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ENVIRONMENTAL PROBLEMS IN URBAN AREAS OF THE WILAYA OF BATNA: EXAMPLES FROM THE SOUTH- EASTERN AREA

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ABSTRACT

The state's efforts to improve the living conditions of the population in the Aures region have been, and continue to be, aimed at reducing disparities to achieve balance among the various regions of the country. Housing and infrastructure are among the most important mechanisms it has relied upon to stabilize the population and develop their areas. Despite the efforts made, the desired goals have not been achieved due to a lack of consideration for the specific characteristics of these mountainous regions, particularly their natural, urban, cultural, and social aspects, which have contributed to the development of these rural areas. The combination of natural, historical, political, economic, and demographic factors and circumstances contributed to the development of population clusters in the study area. (Oued Abdi and Oued El Abiod regions - Aures).

According to a field study based on a comparison between different study centers, relying on data sourced from investigations and observations we conducted with the residents and various relevant authorities, we highlighted the transformations that the region has experienced, which have led to environmental repercussions. We examined the mechanisms involved and the various actors in these fragile mountainous areas, and then we attempted to present the levels of environmental degradation in the region and identify the different issues facing these areas.

In conclusion, we highlighted the most important mechanisms through which we can protect the environment in mountainous areas, and we emphasized the necessity of taking the required measures in various fields, especially urban, forest, and agricultural, to achieve sustainable mountain development a "sustainable mountainous area".

KEYWORDS

Mountainous Areas, Mountain Environment, Population Centers, Environmental Impacts, Protection Mechanisms

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Introduction.

The phenomenon of urbanization in mountainous areas and settlements represents one of the key features of the urban crisis faced by Algerian cities. This crisis stems from the inability of these cities to meet the demands of their urban and economic growth and development, leading to the expansion of urbanization into sensitive areas (mountains, plains, etc.). This has driven centers and settlements towards urbanization, transforming them from rural communities predominantly characterized by agricultural activities. The manifestations of urbanization in mountainous areas and the rapid social change of local communities, whether ancient or rural in nature, occupying the banks of Oued Abdi and Oued Abiod, and the involvement of various actors have influenced and been influenced by the growth of settlements and their social and spatial transformation in the region. The outcomes of the forces and changes that prevailed in each stage of transformation have had repercussions on the Eurasian urban settlements, which in turn have affected the natural environment of the region and the urban fabric of the population centers.

The emergence of urban settlements in mountainous areas is related to the development of population centers in these regions. The latter is defined according to Article 02 of Law 04-03 concerning the protection of mountainous areas within the framework of sustainable development, which states that mountainous areas are "all spaces formed by mountain ranges and/or mountain masses characterized by geographical features such as topography, elevation, and slope, as well as all adjacent areas that are related to the economy, territorial planning factors, and the ecological systems of the intended mountainous space, which are also considered mountainous areas. Mountain masses are the mountainous regions that form a coherent geographical, economic, and social entity."

1. Presentation of the field of study:

It is located in the heart of the Aures and belongs to the Saharan Atlas mountain range within the Batna province. The region of Oued Abdi and Oued Abiod forms a transitional area between the mountainous zone (Saharan Atlas) and the desert. The natural unit encompassing these centers is the basins of Oued Abdi and Oued Abiod.

The study area includes 12 municipalities that administratively belong to the Batna Province, comprising a total of 61 municipalities and 21 districts. It is located in the South-eastern part of the province, extending from the northeast towards the southwest. National Road No. 87 (RN) is a key feature of the Oued Abdi area, while National Road No. 31 (RN) is essential for the Oued Abiod area, as it connects various regions of the two basins. This road links the city of Batna to the city of Biskra over a distance of approximately 150 km, serving the majority of the municipalities in the study area.



Fig. 01: The administrative location of the case of study
Source: Directorate of Planning and Urban Development (Batna)

2. Characteristics of the region as "a factor in environmental problems" :

- The area is mostly a highly rugged mountainous region.
- A quasi-homogeneity in terms of solid geology.
- The drying up of valleys in the summer and the weakening of springs and wells.
- Diverse vegetation cover and known continuous degradation.

These characteristics represent obstacles to development and contribute to the limitations and worsening of the environmental reality.

Methods and Data.

1. The development of the population in municipal clusters and its implications for the environment :

We are concerned with this phenomenon to understand the size of the main centers of the municipalities (ACL), after grasping the growth rate of the municipalities in the study area in general, which has more than quintupled over more than half a century. This is a significant pace, although it is lower compared to other regions in the coast and plateaus over less than half a century. This is attributed to several key factors, the most important of which is "population pressure on the area."

- The natural environment of the studied area (a mountainous region).
- The impact of the security situation that the region of study has gone through.
- The lack of financial and economic investments that attract residents to the area, compared to other regions (coastal and plateau), and their variation in the study area among the municipalities.

To study the development of the population in urban centers, we will rely on the demographic growth of the study's gathering centers and the recorded discrepancies in the development of the size of these urban centers and their growth rates, by examining them during the period from 1987 to 2015. This is because the most significant changes that occurred in the gatherings of the study area emerged after the administrative division of 1984, which established six municipalities in the study area, three of them in the Oued Abdi region and three in the Oued Abiod region, along with the elevation of the municipality of Teniet Abed to the status of a district. In the administrative amendment of 1991, four municipalities were promoted to the level of districts, two in the Oued Abdi region and two in the Oued Abiod region, and several centers were established in this division (Tigherghar, Teniet Abed, Tighanimine), which explains the extent of change in the spread and spatial distribution of urban gatherings in the study region.

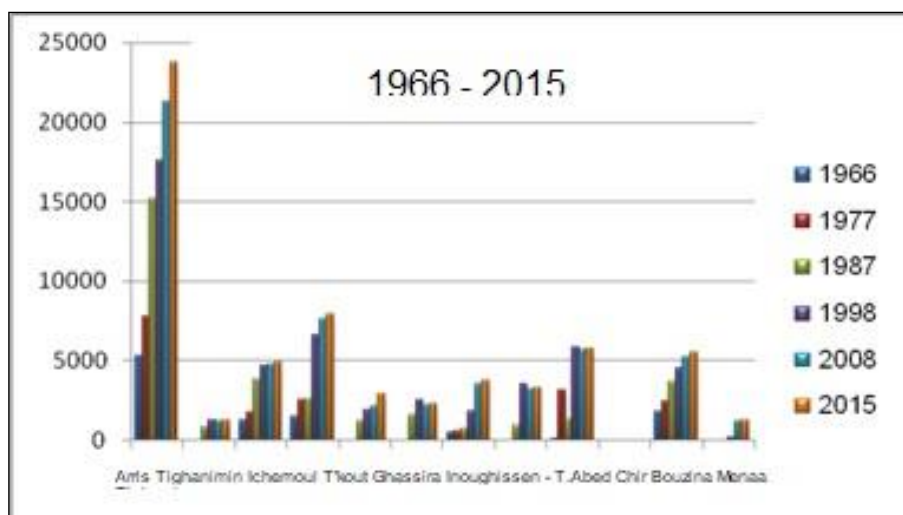


Fig. 02: The development of the population in municipal clusters (1966-2015)

Source: National Office of Statistics

2. The environmental implications of the development of population clusters in the Auresian region :

Law No. 03-10 was issued on July 19, 2003, concerning environmental protection within the framework of sustainable development, which repeals the provisions of the law issued in 1983 related to the environment. This law comes within the framework of the new concept of "sustainable development" and aims to establish

rules for environmental protection based on certain principles and general concepts. Notably, the law does not provide the mechanisms, procedures, or details of the measures taken, nor how they will be implemented; rather, it leaves that to regulations. Consequently, the application of this law in practice will take some time.

The law specifies the sensitive environmental areas or contexts that require protection, which are air and atmosphere - water and aquatic environments (freshwater and marine) - land and subsoil - desert environments - living framework.

The law also introduced measures for protection against damages resulting from certain direct causes such as chemicals, radiation, and noise.

In conclusion, it introduced incentive measures for anyone who contributes to reducing damages, including: financial, customs, and tax incentives, the establishment of a national award in the field of environmental protection, and in return, the law imposed punitive measures on those who violate its provisions. This is at the legislative level, but at the level of lived reality, the situation has affected the studied area due to the urbanization that the region is experiencing. There are significant environmental damages and an impact on the quality of life, including irrational planning in many cases and its absence in others, as well as a lack of control over the production of a balanced urban area. This has led to most urban settlements in the Aures region growing spontaneously, influenced by actors from unregulated sectors. As a result, urban centers have emerged that combine various contradictions, despite what the state has pursued in the last three decades in the fields of development and the environment, which has been characterized by its sectoral approach and has not risen to adopt a comprehensive and sustainable solution. This has often contributed to resource wastage and has not worked towards their sustainability, resulting in a more fragile mountainous area.

The phenomenon of urbanization, despite its long-standing presence in Algeria, reached its peak in the twenty-first century, which is undoubtedly the century of urbanization. With each new urban expansion and the growth and proliferation of economic activities, spatial imbalances have increased, primarily the issue of risks associated with the urban environment. This situation is in continuous aggravation, and the negative impacts of environmental degradation affect various urban settlements across all categories. However, the degree and manifestations of this impact remain highly diverse and differ among them. Sources can be distinguished based on the location and position of the urban settlement, its economic significance, its local and regional status, the nature of its rural surroundings, the quality of the water bodies that traverse it, the extent of inadequate housing, the poor management of solid and liquid waste, and the decline of green spaces within urban centers, which we will highlight in a series of points.

a. The absence of an environmental dimension in urban planning:

The manifestations of environmental degradation in the Aures region are numerous, with inadequate housing at the forefront, threatening the balance of urban communities on all levels. Following this is the issue of solid waste management and how to dispose of it, and finally, the lack of green spaces and urban sprawl encroaching on agricultural and forested areas.

The obsession with immediate planning and the search for urgent solutions that the region has experienced, especially in the last two decades, has led to a neglect of environmental issues and a lack of a comprehensive and long-term vision for the region's future. Environmental problems have begun to emerge in the Eurasian area. Due to the lack of green spaces in some urban areas, and their complete absence in others, it poses an environmental challenge in the region.

Table 1.
Green spaces in the municipalities of the study area

Municipality	Green spaces (m²)
Arris	1500000
Tighanimine	50000
Ichmoul	10000
Tkoutt	2275
Teniet Abed	4000
Tigherghar	26900

Source: Urban Planning Directorate of Batna Province 2020.

b. The lack of green spaces is the biggest threat to the Auresian urban environment:

There is a growing interest in green spaces within urban communities and their surroundings, aimed at purifying the air and preserving the environment. Parks are designated for people to gather and as places for recreation, making it essential to allocate 2-5 square meters for each resident in urban centers, while in major cities, this ratio should be between 15-20 square meters. Green spaces serve as a natural outlet for urban areas; however, our urban communities deviate from this norm, as the focus on them comes last on their agenda. Evidence of this can be seen in the results of field investigations, and through our field studies in the centers, we find that organized green spaces within these centers are almost nonexistent, except for the agricultural and forested areas surrounding the urban environment.

We often find that the forest area is used as a park during leisure time and holidays, especially for children. The green spaces represented by the areas of fruit trees surrounding the homes in the study area are utilized by Eurasian women in their daily agricultural activities.

Although the urban planning and development laws (Algerian law) proposed some green spaces, the violations that occurred against this legal document have been appropriated for residential projects or facilities, due to the real estate nature and its scarcity in mountainous areas (private ownership, small properties). Field investigations revealed that green spaces exist in the city of Ares, and the majority of them are not developed.

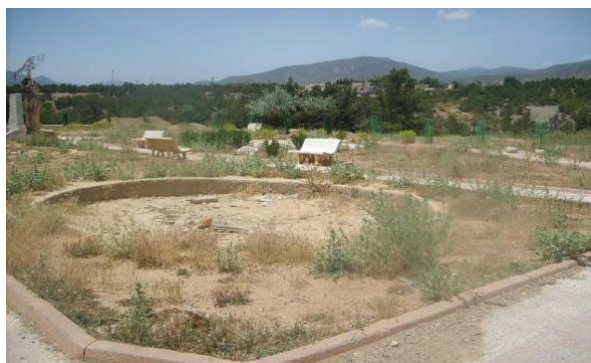
c. Inadequate housing is a manifestation that disrupts the ecological balance of the built environment :

Fig. 3: Unprepared green space



Fig. 4 Prepared green space

In the 1980s, it appeared scattered across agricultural lands on both sides of the main and secondary entrances to the roads between urban centers and among them. It is a modern architectural style characterized by heights and contemporary building materials, often taking the form of villas.

Then, three patterns emerged in the urban settlements: an old pattern that has deteriorated visually and structurally, currently representing about 8% of the total housing in the area; a semi-modern urban pattern that corresponds to the construction period from 1962 to 1990; and a modern urban pattern, often found outside the urban centers, which has resulted in a discordant and deteriorated visual character where different building styles and forms overlap.



Fig. 5. The spread of informal housing in the city of Arris

d. Solid waste:

The process of collecting and disposing of solid waste is one of the important responsibilities of municipal authorities. The cleanliness of streets, roads, vacant lots, and public squares is an indicator of how well these essential services are being performed. Conversely, if there is a buildup of waste in various neighborhoods, it reflects a lack of attention to waste collection, which can have negative effects on the environment and, consequently, on the residents due to the various diseases that such waste can cause.

Waste is classified in Article 5 of Law 01/19 into three categories:

- *Hazardous waste*: It is considered highly toxic and poses a threat to the environment if not treated and stored properly. Among the most important types are; hospital waste and the toxic liquid materials left by factories ...etc.
- *Household waste*: resulting from household activities, economic activities, local communities, and others.
- *Waste generated from construction activities*: This includes waste resulting from construction activities, debris from excavation and demolition, ceramics, and drilling.

In our study area, these three types of waste are present, where municipalities manage household waste by collecting and disposing of it in locations mostly close to urban centers, with many of them being incinerated. Even though the Environment Directorate of Batna Province developed guiding plans for waste management across all municipalities in 2010, aimed at protecting the environment within the framework of sustainable development, these plans remained ineffective, except for the city of Arris, which established a technical landfill for waste disposal.

"The waste generated from construction appears along the sides of main and secondary roads outside urban areas, leading to a distortion of the overall appearance of these mountainous regions." "Visual pollution"

As for the special waste generated by the Arris Hospital, it is incinerated in areas close to the hospital, which poses a risk of air pollution and negatively affects the urban environment of the city. Additionally, the water bodies are contaminated by the waste from industrial units, particularly in the areas of Menaa and the city of Arris, leading to both water and air pollution.



Fig. 06-07: Solid waste – Oued Abiod.

Source: Tourism Directorate of the Wilaya of Batna, 2023

e. Waste management in the study region:

The municipalities that oversee the process manage waste, and each municipality has programs that vary from one center to another. The main centers benefit from a daily garbage collection program, and the waste is disposed of in public landfills located about 12-20 km away from the centers, where it is often incinerated. Secondary gatherings benefit from a waste collection program every two days, which is due to the limited resources of the municipality. The only center that has a technical burial center (C.E.T) is located in Arris, which receives waste from both the municipalities of Arris and Tighanimine.

f. Industry and its Environmental Hazards:

Algeria has been part of the industrialization movement since the 1970s, and the study area has benefited from:

- *The Arris industrial zone:* Its waste is polluted because it uses iron and acids. These compounds create a system before treatment, and its wastewater flows into the sewage system, which directly discharges into the Oued Abiod, causing pollution there. This contaminates both surface and groundwater, especially since the valley's water is used for agriculture.
- *The activity area in the municipality of Menaa:* its waste is directly discharged into the river and is considered one of the most polluting elements in the region. The lack of waste treatment exacerbates the pollution, as it contains toxic and contaminating materials. The Menaa juice and canned goods unit, affiliated with the N'gaous company, is the main source of pollution in the Oued Abdi due to the chemicals it discharges directly into the rivers. The danger increases in the summer due to the drying of the rivers and the concentration of waste and odors, which pose a threat to the residents of the area in general.

g. The environmental degradation of valleys :

This is evident in the inappropriate developmental operations in the mountainous areas, particularly the sewage systems established in all municipalities. These serve as a glaring example of water pollution in the valleys. All drainage channels from urban settlements, even secondary ones, flow directly into the valleys without considering the health hazards they pose.

Previously, the sewage systems used in these mountainous regions and fragile natural environments relied on septic tanks and other methods. The discharges from the aforementioned industrial facilities are released directly into Oued Abdi and Oued Abiod. Law No. 10/03 aims to protect the environment and prevent pollution. Water pollution in the area can be highlighted as follows:

- *The environmental impacts of wastewater discharge in Oued Bouzina, Oued Abdi, and Oued Abiod :*

Water resources play a fundamental role in environmental balance and in organizing urban space. The management of these resources has accompanied the development of urban settlements and is closely linked to the needs of the population in the agricultural environment available in the study area.

The canals are the arteries that nourish the agricultural landscape of the urban settlements in the region, and at the same time, they symbolize a set of customs and traditions, marking a rich culture in irrigation, gardening, and various uses (such as water mills). However, these traditions have begun to fade recently as the water network has become susceptible to pollution resulting from social behaviors characterized by self-interest on the one hand, and a lack of awareness regarding the vital functions of water resources on the other. They are exposed to various types of pollution, such as washing, greasing, and more...

The most important irrigation channels in the study area have maintained a specific distribution of water resources since ancient times and have followed a well-organized system ensuring each ecosystem element has its rightful share. However, several factors have affected the traditional balances of the environment, which can be summarized as follows: the decline in the flow of the rivers due to the drying up of many springs, despite the reduction of agricultural areas because of urban sprawl, in addition to the discharge of wastewater into the riverbeds and the dumping of household and solid waste, which has now become a focal point of pollution par excellence, leading to the emergence of pollution manifestations:

- *Polluted murky water:* The water takes on a color different from its natural hue due to mixing with pollutants, resulting in a distorted appearance of the "mountainous" natural landscape.
- *Unpleasant odors:* Foul smells emanate along the valley that runs through urban areas, particularly, and these odors pose real dangers to the health of residents and are considered pathogenic compounds.
- *The decline of fruit trees in the region:* This is a result of the pollution of water used for irrigation, which has led to a significant reduction in fruit trees, especially in recent years. This has become more evident after the year 2000, with more than 75% of the fruit trees in the study area declining and production decreasing

by more than 40%. This situation has caused significant damage to environmental safety and is seriously threatening the future of agriculture in the mountainous areas of the region.



Fig. 08-09-10: Pollution of water channels in Oued Abdi area

h. Urban sprawl on agricultural and forested areas: mass encroachments on the mountainous environment.

- Urban sprawl on agricultural land:

Through fieldwork, it has become clear that there are violations against the fertile areas located across the municipalities under study. Notably, in the majority of urban settlements adjacent to limited agricultural zones, due to the region's topography, especially those located on both sides of the national roads (31-87). Figure number (11) illustrates the urban expansion in the Oued Abiod area of the city of Arris over the agricultural lands.

What can be concluded from the field research across the study area is that urbanization is rapidly expanding in this agricultural sector, consuming rich agricultural areas from the most fertile lands of the region. The question that arises is to what extent will the agricultural sector, which formed the basis for the emergence of urban centers in the area, be affected by the urban expansion that the mountainous regions are experiencing.



Fig. 11. The urban sprawl over agricultural areas (housing) in the Oued Abiod region

- Urban sprawl over forested areas: "Forest resources are in a constant state of decline".

According to Forest Law 84/12 (Article 20), which falls under the title of the General Forest System, its first article aims to protect forests and forested lands, as well as other forest formations, to develop, expand, manage, and exploit them. It also seeks to preserve the land and combat all forms of erosion. The application of this law, as stated in Article 7, naturally includes forests as well as lands with a forest character and other forest formations.

The inhabitants utilized the forest areas in the Aures for various purposes (grazing, heating, traditional industries, etc.). However, after the entry of colonialism into the region and the issuance of a set of laws, the most important of which was the Senatus Consultum of 1863, under which it became state property, a series of development and exploitation activities were carried out in the study area until 1953. After independence, the exploitation of forest resources continued in intensive and irrational ways. In 1983, with the issuance of

the aforementioned Public Forests Law and Law No. 04/03 dated June 23, 2004, concerning the protection of mountainous areas within the framework of sustainable development, which aimed to protect these areas, especially the forested ones. However, what is noticeable in the studied area is the encroachment on these regions through various violations, illustrating how the issue of land has led to the establishment of several projects in the forest area, the most important of which are the expansions carried out and planned for collective housing in the cities of Arris, Teniet Abed, Menaâ, and Tkoutt ...etc.

All these breaches increase the vulnerability of mountainous areas, in the absence of environmental-oriented community movements that are capable of countering unilateral projects, which are often imposed by the administration without consulting the citizens. We are fully aware of the importance of local endorsement for any developmental project, especially when it concerns their vital domain. In addition to the random expansions carried out by residents without obtaining building permits from the technical authorities, there is also the difficulty of construction due to the legal nature of these legally protected areas.

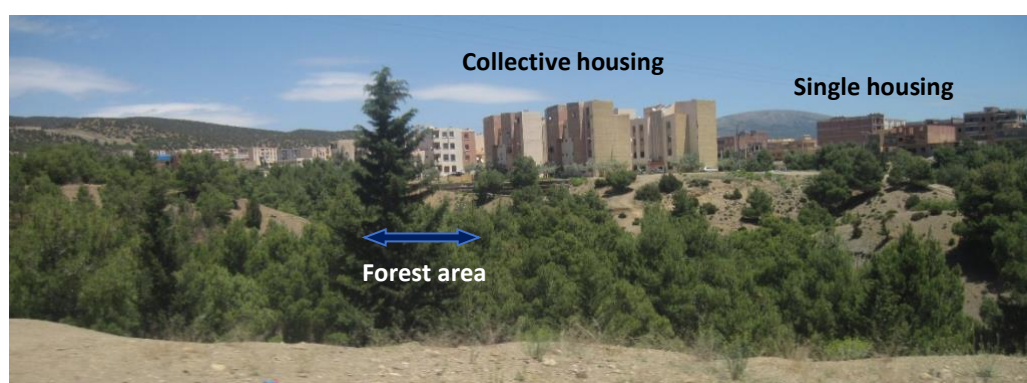


Fig. 12. Urban encroachment on forested areas (collective housing - individual housing) in the Oued Abiod region



Fig. 13. Urban encroachment on forested areas (infrastructure) in the Oued Abiod region

i. Urban expansion and agricultural land: "Choosing between construction or food security".

National policy in this area is quite delayed in creating a balance between developmental choices. Urbanization and construction are an increasing and spreading necessity, while agricultural land serves as an economic resource that ensures the material and spatial continuity of the former. As for human needs, they are closely linked to where I live and what I live on.

This issue has backgrounds that the state has ignored, first in the face of implementing its programs based on agricultural lands. Statistics from the Ministry of Agriculture showed that between December 2005 and April 2008, more than 8,000 hectares of arable land were cut off to carry out public development projects across the country. Secondly, it is in response to individual interventions in the random consumption of land suitable for urbanization, making the resort to agricultural lands a choice dictated by circumstances rather than a strategy. In this regard, the Algerian legislator has continued to provide inadequate solutions to protect and preserve these lands, resulting in three successive applications:

1. Protection and preservation.
2. Not to infringe upon and regulate the right of disposal.
3. Flexibility of modification and retraction.

In general, the rapid transformation of the mountainous areas of the Aures region is manifested in a negative aspect:

The negative appearance manifested in the overdevelopment of built-up areas and the rapid consumption of space, with a shift in land use from agricultural production to various functions. This negative transformation primarily occurred through the channels of urbanization and real estate speculation, which did not take into account the importance of preserving the natural heritage, embodied in the fertile soil abundant in the agricultural terraces of the region, leading to the emergence of various environmental issues in the area.

Results and Discussion.

1. General Principles for Protecting the Environment and Resources:

This aspect is considered essential for all other programs that are closely connected to it, and it includes referring to and protecting all threatened ecological balances (protection of forests, animals, soil, and water resources). It also contributes directly or indirectly to the advancement of activities (forest exploitation, reserves, tourism site utilization, etc.). In this integrated form, it is necessary to understand and envision the entirety of the following actions:

- The preparation and protection of forests can only be effectively envisioned within a comprehensive strategy for mountain restoration. In addition to forest exploitation and the revival and protection of forest wealth, it must rely on the support and involvement of the local population.
- Soil protection and restoration programs must be conceived and implemented based on multi-sectoral objectives (agriculture, forestry, irrigation, basic infrastructure for connectivity, etc.).
- Sites and landscapes should be included in a general policy for entertainment and tourism.

2. Environmental Development: "Environmental Awareness":

These measures revolve around the following:

- Taking measures against harmful uses of the urban environment outside urban settlements, such as workshops and environmentally damaging activities, and repurposing them to localize various uses, especially important ones like public services.
- Creating residential uses and public services by utilizing vacant lands within communities, while avoiding agricultural and forested areas, leaving them as breathing spaces for residents.
- The establishment of two technical burial centers, the first in the Oued Abiod area within the municipality of Ghassira, and the second within the municipality of Teniet Abed, which will serve the four municipalities along National Road No. 87.

The study area is a mountainous region and a sensitive natural environment that requires care and environmental preservation to make it an area of attraction and appeal for local development. This necessitates taking several measures regarding the protection of the mountainous environment:

- The valleys of the study area are exposed to pollution resulting from wastewater, which comes from the urban settlements and the industrial area of Arris, as well as the activity zone in Menaa. Therefore, it is necessary to establish two main sewage channels from the far north of the area to the far south. Each urban center in the two regions will be connected to the main channel, which will discharge outside the basins, as the waters of the valleys in the study area are used for irrigating agricultural terraces. This has led to a decline in productivity due to the water pollution that the valley waters are subjected to.
- Through fieldwork, it becomes evident that there is a near-total absence of green spaces within urban settlements, which are considered the lungs of urban areas. Therefore, it is necessary to create green spaces within the urban boundaries of the studied settlements. Ares remains the only center that has green areas, which are mostly unprepared.
- Regarding waste disposal, all municipalities benefited from the guiding plan for managing household waste in 2010 under the supervision of the Environment Directorate of Batna Province. However, this plan is not implemented in the municipalities under study, and management is carried out according to old plans, with a lack of adherence to designated places and times for waste disposal. A training course was held for the officials and staff of the municipalities in Batna Province in 2008 at the National Institute for Environmental Training in Algiers, focusing on the management of household and special waste. I was part of the group that received this training, but generally, the officials who received the training are often not specialized in this

area, which has affected their role at the municipal level. Therefore, it is requested to activate waste management plans.

- Supporting community initiatives to raise awareness about the importance of environmental cleanliness, protecting the environment, and organizing informational days on the significance of mountainous ecosystems. This is done by taking the most important measures:

a) Protecting the environment:

To protect the natural and urban environment in this region by outright forbidding hunting or by outright prohibiting the cutting of wood for artisanal constructions and handicrafts. Rather, we mean to preserve some of the abundant raw materials in the area without exploiting them. It is important to recognize that ecotourism entails moving about and having fun while doing so responsibly for the environment and the future of natural areas. It also involves studying, appreciating, and enjoying new places.

By protecting the environment, we mean practicing rational activities that are not harmful to the environment, such as walking on foot in valleys or meadows, visiting wildernesses, highlands, and forests for research and study or exploring remote areas, and deepening knowledge of natural environments and their biological and non-biological components and how to deal properly with them with special care and a high degree of honesty, awareness, and sensitivity to their characteristics and requirements.

b) Protecting the environment means investment:

It means investing in the tourism industry without depleting resources and preserving the ecological balance, as hunting is done in certain seasons and within practical limits that allow for preserving biodiversity, and if we want to exploit some trees in the craft industries that serve tourism, other trees must be planted to replace them to keep them as a renewable resource.

c) The most important methods of environmental protection in the study area:

Avoiding pollution of the natural environment, which is rich in mountainous elevations around the city of Arris, as well as preserving the basin of Oued Abiod as the main water resource in the region.

Conclusions.

The development of population clusters in developing countries has not been linked to industrial development and local economic growth, which has made urban growth a burden on economic development in these countries, rather than a factor contributing to their progress. The Aures region has experienced environmental and spatial repercussions in various fields, which have varied from one municipality to another and from one center to another. Overall, these repercussions have had both positive and negative effects, which are highlighted as follows:

- Urban sprawl on sensitive areas.
- The deterioration of the region's environment, including air pollution, water contamination, and river pollution, has created an inappropriate image of the urban landscape. (Illegal construction).
- Urbanization is rapidly expanding in the agricultural and forestry sectors, leading to a reduction in agricultural holdings and their fragmentation due to inheritance, which has diminished their value and complicated their utilization.
- Uneven distribution of urban agglomerations across the municipalities, where we find a municipality with a single agglomeration.

The image of the region has changed, shifting from positioning (mountain, slope) to sliding towards road axes, resulting in urban centers with modern architectural characteristics and various forms, produced by a combination of factors, the most important of which is the natural factor.

The effectiveness of development in these areas lies in the support of all sectors to create balance within this field. Spatial planning is the way to achieve all dimensions of integrated development for mountainous environments among various economic and social sectors, as well as environmental preservation and urban management. However, this can only be achieved through wise, balanced, and participatory investment that takes into account all elements of the natural mountainous region.

Declaration of Interest Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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