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FOR THE CONTROL OF ENVIRONMENTAL CHANGES IN THE COASTAL STRIP CASE OF THE FRINGE BETWEEN THE MENCHA AND NIL RIVERS (EAST OF THE WILAYA OF JIJEL-ALGERIA)

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ABSTRACT

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Coastal Strip, Land, Environmental Impact, Governance. Environmental issues have constantly constituted the main focus of the Algerian authorities in the development of different sectors of activity. The challenge of reconciling economic growth with the protection of the environment and coastal areas dates back to the early 1980s. It is clearly expressed through a range of regulatory texts and anticipatory and restrictive territorial planning guidelines.

The coastal strip between Mencha and Nil rivers to the east of the wilaya of Jijel has not been excluded from strategies for controlling natural resources and territorial projects (PAW, PDAU, and PAC). The anthropization of this small territory gives food for thought on the conditions for controlling the environmental impacts induced by overcrowding, rampant urbanization, landscape fragmentation, pollution and the reduction of natural spaces.

Through this article, we aim to assess the socio-economic impacts on the study territory on the one hand and the factors and prospects of the possible divide between the state of affairs and the principles of good land and environmental governance. (The word Oued is a local name. It is used to mean river in this article).

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Introduction.

The sustainable development of a territory is conditioned to a large extent by the reconciliation of socio-economic imperatives with environmental issues on the one hand and good governance in the allocation and occupation of land which includes various spatial and non-spatial values. In Algeria, the preservation of sensitive and vulnerable areas, including the coastal strip, has constantly constituted a major concern.

Indeed, with the aim of protecting the coastal strip which extends over 120 km, the local communities and administration of the wilaya of Jijel have attempted to implement development projects and territorial orientation plans. (PAW, ZHUN, ZET, PDAU, POS and PAC). However, it is clear that the part between Mencha river to the west of Tassoust and Nil river to the east of Bazoul remains subject to unbridled urbanization, demographic concentration and the accumulation of equipment and activities.

This article aims to highlight the aspects, factors and perspectives of the evolution of the spatial and a-spatial elements of the coastal strip (Oued Mencha–Oued Nil to the east of Bazoul).

1. Problem.

The eastern coastal strip of the wilaya of Jijel has never been on the sidelines of the environmental concerns expressed in the texts governing land use planning, town planning and management of coastal areas. The preservation of this fringe has constantly constituted a primary issue in the successive planning tools which have been developed for the municipalities to which it is administratively attached. In the spirit of the texts and orientation plans, almost the entire study area should be declared non-constructible.

This coastal fringe, which had only 868 inhabitants in 1977, is home to more than 42,028 inhabitants in 2018. The centers of Tassoust, Bazoul and Tleta, which before 1980 were only small centers linked to old agricultural farms, were seen anarchically spread out and enlarged despite the temptations of control by development and land use orientation plans (PUD, PUP, PDAU and POS). Due to the ever-continuing expansion of buildings and the concentration of activities, environmental restrictions prove inconclusive and land use and land use plans are often outdated and revised prematurely.

Although this section of the coastal strip was the subject of the projection in 1988 of two (02) tourist expansion zones (ZET), the two centers (Tassoust and Bazoul) were not able to emerge to the rank of tourist agglomerations structuring their territories.

Furthermore, the dune cord with its plant cover which formerly only intersected at the level of the mouths of the wadis, is in no way similar today due to the establishment of important installations and infrastructures (Port of Djendjen, airport, Elachouat power station, University of Tassoust).

In addition to the extraction of sand for construction, the disproportionate extensions of urban areas, there is added the problem of wastewater sanitation, waste management as well as urban and architectural aspects which lack aesthetics, harmony and coherence. The easement corridors linked to the various networks (gas pipeline, railway, RN 43, LHT, etc.) only seem to be respected in development projects initiated by state services.

In light of the environmental impacts induced by socio-economic development at the scale of the study territory, the principles of sustainable development and limited and rational use of land are far from being embodied.

So what are the ins and outs of the land use and land use processes and their environmental impacts in this part which is considered among the most vulnerable in the territory of the wilaya of Jijel?

2. Territory of study, objective of the theme and research methodology.

2.1. Presentation of the study area.

Our reflection takes place in part of the coastal strip located east of the town of Jijel in the northeast of Algeria. It is more precisely the coastal fringe between the Mediterranean Sea to the north, the mouths of Oued Mencha to the west of the agglomeration of Tassoust, that of Oued Nil to the east of the agglomeration of Bazoul and dominated by the promontories and the agglomeration of Tleta to the south. It depends administratively on two (02) municipalities, namely Emir Abdelkader and Taher.



Satellite photo 1. Study territory in 2024. Source: Google Earth + author's treatment.

2.2. Objective of the Theme.

The realities of land use at the scale of the coastal strip gave me food for thought on the initial state of the study area and the factors of spatial changes in light of very strict environmental restrictions.

Rampant urbanization, population growth and tertiary activities have encouraged me to question land rights, urbanization sectors and natural and vulnerable areas to protect.

The originality of the theme, my perception of the study territory with its potential and its constraints, encourages me through this research to work for a new approach to rational planning and territorial management that is more adapted to the environmental issues of the band coastline and the needs of socio-economic development.

2.3. Research methods.

This research is based on observation and field investigation on the one hand and the exploitation of technical and administrative data relating to the study territory (maps, plans, aerial coverage, the last five (5) general censuses of population and habitat (RGPH from 1977, 1987, 1998, 2008 and 2018) This approach, which highlights spatial mutations, reveals the reality of the concordance of the projected space with that actually produced. analysis of the following elements;

A. The study of the state of the coastal strip through the analysis of the revealing physical, historical and socio-economic aspects;

a. Vulnerable territory

- Rapid demographic growth resulting mainly from exodus and unbridled and aggressive urbanization for the environment and agriculture

- Recent land transfers

- The early and successive revision of town planning instruments

- Difficult waste management

B. Highlighting the planned (desired) space and testifying to the desire to protect the coastal strip through the State's anticipatory actions (early and comprehensive regulations as well as PAW, ZHUN, ZET territorial projects, PDAU))

C. Perspectives and conclusion (For a prospective and alternative approach to the issues raised at the scale of the study area).

3. Analysis of the state of affairs in the coastal strip.

3.1. Strong anthropization of a rich and vulnerable natural environment.

The coastal strip, marked by its natural potential (fertile agricultural land, dense hydrographic networks, water table, fauna and flora, etc.) is strongly subject to aggressive anthropization.

Geomorphological, it is composed of a fringe of beaches stretching from east to west and a plain in the form of a small coastal ribbon enclosed between the beaches and the promontories to the south. It is intersected by a dense hydrographic network represented in the wadis of Mencha, Djendjen and Nil. The entire hydrographic network discharges into the sea (exoreic flow). It is made up of Tertiary deposits (marls, clays, limestones) and Quaternary deposits which essentially correspond to dune sands and alluvial terraces. The dunes, which once constituted the highlight of a continuous natural landscape, have irreversibly disappeared.

The climate is under the influence of the Mediterranean Sea, dry and temperate summer and mild and humid winter with abundant but irregular precipitation (900 to 1400 mm per year).

3.2. Strong demographic growth.

The study area had 868 inhabitants in 1977, 8964 inhabitants in 1987, 14842 inhabitants in 1998, 18511 inhabitants in 2008 and 42028 inhabitants in 2018 (tab n°1). This results in a population increase of more than forty-eight (48) times in 40 years.

The demographic weight of the coastal strip, which represented only 2.50% of the total municipalities in 1977, continued to increase to reach (13.65%) in 1987, (14.99%) in 1998. (15.98%) in 2008 and (28.98%) in 2018.

Locality	1977	1987	1998	2008	2018
Tassoust	361	3 601	6 334	8 543	26900
Tleta		1 273	2846	3 425	5283
Bazoul	507	4 090	5 662	6 543	9845
Total localities	868	8964	14842	18511	42028
Municipality of Taher	24 800	44 895	67.095	77.367	95000
Municipality of Emir Abdelkader	12 100	20 764	31.870	38.468	50000
Total of municipalities	36900	65659	98965	115835	145000

Table	1	Population	growth in	the study	v area	hetween	1977	and 2018
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Source: RGPH 1977, 1987, 1998, 2008 and 2018.

This population (42,028 inhabitants) or 28.98% of the total municipalities (145,000 inhabitants) is very important insofar as the surface area of the study territory corresponds to only a tiny part of the total surface area of the two municipalities of attachment.

3.3. Disproportionate urbanization.

The increase in population was followed by unbridled urbanization to the detriment of natural spaces. The comparison of the facts of 2008 and 2024 demonstrates the enormous areas that have been removed from natural and agricultural areas. The natural and agricultural areas occupied over this short period are calculated from the evolution of land use and the analysis of Google satellite images by translating them using Autocad drawing software. This approach is strengthened by verification of results in the field.

The interpretation of urbanized areas during the period in question leads to a double meaning:

- The state of affairs and the resulting landscapes which are incompatible with the vocation of the coastal strip.

- The scale of urbanization in relation to the total land use recorded at the scale of the two (02) municipalities of attachment, namely Emir Abdelkader for Tassoust and Bazoul and Tleta for Taher (tab n° 02). Amounted to 335 ha in 2008, or 17.44% of the total, and 616 ha in 2018 or 27.37% of the total urbanized areas at the scale of the municipalities.

Although the socio-economic indicators clearly reveal the significant improvement in the living conditions of the populations following the implementation of various collective housing programs, equipment, roads and various networks, etc., the negative impacts inflicted on agricultural

and natural areas are not cannot be compensated in any way. Furthermore, the absence of regulatory subdivisions for residential use since 1998 indicates the proliferation of spontaneous and illegal land occupation.

Coastal localities	Occupied surfac	e /(ha) in 2008	Occupied surface (ha) in 2018		
Bazoul	98		151		
Tleta	102	2	115		
Tassoust	135	5	250		
Total - localités	335	17,44%	616	27,37%	
Total - communes	1920		2250		

Table 2. Evolution of urbanized areas between (2008-2019).

Source: municipal plans + Google Earth + surveys and updates.

3.4. Land changes, environmental transformation and revision of development and town planning instruments.

The municipalities on which the coastal strip depends were provided with the first PUDs in 1982.

The new regulations relating to land orientation and development and town planning (laws 90/25 and 90/29) involved their premature revision which resulted in the edition of the first PDAU in 1995. To the effect to comply with the texts relating to the protection of the environment and the coastline within the framework of sustainable development (early 2000s), this version was in turn revised before the deadline which corresponds to 2015.

The latest edition of the PDAU (2010) raises questions about its effectiveness for the protection and sustainability of the coastal strip. The current state of affairs is reflected in urbanization strongly focused on the traffic routes linking the coastal strip (RN 43, CW 135 and CW 147), and the conversion of large natural spaces and large areas with high agricultural potential into urbanization sectors (photo no. 04). The waterproofing of large areas which were entirely dedicated to market gardening and arboriculture for the benefit of construction and marketing and storage areas for industrial vehicles and construction materials as well as certain polluting activities such as car washing and lubrications.

This reality has led to land changes and profound landscape transformations resulting in irreversible impacts on primary activity, fauna and flora in the coastal strip.

3.5. Waste production and management.

Waste management is now a major concern in the coastal strip both in terms of volume and the insufficiency of the management means put in place.

The sanitation networks for wastewater from activities and towns located upstream of the coastal strip are exoreic and the sanitation of yards requires the installation of treatment plants.

Furthermore, the only existing technical landfill center in the region is located at a place called Démina to the south of the study area. It is no longer sufficient given the excess quantities of all types of waste generating olfactory and visual impacts on landscapes (odors, smoke, leaching effects, etc.).

4. Forecasts and anticipatory steps by central authorities.

It is necessary to highlight the conscience of the State which instituted early in an anticipatory context various actions of a legal, technical and administrative nature for the protection of the coastal area. The unbridled anthropization of the study area would never have occurred if the anticipatory actions emanating from central authorities had been properly implemented locally.

4.1. Comprehensive and restrictive land use regulations.

The promulgation of law 83 - 03 of February 5, 1983, relating to the protection of the environment took place from the first observations on the growth of various types of waste generated by economic activities and urban extensions. The post-1989 legal arsenal stipulates that land use must prevent any form of pollution or nuisance and guarantee a healthy living environment. Also, non-reversible use of land must be extremely limited and any land use likely to cause environmental harm is formally and previously subject to the impact study process.

The impact study or notice established by Executive Decree No. 07-145 of May 19, 2007 provides that the direct or indirect, immediate or distant impacts on species, resources, natural environments, ecological balances and on the living environment likely to be generated by infrastructure, fixed installations, factories, development and construction programs, must be avoided, limited or compensated.

4.2. Development, planning and control of urbanization-Case of Tleta.

The agglomeration of Tleta is originally a resettlement town inherited from the colonial period. It is located on a promontory, a little set back from the sea compared to Tassoust and Bazoul. Its location near the airport and one km from the port of Djendjen predisposed it to covetousness and illicit occupation of the land. The population of Tleta, which was less than 400 inhabitants in 1977, is estimated at 5,203 inhabitants in 2018, an increase of 13 times in 30 years.



Aerial Photo 1. Locality of Tleta in 1973. Source: Aerial photo from 1973 scale 1/20,000.



Satellite photo 2. Evolution of the agglomeration of Tleta. Source: Google Earth 2018+processing.

Given its peripheral location in relation to the town of Taher, the airport, the port, agricultural land and major roads (CW147 and RN43), local authorities have classified it as an urban development zone of the first degree. In order to control the disorderly spread of construction, it was declared a secondary agglomeration in 1987 to be integrated into the orientation plan for the development and town planning of the municipality of Taher in 1992.

Its longitudinal urbanization perimeter extends over an area of 112 ha intended to regulate the existing state of affairs and satisfy the needs of ever-increasing urbanization.

This small town was to receive housing and equipment programs but remains without urban structure and dominated by the spontaneous character of its built environment.

4.3. Administrative division and development programs.

The administrative division of 1984 which gave birth to new municipalities in the mountainous area was part of the revitalization of the sluggish and landlocked area on the one hand and the anticipation of the anthropization of the coastal strip on the other.

By virtue of an order of the Minister of Regional Planning and Urban Planning dated 01/10/1988, in addition to the ZHUN of Taher being made a reality, this vision should be strengthened by the creation of three (3) other new urban housing zones (ZHUN) with an area of two hundred hectares (200 ha).

The location, surface area, programs and spatial configuration of these ZHUNs (in the form of a crescent hugging the foothills), demonstrate the desire of the public authorities to meet the needs of socio-economic development in land for the entire region. and in turn the protection of the coastal strip.



Satellite Photo 3. Geographical location of the ZHUNs projected upstream. Source; Google Earth, Technical and administrative files of ZHUN projects.

4.5. Allocation of the coastal fringe to tourism.

By virtue of an interministerial decree dated 05/11/1988 under number 88/232 and declaring tourist expansion zones (ZET) on a national scale, the entire maritime coastline which extends over a distance of more than 9 km between the sea and national road 43 linking Jijel to Constantine, was allocated exclusively to tourism. This facade, which covered beaches, estuaries, forests, wooded dunes and agricultural activities, should serve as a base for two (02) ZETs over an area of 1096 hectares (Elachouat and Tassoust).

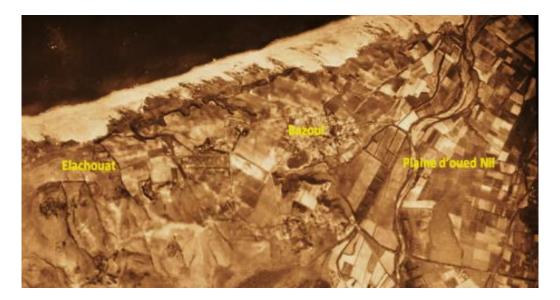
ZET	Area/ha	Initial situation
Tassoust	391	Bounded by Mencha river to the west and by Djendjen river to the east
Elachouat	705	Bounded by Djendjen river to the west and Nil river to the east
Total	1096	This area of dunes, forests and agricultural land should be protected given its original vocation

Table 3. Initial state of tourist expansion zones.

Source: decrees n° 88/232 of 05/11/1988.

The part between Bazoul and Oued Djendjen was reassigned to the power station and the port of Djendjen and the rest of the area was the subject of tourist development studies in the early 1990s. The integration of the planned projects with the local economy (commerce, culture, leisure, water sports, hunting and underwater fishing, etc.), the protection of biodiversity (fauna and flora) and natural potential constituted major issues in the related studies (development plans and plot plans). Despite the establishment of various local structures for the promotion of investment, these projects could not be properly implemented.

The rest of the tourist expansion zone (ZET) of El Achouat, that is to say the eastern part between Oued Nil and Bazoul, has continued to decrease since the beginning of the 1990s due to crossings the railway, the gas pipeline, the new route of the RN 43 and the disproportionate extensions of the buildings for different uses.



Aerial photo 2. State of affairs of the coastal fringe – Elachouat – Bazoul in 1973. Source: Aerial photo /1973 Scale 1/200,000.

The attachment of owners to the land and agriculture in this new area which was allocated to tourism, overcame the upward trend in the land market and tertiary activities. This reality, which was a significant event in the coastal strip of the wilaya of Jijel in general, is now consolidated by the will and encouragement of the higher state authorities.



Satellite photo 4. New limits of the ZET of Bazoul. Source: Google Earth + decrees n° 09/338 of October 22, 2009.

In this same context, the Tassoust ZET, which initially covers a state-owned area of 391 ha, has continued to decrease under the effect of urbanization. At the beginning, its perimeter extended from wilaya road 147 (ex RN 43) crossing the agglomeration of Tassoust to the south, to Oued Djendjen to the east and to Oued Mencha to the west. Its current surface area only represents 50 ha, however that infected by urbanization actually represented agricultural and natural spaces.



Aerial photo 3. Tassoust area in 1973. Source: Aerial photo 1973, Scale/200,000.



Satellite photo 5. Perimeter of the Tassoust ZET is invaded by construction. Source: Google Earth + processing.

5. Factors and perspectives.

At the beginning of the 1980s, the study area was still marked by its beaches, dunes, forests, lakes and agricultural land. In order to control urbanization and preserve these natural spaces, the state has taken an anticipatory approach by implementing urban planning instruments PUD, PDAU, POS and ZET downstream and development tools in upstream (ZHUN).

Under the effect of the precariousness that has marked the mountainous area, relayed by interference in the application of town planning rules and environmental protection, the coastal strip has become a place of accumulation in the disorder of populations and informal areas of activity and commerce.

In addition to early regulations for environmental protection, the State has planned housing and equipment programs (ZHUN) upstream while allocating the coastal zone to tourism and the

environment (ZET). These measures were not accompanied by rigorous monitoring and appropriate application at the local level.

The waterproofing of soils and the extraction of marine sand to meet the needs of construction sites and public works have contributed to the irreversible disappearance of the coastal dune barrier and important agricultural and forest areas with all the ecosystem they contain.

The lack of creation of business zones and residential subdivisions has contributed to the emergence of a private land market disregarding the general rules of development, town planning and environmental protection.

The provisions of Law 90-29 relating to the association of neighboring municipalities in the development of intermunicipal PDAUs were not taken into consideration by local stakeholders. As a result, local management of the territory has not resulted in the implementation of a concerted development project capable of going beyond the paradigm of administrative limits and the territorial skills of local actors.

Reconciling the protection of the coastal strip with the needs of urbanization and the imperatives induced by large infrastructures and installations, requires the promotion and development of new urbanization zones upstream and the emergency construction of several stations. wastewater treatment and waste treatment centers. The establishment of the latter must meet essential criteria: geological nature of the soil, absence of nuisance for local residents, nature and agriculture, accessibility, land control, management, quality and cost.

These actions require the implementation of a global land-use planning strategy including going beyond the paradigm of administrative limits, understanding the study area with its hinterland (the upstream area) as a single geographical piece. as well as the establishment of the principles of territorial solidarity and the involvement of local civil society in the choice of development variants and development projects.

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