oasis in Souk Bayez has, as expected, older date trees.

Three stage canopy level system, which includes dates palm (the highest tier), arboriculture (middle tier) and annual/pluri-annual crops at the lowest tier, is applied by 80% of farmers in Mouthabara, in contrast to only 37% in Souk Bayez. This statement is in contrast with traditional and modern oasis characterization. Water availability (less abundant in Souk Bayez oasis) and financial funding is among the most important reasons causing this difference between oases.

In fact, there is a large difference of water availability between the two oases. Farmers in Mouthabara consume three times more water, but pays 5 times lower amount for water than in Souk Baez (Table 6).

		Mouthabara	Souk Baez
Water consumption	M³/year	23.760	9.031
	DT/year	82.5	492.8
Irrigation rotation	Hour/day	5.5	5.7
	Day/Month	2.0	1.0

Table 6: Irrigation

Average plantation density is 135 trees/Ha in Mouthabara and 88 trees/Ha in Souk Baez. Thus, both oases have low density of palm trees according to the criteria in Table 1, but it is much more pronounced in Souk Baez. It could be explained by the fact that Souk Baez oasis is not well kept. Farmers are not working enough to maintain their palm trees, probably because of the water scarcity.

4.4. Agricultural Production

As expected, average yield of Deglet Nour is higher in Mouthabara (Table 7). The yield of common variety is also higher in Mouthabara. However, it should be noted that this difference in yield of Deglet Nour is small: 68kg/tree in Mouthabara compared with 62 kg/tree. One reason could be the age of palm trees which is younger in Mouthabara. In Mouthabara, 24% and 55% of Deglet Nour trees are aged less than 5 years and between 5 and 10 years respectively. In Souk Baez, on the other hand, 69% of Degled Nour trees are aged 50 years or older.

		Kg/tree	Kg/Ha
Mouthabara	Minimum Deglet Nour	31	2800
	Maximum Deglet Nour	190	10800
	Average Deglet Nour	68	6055
	Minimum Common Variety	14	400
	Maximum common variety	100	2400
	Average common variety	45	1125
Souk Baez	Minimum Deglet Nour	34	5243
	Maximum Deglet Nour	74	7396
	Average Deglet Nour	62	5660
	Minimum Common Variety	18	750
	Maximum common variety	71	2976
	Average common variety	21	858

Table 7: Production per tree and hectare

5. Conclusions

This paper examined the characteristics of two oases in Kébili, based on the farmers' survey conducted in 2014. We may point out the following two conclusions as important findings.

One is about the assumption on the productivity on modern and traditional oases. Mouthabara oasis is modern oasis in term of land size, tree density and specialization in Deglet Nour. However, in terms of date productivity, it seems that Mouthabara cannot be said to have a higher productivity. This leads to question the assumption that traditional oasis has lower productivity than modern oasis.

Another issue is about the definition of modern and traditional oasis. Although both oases fit into the definition in some criteria, there are aspects that do not fit in, especially for Souk Baez. In fact, the majority of plots in this later does not have three stage systems, and has lower tree density than in Mouthabara. These facts differ from the general assumption on traditional oasis, and may be related to the water scarcity.

Thus, future research requires questioning the assumed difference between traditional and modern oases by estimating the productivity in more precise way, and analyzing its determinants by taking into account such factors as tree age and water, and in relation with non-agricultural activities.

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