

## The Agricultural System in the Oued-Righ Valley (Southeast Algeria), Characteristics and Functioning

Merrouchi Lounes<sup>1</sup>, Bouammar Boualem<sup>2</sup> and Benziouche Salah Eddine<sup>3</sup>

<sup>1</sup>National Institute of Agronomic Research of Algeria, 2, Avenu of the Oudak Brothers, Hacem Badi, BP200 El-Harrach, Algiers, Algeria.

<sup>2</sup>Kasdi Merbah University, Research Laboratory on Pheniculture, Ouargla, Algeria.

<sup>3</sup>Mohammed Khider University, Department of Agricultural Sciences, Biskra, Algeria.

<sup>1</sup>E-mail: lmerrouchi@yahoo.fr

<sup>2</sup>E-mail: bouammar1959@yahoo.fr

<sup>3</sup>E-mail: sbenziouche@yahoo.fr

**Abstract.** This study focuses on the characterization and functioning of the oasis agricultural system in the upper part of the Oued Righ valley in southeastern Algeria. It aims to determine, through surveys, the determining elements of production systems, their evolution constraints and to understand their evolution dynamics. The results obtained, according to the cropping system criterion, enabled us to identify and characterize four types of agricultural production systems : (P1) Date palm system-associated crops-breeding, it is the most present system and which presents a certain profitability and a better dynamism. (P2) Date palm system associated with crops, (P3) Date palm system associated with marginal breeding but which remains a relatively profitable activity, and (P4) production system practicing only date palms which is characterized by a stagnation and very reduced agricultural activity being limited to a few cropping operations.

**Keywords.** Farm, Date palm, Characterization, Production system, Oued-Righ, Algeria.

### 1. Introduction

Agricultural activity in the Algerian oases in general, and the oases of the Oued-Righ valley in the south-east (Figure 1), in particular, is characterized by the use of ancestral techniques and know-how. This know-how inherited from the generations who have lived over time in these difficult areas has enabled the populations that have succeeded to overcome all the difficulties imposed by nature, economic and social changes and, therefore, to reproduce.

The introduction, in this region, of new techniques of deeper drilling by depleting the water by pumping, and the installation of modern phoenicultural orchards characterized by aligned plantations and a spacing between plants allowing the use of mechanization, from the nineteenth century [1]. And, the intensive use of water resources and poor drainage, have caused the drying up of old wells, the death of some palm groves located in the heights and the rise of water in low places [2]. Beyond the ecological function assigned to the old oases, these new plantations had a purely commercial objective.

Since the 1980s, agricultural development policy in the Saharian regions has focused on interventions in the old agricultural system, but especially in the new system through the creation of new agricultural development zones. This policy was mainly aimed at the extension of agricultural land

through the development of new land. The objectives assigned to this policy have evolved with the important changes in the national economic policy [3].

Thus, within the framework of Law relating to the accession to agricultural land ownership (APFA) implementation in 1983, for the development of new lands, new farms adopting the new planting system were created in the study region. These new farms are characterized by a diversification of crops whose production is intended in part for the local market, unlike the old farms where only the date of the Deglet Nour variety was intended for the market.

In addition, as part of the national agricultural development plan (PNDA), farms in the region have benefited from state support, most of the operations of which have been oriented towards the rehabilitation of old palm groves, the repair of the irrigation and drainage network and the construction of basins for the possible installation of a new water-saving irrigation system.



Algerian map (algerian map and towns)[4]

Oued-Righ Vally [5]

**Figure 1.** Localization of the study area.

Currently, the Oued-Righ valley has nearly 30 000 phoenicultural farms occupying an estimated area of 37000 hectares, of which more than 23 600 farms come under the old sector and more than 4 700 farms belonging to the new sector created in the framework of the Law on Access to Agricultural Land Ownership (APFA) [6].

This study focuses on the characterization and functioning of agricultural production systems in the Upper Oued-Righ region, with the city of Touggourt as its center, the capital of the valley and the focal point of its population. This region is also located in an oil zone where agricultural employment is not an opportunity.

The main objective of this study is to analyze the interactions that exist between the different elements of the agricultural production system and to understand the farmers' orientations and strategies.

## 2. Materials and Methods

The study region is made up of more or less homogeneous areas or oases. We first tried to grasp the criteria of homogeneity and the criteria of their differentiation. We have also favored the reasoned sampling method in view of the large number of farms.

### 2.1. Zoning

After a "country tour", we noticed that the study region is made up of eleven oases differentiated by the size of the population and the number of palm trees, which gives large oases, medium oases and small oases. The small oases are represented by : Goug, Sidi-Mehdi, Ghamra, El-ksor, Moggar and El-Harhira ; the medium oases are represented by : Beldet-Amor, Zaouia El-Abidia and Sidi-Slimane ; the large oases are represented by : Temacine, Touggourt and Meggarine. As the oases present similarities, we have chosen from each type a reasonable number of oases at which the farms to be investigated are taken. The oases chosen are : Sidi Mehdi and Ghamra among the small oases ; Zaouia El-Abidia among the medium oases and Meggarine among the large oases.

## 2.2. Sampling

The choice of farms to be surveyed within these oases was made according to a summary typology based on two essential differentiation criteria : the size of the farms and the period of creation. According to the size of the farms, we created four classes (Table 1) : C1 (less than one hectare), C2 (from 1 to 2 hectares), C3 (from 2 to 4 hectares) and C4 (more than 4 hectares).

According to the period of creation of the farms, we have two types : old farms and new farms.

As we could not stop the number of farms to be surveyed in advance because of the time that this operation would have taken to find farmers who would respond to our selection criteria at the required time, we proceeded by the Transect method [7] by oasis chosen to touch the different types of farms. In this transect, the notion of "first found, first interviewed" was applied to maximize the panel and ensure the representability of the sample.

To obtain as much information as possible on the operation, we have put together a survey guide of thirty (30) questions dealing with the structural and functional elements of the operation. The investigation operation lasted more than 2 months and allowed to investigate 121 farms.

**Table 1.** Constitution of study purchase.

Farms surveyed			Type of farms surveyed			
Farms size	Number	Rate (%)	Old farms	Rate (%)	New farms	Rate (%)
Under 1 ha	45	37	41	33.88	4	3.30
From 1 to 2 ha	70	58	53	43.80	17	14.05
From 2 to 4 ha	5	4	3	2.5	2	1.65
More than 4 ha	1	1	1	0.8	0	0
Total	121	100	98	81	23	19

## 3. Results and Discussion

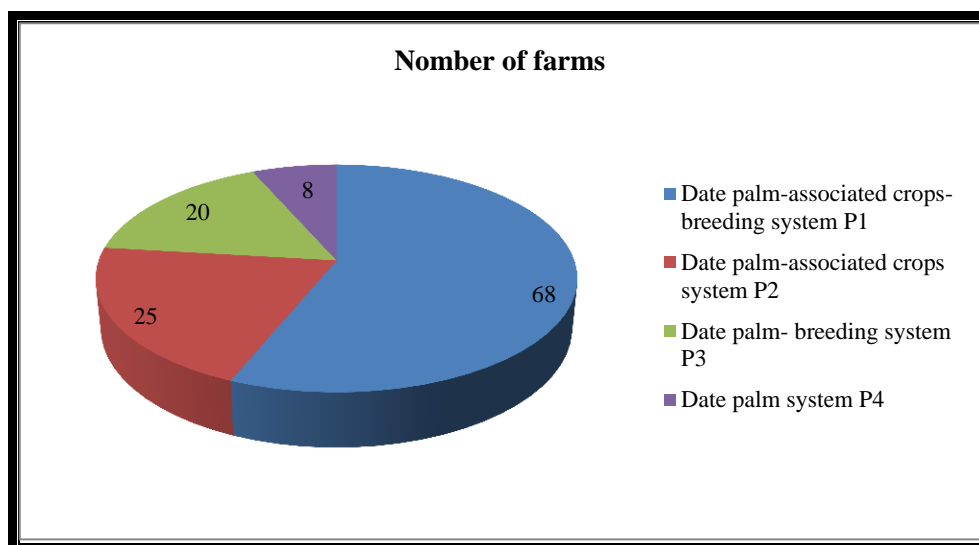
### 3.1. Presentation of the Object of Study

The Upper Oued-Righ is one of the three parts of which the valley is composed (Upper, Middle and Lower valley). It is located in the southern part and includes three sub-areas which are : Temacine, Touggourt and Meggarine ; The Upper Oued-Righ covers an agricultural area of 12 704 ha with 904 532 feet of date palms, including 588 986 feet of recent plantations [6]. The population of opper Oued-Righ was estimated in 2008 at 202 538 inhabitants [8] ; spread over 14 agglomerations, three of which are chief towns of daïra. Touggourt, located in the center of the study area and is the largest city in the valley, was promoted to the rank of wilaya in the last administrative division. The agriculture of the study area is represented by palm groves around agglomerations, each forming an oasis. These oases are differentiated by the number of population and the number of palm trees. Thus, our study area is composed of six small oases (Goug, Sidi-Mehdi, Ghamra, El-Ksor, Moggar, El-Harhira), two medium oases (Sidi-Slimane, Beldet-Amor) and three large oases (Temacine, Touggourt, Meggarine).

The farms in the upper Oued-Righ, and indeed in the entire valley, are phoenicultural farms. That is, the main crop is the date palm, the backbone of oasis agriculture. These farms belong to three legal statuses : Former state-owned farms, resulting from colonial plantations ; Former private property farms whose plantations date from the pre-colonial period and the new farms (APFA) which are of recent creation.

### 3.2. Production Systems

The production system is a mode of combination between land, forces and means of work for the purpose of plant and/or animal production [9]. Referring to this definition, four types of systems are identified in our case study : (i) Date palm -crops-breeding system, (ii) Date palm -crops system, (iii) Date palm -breeding system and (iv) Date palm system (Figure 2).



**Figure 2.** The production systems identified in the study area.

### 3.3. "Date Palm-Associated Crops-Breeding" System or P1

It is the most widely answered system in the study region insofar as it is used by 56% of respondents. This system is considered as the system which makes the best use of the resources of the farm and ensures better profitability thanks to the diversification of crops. The type of this system is used by 78% of the old type farms surveyed and 57% of the farms practicing this system have an area varying between 1 and 2 hectares.

### 3.4. "Date Palm-Associated Crops" System or P2

This type of farms comes just after the first, it is practiced by 20.66% of respondents. The date palm - associated crops system is based on the date palm and associated crops. Palm by-products and fodder are destined for the market as breeding is absent in this system. The type of farms practicing this system is old for 84% of the whole and the area is less than one hectare for 48% of this type of system and between 1 and 2 hectares for 48% also of this type.

### 3.5. "Date Palm -Breeding" System or P3

In this system, breeding values the by-products of the date palm and the weeds of the farm. This type of system is used by 16.5% of the panel, most of which are old farms, i.e. 95%. The surface area of type P3 farms varies between 1 and 2 hectares for 65% of the total and less than 1 hectare for the rest, i.e. 35%.

### 3.6. "Date Palm " System or P4

This system called monoculture is not beneficial for the farmer and the food security of the household, the income is guaranteed only by a single culture which constitutes a risk. This system is used by 6.5% of respondents, 75% of whom are old farms. The surface area of farms practicing this system is less than one hectare for 37.5% and between 1 and 2 hectares for 62.5% of these farms.

The explanation by crossing the variables having an influence on cultivation practices (the age of the farmers, the distance of the farm from the area of residence, the existence of other income, prospects for the farm) has not been significant for all eight observations. Returning to the data collected on these farms showed us that they have a water deficit and require a lack of labor. These two constraints are the basis of the choice of the monocultural system.

**Table 2.** Characteristics of the farms surveyed according to the production systems.

Type of system	Number of farms	Area			Type old farms	Rate (%)	Type new farms	Rate (%)
		Classe	Number of farms	Rate (%)				
P1	68	-1 ha	24	35.29	21	30.88	3	4.41
		1-2 ha	39	57.35	29	42.64	10	14.70
		2-4ha	4	5.88	2	2.94	2	2.94
		+4ha	1	1.47	1	1.47	0	0
P2	25	-1 ha	12	48	11	44	1	4
		1-2 ha	12	48	9	36	3	12
		2-4ha	1	4	1	4	0	0
		+4ha	0	0	0	0	0	0
P3	20	-1 ha	7	35	7	35	0	0
		1-2 ha	13	65	12	60	1	5
		2-4ha	0	0	0	0	0	0
		+4ha	0	0	0	0	0	0
P4	8	-1 ha	2	25	1	12.5	1	12.5
		1-2 ha	6	75	4	50	2	25
		2-4ha	0	0	0	0	0	0
		+4ha	0	0	0	0	0	0

### 3.7. The Size of the Farms

The area of the farms surveyed varies between 0.10 and 16 hectares. Nevertheless, 45% of the farms surveyed have less than one hectare, 23% have between 1 and 2 ha and only 2 farms in the panel have more than 4 ha. The phenomenon of small plots is very responded, especially in old palm groves, to the extent that 40.8% of old farms surveyed have less than one hectare. The old farms are subject to the phenomenon of division by heirs because these farms have known the succession of several generations since their creation. While the new farms are originally small farms of 2 to 4 ha and are of recent creation, so they have not yet fallen into joint ownership. But in the future, these same farms will experience the same fate of fragmentation as the old farms, as the descendants of the current owners of the new farms will become fathers of families and will claim their share of the farm.

### 3.8. Characteristics of Farmers

Young people are not involved in agricultural activity, insofar as 52.1% of farmers present on their farms during our survey are between 50 and 70 years old. The presence of old people is not negligible, as they represent 22.3% of the panel whose age is over 70 years. While farmers under 30 only represent 3.3% of respondents. This age structure is almost in line with the study made by [10] in the same area and which showed that farmers under 40 years of age only represented 4% of the total surveyed; and by the study made by [11] had revealed that 41% of the individuals surveyed were over 60 years old and 52% were between 40 and 60 years old. For these authors, the phenomenon of abandonment of palm groves by young people is due to the low profitability of phoenicultural farms and the appearance of more profitable economic sectors in the region.

As for the financial capacity of the farmers surveyed, it does not make it possible to cover the needs of households and invest part in the farm, even though 79% of the respondents have extra-farm income.

### 3.9. The Varietal Component of the Phoenicultural Groves

The main varieties existing in the study region are Deglet-Nour, Ghars and Degla-Beida. Data analysis (Figure 3). Showed that 69.5% of respondents have all three varieties. Other varieties exist but are less frequent, such as Tinicine, Tantbought, etc. The number of date palm per variety is different from one farm to another. In order of classification, the DegletNour variety ranks first in 99% of the farms surveyed, however, the Ghars and Degla-Beida varieties show permutations.

Indeed, the importance in decreasing order of the three main varieties in the farms surveyed is presented as follows (Table 3): the order (n ° 1) "DegletNour-Ghars-DeglaBeida" is found in 34.7% of

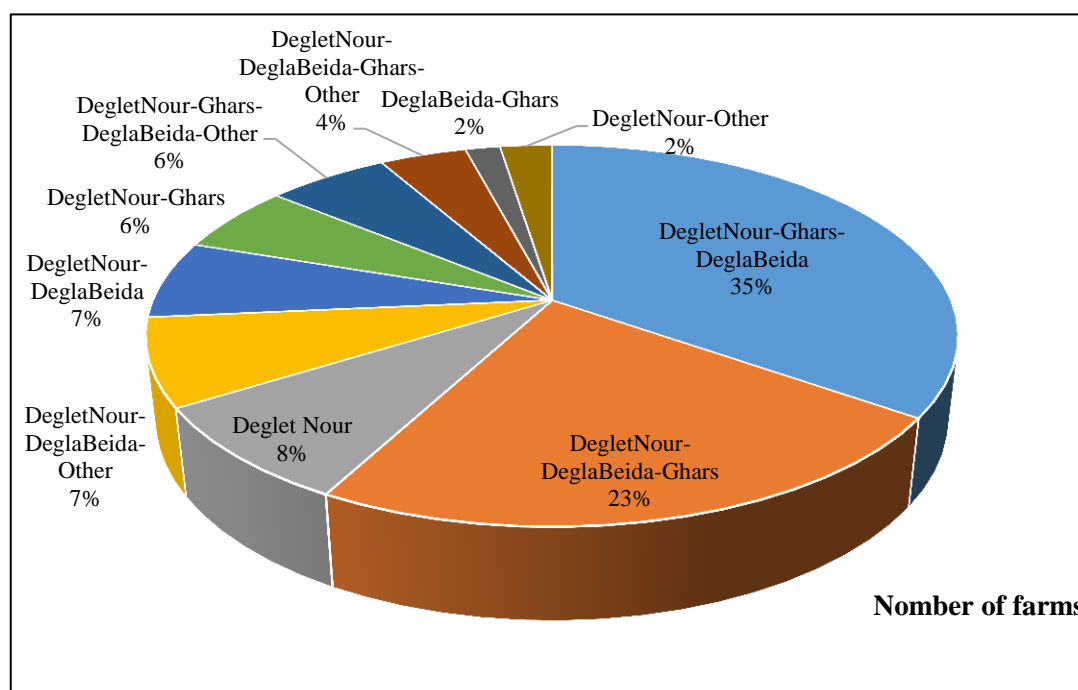
the farms surveyed, of which nearly 65% are old farms, the order (n ° 2) "DegletNour-DeglaBeida-Ghars" is found in 22.3% and the order (n ° 3) represented by the single varietal "DegletNour", is found in 8.3% of the panel. 90% of farms whose palm varieties are classified in orders 2 and 3 are old farms.

While the survey carried out by [12] had identified 175 cultivars throughout the Oued-Righ region, of which 84 cultivars were identified in the Upper Oued-Righ area (our study area). This same survey revealed that 50% of cultivars were threatened with erosion due to their advanced age and their cessation of production of small propagation seedlings.

The National Agricultural Development Plan (NADP) which was to be an opportunity for the renewal of the genetic diversity of the date palm in this region has seen a clear reorientation towards the planting of the variety Deglet-Nour because of its interesting market value.

**Table 3.** The varietal importance of the date palm in descending order.

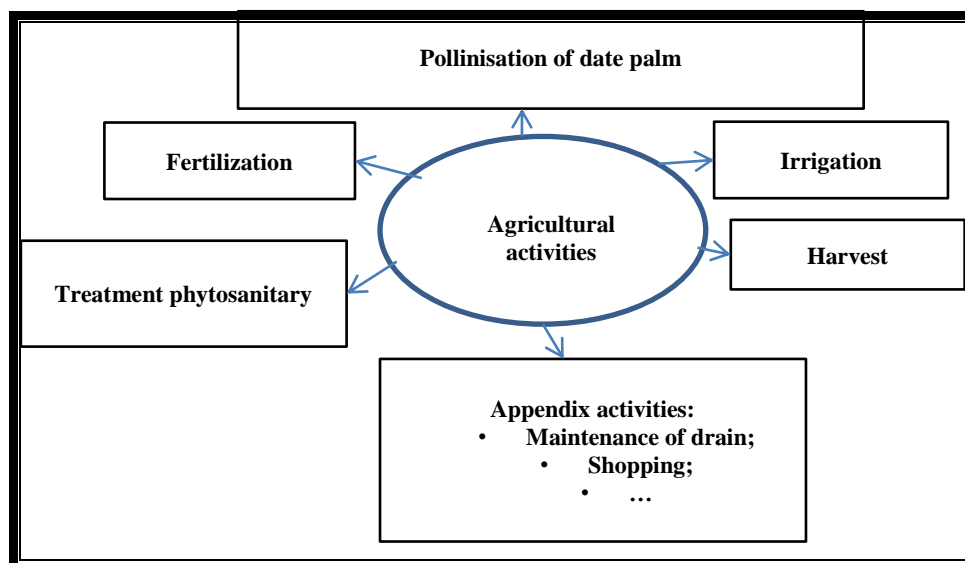
Order of varieties in the farm	Number of farms	Rate (%)	Old farms	New farms
DegletNour-Ghars-DeglaBeida	42	34.70	27	25
DegletNour-DeglaBeida-Ghars	28	23.10	26	2
Deglet Nour	10	8.30	9	1
DegletNour-DeglaBeida-Other	9	7.40	9	0
DegletNour-DeglaBeida	8	6.60	6	2
DegletNour-Ghars	7	5.80	7	0
DegletNour-Ghars-DeglaBeida-Other	7	5.80	5	2
DegletNour-DeglaBeida-Ghars-Other	5	4.10	5	0
DeglaBeida-Ghars	2	1.65	2	0
DegletNour-Other	3	2.55	3	0
Total	121	100	98	23



**Figure 3.** The varietal importance of the palm date in the area study.

### 3.10. Agricultural Activities

The agricultural activities within the farms differ from one holder to another. Some activities are practiced by all farmers, such as : irrigation, pollination and harvesting. But other activities are practiced according to the will of the farmer, such as : weeding, maintenance of drains, occupation of the herd, and other ancillary activities (shopping, making contact with the administration) (Figure 4).



**Figure 4.** The main agricultural activities of the farmer.

### 3.11. Irrigation

This is the most essential operation for the life of the date palm. It can cause a problem if there is insufficient or excess water. According to [13], insufficient irrigation and drainage is the major constraint preventing good palm productivity among farmers.

Knowing that the average flow rate of the irrigation boreholes is 30 liters per second, the irrigation situation in the farms surveyed, from the calculations, shows that the volume of water given in the old farms is 48.64 liters per hectare per minute, and that given in new farms is 59.78 liters per hectare per minute. That is to say an average volume of 50.56 liters per hectare per minute for the two sectors (Table 4).

**Table 4.** Volume of irrigation water served to farms.

Type of farms	Old farms	New farms	Total
Total area surveyed (ha)	130	29.25	159.91
Number of irrigation hours per week	591.15	163.5	754.65
Number of irrigation hours/ha/week	4.54	5.58	4.71
Number of litres/ha/mn	48.64	59.78	50.56

Comparing the volume recommended by Gautier and Hannou (1935) in [14] in the Oued-Righ valley which estimated between 65.44 and 74.65 l/ha/min, the water volume of irrigation given by the result of our survey is in deficit, but much more in the old palm groves (- 16.8 l/ha/min) than in the new palm groves (- 5.66 l/ha/min), at a minimum. Despite a clear increase in the volume of water currently served, the deficit is still apparent. The study made by [10] in the Oued-Righ Valley where the volume of irrigation water supplied to the farms surveyed was 52 l/ha/min in the old sector and 25 l/ha/min in the new sector, showing a deficit of 13.44 and 40.44 l/ha/min at least simultaneously for the two sectors (Table 4), referring to the volume recommended by Gautier and Hannou.

### 3.12. Pollination

This operation is compulsory for phoeniculture. If it is poorly made or not made, the date, the fruit of the palm tree, would not reach maturity and therefore cannot be consumed. This forces the farmers to carry out the pollination operation on time, either by themselves, by family members, or by the use of paid labor.

The survey results showed that 14% of the farms used the wage labor to carry out the pollination operation, 88% of these farms are from the old sector whose area is between 0.5 and 1ha for 73% of them. The number of workers recruited to carry out the pollination operation is on average 1.58 per farm. As for the number of working days, it varies between 7 and 10 working days per farm with an average surface area of 1 ha.

### 3.13. Amendment and Treatment

Fertilization and phytosanitary treatment are also essential to obtain good yields and healthy fruits, but these operations depend on the financial capacity of the farmer according to [13]. The phytosanitary situation in the palm groves is not good and the majority of palm groves are infected with diseases. Nevertheless, the phytosanitary treatment is generally done after the appearance of the disease or the pest, as for the fertilization, it is done with a frequency and different quantities according to the farmers. The fertilizer products used are of mineral and organic origin. Mineral fertilizer is generally used to improve the yield of herbaceous crops. Organic fertilizer of animal origin (manure) is used in the amendment of the date palm.

The survey results showed that 95% of the respondents used organic matter of animal origin to amend their palms. The quantity used by the respondents varies between 5 quintals and 2400 quintals of organic matter every 3 to 4 years. Nevertheless, 89% of respondents use less than 500 quintals per hectare over a period of two to four years, which gives almost a quantity of 1.39 quintals per palm tree. Knowing that the quantity of organic matter recommended by Toutain, depending on the climate and the soil, is 1.75 quintals per palm tree per year on average [15]. In 42% of these respondents, the manure used is purchased and, 20% of the respondents is limited to the manure of their cattle. As for mineral fertilization, only 55% of respondents use fertilizer. The quantity used varies between 0.01 quintal and 5 quintal per hectare, of which 42% of respondents use less than one quintal per hectare. For the phytosanitary treatment, 68% of the surveyed make the phytosanitary treatment of which 60% use products against weeds and insects (herbicide and insecticide).

### 3.14. The Maintenance of the Date Bunches

Concerning the maintenance of the date bunches, expressed by the operations of descent, limitation and chiseling, it seems neglected by a large part of the farmers of our study area, to the extent where the survey found that 53% only maintain the date bunches of their palm trees, including 73% in old farms. The most frequently expressed operation is that of the descent with a rate of 31.25%, followed by the "limitation-descent" operation expressed by 23.43 farms of which 80% are old farms and the last most frequently expressed operation is "limitation-descent-chiseling" with 20.31% of which 61.53% are expressed by new farms.

The reasons put forward by farmers who do not maintain the date bunches in most farmers as their age exceeds 60 years for more than 65% of the sample, or for lack of financial means to recruit paid labor. Some category of the sample does not consider these operations necessary because, for them, the date in the Oued-Righ valley is dry.

The study carried out by [16] in the Ziban region revealed that the chiseling and limitation operations are performed by less than 50% of the sample studied, while the descent and plastic cover date bunches are performed simultaneously by 95.32% and 87.64%. In this study, the farmer who do not perform these maintenance operations justify it by the lack of finance, negligence or by ignorance of the need for these operations.

### 3.15. The Different Crops Associated with Date Palm

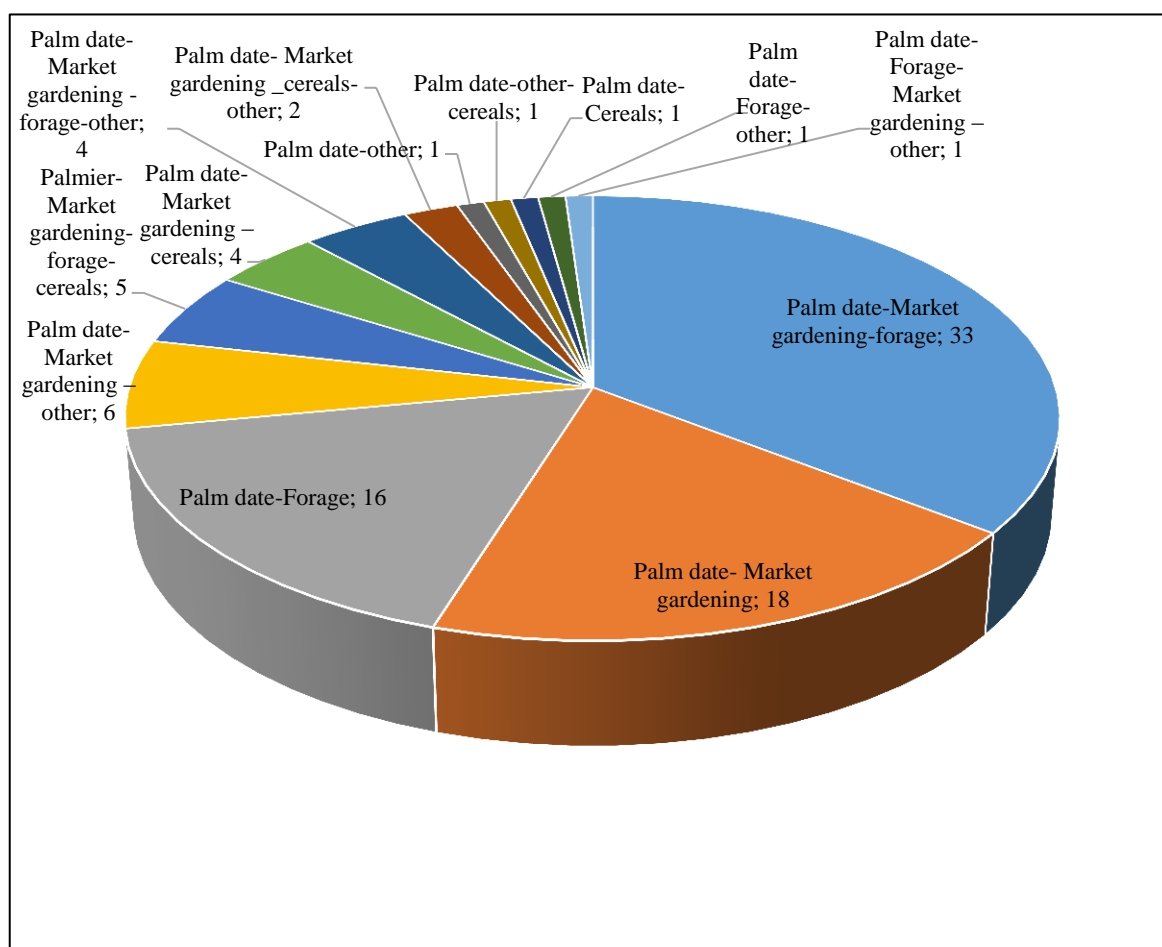
The crops associated with palm trees that can be found on farms in the study area are : market gardening, fodder, cereals, condiment crops, aromatic and medicinal crops. As the last three species are not frequent, they are referred to as "others" in this study (Table 5).

These associated crops are practiced by 77% of the farms surveyed. The most frequent associations are palm-market gardening-fodder which is practiced by 35.5% of the panel, palm-market gardening is practiced by 19.4% of respondents and palm-fodder is practiced by 17.2% of farms surveyed (Figure 5). The associated cultures practiced are intended for own consumption and marketing for 70% of the respondents, while nearly 26% practice associated cultures for their own use.



**Table 5.** The different types of association of crops with palm date.

Type of association	Number of farmers	Rate (%)	Old farms	New farms
Palm date-Market gardening-forage	33	35.5	28	5
Palm date- Market gardening	18	19.4	15	3
Palm date-Forage	16	17.2	14	2
Palm date- Market gardening –other	6	6.5	04	2
Palmier- Market gardening-forage-cereals	5	5.4	4	1
Palm date- Market gardening –cereals	4	4.3	3	1
Palm date- Market gardening -forage-other	4	4.3	2	2
Palm date- Market gardening _cereals-other	2	2.2	1	1
Palm date-other	1	1.1	1	0
Palm date-other-cereals	1	1.1	1	0
Palm date-Cereals	1	1.1	1	0
Palm date-Forage-other	1	1.1	0	1
Palm date-Forage- Market gardening – other	1	1.1	0	1
<b>Total</b>	<b>93</b>	<b>100</b>	<b>74</b>	<b>19</b>



**Figure 5.** Different types of associations of underlying crops with date palm.

### 3.16. The Breeding Association

Breeding is relatively marginal in the study area and the Oued-Righ valley in general however it is family-run, in stabling and with a very small number of heads.

Indeed, the species reared in our study area are, in general, small ruminants and backyard. In this study, we are only interested in small ruminants given the importance they have in the production system in terms of income and the production of organic matter widely used in the amendment. For our study, the species reared are limited to goats and sheep whose herds are kept in stabling, where the stable is associated with the habitat. The herd is fed mainly from the farm with additional concentrate supplied in small quantities. The data collected showed that nearly 73% of the respondents have a herd, including more than 67% of this panel, the herd is made up of goats, of which 91.52% is expressed by old farms, and in 25% the herd is made up of two species (sheep and goats), 68.18% of which is also expressed by old farms.

The preference of goats in breeding is explained by the fact that the latter makes better use of palm grove waste, which consists of palm by-products and weeds.

The owners of the old palm groves belonging to the old generation, have the spirit of associating the exploitation with the breeding to recover the waste of the exploitation and benefit from the products of the herd (meat, milk, manure, etc.) and , the fact of residing in old buildings, for the most part, breeding is possible as the herd is placed inside the habitat. Nevertheless, the owners of the new farms are generally young and cultivated, and reside in new habitations where the stable is not planned and not interested in breeding.

In addition, the practice of breeding is not linked, for our study, to the practice of fodder cultivation and/or the availability of additional income. The results of our survey showed that among farmers engaged in animal husbandry, 68% of them do intercropping, including fodder, and only 53% have additional income.

### 3.17. Destination of Agricultural Products

The farm's agricultural products generally have three destinations : self-consumption, the market and donation (Figure 6).

The survey results show that for the date, 33% of the sample sells on the tree and 59% sells their date after harvest. The sample which sells after harvest, 30% sells at home, 15% in the market and 20% sells a part in the market and the other part at home. The quantity intended for home consumption and for donations is not estimated in this study but, according to [10], the quantity retained for this object was estimated between 5 and 6% of total production.

As for fodder and market garden products, they are generally intended for self-consumption as the area reserved for this purpose is low and estimated at 2% of the total area of the farm. Nevertheless, by financial needs, 57% of our sample directs these products towards self-consumption and the market. While almost 20% of the sample consumes whatever it produces.

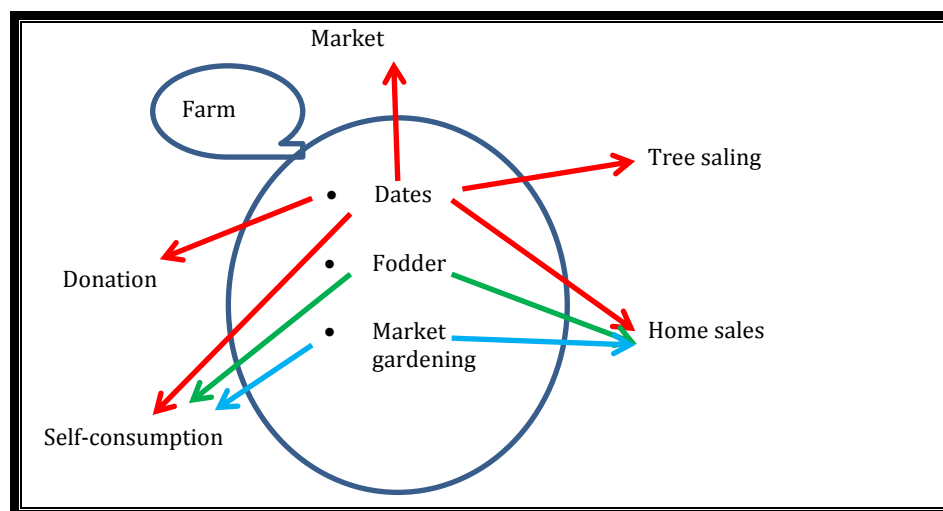


Figure 6. Destination of farm products.

### 3.18. Constraints and Perspectives

The question asked to respondents about the kind of constraints they had, gave 28 different answers. Lack of water is the constraint most cited by respondents, 20 observations were affected by this constraint. As a result, the acute water deficit and the problem of drainage have often led farmers to hide certain crops in order to devote more water to palm trees [11]. As the second most cited constraint is the absence of popularization from technical agents intended for this purpose, it is revealed by 18 observations. The diversity of the answers to the questions explains the great diversity of farmers' situations and the diversity of their perception.

As for the outlook, analysis of survey data yielded 30 different answers. The first project that the respondents would like to implement, if they have the means offered, is the rejuvenation of their palms, cited by 18 observations. The second most cited project is the introduction or development of market gardening including plasticulture, if the State gives them the possibility. This project is cited by 15 observations, 80% of which are old farms. While 61 observations have no project in prospect, or 50% of the respondents, which shows a tendency towards stagnation in half of the farms surveyed.

### Conclusion

The study shows us that no innovation has been made within the farms, except the repair of certain main irrigation canals or the construction of a few water reservoirs made within the framework of the PNDA which did not give the expected results.

The traditional character of agricultural activities in the study region remains unchanged, which negatively affects yields and product quality. This can be explained by the fact that the farms are small, as nearly 70% have less than 2 ha, and the income they bring remains low. The diversification of crop and animal production is an option for improving income, however, the area intended for associated crops does not exceed 2% of the total area of the farm, and family breeding with a limited number of heads between 2 and 4 heads cannot constitute a dynamic element in the development of farms.

State support to farmers through the PNDA could have been a trigger for innovation, in the region, in general, and for our sample in particular. Nevertheless, the difficulties encountered by most of our sample in the constitution of the file and the slowness of the administration left these farmers to their hunger. These farmers rely a lot on the support of the State to improve or innovate their farms, to the extent that several projects remain unfeasible without this support.

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