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DEVELOPMENT OF URBAN EXPANSION AND ITS IMPACT ON PALM OASES IN BISKRA CITY, NORTH-EAST OF ALGERIA

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ABSTRACT

The city of Biskra as the capital of the Ziban is going through an urban growth issue especially the unplanned urbanization, which became a cause and consequence of the majority of problems which the city currently endures whether planning, urban, or demographic...etc. The expansion that this historic city witnessed at first was unplanned extensions of new buildings constructed on the expense of the agricultural area distinguished by palm forests. Since this study aims to demonstrate the extent of the urban sprawl of the city, its effect on the palm oases, and the efforts made by the state to preserve them, the approach used in this study is the analytical descriptive approach through describing the expansion of the city by different stages in time and analyze the impact of this expansion on the richness of palm trees, we also relied on the comparative approach. Among the most important findings, the city of Biskra has benefited from several plans especially the construction and reconstruction master plan, although these the main purpose of the plans was to control the housing crisis, not restoring the oasis character of the city.

Keywords: Urban sprawl, Urbanization, Palm forests, planning schemes, Agricultural support.

1. INTRODUCTION

The city is a human institution that must be organized and managed for the realization of the social harmony and the conformity of the living conditions of its inhabitants (The Preparation and Planning ministry, 1994, P.240).

As indicated in the Arabic City Magazine (1998) (cited in Ghouizi ,2016), this century is called the cities' century, due to the high urban growth which is known by its increasing rates of cities' inhabitants, leading to the development of their number in the whole world. In 1900, the urban population reached two billion and 400 million, and by the year 2025 this number will be doubled to make five and a half billion people (p.2). Moreover, the modern city not only serves as a place just for population gathering and consumption, but also plays a significant role in the social production and the environmental pollution through the agglomerations (Ding & Peng, 2018; Riffat, et al. 2016; Stren, et al. 1992).

Kenneth(1985) (cited in Qabha 2014) asserts that the problem of urban sprawl at the expense of agricultural lands is considered as a major difficulty that all countries around the world are suffering from, especially those characterized by fast increased rates in population. Particularly, the developing countries are facing the challenge of this phenomenon because of

their higher rates of population growth, which resulted a great pressure on resources specially the agricultural lands surrounding the population agglomerations (p.20).

The metropolitan expansion is not limited to a group of countries, but all countries of the world are characterized by it in general. The studies indicate that the United States of America is losing yearly about 400 thousand hectares of agricultural lands as a result to its exposure to the urban sprawl between (1972-2000) (Abdelkader, et al., 1989).

Algeria is among the countries that its cities witnessed a huge activity of population directly after the independence, distinguished by the migration from some cities or some adjacent municipalities to others. Managers found themselves faced with big problems that are difficult to control, represented through emergence of random residential expansions in the majority of cities' outskirts which resulted a rising pressure on the different facilities (Lemkhalti, 2009, p.12).

The urban texture in the Algerian Saharan cities is distinguished from others with the Saharan palaces built adjacent to the palm oases, and these factors formed collectively a local urban heritage that gave these cities their urban identity.

However, as stated by Khalifa (2009) (cited in Mekhatri & Hattab, 2015), recently, as a result to a lot of considerations and variables the Saharan cities have experienced a series of transformations especially those in relation to the urban aspect, since today's Algerian Saharan oases is no longer the same as they were in the past.

The existence of Biskra is deeply rooted in history, where its land had been through many civilizations starting from the stone age, going through the Roman Era then the Islamic conquests, subsequently the French invasion and therefore the independence; It is considered as a liaison between the north and the south, known as "the portal of the Algerian desert". It is also characterized by fruitful climate and terrain. So, these factors contributed to the great interest given to Biskra city through phases and ages over time, consequently, we decided to raise the following problem:

How was the urban reality of Biskra city constituted? What is the extent of the urban sprawl impact on the palm oases? What are the most important listed plans the land-use planning of the city on one side and the preservation of palm richness on the other side?

The potential answers to these and other questions are that Biskra is a city formed throughout many stages in its history, the most significant are the French occupation and the independence. The stage of the independence witnessed an unplanned urban growth as a cause and consequence to the most of the problems that the city is currently experiencing, the most prominent is the urban sprawl at the expense of palm oases, which leads the local authorities to set out several land -use planning on one hand and to increase date palm trees on the other hand.

2. Theory and methodology

the objectives of this research are to highlight the urban sprawl of Biskra city which is the pillar for every orientation process management of the growth of the city to avoid the spontaneous

urbanization and also to protect the agricultural lands especially palm forests .Moreover, the adopted approach in this research is the analytic descriptive approach by describing the urban reality of the city and analyzing the results of this expansion particularly at the expense of agricultural zone of the city.

The adopted approach is the analytical and descriptive approach which is appropriate to this study, where the urban phenomenon was described and the current reality of palm forests was analyzed and the affronted problems were identified and also connected to the urban development of the city; we also relied on the comparative approach in order to compare the urban and agricultural reality of Biskra city with what it used to be in the past, using a group of different references represented by research papers, university theses, various statistics released by diverse local authorities such as the Directorate of Planning, Programming, and Budgetary Follow-up, and the Directorate of Agriculture, additionally , city plans from different years and aerial photographs of Biskra city have been used as information resources. Moreover, information and data have been analyzed and used to set the appropriate strategies and convenient policies to maintain the palm oases and develop them.

2.1.The geographical field of Biskra :

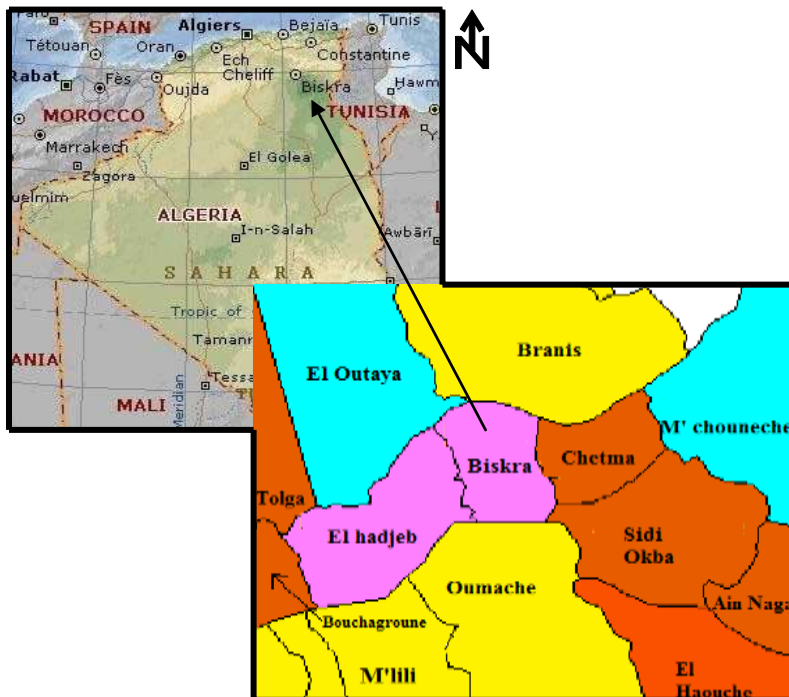
The strong and permanent connection between the urban center sites and the functions they provide has compelled to clarify its characteristics according to the field of study which is situated in the northeastern of Algerian territory , as the city of Biskra is located in the foothills of the Aures mountain cluster that serves as the natural boundary between the city and the north, where we find mountain ranges on the western side and plains on the eastern side ; it is a lowland area which mainly made it earn the presence of national road N°03 linking between the cities of Biskra, Batna and Constantine, along with the national road N°31 linking Biskra and Arris , as well as the national road N° 46 linking Biskra and Algiers, and also the national road N°83 linking Biskra and Tebessa(Directorate of Planning, Programming, and Budgetary Follow-up, 2018, p. 04).

In addition, it also benefits from the railroad line crossing the west of the city linking between the North and the South .Besides, the international Airport of Mohamed Kheider situated in the south of Biskra city made its location of great importance and allows it to fulfill dynamism in the domain of economic exchanges and increases its regional importance as well.

We also indicate that Biskra city is considered as a strategic linking point where the most important major axes meet, contributing to the revitalization of the field and the territory as a whole; which made it acting like a link between the North and South of the country and also increases the necessity of taking care of its urban entity and the potentials of its expansion (Directorate of Reconstruction, Construction, and Architecture, 2016, p. 09).

The city of Biskra administratively belongs to the district and the province of Biskra. It is bordered by the municipality of Branis to the north and by the municipality of Oumache to the south, by the municipality of Chetma to the east and by the municipality of Elhadjeb to the west; it occupies an area of 127.70 km².

Map N°01: The administrative location of Biskra city. (Meguenni-Tani, 2013, p. 2)



2.2. The Emergence of Biskra city:

The emergence of the city of Biskra is closely related to the history of the Ziban, it has always been and remains its capital; because all the periods that have passed and woven its history, had left many effects on this whole region (Laati, 1984, p.12).

To understand the composition of its urban reality, its historical evolution should be drawn in several stages, because through the historical study, we can explore the stages of its growth, as the present is an extension of the past (Ghanem, 1999, p. 23). The city of Biskra has known since its emergence to present several stages of its urban growth and this is illustrated by the witnessing monuments (prehistoric landmarks, roman ruins, Islamic antiquities and lastly the French monuments) (Bouzeghaia, 2003/2004, p.95-96). Furthermore, the original name of the city of Biskra remained disputed among the historians whether Arabs or foreigners. Some of them confirm that its name is derived from "Vescera" the Roman originated word, which means the station or the commercial site due to its strategic location that enabled it to be a transit and a staying area between the north and the south; whereas others claim that it emerged from the ancient Roman designation "Besenam" a Roman name that represents the mineral source of the geothermal bath called Hammam Salihine (Guediri, 2008/2009, p.110).

3. RESULTS AND DISCUSSION

The Urban sprawl of the city of Biskra:

3.1. Urban sprawl during the French occupation:

The era of French occupation forms an essential stage as a result to its settlement nature and the changes that has occurred on all levels. The city was under occupation in 1844, after fierce resistance from the inhabitants led by Hajj Seghir al-Uqbi against the colonial forces led by the Duke Dumale (Directorate of Planning, Programming, and Budgetary Follow-up, 2018, p.18). Due to its importance and location it was considered a military zone in the year of 1878 AD as a fully empowered municipality by virtue of a ministerial decree. Perhaps the first

attempts of reconstruction and settlements were in the second year of occupation by building the military garrison camp of Saint Germain , the chosen place known as Ras Elma (Larbi Ben Mhidi garden nowadays) was not a choice by chance but a result of :“

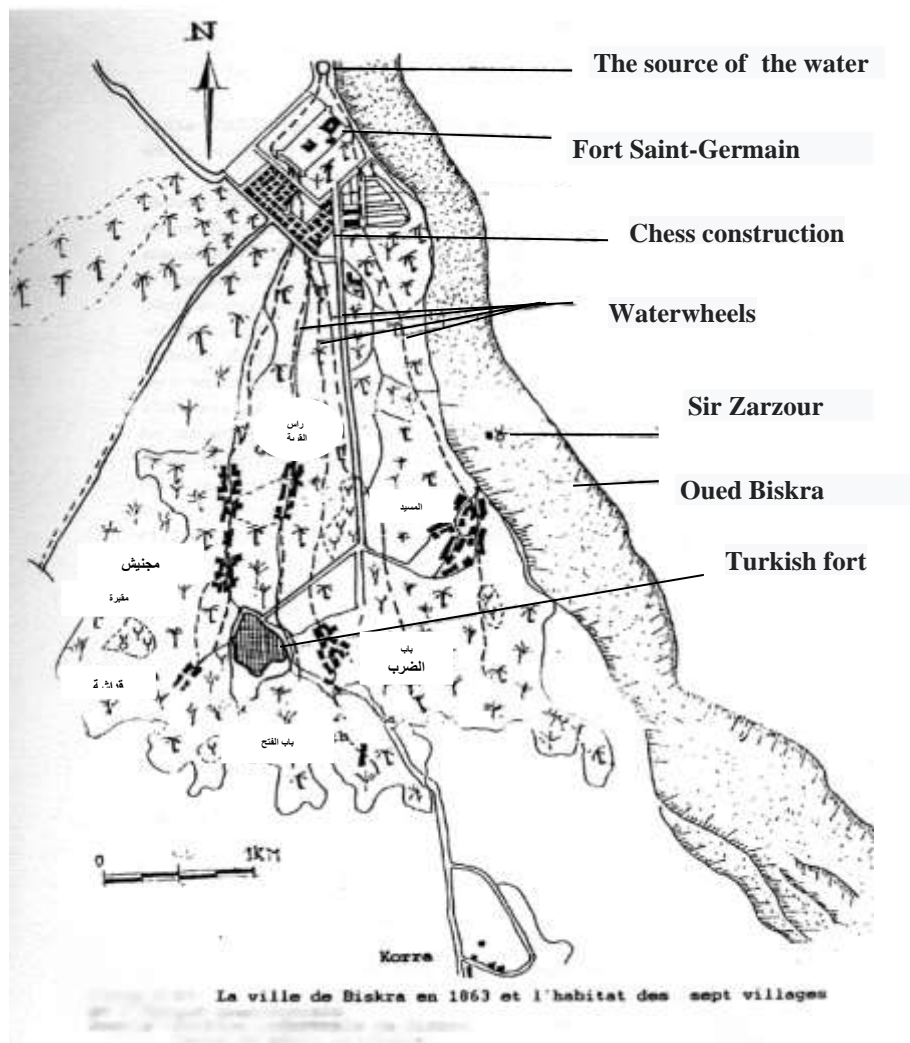
* Military conditions and requirements, "fortification in a military fortress similar to the administrative view of the previous Turkish regime."

* Water sources as a factor of power, dominance and control and the choice of this location comes under that perception since it is drinking water for the inhabitants and used to irrigate their lands.

* French soldiers did not socialize with the inhabitants as a racist position.

* This fortress is considered as the first step toward the rise of the new urbanism aspects.

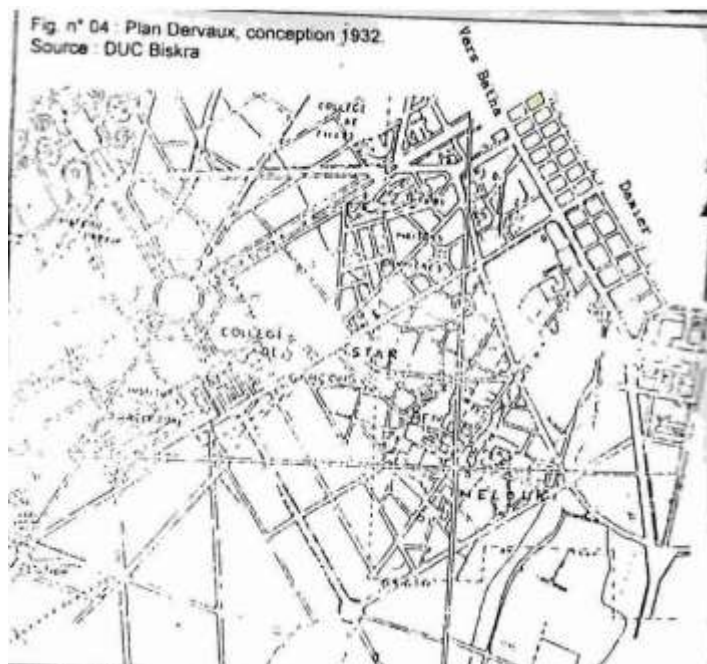
Plan N° 01: the city of Biskra 1863 AD (Directorate of Culture, 2019)+ the researcher treatment.



This period is characterized also with the beginning of the construction of the colonial chess board toward the north of the city, which depicted several projects; where the first school for the city was established in the year 1856 AD. The station and the railway line and many other facilities were also built such as: the City hall, the Desert hotel...

In 1932, the city of Biskra had its first development plan which is called “Plan Dervaux” that was implemented according to the laws 14/03/1919 and 24/07/1924 of the planning law of the cities. This plan suggests a coherent urban texture that intends to link the European city with the original one, in order to reorganize the mechanical cycle and establish a real city that contains tourist attractions like a public parks, a golf course with 18 holes, large streets, casinos and hotels... This project aims to transform Biskra city to a paradise for tourists . It was formed a broad geometric composition based on the lines first of all ; then taking the sewage of the old city into consideration.

Plan N°02: Plan Dervaux 1932 (Bouzaher Lalouani, 2015, p. 241)

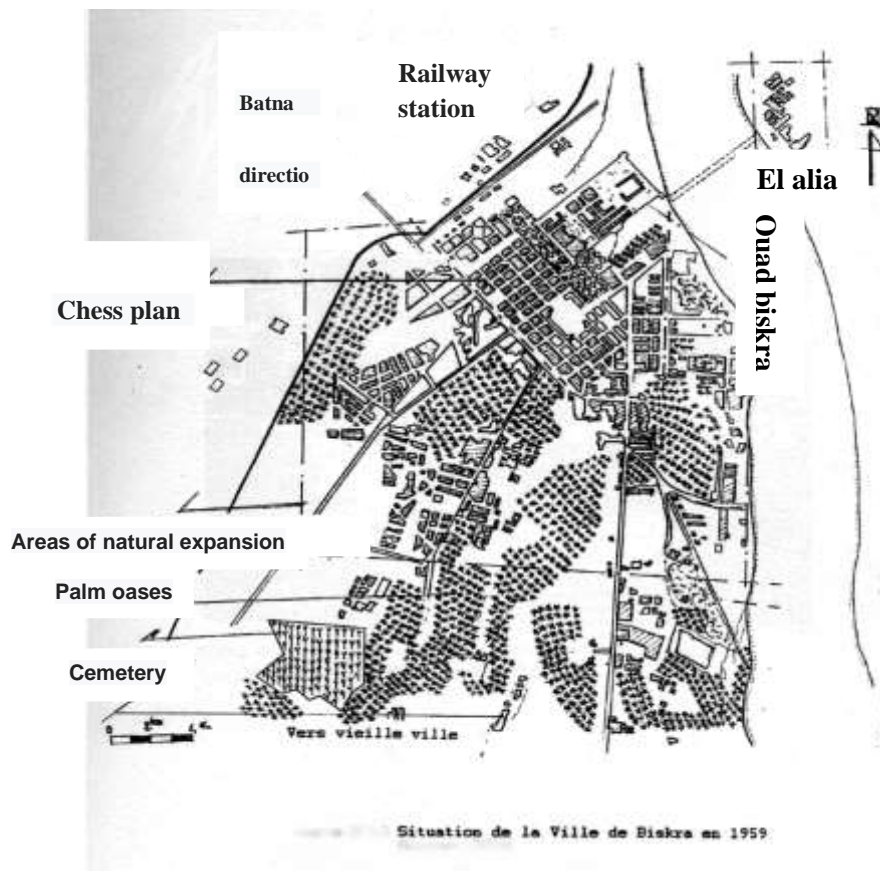


The new aspects of the architecture was represented in the significant neighborhoods of the French settlers with their European style and their urban chess plan (Maaouia, 2007/2008, p. 201) surrounded by popular neighborhoods made for the Algerians ; hence it was the beginning of the dualism phenomenon and the existence of two of the urban forms that one differs from the other.

The First pattern:

The French settlers lived in a modern city designed in a style of chess, which is characterized with intersecting and symmetrical streets, residential shops mostly unified in size, shape and space, as well as the use of building materials unknown to the region like the tiles and the cement, and all what this type carries in terms of health and urban techniques to ensure a better life for the French person.

Plan N°03: The Chess Plan Biskra City (Directorate of Culture, 2019)+ the researcher treatment.



Picture N°02: Biskra City the period of The French Occupation 1959 AD (Directorate of Culture, 2019)



Therefore, with a close examination of the provided plans about the French settlement in its beginning until now, we can find visible marks of a civic and urban field that the French do not adopted in their cities; but it indicates the presence of a human community in this place before their arrival. This is evidenced by the market square and the mosque next to it, where there is a leap in the geometrical grid of the chess planning which is the basis of the French city on one hand; On the other hand, it is believed that the data provided by the southern Turkish fortress, in terms of space, cannot be recommended to accommodate the huge number of inhabitants

mentioned by Alaayachi as well as the building and planning techniques that do not allow, at that time, the vertical extension. Additionally the northern Turkish fortress was not a symbol for the function only. Thus, the French city was built on the ruins of another city as it was ruled and managed by a social system that differs from the colonists.

The Second pattern:

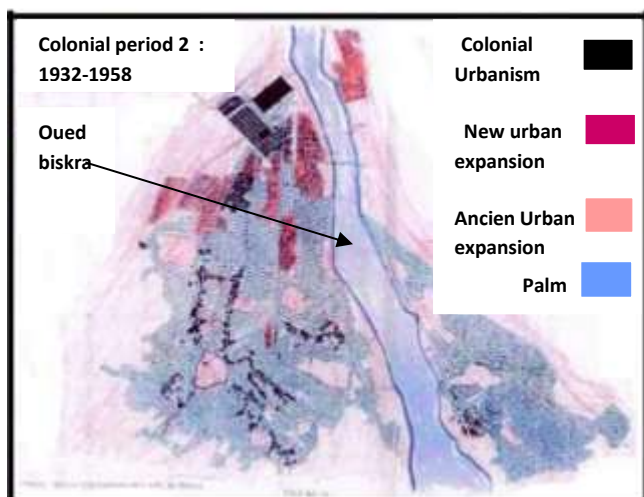
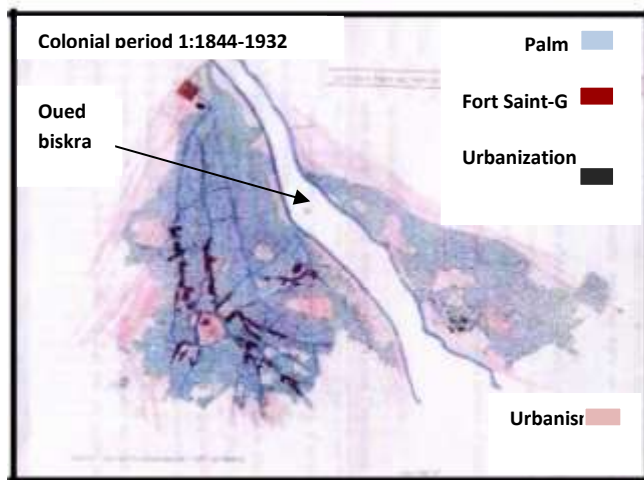
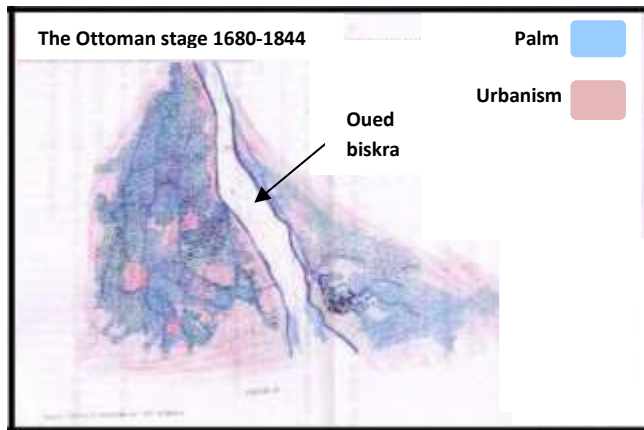
It is an old pattern in the seven societies. It is the water coming down the irrigation canals in the north side towards the orchards, at that time, extending over a large area of the city, as its formation and expansion are directed alongside those waterways which later turned into main streets that penetrate them, then branched off to secondary alleys ensuring the connection with the houses in a different way (Lebaal, 2003/2004, p. 189). It is noted that they are not subjected to any organized geometrical system but rather their form are characterized by the land distribution system, so it insure to each of them the possibility of supplying water through the irrigation canals, and the compact houses come along the waterway in order that the orchards remain behind and at approximate heights.

Picture N°03: The irrigation canals in Biskra city 1959 AD (Directorate of Culture, 2019)



Concerning the expansion of the city, the first building established in it, as mentioned before , is the Saint Germain Tower with the French arrival, and in the same year the four guard gates were set in the places known currently as Ben Malek Ben ElHassen School, Dhalaa Mountain, the water reservoir near the Christian cemetery, and the reservoir of ElAlia; in the following, there are plans clarify the urban sprawl of Biskra city from 1680 to 1958 AD.

Plans N° 04, 05, 06: The urban development of Biskra city in the period from 1680 to 1958 (Bouzaher Lalouani, 2015, p.270) + the researcher treatment.



The urban sprawl in the post-independence stage :

It is the stage that knew different policies and developments, which can be displayed through the following periods:

The first period from 1962 to 1974:

It is the immediate post independence period until 1974 which is the date of administrative division according to Order N°74/69 July 1974. Administratively, this period witnessed several

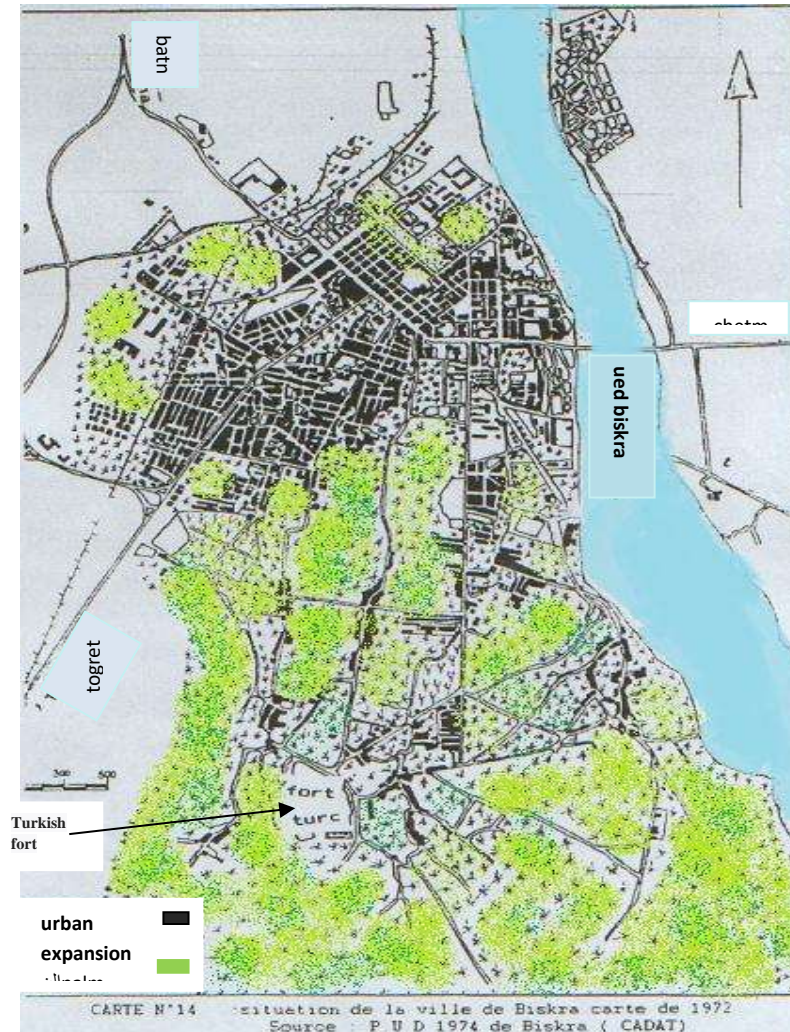
transformations, since from 1963, the city moved from the mixed municipality system by abolishing this kind of management and adopting the single law for the management of the municipalities. In this period, the expansion of the city took a random nature as it is a transitional stage, therefore it provided the absence of urban laws that rationally manage lands amenable to reconstruction. Then the expansion was proceeding rapidly due to the great demographic growth experienced by the city. So its population has doubled approximately three times. The expansion emerged in the neighborhoods that had been allocated by the colonist for the Algerian population during the occupation, and it did not touch the palm oases because their owners held on to their lands.

Therefore, the expansion of the city extended to the northern side despite that there were some buildings which started to emerge inside the palm forests but it was in a small proportion in comparison with what was built in the north side; while 85% of the total urban perimeter area of the city is represented by palm forests, the remaining 15% is represented by buildings. Moreover, the city witnessed an anarchic expansion, and in this period, single neighborhoods emerged far from the city center, which are: Feliach neighborhood which is situated in the south eastern side of the city which is characterized by its rural urban nature. Then, ElAlia neighborhood which is in the north eastern of the city and it was reserved for guards and servants who used to work for Ben Gana (an agent working for the French colonisation), so it was a disorganized neighborhood with narrow alleys and adobe buildings. While the third neighborhood is Sidi Ghezal neighborhood that started to emerge in 1969 in the form of an informal settlement in the southwestern side of the city. It is noted in this stage that it is the stage of the equilibrium of the city with the natural environment.

The second stage from 1974 to 2000:

This stage starts with the beginning of the seventies; it is called the urban sprawl stage of the city at the expense of palm trees (Maaouia, 2007/2008, p.204), so, many of the owners partially or completely had uprooted their palm trees for fear of being affected by the Agricultural Revolution Law. However, during the eighties, the Algerian state realized the importance of the agricultural heritage and the threat of the rural migration relevant to the rural population structure in their traditional kernel, and that is by launching regional economic development programs and launching housing projects. Although they faced the same problems of the inadequacy of these projects for the characteristics of the city, since these projects did not take into consideration the characteristics of the local communities, the ecological system of the oases, the climate, the classification of the local constructions, and above that they did not encourage the urban distribution, on the contrary they preferred the administrative and political centralization, and also they preferred the urban concentration which leads to speculation on the lands and palm trees, even today the palm oases are abandoned and sold. In the city of Biskra, this phenomenon were gradually begun to widespread to reach the largest districts of the province such as: Sidi Okba, Tolga. In the following, a plan explains the urban distribution of Biskra city during the year 1972 AD.

Plan N°07: Biskra city 1972 (Bouzaher Lalouani, 2015, p. 268).



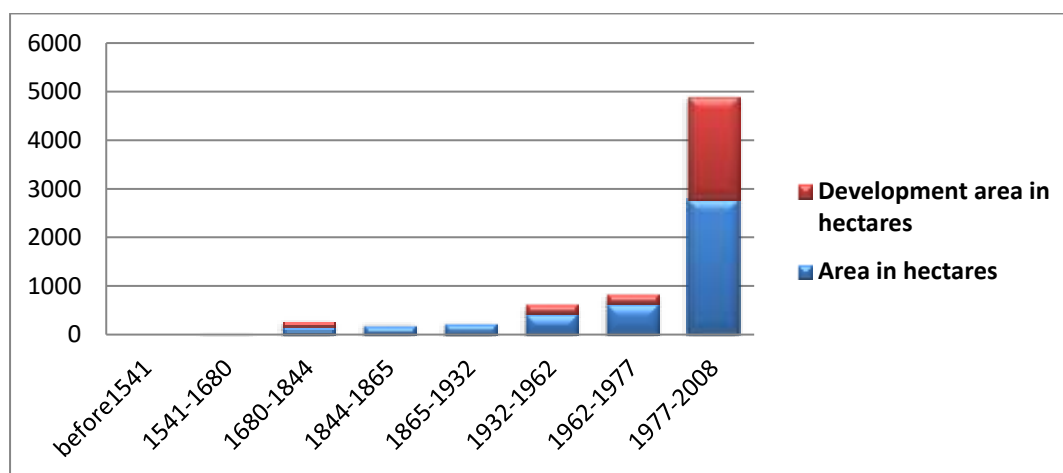
In the late nineties till nowadays, Biskra has continued its expansion towards the east and the west, as a result so many overlaps in constructions with adjacent municipalities (Chetma and ElHadjeb) occurred. Moreover, the center of the city expanded to the south; the following table shows the area of urban sprawl of Biskra city.

Table N°01 : The urban sprawl of Biskra city. (Bouzahzah, 2015, p. 168)

The period	The constructed area “Hectare”	The area of expansion “Hectare”
Before 1541	31.41	-
1541_1680	44.31	12.90
1680_1844	161.07	129.66

1844_1865	200.16	39.9
1865_1932	230.01	29.85
1932_1962	433.25	203.24
1962_1977	640.95	207.70
1977_2008	2778	2137

Figure N°01: The urban sprawl of Biskra city (The work of the researcher based on the table N°01 data)



The third stage from 2000 till today:

After 2000, a new environmentally inclined approach was introduced which includes integrating the sustainability dimension into city planning tools. It should be noted that the state pursued a policy in the various national developmental programs that Biskra city benefited from, and provided a considerable support to the agricultural sector that leading to positive results on farming in the region and in particular the palm forests field, especially the economic recovery program and the National Fund for the Agricultural Development, both have effectively contributed in the expansion of the agricultural area as well as the significant increase in the number of palm trees.

Among the major programs that the city benefited between 2000 and 2008 (Directorate of Reconstruction, Construction, and Architecture, 2016, p.115) is the National Planning Program for the Agricultural Development “FNRDA” (in French: Fond National de Développement Agricole) by executive decree N° 599 of July 08, 2000, and came within the framework of the state support for agricultural development and upgrading it. It is an executive program that

was launched in 2000 through a financial support benefiting the farmers only. The duration of the program realization is 05 years (2000 – 2005). It aims to develop the Agricultural sector and to invest in it. It was divided into two sections

The National Plan for Agricultural development and investment “FNDLA”: It came under the executive decree N°259 of May 22, 2006. It aims to realize private installations “investments”; its duration is one year.

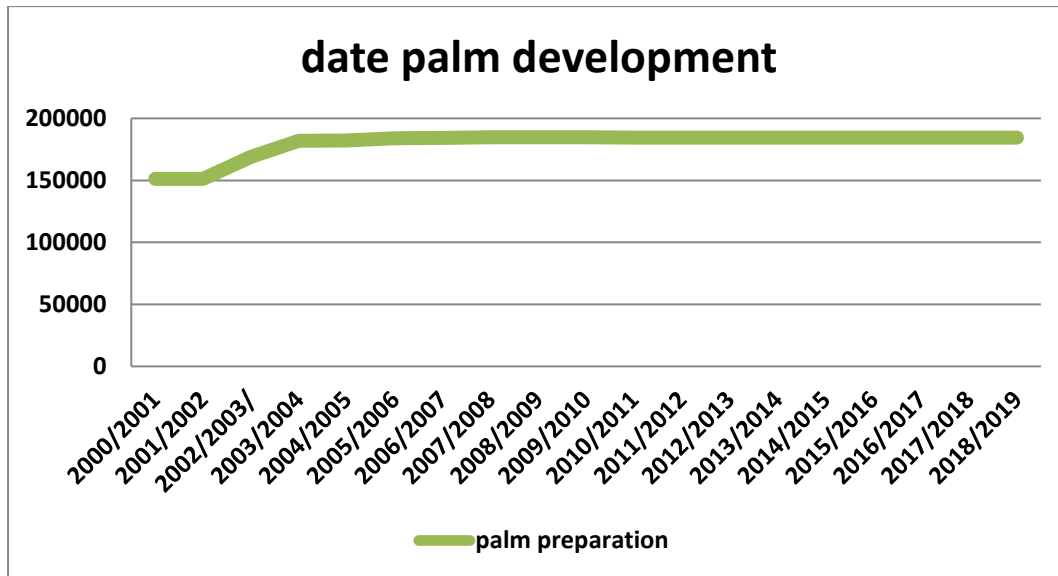
The National Plan for the development and improvement of the Agricultural production “FNRPA”: It came under the executive decree N°260 of May 22, 2006. It aims to improve the production. Its duration is one year.

The FNRDA (national fund for agricultural development and regulation) program includes individual projects that aim to support and develop the agricultural side at the first place by realizing the following: establishing cold rooms with a capacity of “500×4” M3 , drip irrigation, water basins with a capacity between 100- 150 M3 , and also craters and wells + restoring them if they already existed , and allocating spaces for growing fruit trees. Moreover, the following table shows the development of the palm tree number in Biskra city for the period from 2000 to 2019.

Table N°02: development of the palm tree number in Biskra city for the period between 2000-2019 (Directorate of Agriculture, 2020)

The year	The number of palm trees
2000_2001	151200
2001_2002	151200
2002_2003	169100
2003_2004	181800
2004_2005	182146
2005_2006	183980
2006_2007	184180
2007_2008	184770
2008_2009	184770
2009_2010	184770
2010_2011	184580
2011_2012	184580
2012_2013	184580
2013_2014	184580
2014_2015	184580
2015_2016	184580
2016_2017	184580
2017_2018	184580
2018_2019	184580

Figure N°02: development of the palm tree number in Biskra city (The work of the researcher based on the table N°02 data).



By extrapolating the table data, we deduce that despite the efforts provided by the state to protect the palm oases and develop them on one hand, and to implement the preparation and reconstruction master plan on the other hand in order to realize the principles of management and development, and also to find prospects for future expansion in light of the natural and human resources of Biskra city ,yet they have not achieved the goals. Whereas we find the demographic growth is rapidly and continuously increasing due to the natural growth and the rural migration which are not , matched by the same increase in the number of the palm date trees; and since 2011, the city did not witness an expansion in its oases, in contrast, we find a significant urban sprawl, as the city started to expand toward the east and the west direction, then it grew linearly along the national roads “03, 46, 31” and also started to grow spontaneously in an irregular way in the southwest direction.

Picture N°04: Aerial image of Biskra city 2020 (Google Earth 15-07-2020)



4. CONCLUSIONS

The urban sprawl of Biskra city and its impact on the palm oases:

The historical analysis of the urbanization process adopted by Biskra city and its urban sprawl has enabled us to highlight the following decisions:

Biskra was originally established according to the oases system, as the the green spaces “gardens and Palm groves” represented the largest part of the city structure , i.e. more than 90%, which definitely made Biskra city a pole of social and cultural attractiveness.

With the arrival of the French, the military fortress of “Saint Germain” was established on the northern boundary of the palm groves, in order to monitor the water resources in the area, but in reality it was an attempt to control the entire region.

The first southward expansion was created, starting from the military center, by establishing a colonial monitoring panel that represents the European city, designed to accommodate the large number of the settlers arriving to the region. This design meets the requirements and the planning of the modern city, with the implementation of “dervaux” plan, the centralization was moved which was applied at the level of the old city of Biskra, as a consequence the old center was marginalized in favor of the colonial chess board.

A road was constructed during this period, which links the European city with the original core city in the South, inside the palm groves ,as well as the expansion of the railways axis.

During the first years of the independence, Biskra experienced a large population growth which led to the expansion of its urban texture southward at the expense of the palm groves.

Starting from 1972, the situation changed with the implementation of the Agricultural Revolution Laws which caused the degradation of the lands and consequently selling them on a large scale for construction purpose.

A sharp deviation of the situation in the eighties led to the extension of the city toward the east and the west with the emergence of new methods; additionally the urban growth of the city became spontaneous, and could not be controlled in the absence of rational management. From the beginning of the seventies till today, Biskra continued to expand, to reach the nearby municipalities “Chetma, ElHadjeb”.

The Agricultural Support affected the palm forests in Biskra city; as a result there was a significant increase in the number of the palm trees, although this increase is not comparable with the population growth and the urban expansion of the city.

The city has benefited from several plans, the most important of them is the master plan of construction and reconstruction. The main aim of these plans is to control the housing crisis, not to restore the oasis character of the city.

For this reason , it is necessary to establish a project for the urban planning and the local development in order to encourage using palm trees in the city, as well as suggesting plans

projects to restore the palm groves and involve the officials in the agricultural sector in urban projects, and that is by the materialization of the local development in the restoration of the oases system as an instrument for the sustainable urban development which would be an economic project that generates a local workforce and could be Invested in the touristic aspect considering that the oasis is a touristic attraction factor since ancient times, more particularly, through planning the exterior spaces following the sustainable environmental development standards by establishing a local development program that takes into consideration problems and potentials of these spaces and aims to restore the urban environmental system of Biskra city.

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