

Oasis agriculture and food insecurity in Algeria: the case of Ghardaia region

Rachid HOUICHITI (Corresponding author)

Kasdi Merbah University Ouargla, Laboratory of date palm research, Faculty of Natural Sciences and Life

BP 511 Road of Ghardaia, Ouargla 30000, Algeria

Tel: 0796 264 125 E-mail: rhouchiti@gmail.com

Samia BISSATI

Kasdi Merbah University Ouargla, Laboratory of Bio- resources Saharan: preservation and enhancement, Faculty of Natural Sciences and Life

E-mail: bissati.sa@univ-ouargla.dz

Boualem BOUAMMAR

Kasdi Merbah University Ouargla, Research laboratory date palm, Faculty of Natural Sciences and Life

E-mail : bouammar1959@yahoo.fr

Abstract

This work has been undertaken to assess the situation of food security in the region of Ghardaia (southern Algeria), including coverage needs food products, local production. The study revealed that this region is characterized by an increased dependence on supplies. Indeed, the region produces only about 5% of cereal needs, 35% fruit, 57% of meat and 37% milk. Production of major vegetables is quite satisfactory, with 88 % coverage needs. Overall, these rates are lower than the national average, reflecting the vulnerability of the Sahara in southern Algeria, in terms of food security.

Keywords: agricultural productivity; food product; food security; Ghardaia ; self-sufficiency.

1. Introduction

Food insecurity in Algeria is characterized by a high dependence on foreign markets because of the lack of local food production (Chabane, 2010). The growing needs of the population are increasingly met by imports, particularly cereals, milk, sugar and edible oils (Bouazouni, 2008).

Food availability in Algeria, estimated for the period 2000-2009 amounts to 3600 kcal (kilocalories)/capita/day (Ferroukhi, 2009). However, the self-sufficiency in basic foodstuffs is low. Thus, Algeria imports 75 % of its cereal needs and 60% of milk requirements (CENEAP, 2010) and 30% of the feed requirements (CNA, 2008), in addition to all of the sugar and oils food consumed. Therefore, a significant share of energy supply is attributable to imports. This represents a vulnerability in terms of national food security , especially as it relates to consumer products whose prices are becoming increasingly volatile, while the capacity of the country 's import rest uncertain because of a renter, highly dependent on hydrocarbon prices (Mouhoubi, 2008) national economy.

Several constraints are the cause of this situation, the problem of low agricultural productivity, the failure of development programs, the harsh natural conditions, the water deficit and limited land resources (Bessaoud & Montaigne, 2009). In fact, some regions are more disadvantaged than others in terms of productive resources. In this respect, the south, sometimes called the guarantor of national food security, as it covers vast tracts of land and it is full of ground water, is actually more vulnerable. Indeed, the Saharan climate is hostile land is, in most infertile time and often non-renewable water resources in mobilizing costly and sometimes even unfit for agricultural use (Bouammar, 2010).

Agriculture in the region of Ghardaia, is penalized by such constraints. UAA (usable agricultural area) is very low, it is estimated at about 32 000 ha (hectares) (MARD, 2013). This represents a ratio of 0.07 ha/capita, three times less than the national average, estimated at 0.23 ha/capita, and relatively low skilled to ensure food security. In addition, the water resources in this region are considered to be low, except for the El Goléa area south, which has a certain capacity for water mobilization of the water of the continental insert (called web Albian). Finally, groundwater is present in all the ancient oasis of Ghardaia and remains the main source of irrigation water, despite their limited capacity.

2. Materials and methods

2.1 Presentation of the study area

The region concerned is a vast desert area north of the Sahara and whose boundaries correspond approximately to those of the wilaya of Ghardaia (administrative district). Its land area is about 86 560 km² and has an estimated 413 000 people (MICL, 2012) population.

It includes, in the northern part of the country of M'Zab, a rocky area, torn by a series of wadis (rivers exceptional flow) highly branched. We find an oasis or more on each of the main wadis of this region, including the valley of the M'Zab, which includes in it self a group of five oases. In its southern part, the region includes El Goléa area.

Although the date palm cultivation is dominant, agriculture Ghardaia is relatively diversified. There are growing vegetables, fruit trees, cereals (barley and durum wheat), in addition to the peanut crop. The existing livestock consists primarily of sheep; goat and camel, but there are also farms dairy cattle and broiler.

2.2. Methodology

The issue of food security in Algeria, there is much more in terms of dependence on international market. Thus, the issue was addressed through an analysis of the self-sufficiency rate, that is to say, the coverage needs of the population of the study area, for local food production.

This analysis covers a period of 10 years (2003-2012). Identifying needs in food products was carried out on the basis of estimates of the FAO (United Nations Food and Agriculture) on per capita food availability for human consumption. These are established by country and by food group, they refer to the amount of food available for human consumption (FAOSTAT, 2012a).

In fact, the available data prior to 2010. Thus, it was possible to make a projection for the following year, with reference to the evolution of consumption by food group rate recorded between 2000 and 2009. Data obtained are shown in Table 1.

3. Results and discussion

Means of self-sufficiency rate obtained for the wilaya of Ghardaia, illustrated by Figure 1, indicate overall low coverage needs through local production. This figure shows a deficit in agricultural crop and livestock production, compared to the needs. These deficits affect all commodity groups except the production of dates, which is rather redundant. Moreover, the coverage all seems, except dates, below or equal to the national average.

3.1. Date production

Ghardaia is a phoenicole region, which produces excess amounts of dates. This production covers almost six times the needs of the population. The date is an energy food, hence its importance for food security Saharan populations. This importance also is the fact that it is a commodity that stores easily. In addition, compared to other cultures, the date palm is a very hardy tree; it can give crops even in extremely adverse conditions (prolonged drought, natural disasters)

In fact, the production of dates in Ghardaia growing faster than required. During the period, production tripled (189 % increase), while growth in overall consumption was estimated at 56%. This comes at considerable development of date palm through programs initiated to support this sector. This leads us to say that the production of dates tends to be increasingly redundant. Until 2012, new plantations, which were not productive, represented 16% of the total number of palm trees, estimated at 1 225 000 trees (MARD, 2013). It is therefore essential to think of ways to enhance the excess production and make the best for the benefit of farmers' incomes and food security of the population.

3.2. Cereal production

Conversely dates, the amount of grain produced in Ghardaia, namely wheat, durum and barley only covers a small part of the needs of people, the equivalent of 5%. In reality, the needs in this area are enormous, while the production is very low. Cereals are at the base of the diet, and are the group most consumed about 234 kg (kg/person/year in 2012, representing 30% of the volume of the ration (FAOSTAT, 2012b) Food). Thus, for 2011 (great year for the coverage rate was 9%), needs amounted to 96 300 t (tonnes), while the production obtained by only 8 600 t (MARD, 2013).

In fact, grain production is low due to insufficient reserved for this type of production surfaces, estimated at 2 200 ha, or 8 % of the UAA of the wilaya. Yields meanwhile, are an average of 4 t/ha for durum and 2.6 t/ha for barley (MARD, 2013). Indeed, the cereal in southern Algeria is underdeveloped, and its practice is reserved to a restricted category of farmers who can provide important financial resources required. Moreover, it requires large amounts of water and large areas more or less flat.

Cereal in the Saharan regions is a delicate and very expensive agriculture. It requires constant irrigation with sprinkler systems central pivot, covering 30 to 50 ha in one piece. This requires the mobilization of huge amounts of water, obtained by deep drilling and pumping groups and causing a large consumption of electrical energy and careful maintenance of irrigation machines. Cereal cultivation also requires a complete mechanization of farming operations, which is far from controllable. In addition, cereal under pivot in the Saharan regions is relatively recent, it has been twenty years and its development has been constantly disrupted due to technical and economic constraints.

3.3. The production of vegetables and fresh fruit

Market gardening and orchards are intercropped with palm tree in the traditional farming systems (Bouammar, 2010). In intensive culture, they are also produced on independent plots.

Culture provides fresh vegetables on average 88 % of the food needs of the local population. This is the most important after the dates of self-sufficiency rate. However, in terms of volume, market gardening offers greater production, estimated at about 65 000 tonnes against 52 000 t for dates in 2012 (MARD, 2013). In reality, the difference lies in the amount consumed per person because vegetables fall into the ration at the rate of 148 kg/person/year, while the dates generally do not exceed 20 kg/person/year (FAOSTAT, 2012b).

On locally produced fruits, they cover an average of 35 % of needs. The self-sufficiency rate has decreased over the study period (2003-2012) from 36 to 30% due to consumption growth, slightly higher than production. This fact leads us to predict a deficit increasingly important in fruit production, despite the new plantings carried out each year. To reverse this trend, it is necessary also to improve the productivity of trees.

In fact, average yields are low and vary from 10 kg / tree for apple, pear and grape and not exceed 20 kg/tree for citrus and olive (MARD, 2013). A large proportion of farmers in the region do not know how

to properly maintain their trees for lack of decisive productivity aspects expertise, namely the size, health protection and fertilization of trees. In this area, the government has invested heavily in the expansion of fruit growing, but not enough in the extension and farmer learning the techniques of the most basic production.

3.4. Productions of animal origin: meat and milk

Local production of red and white meat covers about 57 % of consumption. During the period, the production of meat has increased by about 20 % from 3900 to around 4700 t (MARD, 2013). However, the self-sufficiency rate was virtually unchanged due to similar growth in consumption.

On milk production, it is estimated that just 37% of the region's needs. As meat consumption, the share of milk in the diet significantly increased (from 108 to 149 kg/person/year), which contributes to the stagnation of coverage needs, despite 45% growth production, estimated at 22 800 t in 2012.

4. Conclusion

The study of the coverage of food needs of the population of Ghardaia, compared to local production, shows dependence and a need to resort to imports. Thus, with the exception of the production of dates, self-sufficiency ratios are lower than the national average, especially for cereals, which represent the basis of the diet (5% against 25 % nationally). These results mean that Algeria, the Saharan regions are most vulnerable to food security. They are characterized by dependence opposite other regions, more or less favored in terms of productive resources and climatic conditions.

This state of increased dependence poses a perspective problem of food insecurity, which can only be solved by finding an increase in local production. Theoretically, there are several choices, including extended and increased productivity. However, in Ghardaia, as in many Saharan regions, agricultural potential is insufficient, which poses limits on extended opportunities.

Today it is possible to combine productivity and sustainability in agriculture. The world, we are witnessing the development of methods and techniques to sustainably improve crop productivity without, however, have a negative impact on the environment or society. In terms of per capita resource depletion, climate change and increasing food demand, it is necessary to improve productivity by drawing on new approaches such as ecological intensification developed by FAO or, ecologically intensive agriculture, initiated by CIRAD (Centre for international cooperation in agronomic research for development).

References

Bessaoud O. & Montaigne E. (2009). Which answers for agricultural underdevelopment? Analysis of past and present agricultural and rural policies. *Options Mediterranean* (B). 64, 51-91.
<http://ressources.ciheam.org/om/pdf/b64/00801109.pdf>

Bouammar B. (2010). *Agricultural development in the Saharan regions, case study in the region of Ouargla and Biskra region*. PhD thesis, University Kasdi Merbah, Ouargla (Algeria).

Bouazouni O. (2008). *Study of the impact of food price base on poor households Algerians*. FAO, Cairo.
<http://documents.wfp.org/stellent/groups/public/documents/ena/wfp194575.pdf>

CENEAP (2010). Elements of the problem. International seminar on food security, 12-13/02/2011 : *What policies of food security for Algeria 2025*, CENEAP, Algiers.

<http://www.ceneap.com.dz/Pdf/SemSECUALIM-Prob.pdf>

Chabane M. (2010). Global warming threatens food security. Whose vision and policy for the future which in Algeria. In: 6th international conference: *development strategies, which traveled path? What responses to the new economic and climatic constraints ?* 21-23/06/2010. Tunisian association of economists, Hammamet (Tunisia). [http://www.ps2d.net/media/CHABANE % 20Mohamed.pdf](http://www.ps2d.net/media/CHABANE%20Mohamed.pdf)

CNA (2008). Economic defense. Summary of the 4th day of parliamentary studies: *national defense*, 07-08/06/2008. Council of the Nation of Algeria, Algiers

www.majliselouma.dz/!4emeJep/!communications/Synthese.doc

MARD (2013). *Digest statistics in the agricultural sector of the wilaya of Ghardaia (2000-2012)*. Directorate of agricultural services, Ministry of agriculture and rural development, Ghardaia (Algeria)

MICL (2012). *Statistical yearbook of the wilaya of Ghardaia (Statistics as of 31/12/2011)*. Department of planning and regional planning, Ministry of the interior and local government, Ghardaia (Algeria)

Mouhoubi S. (2008). Vulnerabilities Algeria. In: 4th day of parliamentary studies : *national defense*, 07-08/06/2008. Council of the nation of Algeria, Algiers

[http://www.majliselouma.dz/!4emeJep/!communications/com% 20Dr % 20MOUHOUBI.doc](http://www.majliselouma.dz/!4emeJep/!communications/com%20Dr%20MOUHOUBI.doc)

FAOSTAT (2012a): List glossary: *Definitions of terms used in statistics*. Databases of FAO, Rome (accessed 03/03/2013). http://faostat3.fao.org/home/index_fr.html?locale=fr#METADATA_GLOSSARY

FAOSTAT (2012b). Food availability by food group in Algeria, data domain. Databases of the FAO, Rome. (accessed 03/03/2013).

<http://www.fao.org/economic/ess/ess-fs/fs-data/ess-fadata/fr/>

Ferroukhi S.A. (2009). Politics agricultural and rural renewal in Algeria, a response to the challenges of food security. In: *Seminar on food security in the Mediterranean*, 17-19/12/2009. CIHEAM; IPEMED, Paris. <http://www.ipemed.coop/spip.php?column100>

Table 1. Evolution of food availability in Algeria (kg/person/year)

	2003	2004	2005	2006	2007	2008	2009	2010*	2011*	2012*
Cereals	228,80	224,00	222,80	226,80	228,00	226,50	230,20	231,56	232,91	234,27
Potatoes	52,90	52,60	58,00	59,30	42,70	56,80	67,30	72,33	77,37	82,40
Fresh vegetables	101,20	120,60	120,70	113,90	110,40	104,50	126,00	133,55	141,09	148,64
Fresh fruit	63,9	64,1	71	77,7	67,8	78,1	91,2	101,65	112,10	122,55
Dates	14,6	13	14,9	13,9	14,6	15,1	16,3	17,04	17,78	18,53
Meat	18,90	21,40	21,60	20,20	20,10	19,40	19,50	19,54	19,58	19,62
Milk and dairy	108,40	122,40	121,90	125,60	116,30	122,40	137,60	141,54	145,47	149,41

(*) Forecasted value.

Source : FAOSTAT (2012b)

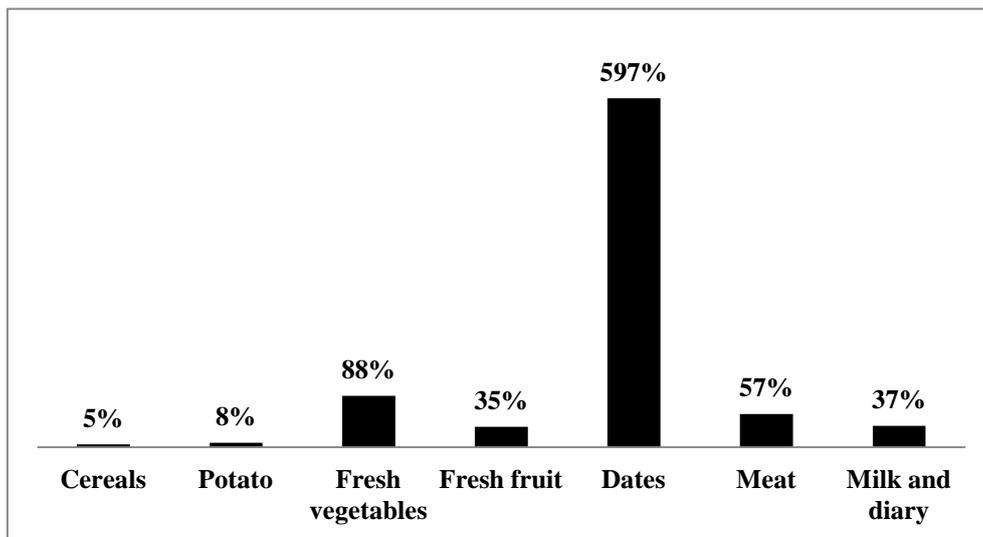


Figure 1. Rate of self-sufficiency in food products in the wilaya of Ghardaia (2003-2012).

Source: FAOSTAT (2012b) , MARD (2013).