

Article

Agricultural development as a mechanism for protecting borders: Oued Souf region as a model

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Abstract: Algeria's border areas are among the sensitive issues that may pose significant threats to Algeria's national security. These include smuggling, organized crime, drugs, and terrorism. As a result, Algeria has implemented a set of preventive measures and a development plan that will serve as an impenetrable barrier to such threats, and this has been embodied in some border areas such as Oued Souf, where agricultural dynamism has resulted in an expansion of exploited agricultural lands and a great diversity in agricultural crops in recent years. This may be attributed to the first agricultural programs established by the country to develop the agricultural sector. And through this article, we will try to shed light on the most important development programs in the agricultural sector, and accordingly, the study sample included 120 female agricultural investors who were chosen randomly, distributed among five municipalities, as they occupy the first ranks in national production. The state's agricultural development plan has greatly contributed to the creation of jobs and the strengthening of the national economy through the use of various agricultural products. The study's recommendations are to work more toward the sustainability of agricultural development projects such as using modern agricultural irrigation systems, avoiding monoculture, as well as using fertilizers and agricultural pesticides more rationally, and establishing specialized institutes for technical assistance for farmers. Finally, those frontier areas should be given special priority and development projects. are listed as such. The section titles given are for articles. Review papers and other article.

Keywords: land development, development, Frontier area

1. Introduction

1.1 Frontier development concept

The concept of development in the twenty-first century is one of the most important global concepts. The process of establishing coherent economic and political systems, and the importance of development lies in its [13] dimensions, its multiple levels, and its connection with many other concepts such as production [14], development, progress, and planning. Since World War II, the concept of development has gained prominence due to its political, economic and social impact on nations, and its legal implications for the relationships between nations [15], [16].

1.2 Definition of development projects

Development projects aim to improve the current situation by utilizing available resources to achieve the best outcomes for people and society [17]. The development of border areas is a strategic priority that has received attention from researchers in political, economic, social, and environmental fields [18]. After World War II, international organizations such as the United Nations recognized

development as a right and necessity for newly independent states. The state plays a crucial role in promoting infrastructure, grassroots structures, and human development in these regions[19]. The development of borders involves future plans and projects to solve problems such as pollution or misuse of land, and to establish international strategic projects for overall state development[20].

1.3 Objectives the development of Frontier areas.

There are several goals that can be achieved through the development of the frontier strip, the most important of which are political goals: working to improve the relations of the frontier countries. Secondly, come security and defense objectives, and these are achieved through security coordination[21]. Also, economic goals, as the development of the frontier strip benefits from trade and tourism development of these areas. One of the most attractive aspects of investment is private and public capital development projects, which should be preceded by prior planning to determine the objectives and obstacles[22]. This should follow comprehensive framework so that the development process is not subject to failure and waste. In addition, cultural dimension should also be integrated. Indeed, development of frontier regions leads to cultural exchange[23]. developing border areas can have a positive impact on the population by providing them with a sense of safety and stability, as well as access to high-quality services and order.[18]

2. Materials and Methods

2.1 Local development strategy for border areas

The development of border areas involves various approaches and strategies to protect residents from displacement or reliance on illegal activities such as smuggling and drug trafficking[24]. One strategy is agricultural development[25], which can improve living standards and increase farmers' incomes through bank financing and insurance protection against agricultural risks[26]. Another strategy is industrial development, with plans and programs that respond to societal priorities. The state can encourage the establishment of industries in border areas[27], with a focus on balanced development between regions[28]. Small industries are particularly suitable for border areas as they create employment opportunities for simple production arts. Small and medium enterprises are more labor intensive and can contribute to development in countries with limited capital[29].

2.2 Introducing the Souf area:

2.2.1 historical overview of the origin of Souf residents:

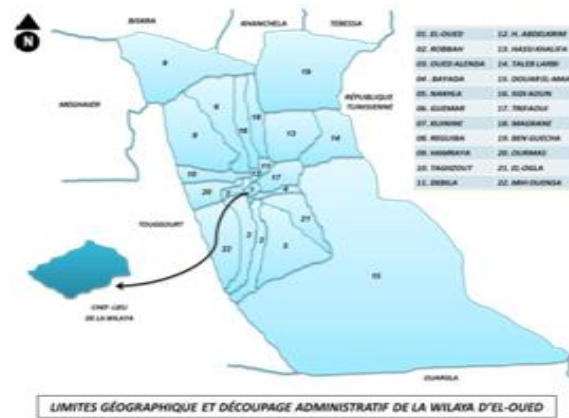
The province of El Oued has a rich history with evidence of human habitation dating back to prehistoric times. The Souf region located along the great eastern Erg of the low desert and was inhabited, according to Ibn Khaldun by Zanata tribes. Romans and the Phoenicians ruins are found in several locations, including the famous Al-Uqla circle. However, the region prospered under the Muslim rule, led by Hassan bin Numan, with the emergence of the "Tarour" and the "Adwan" tribes who controlled this region. However, after the arrival of the French in 1872, rebellion against the occupier began led by al-Maqrani's brother and Abd al-Aziz ibn al-Haddad, followed by the Bouchoucha rebellion and continued until 1917 when al-Hashemi ibn Ibrahim proclaimed the Zawiya of al-Qadiriyya[30].

2.2.2 The site :

El Oued is located in the northeastern part of southern Algeria. It is bordered by Khenchela to the north, by Tebessa to north-east, by the wilaya of El-Mughir to the northwest and Tougourt to the west. Established as a province since 1984, its modern administrative division was restored in 2020, as it became Oued Souf without Wadi Rig, and thus includes only 22 municipalities and 10 districts. El Oued covers an area of 35,752 km², and has a population of 716,905 people (with a population density of 20.05 People per sq km). It shares a land border of 260 km with Tunisia [30], and includes

Talib al-Arabi constituency with three municipalities: (Talib al-Arabi, Douar al-Maa and Ben Qisha). This constituency covers an area of 21,569.60 square kilometers or 48% of the province's territory and had a population of about 29,490 in 2018, i.e., a density of 1.37 people per square kilometer.

2. Mat territory and had a population of about 29,490 in 2018, i.e., a density of 1.37 people per square kilometer.



Source : Source: Monograph of the WILAYA OF EL-OUED 2021

Figure1: Administrative boundaries and divisions of the wilaya of El oued

2.2.3 Climate: Souf has a desert climate with large temperature fluctuations and a very low rainfall. In 2018, the total precipitation was 30 mm. summer temperatures reach up to 45 °C, while winter temperatures can drop to – 5 degrees Celsius.

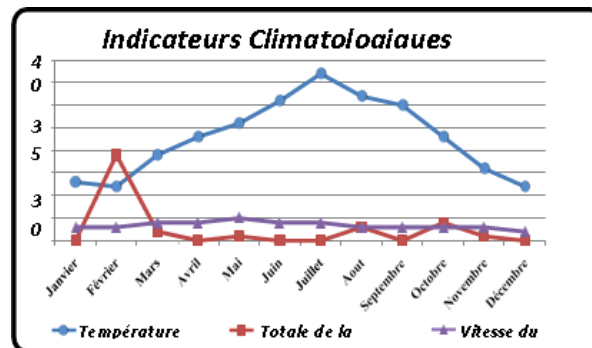


Figure 2: climatology indicator, Source: Monograph of the WILAYA OF EL-OUED 2021

4. Capabilities of the agricultural sector:

4.1 Population:

Total population of Soud is 716,905 people, with an active population of 441,915, and a labor force of 292,500 workers. Of these workers, 130,800 are employed in the agricultural sector with 80,700 being permanent workers.

4.2 Spaces:

Table 01: Distribution of agricultural land

Distribution	Area in hectares	percentage
The total area of the province	4 458 680	100%
The total agricultural area	1 768 900	39.7%

exploited agricultural area	100 000	5.7%
It has a watered area	92 000	92%
pasture lands	1 410 000	79.7%
Unproductive land destined for investment in agriculture	258 000	14.6%

3.3 Hydraulic capabilities:

The province of El Oued part of the northern Sahara groundwater system (SASS), which spans across Algeria, Libya and Tunisia. The total area of the system is estimated to be 01 million km² (Barkat et al., 2022): - with 70% coverage in Algeria, - 20% in Libya - 10% in Tunisia. The water direction in the SASS system is from the south to the north. The SASS system has an estimated water storage volume of 40,000 billion cubic meters per year, and a production capacity of 5 billion cubic meters annually for drinking water and 50 million cubic meters for irrigation. Since the province is located within this water system, it contains several aquifers, which are as follows[31]:

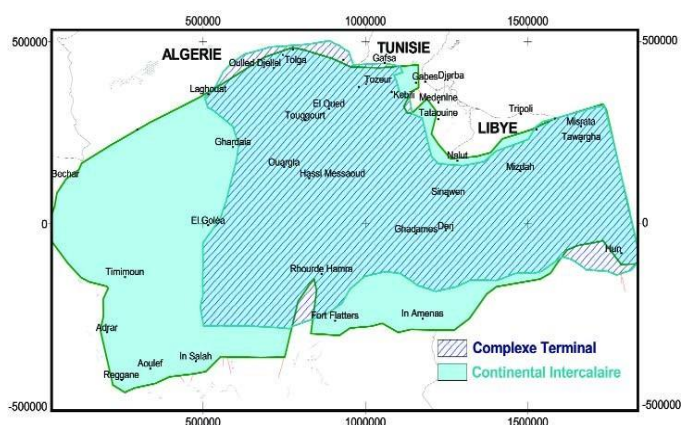


Figure 3: Aquifer system of the Northern Sahara (SASS)

3.3.1 Groundwater: the final compound CT is the most commonly used due to its proximity to the surface, with an average depth of 300 meters and an average water flow of 40 to 50 l/sec. The water temperature reaches 20°C and its salinity ranges from 04 to 06 g/l. The terminal complex contains 03 three layers: Mio-Pliocene, Eocene, and Senonian Carbonate, up to a depth of 600 m[32].

3.3.2 The aquifer of the terminal complex (CT)

The formations of the terminal complex are very heterogeneous and include the permeable layers of the Senonian limestone and the Mio-Pliocene. Three main aquifer sets can be distinguished, separated locally by semi-permeable or impermeable horizons. These sets are represented by limestones and dolomites from the Senonian and lower Eocene, by sands, sandstones, and gravels from the Pontian, and by sands from the Mio-Pliocene. The depth of the terminal complex is between 100 and 600 meters with an average height of around 300 meters. The static level varies between 10 and 60 m and the water salinity is 3 to 6 g/l. It is exploited by 129 boreholes throughout the province, including 84 in the study area. According to the inventory of boreholes and a survey of the flows extracted from the wilaya of El Oued[33], some of them show a slight Cartesianism in the northern part[34].

3.3.3 The continental intercalary (Albian) aquifer (CI)

The formation of the continental intercalary is represented by sandy-sandy and sandy-clayey continental deposits of the Lower Cretaceous. It is a multi-layered aquifer system with a depth that locally reaches 2000 meters[35] and a height that varies between 200 and 400 meters. It is exploited by two artesian boreholes for the drinking water supply of El Oued (1850 meters for the F1 borehole). [33]The pressure at the head of the borehole is 22 to 23 bars, and the artesian flow rate is 222 liters per second, at a temperature of over 60°C and a dry residue of 2 to 3 g/l. The continental intercalary aquifer is recharge by infiltration of precipitation on the edges of the basin, all along the wadis that descend from the mountainous massifs, in particular from the Saharan Atlas in the north-west and from the Dahar in the east. Runoff at the edge of the plateaus can also contribute to the replenishment of the water table on the edge of Tademat and on the edge of Tihert[36].

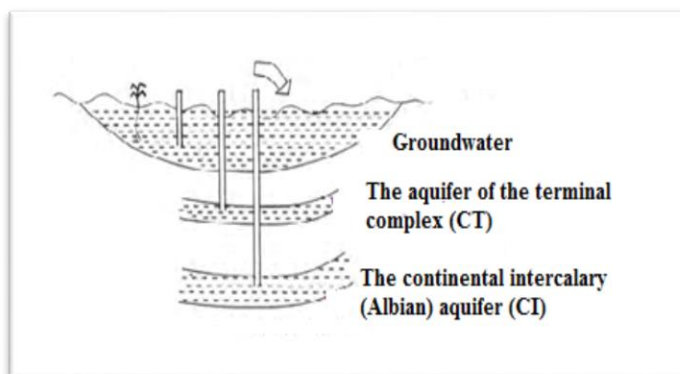


Figure 4: Map of aquifer water resources of CT and CI

4. Development projects in the field agricultural land

4.1 Acquisition of real estate property through reclamation - A.P.F.A

The Act No. 83/18 dated 08/13/1983 grants the right of ownership to the parties who have reclaimed it. The state recognizes the right of possession of land ownership for every citizen who undertakes the reclamation process according to applicable legal frameworks.. Since the implementation of this law, 115 612 hectares have been distributed to 22 684 beneficiaries[12]. In addition to the procedures stipulated in the joint ministerial circular No. 402 dated 08/06/2011 includes administrative settlement.

4.2 Agricultural concession

115 612 hectares were distributed to 22 684 beneficiaries, and under the general framework of the Ex CGA, 33 perimeters with a total of 8702 hectares were distributed to 1650 beneficiaries. Additionally, 8 perimeters were distributed under the Grand Works Program, Furthermore, according to the Joint Ministerial Circular No. 108 of 02/23/2011, 117 perimeters were distributed totaling 133,929 hectares were distributed to 2,343 beneficiaries[12].

Under Law 03/10 of August 15, 2010, which specifies the conditions and modalities of agricultural lands belonging to the private property of the state, the permanent usufruct right was converted into a concession right. About 2,653 contracts were signed for an area of 2,930 hectares.

Additionally, within the framework of the joint circular 1839 of December 14, 2017, about 32,000 hectares were distributed for the establishment of new agricultural perimeters.[12].

4.3 Programmes de développement du secteur agricole à Oued Souf :

In Oued Souf, the total amount of state support for various agricultural development programs from 2000 to 2017 is estimated at 22 billion DZD.

This includes the FNDIA/FNDA Agricultural Support Programs with a total of 9.4 billion DZD. A set of operations has been accomplished, including the planting of 8872 hectares of date palm, 1738

hectares of olive tree, establishing 2575 greenhouse, 2423 surface wells, 577 medium wells, equipping wells with electric pumps (6481 pumps), 4190 irrigation pools and a spraying and drip irrigation networks covering 15,300 hectares.. Additionally, 55 cold rooms, 20 olive presses, 10 date conversion units, and five date packaging units were completed. Other accomplishments include the provision of 157 agricultural tractors with attachments, 80 harvesters, 145,200 quintals of mineral fertilizer subsidy in 2016, and an energy subsidy for 23,795 hectares[12]

5. Discussion

5.2.1 Data Collection and Analysis Tool:

We collected information using a corresponding form that was modified and formulated into its final form. The form included three main sections: general information about the farmer, information about the female investor, and indicators of sustainability in its environmental, economic, and social dimensions. We used the SPSS program to analyze the data and the ARC GIS program to map and locate the study sites after uploading coordinates using a GPS device.

5.2.2 Community and Sample:

The field survey included 120 samples from five municipalities in the wilaya of OuedSouf (Hassi Khalifa, Tarifaoui, Ourmes, Reguiba, Taghzout), which occupy the top ranks in terms of production, particularly potato production with 70% of Souf's overall production. The samples were taken randomly and the field study lasted 27 days. Five days were devoted to collecting data from various actors in agriculture and 22 days (2 x 11 days) were spent interviewing farmers on their farms.

Table 2: Classification of municipalities according to vegetable production

Department	Municipal	Ranking	Area (Ha)	Percentage (%)	production (quintal)
Hassi khalifa	Hassi khalifa	1	6 580	19,9	2173000
Hassi khalifa	Trifaoui	3	4 620	14,1	1527000
			11200	34	3 700 000
Guemar	Ourmes	2	5 417	16,4	1 788 216
Guemar	Taghzout	5	2149	6,5	710 150
			7566	22,9	2 498 366
Reguiba	Raguiba	4	4 200	12,7	1 392 000
			4 200	12,7	1 392 000
rest of the 2)municipalitis (5		6	10 034	30,4	3 299 634
			10 034	30,4	3 299 634
			33 000	100	10890000

5.1 The relationship between the age of farmers, their educational level and their experience in farming.

According to the data recorded in the table below, 64 farmers have 10-20 years of experience in agriculture and are between the ages of 31-41. Of these farmers, 17 have an elementary education

level. There are also 31 farmers with less than ten years of experience who are between the ages of 31-41, with 11 having an elementary education level. Additionally, 23 farmers have 11-20 years of experience, including nine with an elementary education level. Finally, 19 farmers with more than 21 years of experience have an elementary education level and are between the ages of 31-41. From these results, we can conclude that the predominant age group of farmers is between 31-41 years old and that the predominant education level for this group is elementary.

Table 3: The age of the farmers, their level of education, and their agricultural experience

Age of farmers * Your education level * Experience of farmers Crosstabulation								
Count								
Experience of farmers			Your education level					Total
			illiterate	Koranic school	primary school	secondary school	university	
1-10 years	Age offarmers	20-30		1	0	1	0	2
		31-41		0	11	3	4	18
		42-52		0	5	1	0	6
		+53 years		2	2	1	0	5
	Total			3	18	6	4	31
11-20 years	Age offarmers	20-30	0	0	3	0	3	6
		31-41	0	0	17	5	6	28
		42-52	2	1	9	8	3	23
		+53 years	2	1	3	0	1	7
	Total		4	2	32	13	13	64
+ 21 years	Age offarmers	20-30			3	0	0	3
		31-41			9	2	1	12
		42-52			6	0	1	7
		+53 years			1	0	0	1
	Total				19	2	2	23
Total	Age offarmers	20-30	0	1	6	1	3	11
		31-41	0	0	37	10	11	58
		42-52	2	1	20	9	4	36
		+53 years	2	3	6	1	1	13
	Total		4	5	69	21	19	118

6.2 Geographical affiliation of the peasants:

As indicated in graph No., the vast majority (99.17%) of surveyed farmers are from the Souf Valley region. This high percentage suggests that the farmers included in the study are likely to possess a strong understanding of the region's natural conditions. Farmers

6.3 practicing a professional activity outside of agriculture:

6.3.1 Labor

With the advent of pivot irrigation and the expansion of field farming, agriculture is no longer limited to Ghout. This has led to the emergence of a new agricultural system that requires both seasonal and permanent labor. According to the field study, production in all farms now exceeds family consumption and extends to agriculture for marketing and even export to international markets. As a result, there is a demand for labor during various stages of the agricultural season,

from planting to harvesting and post-harvest operations. The study found that 100% of the agricultural investments in the sample employ labor, indicating that modern agriculture has created and provided a large number of both seasonal and permanent jobs for both skilled and unskilled workers.

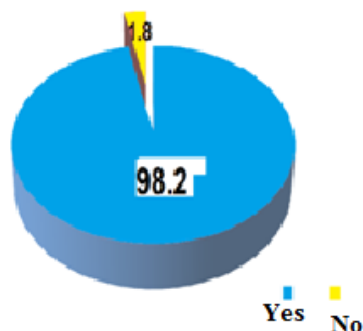


Figure 6: showing the percentage of employment in agriculture

6.4 Legal status of the exploitation

According to the figure presented, it can be observed that the combined percentage of APFA (35.83%) and CON (11.67%), totaling 47.5%, constitutes nearly half of the results from our field study. This indicates that a significant proportion of the population has benefited from province-managed programs, leading to the creation of job opportunities and increased activity within the agricultural sector. Over the past decade, this has resulted in the region becoming a national leader in plant production.

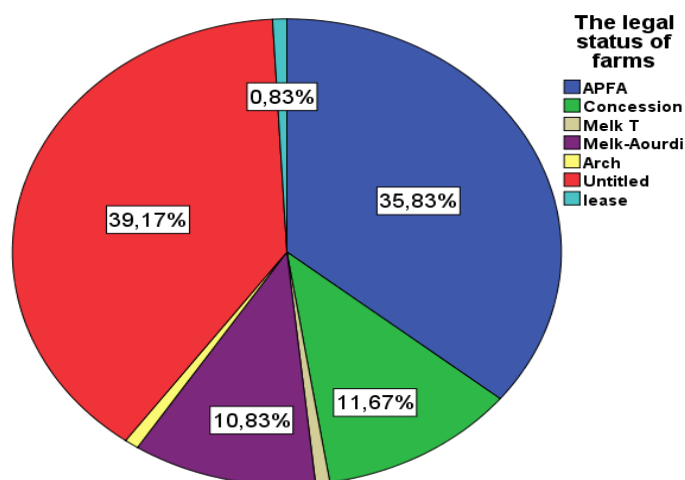


Figure: 7 legal status of the exploitation

7. Conclusion

Based on the data obtained from various departments and directorates within the state of OuedSouf, as well as our field study, it is evident that the state-managed development programs have significantly contributed to the growth of the OuedSouf region. As a border region, this growth is reflected in a rate of +7.47%, with an estimated agricultural product value of 191.2 billion DZD. This accounts for 6.4% of the GDP and ranks second overall. In terms of total quantity and agricultural product, OuedSouf occupies the first place nationally, with field crops such as potatoes and industrial crops including peanuts and tobacco being particularly prominent. The region also ranks second in date production. The agricultural sector within the province has experienced rapid expansion in terms of area, production volume, and product value.. This pace requires us:

- Keeping pace with the needs of the sector in terms of necessary development projects.
- Considering the introduction of other strategic crops, whether food or medicinal crops, especially water-saving ones
- Maintaining the province ranking by intensifying the province has reached efforts through collaboration with professional organizations, universities, and relevant institutions. This necessitates coordinated action among all stakeholders in the field of agricultural development to achieve the desired goal of developing border regions and promoting stability at all levels. Furthermore, this will contribute to improving the country's food security and reducing economic dependency on food imports..

9. Recommendations

Increasing the provision of electricity and agricultural land to meet demand.

Increasing cold storage capacity.

Addressing the issue of insufficient storage capacity for strategic grain crops at the Cereals and Pulses Cooperative (CCLS).

Increasing the number of national technical institutes to provide better support to farmers.

Establishing a regional directorate for the Bank of Agriculture and Rural Development.

Resolving the problem of agricultural land ownership.

Considering the inclusion of solar energy equipment in the support schedule.

Developing a special program to conserve and develop camel resources.

Encouraging investment in the valuation of products with high production levels.

Promoting the production of various plant seeds at a national level.

Making agriculture more sustainable from an environmental, economic, and social perspective.

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