



Agriculture in Dades Oasis Problems and Development Strategy

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Abstract

Traditional agriculture has been the foundation of agricultural civilizations in the Dades Oasis throughout history. And the agricultural relies on the use of traditional agricultural methods and practices that are passed down through generations. Traditional agriculture focuses on cultivating crops in open fields using natural soils, and surface water resources are the main source of irrigation. Traditional agriculture is one of the most important farming patterns, used to produce a wide range of food crops and medicinal plants. Despite the challenges they face in light of modern technological developments, they still play a key role in ensuring food security for some local communities, and represent an essential part of the agricultural identity in many regions of Morocco. Through this study, agriculture in the Dades Oasis, which is located in southeastern Morocco, will be discussed and the main challenges it faces, with reference to possible ways to develop it in light of climate variability and the challenges of modernization.

Keywords: Agriculture; Dades Oasis; Challenges; Development

Introduction

Moroccan oases face a range of challenges, which limit their development and sustainability. Where there is a natural problem, such as the climate and topography of the oasis that does not help agricultural production. Then the simplicity of agricultural tools, in addition to the use of unsophisticated techniques and practices. They are often simple techniques that correspond to the smallness of agricultural land.

Through this study, the problem of agriculture in the Dades oasis, which today suffers from a harsh environment and lack of water, will be addressed. It has become necessary to study the impact of the transformations of the oasis on agriculture and to seek appropriate solutions to adapt to it. Here comes the importance

of this study and scientific analysis of the potential impacts of climate change on agriculture, with the aim of developing effective strategies to improve productivity and sustainability in this sector. This is done through field research, bibliographic reading that is of interest to the same subject, and then Cartographic work.

Material and Method

In order to study the topic of agriculture in Dades Oasis, reliance was made on geographic information systems, through which a map was drawn including the field of study. It also clarifies the areas of agricultural fields in mountainous and flat areas. Field research was then carried out to find out the status of agriculture in the Dades Oasis, and to take some pictures of agricultural land and water sources. Then bibliographic reading.

The importance of agriculture in Dades Oasis

Oases are known as fertile land surrounded by desert land. The presence of oases is linked to water sources and can depend on well water, valleys or eyes to other water sources. Oases may extend for thousands of square kilometers. Oases are an important source of agriculture in dry and desert areas and play a vital role in providing food and income to local communities. Traditional agriculture in Dades Oasis is passed down through generations, relying mainly on natural resources, and agricultural productivity can be increased and crop quality improved through the use of modern technologies and the adoption of sustainable agricultural practices.

Agricultural techniques in Dades Oasis

Agriculture in Dades Oasis is based on simple techniques at all stages of agriculture. Simple techniques include a range of methods for growing crops because modern agricultural methods cannot be used. Due to the geomorphology of the region, agricultural land is cut off.

Basic tools in cultivation

The Man practiced agriculture in the sides of the Dades Valley. Agricultural land was an important economic and social resource. In agriculture, man relied on simple traditional tools, from preparing the land for agriculture to harvesting and harvesting. Among these tools we find:

- Wooden plough, is an ancient agricultural tool for plowing the land, getting rid of weeds;
- Manual axe, used to flip the ground, break hard surfaces, which are versatile;
- The pickaxe, which is used to divide the peasant land into agricultural fields and to break up the soil;
- Machete: A hand tool used in the harvesting process, cutting herbs for feeding livestock;
- Pitchforks were used to isolate grain from hay.

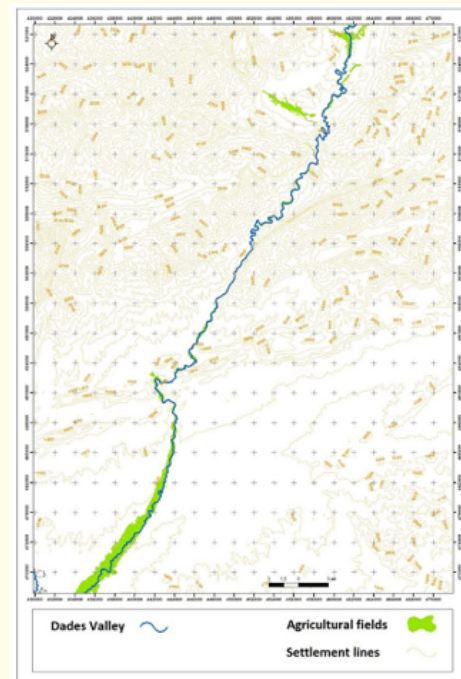
Farming methods

The traditional agriculture in Dades Oasis has special features. It has a role in ensuring the livelihood of some families. Agriculture in the Dades oasis goes through many stages, from plowing to planting to harvesting. Animals (mule and donkey) are used in the process of tilling the land, and through these animals that walk in the ground back and forth the soil is flipped and ventilated. Then soil fertilization begins with manure, which is livestock waste. It is followed by the sowing process, that is, manually scattering the

seeds in the fields, then the ground is stirred for a second time and this process is carried out when growing wheat and barley.

After germination and ripening comes the period of harvesting and collecting the crop, this process is carried out collectively with the cooperation of the inhabitants among themselves. Because of the small amount of agricultural land and the harsh natural conditions, production is poor. And agricultural yields vary from cereals, vegetables and fruits. Among the fruit trees of the Dades Oasis are figs, almonds, walnuts, apples, olives, apricots, pomegranates, plums and grapes. For vegetables, kale, beans, carrots and pumpkin. Then forage, which are alfalfa and have an essential role in feeding livestock. the Fodder production takes place between April and November, when the climate is mild. As for winter, this production stops due to the extreme cold in the oasis [1] (Hammam, 2002).

The cultivation of roses is widespread in the oasis of Dades, and is used in medicine and cosmetology, and has also been valued since the colonial period, where a unit for distilling roses was completed in the name of the Cap Floral Atlas Company (CAAP Floral Atlas) in 1938 in Qal'at M'gouna, followed by a second distillation unit in 1949 in the name of AROMAC in the roundabout «Amdenagh» (Aqioh, 2005) [2].



Map 1: Agricultural Field Distribution Areas.

Source: Google Earth Images 2020, Digital Altitude Images, 2020.

Map 1 shows the presence of agricultural fields near the Dades Valley, distributed over a few areas. It is noted that in the north of the map there are mountainous areas, characterized by rugged terrain and steep slopes, and this is evidenced by the convergence of settlement lines, and the heights of these areas range between 1900 meters and 2800 meters. These harsh natural conditions show the lack of flat land except for the depth of the valleys, where agricultural fields are spread over narrow areas. If we turn south, both southeast and southwest of the map, we notice the divergence of the settlement lines, which means the beginning of the emergence of flat lands, where we find heights ranging from 1800 meters to 1500 meters. In these areas, agricultural land is expanding, and all are located in the Dades Valley, where fertile soil is spread.

Irrigation and fertilization methods

The irrigation process is carried out through waterways (Photo 1), and it depends on the water of Oued Das. Water is diverted to the waterwheel through the technique of «Akok», a traditional water-diversion dam, i.e. an earthen dam built by the inhabitants of the tribes that own the sakia, and built in the middle of the river to push water towards the sakia in sufficient quantity [3].

It is noted that the majority of peasants rely on surface water watering in the period of abundance of water, and agricultural production ceases in dry periods, due to the cost of groundwater watering. and Some peasants rely on groundwater watering after surface water has dried up by purchasing watering water from individuals who own wells.



Photo 1: Water diversion of waterways.

Source: Personal Photography, Souk El Khamis Dades, March, 2022.

Through photo. 1 shows the channel of water diversion in the direction of agricultural fields, and this water was diverted by the traditional dam from the Dades Valley.

Marketing agricultural products in Dades Oasis

Some products within the oasis are known for internal marketing and others for national and international marketing. But in general they know a weakness at the level of marketing, for various reasons poor interest in agriculture, and the harshness of natural conditions. Agriculture in the Dades Oasis is weak in terms of techniques and tools used, where it is characterized by simplicity, which makes the return is weak. But roses are a highly developed product at the local level, which is marketed internationally. The production and marketing of aromatic roses has become particularly popular in the rose harvest season (May and June), and the topographic factor contributes to the distribution of agricultural fields between ranges differently. Areas with a flat topography have an important agricultural concentration, ranging from traditional to modern agricultural exploitation.

Poor marketing is also due to the absence of excess production for marketing, in addition to the presence of competing agricultural products that come outside the oasis and market locally.

Future challenges and opportunities for traditional farming techniques

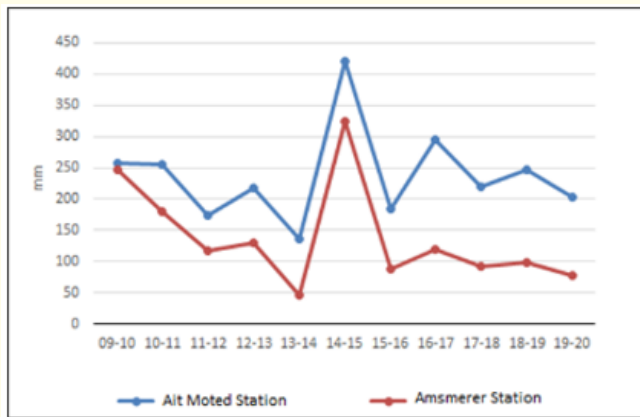
The agricultural system of the Dades Oasis is facing challenges that threaten its survival. This is due to climate change, and the weakness of its competition with modern agriculture. Due to the simplicity of the tools used in agriculture. Which leads to a lack of production and then poor marketing. In addition to the absence of support for traditional agriculture by the responsible authorities. Most of the crops in the Dades oasis are experiencing a significant decline, due to the frequency of drought and damage to crops, which has led to the exposure of important agricultural areas to degradation. Mention, for example; Roses, almond trees, olives, figs, apricots and the decline of cultivated areas of hard wheat, barley and corn especially in recent years.

Climate change and its impact on agricultural projects

The geographical location of the Dades Oasis, between the High Atlas in the north and the Small Atlas in the southeast of Morocco, contributed to a semi-arid climate characterized by poor rainfall and high temperature. On the southern side, the oasis overlooks the Sahara Desert, receiving dry desert currents, while in the north, the High Atlas Mountains prevent wet currents from reaching the

oasis. Dades Oasis receives weak rainfall, which varies greatly between years. Under these harsh climatic conditions, the severity of the climate following the frequency of drought on the oasis has increased dramatically. Agriculture, one of the most important pillars of the agricultural economy, has declined for climatic and human reasons.

Evolution of rainfall between 2009 and 2020



Figure

Data source: Regional Office for Agricultural Investment Ouarzazate.

A variation in the level of annual rainfall is observed in the Dades Oasis. After tracking the rainfall path for 10 years, it was found through Figure 1 that rainfall has been heterogeneous over the years. It is noteworthy that rainfall Ait muted station 2009 and 2010 reaches 250 mm, and began to decline significantly to weak levels, reaching between 2013 and 2014 to 137 mm. The precipitation takes roughly the same route at Amsmerer Station. But an extraordinary period emerged between 2014 and 2015, where the rainfall of the Ait Moted station reached 420 mm and the Amsmerer station to 325 mm. After this period, rainfall rates began to fall significantly, and it recorded the weakest rate between 2019 and 2020, especially at Amsmerer station, which is 77 mm. This continuous decline in rainfall recorded in both stations directly reflected on agriculture in the Dadais oasis, where it also deteriorated due to the absence of watering water.

The climate heterogeneity of Daddies Oasis has affected agricultural activities in general. In recent years, droughts have been repeated in succession, leading to a decline in agriculture and fruit trees in the oasis. Because traditional oasis agriculture depends on rainfall that provides surface water, especially the waters of the Dades Valley, which distributes water to agricultural fields, and the decrease of rainfall means the deterioration of agriculture in the oasis (Photo 2).



Photo 2: Agricultural fields affected by drought.

Source: Personal Photography, Baumalen Dades roundabout, August 2021.

Photo 2 shows the impact of years of drought on farmland and fruit trees, as crops and fruit trees have deteriorated. This effect has been most pronounced south of Dades Oasis, where water sources are limited and agricultural land is heavily affected by periods of drought.

In addition to climate variability, which has greatly affected agricultural fields, there are other impacts associated with human practices, and the following are some of the negative effects of human interventions:

- Migration of young people from the oasis and lack of labour;
- Poor involvement in agricultural associations or cooperatives;

- Poor attention to oasis farming by the responsible authorities;
- Lack of agricultural guidance for traditional peasants;
- Looking for agricultural land, to get rid of burdens, or looking for partners to benefit from an agreed annual income, or a percentage of the agricultural crop.

The weak economic contribution of agriculture in the oasis compared to other economic sectors, led to a significant decline in interest in it, especially by young groups, and this led to a severe shortage of Labor Force after young people abandoned agricultural work, and integrated into other economic activities with high incomes. Agriculture in Dades Oasis also suffers from the absence of modern means and techniques in the production process. Because the size of the agricultural fields is small, and does not help the use of machinery, add the ruggedness of the terrain, and the intensity of their erosion, especially north of the oasis. It should be noted that the problem of fragmentation of agricultural land was contributed to by the inheritance of land between generations and the acquisition by each individual of his share of the land in the inheritance.

It turns out that agricultural techniques and methods are very old. Agriculture that needs irrigation is associated with interim crises due to drought and seasonal scarcity of precipitation» [4]. Today, agricultural activity is a profession practiced by the elderly, women housewives, who use agriculture along with other economic income to meet their livelihood needs. Oasis agriculture is no longer a sufficient resource to support the population, due to drought, productivity and quality constraints. Hence, it is clear that agriculture, which was a major pillar in the emergence of oases, can no longer keep pace with needs, and requires deep treatment to adapt it to the requirements of the new situation [5].

Results and Discussion

Through the study, a group of abstracts of interest to agriculture in Dades Oasis was deduced. And The pros and cons will be identified and then the solutions.

Potential opportunities for agricultural development in Dades Oasis

Agriculture in Dades Oasis faces a range of challenges, especially the problem of climate variability and the frequency of drought

years. Then the problem of using traditional methods of production and irrigation, and this does not help to achieve production intensity. In addition to the long time required by the agricultural process, then the cost of Labor Force compared to the limited production. Agriculture cannot cover the population's needs for agricultural products, especially with the growing population and increasing food needs.

On the other hand, there is modern agriculture that competes with traditional agriculture outside the oasis area, and relies on modern techniques, whether in terms of machinery, fertilization, and irrigation methods.

Oasis agriculture is of great importance in the continuation of the oasis in general and this importance is shown by:

- Environmental balance;
- Oxygen production;
- Local economic boom;
- Protection of green spaces in the oasis;
- Provision of some local products;
- Natural cultivation without chemicals;
- Protection of biodiversity;
- Preservation of genetic and non-hybrid sources of plants;
- Preservation of traditional farmers;
- Preserving the ecosystem and agricultural biodiversity.

Agriculture in Dades Oasis plays important natural and human roles. Therefore, this traditional system must be preserved from decline, and this will be done through:

- Encouraging traditional farmers and providing sufficient capital by the competent bodies to enable farms to use traditional tillage tools suitable for this system;
- Guiding and training traditional farmers and facilitating their access to local and national markets;
- Support for traditional oasis agriculture and the valorization of their local products;
- Support for natural crops free of chemicals and based on the traditional farming system;
- Providing profitable farming activities for all farmers;

- Promoting innovation and scientific research for local agricultural projects;
 - Developing local agricultural enterprises and encouraging young people to engage in agricultural work;
 - Cultivation of drought-resistant crops;
 - Employing modern technology and its applications in traditional agriculture;
 - Work on the development of sustainable practices in the cultivation of oases.
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Conclusion

Traditional agriculture is one of the most important local economic sectors in Dades Oasis, where humans depend on it to provide some products for daily life. In light of the climatic variability witnessed by Morocco, and the Dades oasis in particular, the impact of these climate changes and various human activities on agriculture in the oasis is noticeable, and led to its significant decline. Therefore, it is necessary to work to preserve agriculture inherited from previous generations, and work to ensure the sustainability of this vital local sector. This is to ensure that some food is adequately provided to the population, and to preserve these limited green spaces. Climate variations can sometimes lead to weather fluctuations, resulting in less rainfall, high temperature, and the prevalence of a severe drought that negatively affects agricultural activity as a result of water shortages. Thus affecting agricultural production and economic life in the oasis, which is revived by agriculture. Therefore, agriculture in Dades Oasis needs special attention to local farmers, training them to adapt to these transformations, and adopting policies and strategies that promote sustainability and productivity in agriculture.

Ethical Statement

«There is no need to obtain permission from the ethics committee for this study».

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