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GREEN SPACES BETWEEN WATER SHORTAGE AND GREED FOR URBAN SPRAWL, SUPPORTED BY FIERCE SPECULATION: CASE STUDY, THE CITY OF M'SILA

Abstract: Water and green spaces have an existential, sometimes conflicting, relationship with urban sprawl, especially in regions with arid climates. Both are important elements of the urban composition that provide psychological and sanitary comfort and are economically, socially, and ecologically necessary for the population. By green space, we mean fruit trees and the cultivation of cereals and vegetables, which represent the main economic resource for the majority of the population of the city of M'sila. Our research aims to highlight the impact of the drop-in water from the Ksob dam. The only source of irrigation for climatic and management reasons, on the degradation of green spaces and their transformation into bare land without economic value, then into nurseries for urban planning. The consequences of the directives of the urban planning master plan (PUD 1976) are certainly catastrophic; water, demography, urban planning, and the future of the agro-pastoral vocation and green spaces of the city of M'sila. The data available and the technique used allowed us to include the period from 2017 to 2021. The numerical data shows the upward curve of urban expansion from 3,401.67 hectares to 3,969.28 hectares, the reduction of green spaces from 7,732.68 hectares to 3,802.77 hectares in just five years. There is similar trend for water which is reduced from 30 million m^3 in 1972 to 3 million m^3 in 2021, ten times less in 40 years. These figures reflect the seriousness of situation.

Key words: water, green spaces, urban sprawl, urban composition, ArcGIS, Ksob dam, M'sila

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Introduction

The new city concept is no longer limited to the urban perimeter but goes beyond it, the concept of city territory. This includes its sphere of influence, and it is a broader field than the urban perimeter. “Natural and agricultural” green spaces, as well as watercourses or bodies of water, are both elements of the natural landscape and the urban composition. The city is an interactive social, economic and cultural space, which needs “material and immaterial” elements to survive. It is also a “natural and animal” ecological space that is complex, fragile, and requires compliance with the rules of its preservation. Ensure the coexistence of its components and the urban comfort of its inhabitants. Put ecological processes and biodiversity at the heart of the urban project. It is no longer a question of integrating nature into the city, but of creating an urban ecosystem. It is no longer a question of building a human settlement, but of giving as much importance to buildings as to buildings (Philippe, 2020).

Although Algeria has taken all of this into account in its national or regional land use planning tools (SNAT, SRAT). In particular, the Wilaya Development Plan (PAW) also the Urban Coherence Plan (SCU), and the Development and Urbanism Plan (PDAU, POS). The reality of our cities requires a great deal of effort to achieve harmony between these components. Urban sprawl to the detriment of green spaces is one of the most dangerous manifestations of the violation of these rules; mainly the foundations of sustainable development. In M'sila, the climate and the lack of water control have certainly contributed to worsening an already fragile situation. The lack of water from the Ksob dam caused the drying up of green spaces, ending up as bare land with no economic interest for its owners. Then, it became an incubator of illicit constructions, causing an economic, social, and environmental imbalance. By green spaces, we mean all the cultivation of cereals, vegetables, and fruit trees, in particular the apricot trees, which are the pride of the city of M'sila, as they are considered heritage. To position oneself epistemologically on the object of study to justify our research approach, it is necessary to look at studies close to ours.

After determining the assets of public green spaces and their impact on the urban landscape, as well as the urban well-being of its inhabitants, investigation is led through the historical approach. The authors of this research referred to the decline of green spaces in the city of M'sila to the arid climate; density more than urban sprawl and the failure of urban management (Mili et al., 2019). The tourist town of Bousaada is the gateway to the desert, known for its oases scattered throughout the city and on its edges. It is considered a heritage of the city. These green spaces are threatened by urban sprawl, they use the arc GIS technique to quantify these green spaces to preserve them (Ouzir et al., 2021). Bodies of water and green spaces positively affect the urban microclimate, lowering temperatures. Mila represents the typical example with its largest dam in Algeria. This work consists of measuring the magnitude of this effect using remote sensing (Gherraz, 2020). Guelma is known for its dense vegetation. The authors of this study also measured the degree of impact of this vegetation on temperatures using remote sensing technology (Guechi et al., 2021). The Iraqi city of Erbil with an arid climate, without an urban plan, has been known a great urban expansion, a consequence of a demographic explosion to the detriment of the cultures, and a source of subsistence for the majority of these inhabitants with overexploitation of natural reserves, including water. The repercussions are dramatic in environmental, economic, and social terms. Using the ArcGIS technique, the authors of this work were able to measure the extent of the damage (Muayadet al., 2021). The sixth example

deals with the phenomenon of landscape fragmentation in cities due to urban expansion and condensation. One of the most important reasons is the deterioration of the quality of the environment and the deterioration of biodiversity. Beijing-Tianjin-Hebei (BTH) urban agglomeration was taken as a case study. Through the analysis of multiscale landscape models and statistical analysis, the characteristics of spatio-temporal evolution and their impact on the fragmentation of agricultural land, then grassland and water (Chu et al., 2022) Based on the example of the city of Lahore in Pakistan researchers have tried to highlight the increasing rate of urbanization, and therefore urban sprawl, and its social, cultural, economic, and environmental impacts. Researchers used the supervised image classification method. The results observed are surprising for the impact of urbanization on the city (Farid et al., 2022).

The researches to which we have referred, as well as our own, all agree on the environmental, health, and social impact of green spaces on the population and its effects on bodies of water, on the softening of the atmosphere by the creation of a microclimate favourable to urban comfort, particularly in cities with an arid climate, all of which are threatened by urban sprawl due to an unprecedented acceleration in the rate of urbanization. Our contribution highlights the economic importance of green spaces in the city of M'sila, as a source of income for their owners. The decrease in irrigation water from the Ksob dam has caused the drying up of green spaces located in the centre and on the outskirts of the city of M'sila to become bare land, an incubator of urban sprawl, forcing its owners to convert to crafts and activities other than agriculture. The inability of planning and town planning tools to orient the economic movement according to the human and natural capacities of the city of M'sila and to propose urban solutions protecting these green spaces, as well as deficiencies in the management of water and city sectors.

All these benefits are threatened by urban sprawl, the result of an unprecedented rise in the rate of urbanization. Our contribution is to highlight the economic importance of green spaces as a major source of livelihood for the majority of the inhabitants of the city of M'sila. Without material interest, green spaces after their drying up and transforming into bare land by lack of irrigation water, their owners are obliged to make them a profitable destination. The inability of urban planning and development tools to direct economic development according to the human and natural capacities of the city of M'sila. To propose urban solutions those, protect these green spaces.

The objective of the study is to demonstrate, through measurable values, that the lack of water from the Ksob dam has led to the drying up of green spaces, located in and around the city of M'sila. Source of subsistence for their owners. Converted into worthless bare land, becoming an incubator for urban sprawl, in violation of the principles of urban planning and development mentioned in law 29/90 of 18/11/1990. The Master Plan for Urban Development and Planning; (PDAU) (URBAS, 2012). In its initial version in 1996 and its revision in 2012, this confirmed the agropastoral vocation of the M'sila region to propose conceptual solutions favouring the protection of green spaces. On the contrary, it has contributed to the spread of urban sprawl, combining the already unfavourable climatic conditions with the challenges of managing the water sector. Algeria's strategy of managing the supply depends on managing the water demand. All these constraints have aggravated the already dramatic situation of green spaces. The consequences are dramatic, in all aspects; urban, environmentally, sanitary, social, and economic.

Methodology and Tools

In this study, an annual 10-meter map of the Earth's surface was used from 2017 to 2021 from the ESRI website, which is a high-precision land use map, open source, accurate, comparable, and timely for decision makers from many sectors and developing countries enhances existing land classification models with artificial intelligence (AI) by Azeri, by combining a large data set. These models were applied to Sentinel-2 satellite imagery for each year from 2017 to 2021 - over 2,000,000 Earth observations from 6 spectral bands to produce maps. These maps provide an understanding of land use change issues important to land and surface water use planning and resource management strategy. In addition, national government resource agencies use land use/land cover as the basis for understanding trends in a country's natural capital, helping to determine priorities for land use planning. The result provides a surface map of 9 categories, including vegetation types, exposed surface, water and land, crops, and built-up areas. These maps are available on Arc GIS Living Atlas of the World.

Land use or land cover maps are a snapshot in time, but natural processes and human activity can quickly alter the landscape. Often, these maps take several years between obtaining the data and making the maps available. The unique machine learning approach used to create these global maps can process an entire year of observations in a matter of days. This means we can produce the most timely land use analysis for the delivery year and use time series to detect changes. To facilitate change analysis, we have pre-processed several layers showing how land use has changed from 2017 to 2021 to understand the change in the study area.

In addition to the use of the temporal process in connection with the degradation of green areas, whenever the water shortage occurs, the Ksob dam is due to climatic factors, as well as related to the management and maintenance irrigation facilities “the Ksob dam and irrigation canals”, retained the place of urban sprawl and the reproaches brought to the referent tools of development and town planning. Especially with the administrative status of the city of M'sila acquired in 1974 as the capital of Wilaya which imposed an accelerated pace of development, as well as changes in all areas such as economic, social, environmental.

Historical Approach

Thanks to this approach, we can locate the period of coexistence of the city with its environment, and the stage where this coexistence ended. Using a periodic rhythmic chronological order, we will target the referent mutations of the city of M'sila and estimate the uses of green spaces by the lack of water from the Ksob dam filled by urban sprawl.

Quantitative Descriptive Approach

Through an analysis that seeks to define the impact of the existential relationship of green spaces and water on urban sprawl, and to highlight the economic importance of green spaces for their owners we seek to find out, apart from water, what are the most important reasons for the degradation of green spaces and the spread of urban sprawl.

Investigations Methods

Through the work of investigating planning, management, and special tools and the prerogatives of the sectors responsible for their development and execution, and whether these

factors are taken care of, as well as the solutions, proposed, as well as knowledge of the authorities concerned by this phenomenon.

Study Area

M'sila is a steppe region located north of the Hodna plain. It is part of the central highlands, according to the classification of the regional land allocation plan (SRAT) for agropastoral purposes; in the north, the cultivation of fruit trees, in particular apricot trees, in the south of vegetables and cereals. Located 240 km east-central of the capital, its location has made it the meeting point of the intersection of North, South, East, and West. The gold of the administrative division of 1974. It was promoted to the capital of Wilaya, at the head of 15 daïras and 47 municipalities. Its population exceeds one million inhabitants, according to the last general census of the population of Algeria in 2008. The population of the commune of M'sila in December 2021 was 247,985.

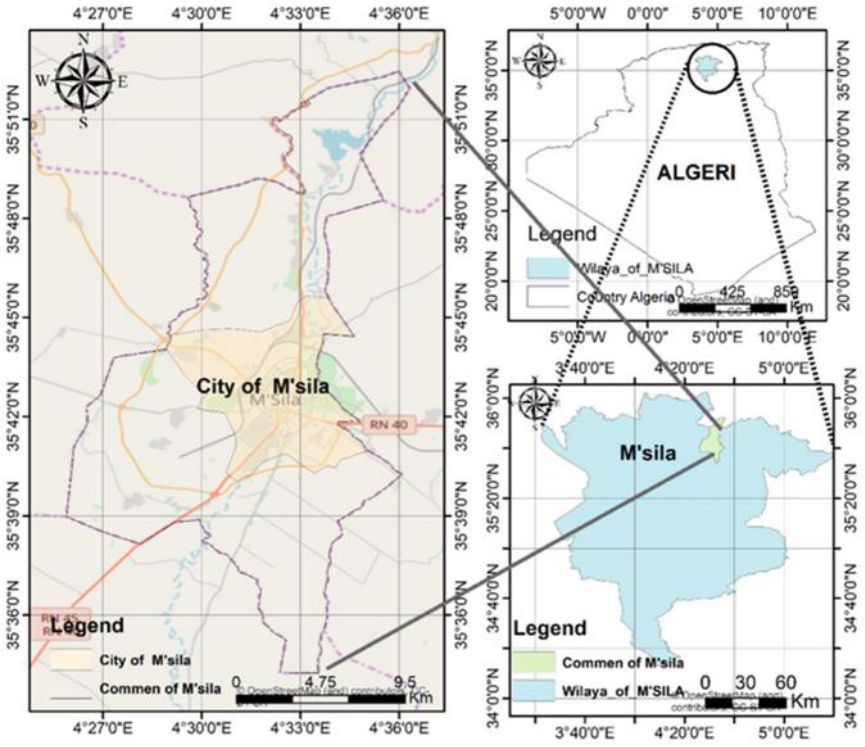

Fig. 1. Location of the Study-Area City of M'Sila (Source: Dehimi & Dadjab, 2019)

Results and Discussion

In an urban chronological study of the city of M'sila, we note that Oued Ksob represents the structuring axis of the urbanization of the city, where the old districts of M'sila were located on its banks. These ramifications constitute secondary structuring axes for the remote districts of the wadi. Each neighbourhood has its own green spaces and the city as a whole is surrounded by a green belt; to the north, fruit trees are located, mainly apricot trees. They, as pride of the city of M'sila, are considered its heritage. The east and west is covered in

vegetable and cereal crops, especially wheat and barley. The importance of water and green spaces for the city of M'sila does not only lie in the aspect, aesthetic or ecological and urban. As two of the most important elements of the urban composition, but are two essential elements of economic and social life, since the majority of the inhabitants of M'sila live from agriculture, and livestock (Figure 2, Figure 3).

Fig. 2. Wadi Ksob, vital element and structuring axis of the city of M'sila (1960)

Fig. 3. It highlights the size of the green spaces and their harmony with the urbanization of the city (1974)

With the entry of colonialism, the city has not changed much, apart from the typical aspect. Local urbanization of an organic nature to European urbanism with a checkerboard composition of the buildings to the different networks (roads, water, sewers, and electrical networks), as well as new construction materials is used. Water and green spaces have kept their previously acquired roles, although this new state of affairs has suffocated the old town, and limited the agricultural activity of the natives in favour of the new arrivals (Figure 4).

Fig. 4. Despite the contrast between the European urban plans of the French colonizer, with that of the local urbanization of the city of M'sila, they tell an exciting story of cohabitation between green spaces, water, and urbanization (Source: Mili et al., 2019)

The colonizers cultivated by monopolizing the most fertile lands of M'sila. They have invested in growing fruit trees like apricots, vegetables, and grains of all kinds. New methods and mechanical means have led to the increase in production to the point of being able to export to France (Figure 5). The business is lucrative; we are seeing an increase in green spaces. In 1943, this required the construction of the Ksob Dam with an estimated volume of water of 12 million cubic meters and a network of irrigation canals of suspended land to irrigate the Hodna Plain.

Fig. 5. In addition to the economic benefits of green spaces, the charm of the view stands out: the apricot tree of the settler "Fourni" owner of several like this one has more than 3000 trees on the north-west bank of Oued Ksob. In 1974, we witness the construction in this place of the Grand Hospital of M'sila, schools, housing programs, and other public facilities

After independence, the city of M'sila became the capital of the daïra, administratively attached to the Wilaya of Sétif. Hence, the emergence of a few nuclei of illicit neighbourhoods to the detriment of green spaces, particularly on the eastern and western slopes of the city. During the period from 1966 to 1977, the population increased from 35,395 to

52,588 with an effective growth rate of 4.04% (Table 2). Despite this strong demographic increase, the situation in its general form is manageable. Thanks to the subsidy program of the World Food Organization (FAO), M'sila planned for this expansion program the planting of fruit trees, then the raising of the Ksob dam in 1972. To achieve a capacity to mobilize 30 million cubic meters of irrigation water (Figure 6).

Fig. 6. Flowering green spaces thanks to the availability of water and a breathtaking view of the oued Ksob on the northern outskirts of the city of M'sila (1980)

With the administrative division of 1974, the city of M'Sila became the capital of the Wilaya, supervising 15 dairas and 47 municipalities. This new status allows it to benefit from an important specific development program, including projects of different types of housing, public facilities, an industrial area, and other activities and storage. M'sila has become an area of demographic attraction and the future of farmers is threatened. The fatal consequences of the master plan on the future of the city (URBAS, 1976) are due either to a lack of competence or the speed of study. The location of the industrial area south of the city has limited urban expansion in this direction.

After 1990, the promulgation of Law 29/90 of 12/1/1990 on urban planning is registered, whose most influential rules promote the protection of agricultural land and green spaces. Development and urban planning studies must integrate the environmental approach, but the political situation in Algeria during this period has intensified the phenomenon of illegal construction. Especially at city entrances, at the expense of green spaces, which became bare due to lack of water from the Ksob dam, no more than three million cubic meters, according to the organization in charge of managing the irrigated perimeter. This amount of water cannot meet the demand for irrigation water, especially during the hot season, which exceeds half the year. DSA & Services confirm the decline in cultivated and fruit areas, mainly in the northern part of the city, and the catastrophic fall in the production of fruits, cereals, and vegetables. With the reduction of water from the Ksob dam and the containment of agriculture, the influence of water and green spaces as important elements of urban composition has passed. Planning and urban planning instruments have accelerated the solutions that can save the situation. Even worse, they integrated the land sent to the urban perimeter. The Urban Coherence Scheme (SCU) indicates that the tissue was multiplied by 10 compared to that from 1970 to 2008 (Table 1). While the population of the commune of M'sila has more than doubled (Table 2), of course to the detriment of green spaces. The Real Estate Agency of the Commune of M'sila, since its creation, has created 22 housing estates with 12,000 plots. The collective and individual housing programs and the accompanying equipment provided by the State should not be forgotten.

Tab. 1. Galloping evolution of M'sila.

The year	1970	1998	2008
Urbanized space (HA)	240	1970	2500

Tab. 2. The urban explosion of M'sila.

The year	1966	1977	1987	1998	2008
Total	35395	52588	82877	121688	156674

Tab. 3. The urban explosion of M'sila.

The period	1977-1966	1987-1977	1998-1987	2008-1998
The average in %	4.04	4.56	3.55	2.70

The unfavourable conditions mentioned above are stronger than the attempts of owners to preserve their green spaces, which have become bare land without economic interest, under the pressure of need and the magnitude of temptations. They sold them to be invaded by urban sprawl. Oued Ksob is still the structuring axis of the city of M'sila, but without the soul of life, becomes an estuary of all kinds of instabilities and sources of pollution. The town of M'sila has lost its urban identity and its agropastoral vocation. All this has had economic and social repercussions, but also natural and environmental ones (Figure 7).

Fig. 7. Oued Ksob represents the pride and glory of the city and has become a source of pollution and an obstacle to its construction (Source: Authors, 2022)

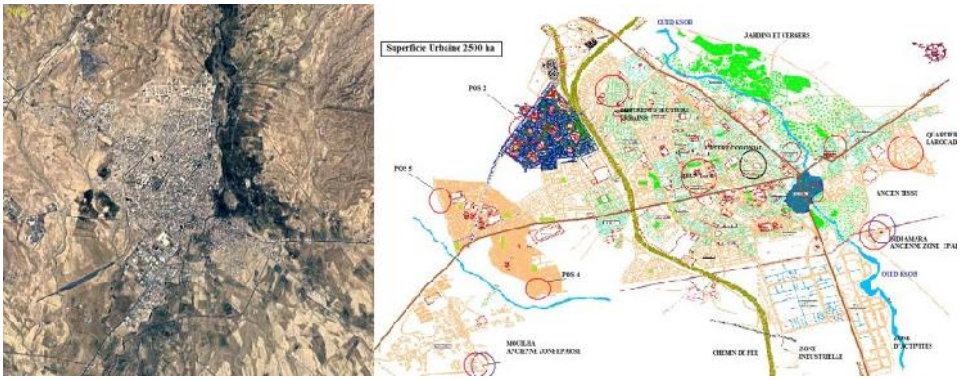

Fig. 8. Urban sprawl of the city of M'sila. Shows the extent of urban sprawl to the detriment of green spaces and the emergence of illegal constructions. The location of the industrial zone limits any urban expansion of the city towards the south of the city (Source: URBAS, 2012)

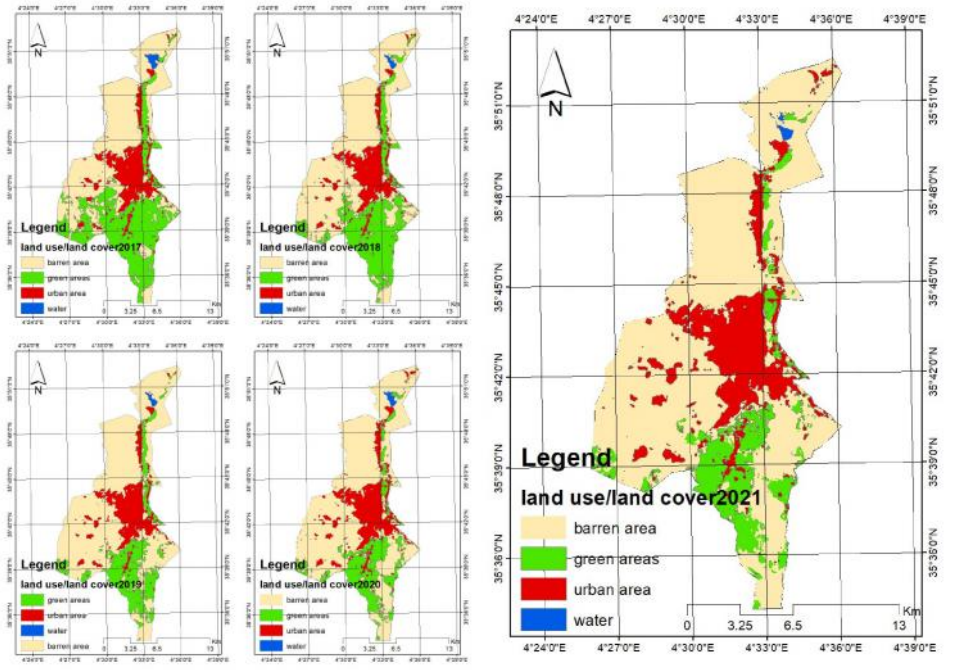

Fig. 9. Indicative plans for green areas, bare land and urban areas and the water surface of the Ksob dam. Illustrative schemes shown for the growth of urban expansion at the expense of green area. With the ability of fallow barren area the pressure of speculation to be an incubator for illegal construction, and to keep pace with the planning and reconstruction plans for it, and as a sample we chose for the period from 2017 to 2021

The inverse relationship indicates that when the water in the Ksob dam decreases, green space decreases and urban sprawl increases. The technique adopted allowed us to include the period between 2017 and 2021, in five years (Tables 5 and 6).

Tab. 5. The time change of land uses from 2017 to 2021.

Year / Area in H a	2017	2018	2019	2020	2021
Water	73.69	196.34	168.21	97.53	105.08
Green areas	7 732.68	6 109.37	4 215.36	4 189.28	3 802.77
Urbain area	3 401.67	3 450.32	3 540.89	3 775.77	3 969.28
Barren area	12 112.19	13 564.21	15 395.77	15 257.67	15 443.10

Tab. 6. Percentages of time change of land use from 2017 to 2021.

Rate % / Type of occupancy	2017	2018	2019	2020	2021
Water	0%	1%	1%	0%	0%
Green areas	33%	26%	18%	18%	16%
Urbain area	15%	15%	15%	16%	17%
Urbain area	52%	58%	66%	65%	66%
Global Rate	100%	100%	100%	100%	100%

Before discussing the observed results, it seems to us necessary to know the modalities of development of the "natural and urban" spatial planning tools. As well as the planning and town planning of "urban agglomerations", which they took into account in taking into account the elements discussed in our study. Of their legal value once approved; of the institutions responsible for their elaboration and implementation, and the nature of their relations.

Overview of Spatial Planning and Urban Planning Tools

Planning is the basis of all development; previous analyses have revealed the alarming reality of urban sprawl at the expense of green spaces. The main reason we have put forward is the shortage of irrigation water from the Ksob dam. Thanks to these tools, which make it possible to identify, through a systemic analysis, all the reasons for the phenomenon studied, then to propose solutions to reduce the degradation of green spaces and find other sources of irrigation water.

National Spatial Planning Scheme (SNAT). Prospecting, planning, and decision support tool, which defines regional schemes, proposes administrative divisions and aims at an integrated and equitable economic development policy between the different regions to avoid the creation of zones of demographic polarization.

The Regional Land Use Plan (SRAT). SRAT is a tool for prospecting, planning, and decision-making that defines the socio-economic development policy for a part of the national territory set by the SNAT. M'sila is part of one of the nine regions of the country, called the Central Highlands, with the Wilaya of Djelfa and Laghouat. In an area of steppes with an arid climate, agropastoralism is its dominant vocation. Contrary to this, M'sila is designated by the same tool; the center of the building materials industry, a consumer of water, which requires many hands of work, promotes urban sprawl and accentuates the catastrophic situation of green spaces.

Wilaya Development Plan (PAW). Its purpose is the development of the Wilaya under the guidance of the SRAT; The PAW is a tool for prospecting, planning, and decision support for the M'sila Wilaya. Certainly, from a development point of view, the city of M'sila has benefited from the status of the capital of Wilaya. Monopolizing the majority of the programs allocated to the Wilaya, to the detriment of the development of green spaces.

Urban Coherence Scheme (SCU). The SCU is a tool that seeks to strengthen the interaction of the different agglomerations of the Wilaya, and even outside the Wilaya. The status of wilaya's capital because the city of M'sila is a major pole of influence on human groups in the neighbourhood or far away. Especially with the monopolization of the activity of manufacturing of building materials in an area that includes three large wilayas of more than 3 million inhabitants. The project is initiated by the Ministry of the Environment, which has tried to encourage the tourism sector, a recommendation that cannot

stand with the guidelines of the three previous spatial planning tools, established by the Ministry of the Interior.

The Master Plan for Development and Planning (PDAU). The PDAU: Instruments of special planning and urban management, considered the top pyramidal tools of the urban space. Established at the initiative and under the control of the President of the Municipal People's Council. One of these missions is to divide the urban perimeter into sectors to control urban sprawl. However, the deteriorating financial situation of most municipalities and the modest human environment limit the municipality's ability to do so. The lack of design offices able to implement such devices, make them of limited interest and even worsens the situation.

Land Use Plan (POS). The POS; An instrument to define land use rights and building rules. The same observations which limit the possibility of correcting or at least limiting the deterioration of the situation by this instrument are cited above.

Through this brief presentation of planning and urban planning tools, or land use planning. We note that despite their decreasing and homogeneous hierarchies and the desired purposes entrusted by the legal texts to these tools. Their impact on the reality of our cities is catastrophic, and we refer to this either as gaps in studies or to their application on the ground.

The Institutions Responsible for the Management of Urban Areas, Green Spaces, and Water

After the overview on the tools of assistance to the decision; Knowledge of the organizations, their human and material means to accomplish the missions assigned by the regulation. The nature of the relationship between them helps us to know the real causes of the gravity of the situation of the phenomenon studied.

The Ministry of the Interior, Local Authorities and Regional Planning. A Ministry of State, supervising local authorities (Wilaya, Daira, and municipatily). These prerogatives include the preparation of land use plans. A task that is contested by the Ministry of the Environment, that of Urban Planning, which makes it, despite its importance, unstable. And the fact that one of its themes is the administrative division, subject to political considerations in the first place.

Wilaya. An administrative district under the supervision of several dairas and communes, managed by a senior official representing the central authority at the level of this region. Among these missions, is the development of the PAW.

Municipalities. The constitution of the Algerian state considers it the first cell of the state. It is run by an elected council under the authority of Wali. The Council represented by its President may deal with all matters relating to the development of the municipality through the procedure of the deliberations submitted for approval by Wali. Among its missions is the initiative for the creation, ratification, and implementation of planning and urban planning tools (PDAU, POS). But the financial situation of most municipalities in the country, as well as the modesty of their supervision, leaves doubt on the ability of the municipality to assume such missions.

Wilaya urbanism and architecture and city department. It represents the central authority of the State in matters of urbanism and architecture, and ensures the application of

the laws governing the jurisdiction. And merges and accompanies all local institutions, especially the municipality, in the preparation of Planning Tools.

Wilaya Water Hydraulics Department. It represents the central authority of the State in the field of hydraulics, its key mission, and the mobilization of water resources under its supervision; these bodies of water management and distribution:

- Algerian Water Company (ADE): Institution responsible for the management and distribution of water for the residential and industrial sectors and which depends on groundwater. The deficit of the distribution network exceeds 50%, due to a lack of budgets due to the very low rate of debt collection, exacerbated by deficiencies in management. (Algerian Water Company, 2021)
- The National Sanitation Agency (ONA): is the body in charge of the sanitation network, from where wastewater is routed to a purification and treatment station (WWTP). Instead of being used for irrigation, this water is discharged into the Oued Ksob. (ONA, 2021)
- The National Dams Agency (ANB): The management body of the Ksob dam; all decisions are centralized at the level of the capital, which remains powerless in the face of the magnitude of the problem of backfilling by siltation. (Agency, 2021.).
- The National Office for Irrigation and Sanitation (ONID): brings together disabled people from the management of ADE and ONID. (ONID, 2021)

Directorate of Wilaya Agricultural Services. It represents the central authority of the State in the field of agriculture, one of its missions is to ensure the promotion of the agricultural sector and to inform the supervisory authorities in the event of infringement, however, the lawsuits regulations for the preparation of development and urban plans, of which the DASW is a member, and there is no opposition or at least a reservation reported against this infringement.

Department of the Environment of Wilaya. It represents the central authority of the State in the field of the environment, despite the legal texts which are in favor of the protection of the environment, in particular the preservation of green spaces and natural resources, particularly water. And the irradiation of illegal constructions and all forms of pollution or nuisances, reality reflects the bitter truth.

Results

Thanks to the above analysis of the phenomenon of urban sprawl at the expense of green spaces, there are several reasons for this, in our research; we have targeted the lack of water as the main reason. M'sila is a steppe region with an arid climate. In summary, we found that the urban area of M'sila increased tenfold between 1970 and 2008. From 240 hectares to 2500 hectares according to the SCU (URBACO, 2008). Invaded all three directions except the south because of the industrial zone. The trampling of green spaces by urbanization is largely due to the lack of water from the Ksob dam. In addition to gaps in water management, in particular the dilapidated state of the irrigation system, the non-use of treated wastewater in agricultural wastewater treatment plants (WWTPs). The factors that have contributed to the drying up of these green spaces are found in bare lands without economic interest. Highly coveted by land speculation, which landowners cannot resist. In addition, the inability of urban planning instruments to find urban solutions has allowed the preservation of green spaces, combined with the apparent failure of the

authorities responsible for irradiating illegal buildings. For the considerations imposed by the site, check our hypothesis; the causes of the degradation of green spaces. The site used, with an indisputable accuracy of up to ten meters (10 m), allowed us only the period between 2017 and 2021. The graphs, using the AGIS technique, allowed us to measure areas with percentages of Reed Dam water area. And the areas of clear, pale, urban, and bare, pale green for each year, are listed in Tables 5 and 6, where we note the following: Urban land. The instability of the water surface of the dam due to climatic factors, as well as the silting phenomenon of the dam, and its general shape, and curvature, tend to decrease. As for green spaces, their reduction is clear in favour of an increase in urban surface area, and bare spaces are doomed to urbanization because of the end of their economic interest as green spaces. For example, the area of bare land in 2017 is 12,112.19 hectares, or 52%, which was originally green space. Green spaces for the same year were 7,732 hectares or 33%, the two represent 85% of the area of the city of M'sila. While the surface area of the urban area is estimated at 3,401.67 hectares, which represents 15%. In 2018, the area of bare land increased to 13,564.21 hectares, bringing the percentage to 58%, and the area of open green space fell to 6,109.37 hectares or 26%, and together they constituted 84%. A slight increase in the area of the urban area became 3,450.32 hectares, noting that the increase in the water surface does not mean an increase in the amount of water. The situation continues with the regression of green spaces in favour of bare land, an incubator of urban sprawl. In 2021, the situation is as follows: The area of bare land is 15,443.10 hectares or 66%. As for green spaces, they have shrunk to 3,802.77 hectares, more than half of what they were in 2017. The problem of a percentage of the dam expresses the terrible scarcity of its water. On the other hand, there is a notable increase in the surface area of the urban area to reach 3,969.28 hectares, bringing the percentage to 17%. That is an increase of 567.61 hectares in just five years, and these figures alone are enough to confirm the hypothesis that we mentioned in our study objective.

Conclusion

In conclusion that the relationship of green spaces with water is existential, very fragile relationships, influenced by many factors, some of which exceed human capacities, in particular climatic like M'sila. Both are elements of the urban composition essential to the physical and moral well-being of citizens. Indispensable for social and economic exchanges and the balance of the environment. In green spaces, we target fruit trees, especially apricot trees, the pride of the city and its heritage, cereals, and vegetables. Located inside and on the outskirts of the city of M'sila. Like water, these green spaces are the source of life for the majority of the inhabitants of the city of M'sila. Water from the Ksob dam, located north of the city, upstream from the Hodna plain, is the only source of irrigation for these green spaces. Apart from the climate, which is beyond human competence, all the factors that have negatively influenced the relationship between green spaces and water; in favour of unprecedented urban sprawl, are the consequences of human practices? The situation of the Ksob dam is due to the lack of development of these banks, and their basin. The total dependence of irrigation on water from the dam is the backlash of the Algerian State's strategy. Focused on water supply management rather than water demand management. The SRAT oriented M'sila towards the building material industry mortgaged the future of agriculture and made it a demographic attraction zone. The industrial zone's location on the southern outskirts of the city's “barren land” limits its logical expansion. For reasons due to the hasty development of planning and urban planning tools. However, due to a lack of

skills in the design offices, the M'sila PDAU of 1996 and its revision of 2012 failed to find urban solutions to preserve the green spaces which represent the lungs of the city. Our research may have highlighted the danger M'sila finds herself in and determined the causes for further work to find the solutions.

Conflicts of Interest: The authors declare no conflict of interest.

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