

HOUSING AND SPATIAL IMPACTS IN ALGIERS PROVINCE 1984 - 2021: EASTERN REGION CASE STUDY

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Abstract: Algeria underwent expedited urbanization in response to a growing demand for housing. The study aims to identify the current housing situation in Algiers from 1984 to 2021 using official statistics and a field investigation of a sample of 600 households. The study also used Landsat 5 and 8 satellite images to analyze the development of vegetation cover in the province, so the results analyzed in SIG. This study shows that the built-up area has increased from 47.32 km² in 1984 to 81.34 km² in 2021, damaging the fertile Mitidja plain. Inadequate housing persists despite the rise in residential construction, and insecure dwellings are proliferating due to migration.

Key words: Algiers province, housing, vegetation index NDVI, Mitidja plain, Housing formulas, Precarious housing, migration

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INTRODUCTION

The housing problem is one of the most significant problems confronting policymakers worldwide, but the extent of its impact varies depending on the population, social, and economic regulations that control the two poles of the supply and demand problem (Lombard, 2023; Prayitno et al., 2023). Algeria's housing crisis is the result of a series of housing policies that lacked a clear and thoughtful strategy characterized by circumstance, resulting in a multi-faceted crisis characterized by a continuous shortage of housing supply in the face of increasing demand.

The procedures followed within the framework of the national reconstruction policies have resulted in radical changes in its urban composition (Ahlem and Zina, 2023; Djafri et al., 2019) and the emergence of different consumption patterns for urban space (Kadri and Khalfallah, 2023) that are experiencing rapid growth in all provinces, each with its own unique expansion, in conjunction with facilities for granting building permits and land plots designated for housing. This has contributed to the formation of an unregulated and non-harmonious urban scene (Djouablia et al., 2022), resulting in excessive space consumption, a reduction in the buildable area, and the impediment of agricultural land.

Therefore, the Algerian authorities have established several laws for real estate management, such as Reconstruction Law 90-29 of 1990, which liberalized the real estate market, introduced flexibility in its management methodology, and delegated the study and implementation tasks to private real estate agencies, in addition to encouraging private initiative and recruiting new means and systems for housing finance (Mihoubi and Boukhemis, 2021). This has made the housing production policy, especially in the state, a field for the diversity of actors from both the public and private sectors.

The National Urban Development Plan (SNAT) is regarded as the primary foundation for this law (Samir and Bouchareb, 2023), as it embodies long-term decisions regarding the planning and organization of the national territory over time horizons of 10–20 and 20–25 years. The Regional Urban Development Plan (SRAT) clarifies the national scheme's guidelines and principles (Hafsi et al., 2022). There are also local development plans that facilitate spatial regulation, such as the State Development Plan (PAW), Municipal Development Plan (PAC), Development and Reconstruction Orientation Plan (PDAU), and Land Use Plan (POS) (Chorfi and Madani, 2022; Naziha and Hassib, 2023).

Algiers has experienced remarkable urban expansion in recent decades as a natural result of rising housing demand (Bellout et al., 2020; Rabehi et al., 2019). The opening to the market economy that characterized Algerian public policy necessitated changes in housing and real estate policies, which resulted in the liberalization of the real estate market, with direct consequences for urban organizational structure. As a result, the capital and its suburbs have evolved into a dynamic

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urban area worthy of study and attention, whether it is related to major housing projects or housing programs developed by real estate promotion bureaus and large and medium private contractors. Housing patterns in the province's suburbs have varied, resulting in a wide range of urban formulas ranging from individual to collective, and from social to clavicular and even unregulated. As a result, urban sprawl has spread in all directions (Otmani et al., 2020; Souiher and Abdessamed Rezzaz, 2020).

The province of Algiers was chosen as a field for study and analysis because it contains the country's capital, which is considered the head of the national urban system and the first population center with a population of over 3 million people. The province of Algiers, like the other provinces in Algeria, has greatly benefited from special housing programs for collective housing as part of the province's efforts to overcome the housing crisis and organize the urban space.

Within the academic literature concerning the change of residential infrastructure in Algeria, many researchers have contributed to the discourse. Notably, authors addressing this topic include:

In their study, Yelles and Khalfallah (2022) investigated the influence of citizen involvement in initiatives aimed at mitigating substandard housing conditions in the deprived neighborhood of Sidi Slimane in the medium-sized city of Boussaâda located in the Algerian high plains. The author examined the effectiveness of such participation in programmatically addressing the issue of precarious housing. Following the end of the 1990s, a series of interventions have been initiated within this vulnerable district with the objective of ameliorating its residential atmosphere, such as the implementation of the Precaire Habitat Reduction program (PHR).

A recent examination conducted by Slimani and Raham (2023) have expounded upon the consequences of urbanization on the decline of agricultural land. This study was conducted in the city of Setif, and its findings confirm that economic activities are contributing to the rapid and unplanned urban growth observed in the area, and exacerbating the resultant environmental impact. Another study presented by Ali et al. (2023) proposed ways to organize space in the province of Algiers by balancing the building process while preserving the beauty of the landscape and nature.

We also have a study by Hind et al. (2022) that used satellite images to show the decline of agricultural areas and forests in the province of Algiers from 1987 to 2018. Predictions were also made for the changes in land use that will occur by the year 2040. The aim of this research is to examine the housing situation in the province of Algiers from 1984 to 2021, focusing on the impact of increased housing inventory and relevant factors on the spatial aspect.

The present discourse focuses on the causes and ramifications of arbitrary interventions that have impacted the spatial realm, as well as the salient factors that contributed to the expansion of housing units, including the phenomenon of intra-national migration. The present study aims to ascertain the effects of urban expansion on the vegetation cover and the attendant issues that ensue, such as the emergence of pre-existing and unregulated settlements as well as illegal abodes that impose unaesthetic encroachments on the space of Algiers which are deemed imperative to be eradicated.

To demonstrate the urban metamorphosis transpiring within the Algiers province and its concomitant decrease in vegetation, we collected a study sample from three municipalities (Bordj El Kiffan, Bordj El Bahri, and El Marsa) in the eastern part of Algiers province in order to facilitate the field investigation process and distribute questionnaires. According to previous studies, these municipalities were chosen because they have seen growth in housing stock over the last two decades. Therefore, it was natural to inquire about these residents' original residence, the reasons that led them to migrate to these three municipalities, and the type of housing in which they currently reside. The focus of our inquiry pertains to the contemporary status of the housing industry within the province of Algiers, and the challenges arising from the influx of citizens migrating from other provinces, as well as the disproportional balance between the supply and demand of housing.

MATERIALS AND METHODS

Research methodology

To achieve the research objective, we adhered to a set of stages as follows:

- Introducing the study area and the most important changes that occurred in the housing stock of the province of Algiers;
- Identifying the new formulas of housing stock in the state with an explanation of their impact on the space;
- Analysing the results of the field survey that was conducted in the eastern part of the state in the three municipalities (Bordj El Kiffan, Bordj El Bahri, and El Marsa).

Initially, we approached various relevant departments and organizations, conducting interviews to collect data, including the Directorate of Urban Planning, Housing, and Construction (DUCH), the National Statistics Office (ONS), the National Institute of Maps (INC), and the Office for Promotion and Management of Real Estate (OPGI). These statistics were included in tables, graphs, or maps to facilitate analysis. We also utilized the Normalized Difference Vegetation Index (NDVI) calculated from a set of satellite images, LANDSAT 05 ETM+/Landsat 08 OLI, taken in 1984 and 2021.

The NDVI is used to display the chlorophyll activity of vegetation by utilizing the infrared band of the electromagnetic spectrum, where vegetation reflects the most energy that can be observed and recorded by a satellite sensor (Berger et al., 2020; Joiner et al., 2018; Martín et al., 2023). The NDVI determines a high value to areas with defensible and living vegetation, while a low value to areas without vegetation. The methodological approach, on the other hand, is based on calculating the index using the following formula (Huang et al., 2021, p. 3):

$$N_{DVI} = \frac{N_{IR} NIR - R_{ed} Red}{N_{IR} NIR + R_{ed} Red}$$

NDVI is normalized difference vegetation index; R_{ed} and N_{IR} are spectral radiance (or reflectance) measurements recorded with sensors in red (visible) and NIR regions, respectively. We distributed a set of questionnaires (600 surveys) to the residents of the three municipalities: Bordj El Kiffan, Bordj El Behri, and El Marsa, by distributing the questionnaires to three secondary schools. Generally, the questionnaire included 25 questions divided into three axes:

This is due to a decrease in the number of births, as many Algerian families have reduced the number of children due to the decrease in purchasing power, in addition to the factor of an increase in the age of marriage for women due to education and work, which has become a priority for Algerian women recently.

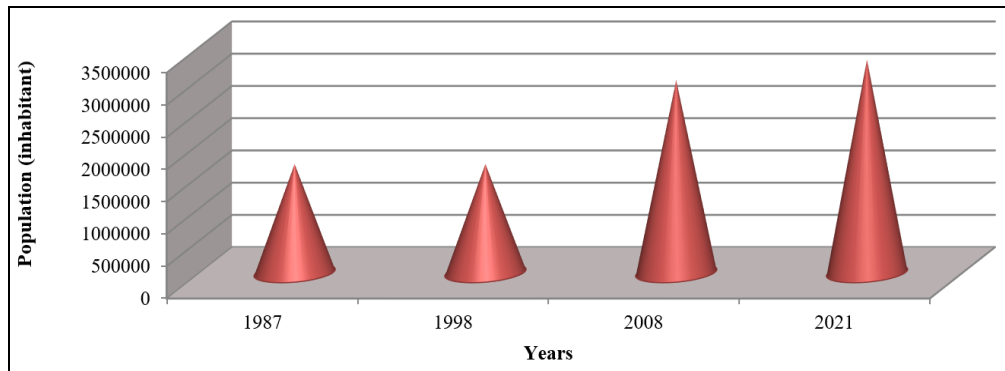


Figure 3. Evolution of the population of Algiers from 1987 to 2021 (Source: DPSB, 2021)

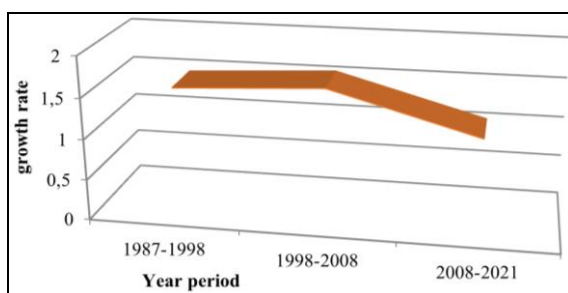


Figure 4. The population growth rate developed between 1987 and 2021 (Source: DPSB, 2021)

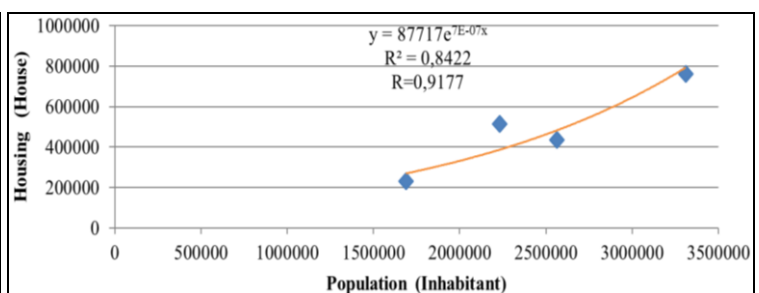


Figure 5. Correlation between the number of the population and the housing stock in the province of Algiers (Source: DPSB, 2021)

The housing stock in the province of Algiers witnessed rapid development between 1987 and 1998, with the number of housing units increasing from 233384 in 1987 to 435605 in 1998 and reaching 624738 in 2008. This increase was due to the availability of land for housing construction in the suburban administrative districts of the province, however in 2021, the number of housing units reached 760619 (DPSB, 2021). Through the relationship between population growth and housing stock in the province of Algiers, it becomes clear that there is a strong correlation of 91.77% (Figure 5).

As the population increased, so did the demand for housing. Given that the state of Algiers has experienced demographic growth due to natural increases and internal migration, the housing stock has increased. Figure 6 shows the gradual rise of the housing stock throughout the province of Algiers between 1998 and 2021.

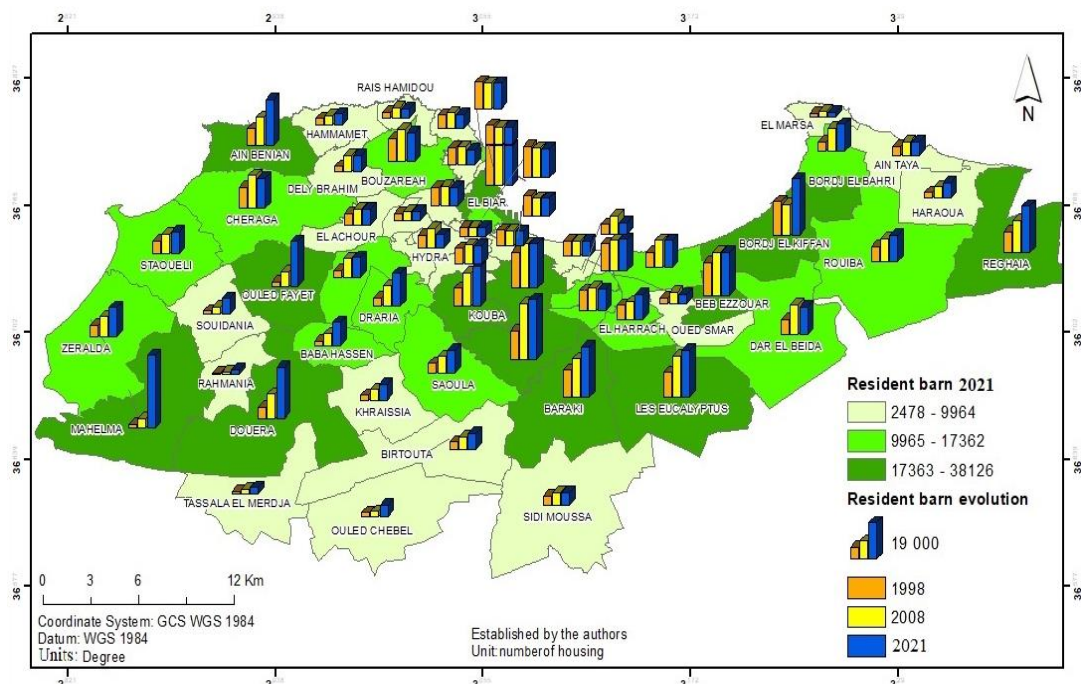


Figure 6. Development of the housing stock in Algiers from 1998 to 2021 (Source: DPSB, 2021)

This can be summarized as follows:

- Municipalities with a high increase in housing stock for the year 2021 range from 17363 to 38126. These include the municipality of Mahelma, which witnessed an increase in its housing units from 2033 in 1998 to 38126 in 2021. Additionally, there are Douera, Ouled Fayet, and Ain Benian in the western region, as well as Gue de Constantine, Bir Khadem, Kouba, Bab El Oued, Bir Mourad Rais, Baraki, and Douera in the central and eastern regions. We can explain this rapid increase in housing in the eastern and western regions by the desire of the public authorities to open up space for construction and move away from the coastal areas close to the Bay of Algiers. In recent years, important projects for building or housing have been recorded, such as public promotional housing (AADL, LPP). We will talk about this next.

- Municipalities with a medium level of housing stock ranging from 9965 to 17362 units in 2021 include Dar El Beida, El Achour, Staouali, and Zeralda in the western region, as well as El Harrach, Bourouba, Mohamedia, Bordj El Bahri, Rouiba, and Dar El Beida in the central and eastern regions.

- Municipalities with a low housing stock, where the number of units in 2021 ranges from 2478 to 9964. These municipalities include: Souidania, Rahmania, Tassala El Merdja, Ouled Chebel, Bir Touta, and Sidi Moussa in the southern region, Dely Brahim, Beni Messous, El Hammamet, Hydra, Raïs Hamidou, Oued Smar, and El Marsa in the central and eastern regions of the state of Algiers. In general, these municipalities have not experienced a significant increase in housing stock in the past decade due to their saturation and inability to accommodate additional housing because of the lack of real estate inventory. If found, the price of the property is very high, and a simple citizen cannot afford it.

It is worth mentioning that the rate of growth of the housing stock in the last decade is evidence of the public authority's determination to provide decent housing for citizens and to change its pattern to a civilized urban style. However, this has negatively impacted the vegetation cover in the province (Bellout et al., 2020). Especially since the province contains the most fertile plain in Africa, which is the Mitidja Plain. Thus, we observe the phenomenon of unregulated expansion on agricultural lands and random horizontal spread when construction lands are consumed before the deadlines set for them, impeding any urban expansion if the pace of reconstruction continues (Tahraoui et al., 2023). Figures 7 and 8 represent the growth of built-up areas, which have increased from 47.32 km² in 1984 to 81.34 km² in 2021. In 2021, the black dots will be growing, indicating an increase in housing stock. The NDVI vegetation cover index shows a reduction in vegetation cover. Green dominates the map's color in 1984, indicating that vegetation cover is spreading across the province. However, the green color on the 2021 map is shrinking and almost disappearing this is due to the urban expansion on the agricultural land in the province remaining only in the province's southern and eastern regions, which represent the airport area (Soulard et al., 2018).

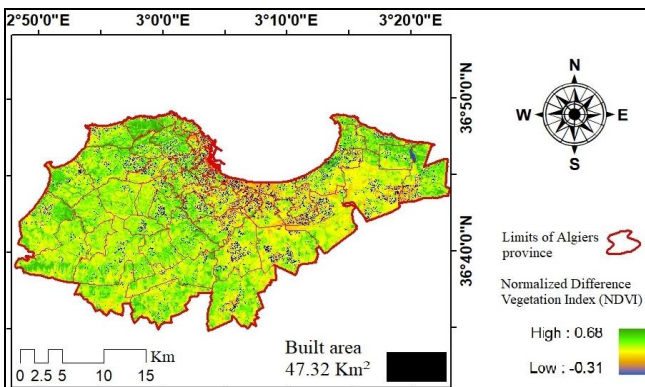


Figure 7. Algiers' urbanization in 1984 was compared with NDVI analysis (Source: Landsat 5)

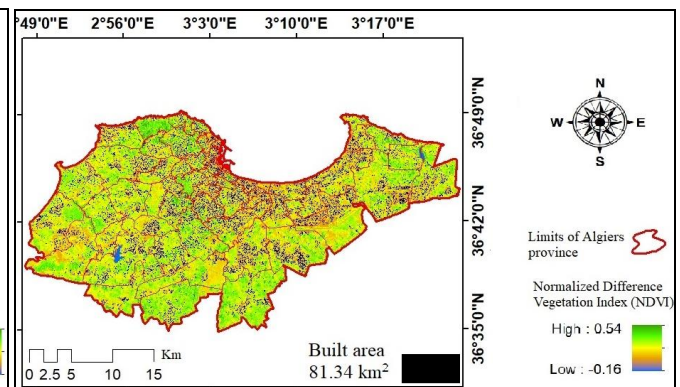


Figure 8. Algiers' urbanization in 2021 was compared with NDVI analysis (Source: Landsat 8)

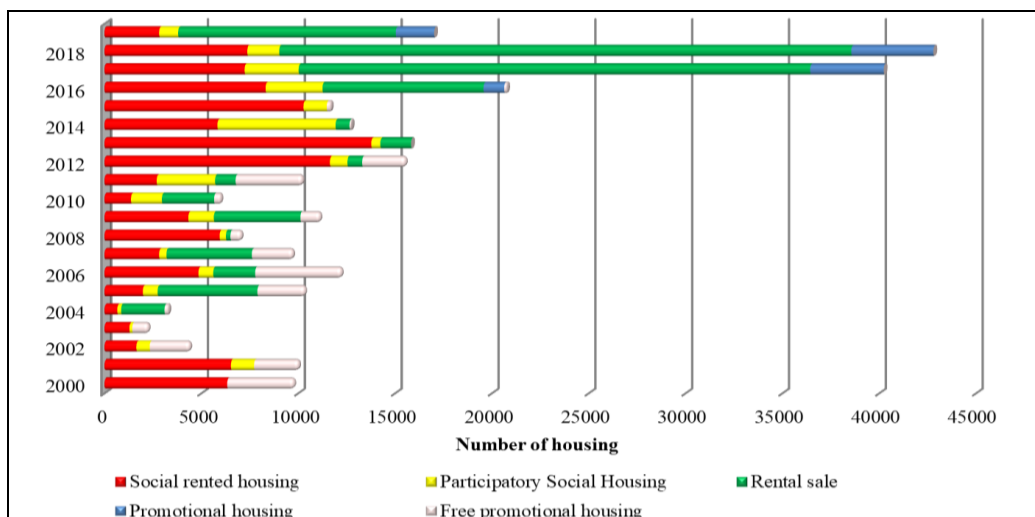


Figure 9. The development of housing stock types in the province of Algiers from 2000 to 2019 (Source: DPSB, 2021)

The province of Algiers has benefited from the various housing formulas because it is an attractive state for the population, so it must keep pace with the growing demand of the population. Figure 9 illustrates the evolution of urban housing in various formulas in Algeria between 2000 and 2019, with 286689 homes delivered. Prior to 2001, there were no formulas available, as housing shares were provided through social and self-construction, resulting in the delivery of 107787 social rented housing units and 27407 participatory social housing units. However, after 2001, an economic revitalization policy aimed at developing all sectors was implemented (Kheira and Rachida, 2021). We also observe the beginning of the release of housing units for rental sale, which began with 2241 in 2004 and reached a high of 29540 in 2018. In terms of the promotional housing formula, housing unit delivery began in 2016 and reached a total of 11084 units in 2019.

Despite the efforts of local governments to provide decent housing for residents, the phenomenon of precarious housing has spread. According to statistics compiled by the Ministry of Housing and Urban Planning's directorates, the number of precarious housing units reached 45480 in 2007 (Ben-Hamouche and Medjitna, 2021; Lamri et al., 2020), accounting for 8.21% of total precarious housing. Figure 10 illustrates the evolution of precarious housing in municipalities across Algiers from 1998 to 2021, with informal housing decreasing in 2021.

This observation is common in most municipalities and is due to the desire of local and national authorities to eliminate precarious housing. According to reports, massive relocation operations took place between 2014 and 2016, relocating 46000 families. In October 2016, 3000 families were relocated from Hafra neighborhood in Oued Smar and other capital municipalities, including Bab El Oued, Bordj El Bahri, Bordj El Kiffan, and Oued Smar. Seven major neighborhoods, housing over 7000 families, were relocated in May 2016.

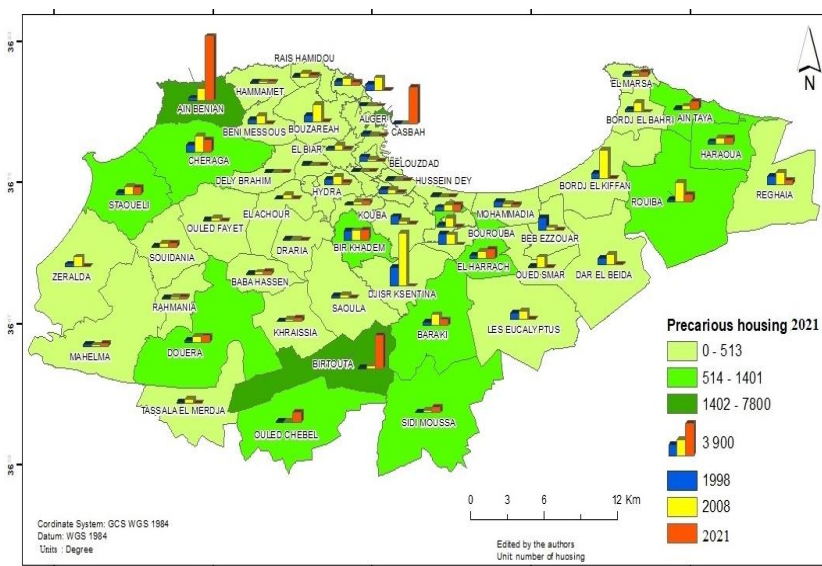
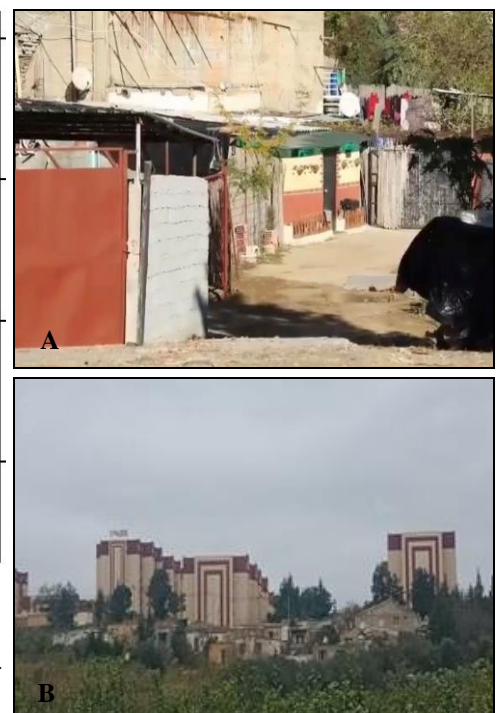


Figure 10. Evolution of the precarious housing in Algiers province from 1998 to 2021 (Source: DPSB, 2021)

Figure 11. Precarious housing within the neighborhood in the municipality of Staoueli (A), and near the buildings (B) (Source: Authors, December 2022)



It is also worth noting that the number of precarious housing units in the following municipalities has increased significantly in 2021: Ain Benian, Casbah, and Bir Touta. In Ain Benian, the number of precarious housing units has increased from 1497 in 2008 to 7800 in 2021. In Casbah municipality, the figure will reach 4500 by 2021, up from 87 in 2008. It can be observed that the number of precarious housing units has increased significantly in recent years in the western and southern regions of the state. In the past few years, the construction sector has been worked on and improved. This is evident in the map above. The increase in the number of precarious housing units can be attributed to several factors, summarized as follows:

- The resurgence of the phenomenon of precarious housing, due to the inability of low-income families to purchase or rent a proper housing unit, and thus these families found temporary shelter in precarious housing units with social characteristics.
- Living in a precarious housing unit has become a solution for many greedy people seeking housing units in the capital city, where they move from other provinces and live in inadequate ones in sensitive areas of major cities, especially in the absence of local government monitoring. They then demand adequate housing units in exchange for leaving the neighborhood.
- In reality, the municipalities that have seen an increase in precarious housing units after 2008 are either inadequate, which are tin houses that have been set up and inhabited due to the housing crisis and citizens' inability to obtain adequate housing units, or they are old, deteriorating buildings due to natural disasters and erosion factors.

The increase in the number of precarious housing units is considered a reflection of the weakness of municipalities in monitoring and following up on urbanization processes, which requires new approaches to alleviate the daily suffering of citizens. As Figure 11 shows, the mixing of promotional housing with tin houses tarnishes the overall view of the city, indicating the province's inability to meet the housing needs of its citizens. As a result, residents are forced to live in these shacks that lack the minimum standards for a decent life.

RESULTS AND DISCUSSION

The study sample consists of 600 families residing in the eastern part of the province in the municipalities of Bordj El Kiffan, Bordj El Bahri, and El Marsa (Figure 2), which have witnessed significant urban growth between 1998 and 2021. Through our analysis of the results of the field survey, we have concluded that:

1. The geographical origin of the study sample

The phenomenon of migration has been associated with populations since their existence on earth and has had an impact on societies. It is among the factors responsible for demographic changes in any community (White and Lindstrom, 2005). Migration can be defined as the movement of people from one place to another with the intention of permanent or temporary residence during a certain period of time. According to the field survey and

Figure 12, it appears that the majority of the residents in our study area originate from the municipalities of Algiers province, accounting for 73%. We notice that 5.52% are native inhabitants of Bordj El Bahri municipality and 5.35% are from Bordj El Kiffan municipality. Meanwhile, 6.90% are from the capital, Algiers, indicating that some families have migrated to the area. Based on our investigation, after the 2003 earthquake, many houses were threatened with collapse, especially in the old neighborhoods such as the Casbah, and families were distributed to neighborhoods in Bordj El Kiffan municipality. Likewise, taking another example, the residents of Bab El Oued, whose houses collapsed, have moved to Bordj El Kiffan municipality. According to Figure 13, we can observe that the province of Algiers has the highest number of immigrants in the study sample at 73.06 % out of a total of 476 immigrants in 2021. The eastern region comes next with a rate of 10.88%. Then, the western region comes in with a rate of 5.01%, followed by the southern region with a rate of 0.9%. We also notice that neighboring provinces such as Blida, Boumerdes, Tipaza, and Tizi Ouzou are among the ones from which people have migrated in larger numbers due to the short distance between them.

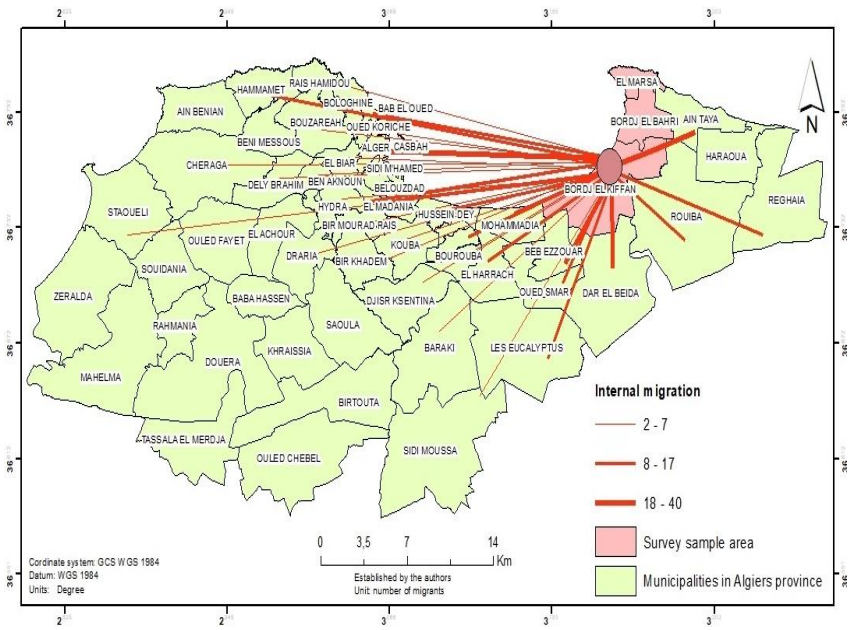


Figure 12. Geographical origin of the population of Survey sample area (Internal migration) (Source: Field survey, 2021)

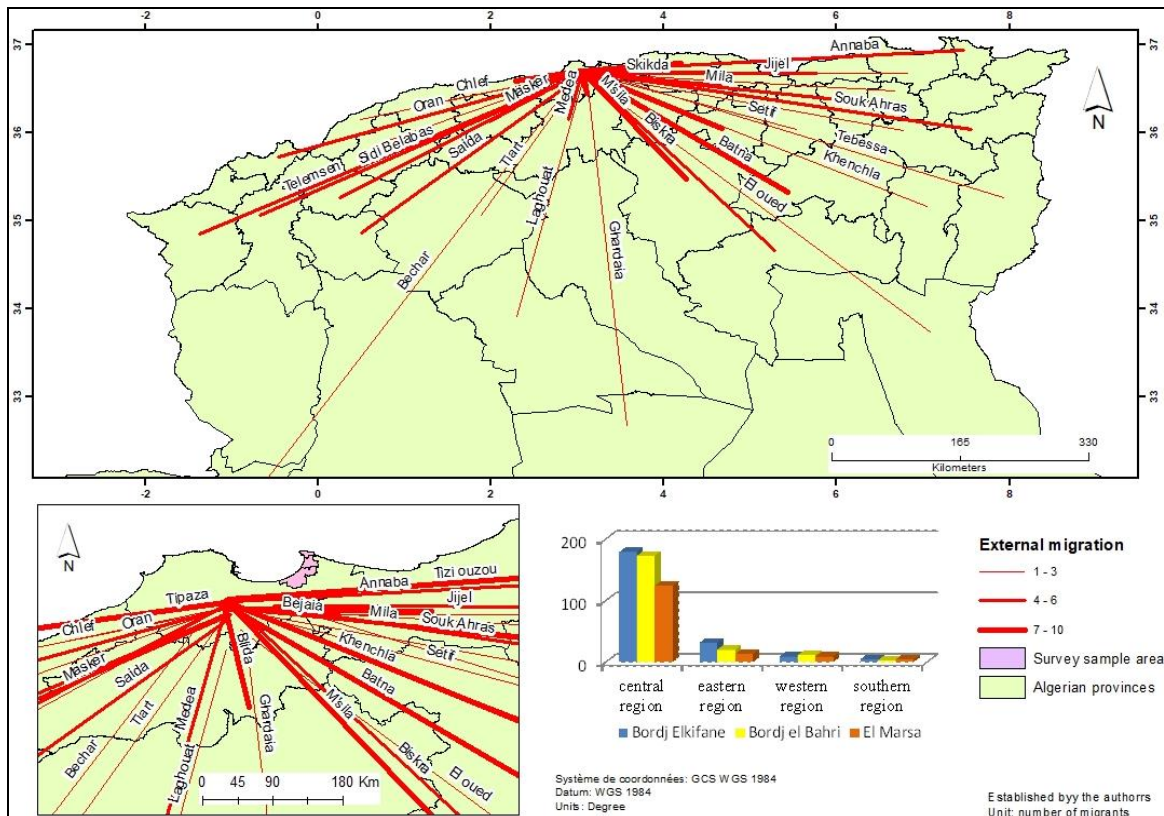


Figure 13. Geographic origin of the population of the survey sample area (external migration) (Source: Field survey, 2021)

This movement is a global migration of people from the interior to the capital (Kelley, 2022), because there is a greater advantage in terms of employment and services (Prayitno et al., 2023). On the other hand, not requiring a residence permit during migration opens the door to people who do not reside in the municipality. This study confirms that the migration factor, whether from municipalities in the province of Algiers or from outside, has contributed to the increase in the population and the demand for housing, which naturally leads to an increase in the housing stock over time. Additionally, initial immigrants contributed to building homes with fragile materials such as bricks or sheets, as their only concern was to provide shelter for their families, especially those who migrated during the "black decade" (Daoudi, 2018; Martinez, 2004) or were looking for work. The province of Algiers also utilized vast areas intended for agriculture to meet the demand for housing and solve the housing crisis. The field survey conducted in the municipality of Bordj El Kiffan (Figure 14) showed an influx of 223 citizens out of a total of 579, representing 38.51%. Therefore, we note that with the passage of time, due to migration and natural increase, the population seeks stability. And due to self-construction or by local authorities, urbanization increases and green areas shrink, especially since the municipality of Bordj El Kiffan is part of Mitidja plain. We also note a contraction in agricultural land on the map, as its area has decreased from 1002.36 hectares in 2000 to 371.12 hectares in 2021. Since urban growth directions occur on fertile plains and specifically on the coast, the public authority should anticipate the losses resulting from new expansions on these lands if alternatives and solutions are not found before it's too late.

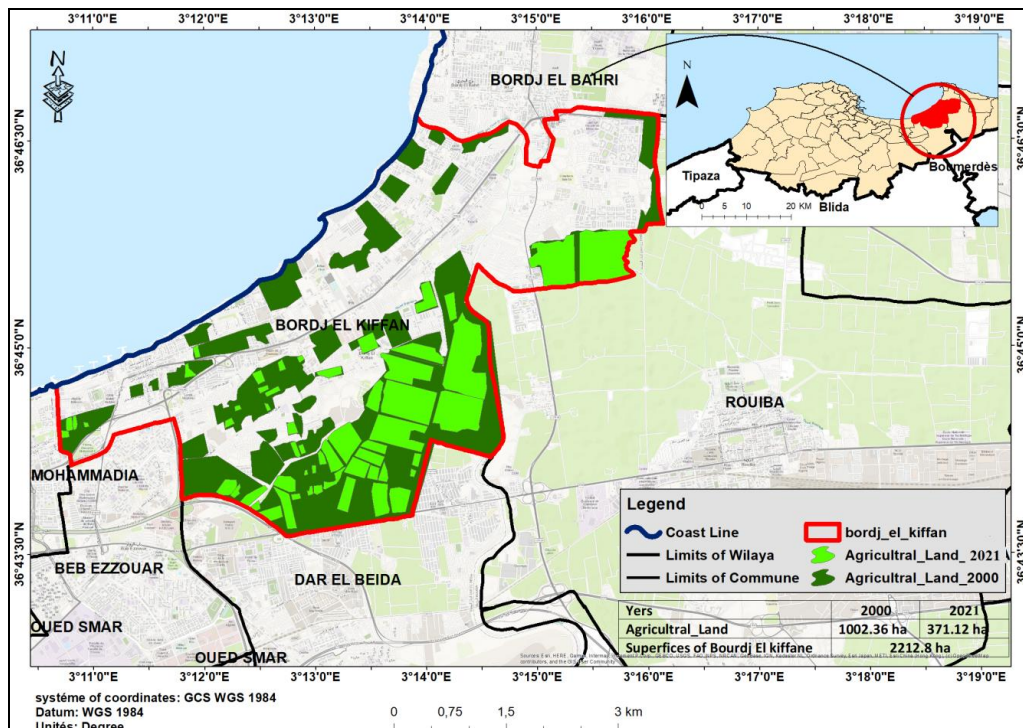


Figure 14. Evolution of the agricultural area of the municipality of Bordj El Kiffan (Source: Landsat 8/ Landsat 5)

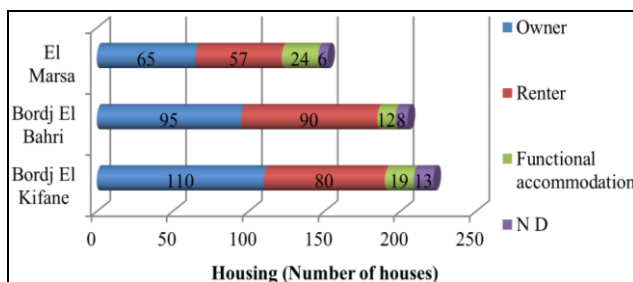


Figure 15. Nature of housing occupancy for the category studied (Source: Field survey, 2021)

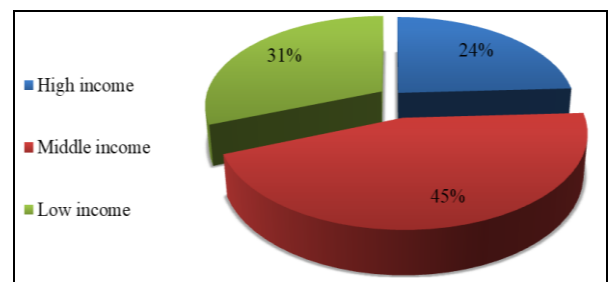


Figure 16. Income levels for the studied category (Source: Field survey, 2021)

2. The case of housing occupancy

With regard to the housing occupancy status and according to the results of the field investigation, four forms were distinguished: owner, functional housing, and Renter. The occupancy status of the house determines the legal status of the household with regard to its occupancy. Through Figure 15, the nature of housing for the studied group is shown, where we can see that 46.63% of these homes are owned by them, while 37.13% are rented homes. It can also be inferred that this group does not own a home and therefore is seeking housing through one of the housing programs or waiting for their under-construction homes to be completed. As for the group living in functional housing, they represent 9.49%, as this is temporary housing that residents will have to vacate at the end of the employment period, and therefore they are also housing seekers or waiting for their own homes.

3. The date of stability of the study sample population

We will learn about the history of population stability in the study sample through this element. Based on the obtained statistics (Table 1) from the field investigation, it is clear that only 1.20% of the population settled in the area before 1986, which is a low percentage. On the other hand, 5.87% of the population migrated to the study area between 1986 and 1996, which is a relatively high percentage compared to the previous one.

This indicates that people from other municipalities and provinces migrated to the area in search of security, as they fled from areas where security was lacking to reach larger cities (Roufeida, 2022). As the percentage of migration to the study area increases between the years 1996 and 2006, a period in which fear is still widespread among the population due to a lack of security, in addition to the socio-economic crisis resulting from the failure to revive the national economy, and therefore the spread of unemployment during this period. Between 2006 and 2021, we noticed an increase in the rate of migration, reaching 70%, whether from municipalities in the province of Algiers or other areas, as the region has experienced an increase in housing stock, including various housing formulas. Therefore, the region has become a destination for migrants from different areas. Especially since the authorities have begun to reconstruct the area, which is attractive due to its strategic location and is also a tourist destination (Alloui-Ami Moussa, 2021).

4. Distribution of the working population according to the occupational and social category

To identify the social level of the resident population in the three municipalities, we grouped the functions of the working population

Table 1. History of population stability in the study area (Source: Field survey 2021)

	Before 1986	1986-1996	1996-2006	2006-2016	2016-2021	ND	Total
Bordj El Kifane	4	13	34	67	92	12	222
Bordj El Bahri	2	11	36	65	75	16	205
El Marsa	1	10	40	26	70	5	152
Study area	7	34	110	158	237	33	579
%	1.20	5.87	18.99	27.28	40.93	5.69	100

according to income levels in order to determine the different socio-professional categories of the studied group. According to the results shown in Figure 16, the dominant category is the middle-income group in the study sample, with 260 individuals, which is 45% of this group. The low and modest income group comes in second place, representing 31% of the total working population. This percentage highlights the importance of the group that benefits most from social rented housing, given their monthly income of 24000 Algerian dinars (Djafri and Mohamed Osman, 2021). These families have a hard life because they live in unsafe or unstable homes. This can make poverty worse and cause more crime, drug use, and problems like not having a stable place to live. As for the high-income social group, 140 workers, which is 24% of the people studied, are included in the survey. They represent company owners and managers. The data analysis shown in Figure 17 indicates that the working population included in the study sample belongs to the socio-professional category, with the majority being those with intermediate qualifications, reaching 50.43%. They are the dominant category in the three municipalities and work as teachers, traders, and self-employed. This category is likely to opt for rental-sale and promotional housing formulas. Meanwhile, 28.3% of citizens reported being workers or employees in schools or public institutions. This category is directed toward rental-sale housing, and they can also obtain functional housing. As for the low-income category, its percentage among the target group is 21.42%. This category benefits from social rental housing and also performs simple jobs.

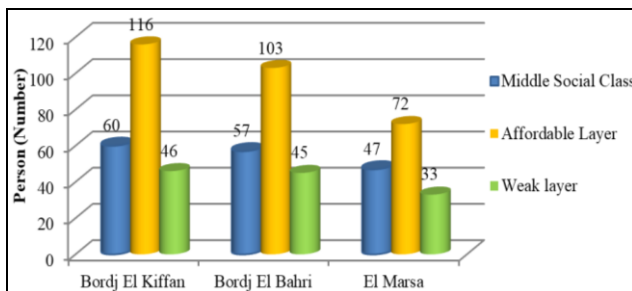


Figure 17. Income levels for the studied category (Source: Field survey 2021)

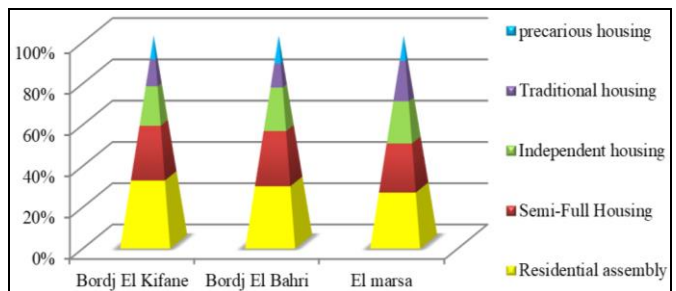


Figure 18. Type of housing of the studied category (Source: Field survey 2021)

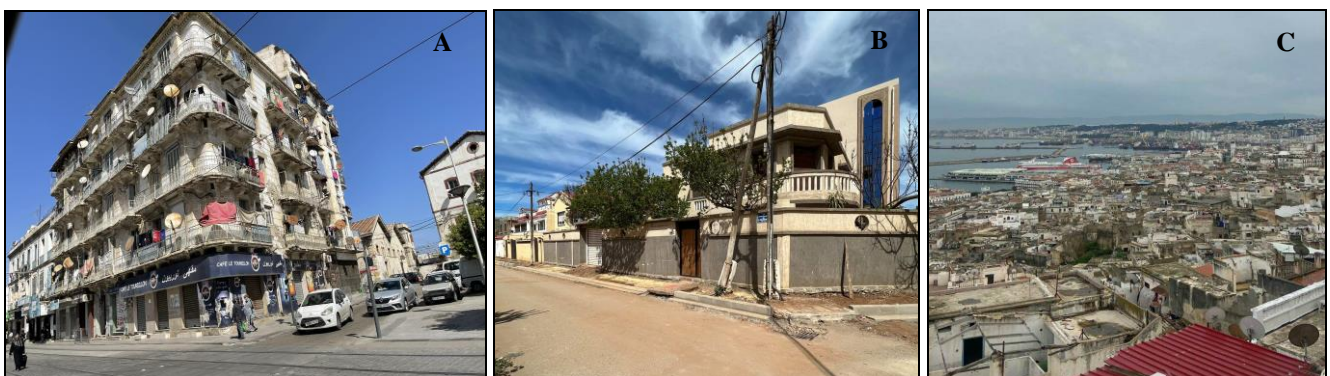


Figure 19. Types of housing in Algeria (Residential assembly (A), Independent housing (B), Precarious housing (C) (Source: authors, April 2023)

5. Housing types

The field of study is characterized by heterogeneity in the classification of housing, where we find many types of housing. Through Figure 18, we can observe that residential assembly represent 29.53% and are the most common type of housing in the region. They are followed by 23.66% of semi-full housing, which consists of residential projects, buildings, or individual unfinished homes. Independent housing, which includes small houses or villas, represents 19.51%. Traditional housing, which has an old architectural style, represents 13.81%. Moreover, precarious housing accounts for a considerable percentage of 12.08%, especially considering that we are in the capital and a tourist area. We will provide some pictures of the different types of housing we mentioned in Figure 19.

CONCLUSION

The Algerian state has witnessed population growth during the period between 1984 and 2021, which has made housing a matter that cannot be separated from the social development plans that successive governments have outlined. The housing sector in the province of Algiers witnessed a series of changes during the period of 1984–2021, where it experienced various housing experiments that aimed primarily to alleviate the severity of the housing crisis and eliminate precarious housing. In fact, this high population growth is due to a natural increase in the population as well as the factor of internal migration, whether rural or urban, which has led to an increasing demand for housing and, consequently, excessive consumption of space in the absence of strict urban planning laws that preserve urban space. Despite the emergence of new housing formulas, the housing shortage continues in the face of growing demand, which has led to arbitrary use of space, such as encroaching on agricultural land, and the spread of precarious housing due to population migration from other municipalities and provinces. The pace of development, which has accelerated in recent years, is now threatening Mitidja Plain, which is gradually shrinking. The built-up area has increased from 47.32 km² in 1984 to 81.34 km² in 2021. For example, the municipality of Bordj El Kiffan, which is part of the Mitidja plain, has decreased from 1002.36 hectares in 2000 to 371.12 hectares in 2021. In order to find a solution to the housing crisis, Algeria has introduced new housing formulas, including rental social housing, participatory social housing, rental sale housing, and free and public promotional housing. Where the citizen benefits from one of these formulas depending on his financial ability and social status.

Through our study, it becomes clear that social housing is found in areas that have been affected by natural disasters, such as the floods of Bab El Oued and the earthquake of 2003. This prompted the authorities to build housing units to compensate the affected people, while the public authorities are working towards solving the housing problem by constructing new housing units. In general, all housing projects planned for the province of Algiers under rental sale and promotional housing have had their locations chosen in the suburban municipalities, i.e., in the western, eastern, and southern regions, in order to reduce the pressure on the central region, which suffers from the depletion of real estate in addition to the historical architecture of its facilities. We can conclude that social rental housing is the formula that has prevailed and gained great popularity in the state, but over time the AADL formula of rental sale housing has become more popular, especially after 2016. There has also been an increase in the type of housing formula used, LPP. This is a desire from the public authorities that citizens, especially workers, contribute to the purchase of their own housing and that each citizen benefits from housing according to their financial ability. All of this is to ensure the formation of an organized and balanced urban area that current urban development tools have failed to achieve due to changing circumstances.

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