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Research Article

Evolution Of Natural Resources And Local Governance In The Commune Of Droum In Niger

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ABSTRACT

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The combined effects of climate variability and change, as well as human pressure, continue to strongly influence land use changes in Niger. In the commune of Droum, the diachronic analysis of the landscape shows that, like several other regions of Niger, there are significant transformations in the evolution of the natural environment. As part of this study, the exploitation of multi-date satellite imagery made it possible to trace the landscape dynamics in progress between 2005 and 2025.

The main objective of this work is to detect changes in land use and analyze the issues related to the exploitation of community natural resources in a context of local governance.

The methodology used consisted, on the one hand, of analyzing the bibliographic data, in particular that of the diagnosis carried out by the commune in 2015, which made it possible to highlight the potential in natural resources of the commune as well as the mechanisms of local governance. On the other hand, an approach based on the diachronic analysis of the study of land use from a supervised classification of satellite imagery which led to evaluating the evolution of the landscape of the commune.

The results obtained reveal that land use changes are characterized by increasing anthropogenic pressure, materialized by the extension of rainfed cultivation areas and the degradation of plant resources, in particular the wooded-shrubby steppe. From 2005 to 2025, the area occupied by the wooded-shrubby steppe decreased from 12.90% of the area of the commune to 5.90%. On the other hand, the rainfed crop/fallow mosaic unit marked an extension, increasing from 79.87% of the area of the commune in 2005 to 90.03% in 2025, while other units experienced progress (dense wooded steppe) or relative stability (rocky outcrop). In this context of increasingly widespread degradation of community natural resources, mechanisms in terms of local governance are applied for more sustainable management of these potentialities.

Keywords: Evolution, Local governance, Natural resource, Droum, Niger.

INTRODUCTION

Like many other Sahelian countries, Niger is also facing the degradation of natural resources, due to the combination of the harmful effects of climate, population growth and exploitation methods of the environment which are the determining factors [1]. However, the vital needs of the populations continue to grow, causing strong pressure on natural resources already weakened by physical factors, hence the need to provide decision-makers with reliable information on the dynamics of territorial resources [2]; [3], [4]. This is why the diachronic study of land use is a privileged approach for evaluating the interactions between Man and his environment and identifying strategies adapted to planned management of natural resources [5], [6].

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In Niger, the responsibility for managing natural resources lies primarily with the State through a legal and institutional framework governed by legal and regulatory texts (Constitution, Rural Code, Forestry Code, etc.), the application of which is often poorly perceived by rural actors, because despite these provisions forest and land resources are only deteriorating. Indeed, three categories of land administration (modern, customary and Islamic) are observed in Niger, although the legislative text (Ordinance 93-015 of March 2, 1993) provides for their integration.

Also, the installation of land commissions has gradually developed with basic land commissions at the village level (Cofob), communal land commissions (Cofocom), departmental land commissions (Cofodep) and regional permanent secretariats [7]. Like other municipalities in Niger, that of Droum is also subject to a landscape transformation, highlighting the ecological upheavals that have occurred. In this context characterized by increasing competition for access to and exploitation of community natural resources, the question of local governance of these resources is at the center of the debate of communal actors. Thus, the study of the dynamics of land occupation in this municipality makes it possible to understand the issues related to the sustainable management of these resources in view of the multiplicity of actors as well as the diversity of the typology of conflicts in order to provide appropriate responses.

Indeed, they exist in the municipality of Droum several mechanisms in terms of local governance of community natural resources, relatively adapted to the current socio-environmental context. These include traditional channels for preventing and managing conflicts related to their (natural resources) exploitation, to which are added state legal and regulatory texts, and recently Local Conventions as a new mode of local governance. Local Conventions are alternatives for participatory management of natural and land resources [8] in the face of the limits of legal and regulatory texts on the one hand and the often-conflicting coexistence of customary practices of managing these resources and regulatory provisions on the other. [9]. Hence the need for local management of renewable resources in the face of the multiple challenges that arise in order to strengthen local governance in a context of decentralization [10]. [11], [12], [13], [14], [15].

What is natural resource governance?
Reading the existing literature, particularly in the field of renewable natural resource management, local governance can be defined as a set of institutions, mechanisms and processes by which States, local communities and other actors involved manage these resources equitably and sustainably at the local level. In short, it is a transfer of skills from the State to local authorities in the management of renewable natural resources, according to an inclusive, participatory, transparent approach to the management of affairs entrusted to local authorities, the transdisciplinary competence of local actors, etc..[27], [28], [29].

MATERIALS AND METHODS

Study area

The rural commune of Droum is located in the Zinder region of southeastern Niger. With an area of approximately 870 km², it has 141 administrative villages and a population estimated at 102,306 inhabitants, for a density of 118 inhabitants/km² with a growth rate of 2.8.%. Agriculture and livestock farming are the main socioeconomic activities of the population of this communal entity with a Sahelian climate, whose annual rainfall ranges between 300 and 600 mm depending on the year. The relief, relatively homogeneous, is marked by a succession of plains interspersed with a few small plateaus. Surface waters consist of streams with seasonal flow and a few permanent and semi-permanent ponds. Groundwater resources are abundant and easily accessible in certain areas of the valleys where the water tables are reached at a depth of 5 m. The vegetation cover of the commune consists of a very rich but dispersed agroforestry park and a relatively poor herbaceous carpet. Overall, there is a continuous degradation of this vegetation cover due to overexploitation following the increase in population in search of cultivated land. This situation has also contributed to the withdrawal of fauna from this ecosystem to more suitable biotopes. It consists (fauna) of squirrels, hedgehogs, wild guinea fowl, wild rabbits, mice, reptiles and an important avifauna [16], [17].

Figure 1 presents the location map of the commune of Droum.

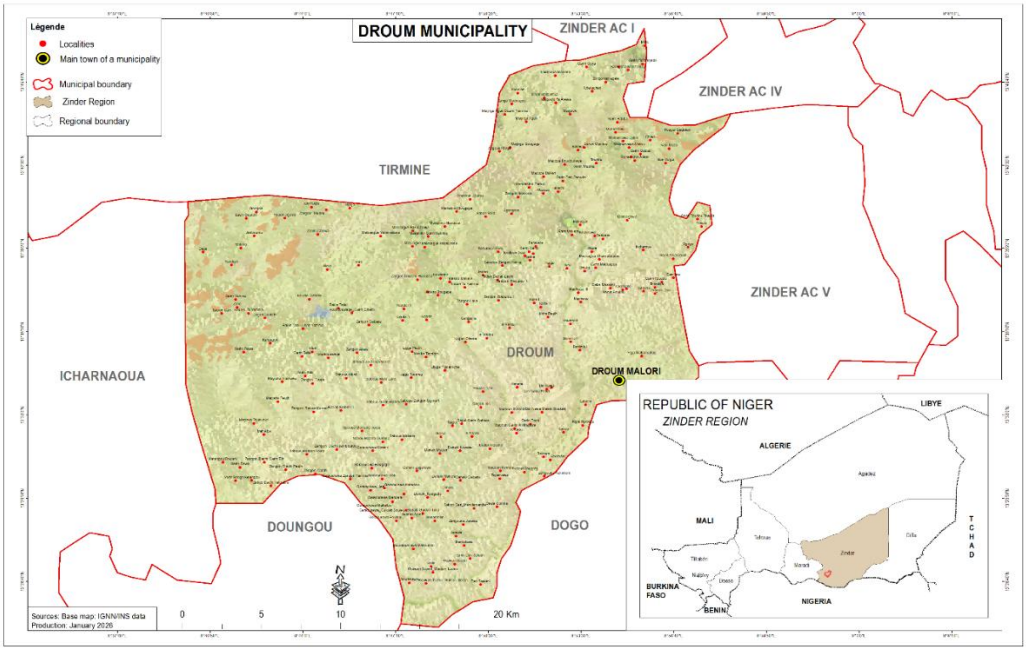

Fig. 1: Location map of the commune of Droum

Material

The material used consists of a GPS receiver for recording coordinates, image processing and Geographic Information Systems software (ArcGIS 10.8 and QGIS 3.X), as well as statistical analysis and graphing tools (Excel).

Basic data

For the diachronic analysis of the commune's landscape, existing data sources are used, including the administrative boundaries and localities of Niger from the IGNN. These are complemented by Landsat satellite images, whose characteristics are given in Table 1.

Tab. 1 : Characteristics of the Landsat images used

Image	Date d'acquisition Acquisition date	Path & Row
Landsat 7TM	December 2005	188-051
Landsat 8 OLI/TIRS	December2015	
Landsat 9 OLI -TIRS-2	December2025	

Methodology used

In the context of this study, the methodology used focuses on the analysis of bibliographic data, including that of the municipality's diagnosis carried out by the municipality in 2015, which highlighted the potential in natural resources of this administrative entity as well as the constraints related to their management, among other things. Also, interviews are conducted in 2023 with certain key actors (town hall, decentralized technical services, representatives of rural actors including village chiefs, etc.) on the evolution of community natural resources and their governance in a context of scarcity and multifaceted anthropogenic pressure. In total, around fifty people were interviewed as part of the interviews. On the other hand, it was based on a geographical and diachronic approach to the evolution of natural resources through the analysis of land use dynamics. To do this, Landsat 7 ETM+ (2005), Landsat 8 (2015) and Landsat 9 (2025) multispectral satellite images were processed by supervised classification in order to map land use. As for the changes that have occurred, they are understood through the spatio-temporal evolution of land use classes. This includes assessing the surface evolution of the different land use classes between two observation dates. Regarding conversion rates, they are understood from the measurement of the degree of conversion of a given class into other land use classes.

The annual rate of change (T) between consecutive dates is calculated according to the following formula [20]:

$$T = \frac{(\ln S_{i+1} - \ln S_i)}{t \times \ln e} \times 100$$

Where:
Si = Area of the occupation class at the date **i; Si+1 = Area** of the occupation class at the following date; **t** = Nomber of years separating the observation dates **Si** et **Si+1;**
ln = Nepirian logarithm and e = 2.71828 (approximate value of **e** from Leonard EULER).
This formula measures the average annual rate of change of a surface
or variable between two given dates [21].

The transition matrix

The transition matrix highlights the transformations undergone by land occupation units between two dates $\mathbf{t_1}$ and $\mathbf{t_2}$. It describes the changes in state of the elements of a system during a given period, the cells of which contain the value of a variable having passed from an initial class **a** to a final class **b** during the period from $\mathbf{t_1}$ to $\mathbf{t_2}$. It consists of **X** rows and **Y** columns. The number of rows in the matrix indicates the number of classes of land occupation at time $\mathbf{t_0}$; the number **Y** of columns of the matrix is the number of land occupation classes converted at time $\mathbf{t_1}$ and the diagonal contains the areas of the plant formations that remained unchanged.
The transformations therefore take place from rows to columns [22], [23], [24].

The Conversion Rate (Cr*)*

Of land occupation is calculate using the equation proposed by FAO in1996. The rate corresponding to the dynamics of each land occupation unit is calculated according to the formula of [25].

$$\mathbf{Cr} = [(\boldsymbol{S2} - \boldsymbol{S1}) / \boldsymbol{S1}] * 100$$

Where:
Cr: Conversion rate;
$\mathbf{S_1}$**:** the area of a class of surface unit at the date $\mathbf{t_1}$;
$\mathbf{S_2}$**:** the area of the same class of surface unit at date $\mathbf{t_2}$**.**
The data from the calculation results of the rate of change of land use will be preceded
by minus **(-)** or plus signs **(+)** to express a regressive or progressive [26].

The detection of land use changes

It is apprehended through the spatio-temporal evolution of land use units towards another stage (degradation, improvement, more or less stable equilibrium, etc.) accounting for all spatio-temporal variabilities. This dynamic makes it possible to synthesize the changes in land use classes that have occurred in the same landscape at different periods [25], [26].
In the context of this work, the detection was carried out with the MOLUSCE plugin (Modules
for Land Use Change Evaluation) of QGIS by crossing the classified images of 2005-2015 and
2005-2025). Figure 2 presents the conceptual diagram for data processing and analysis.

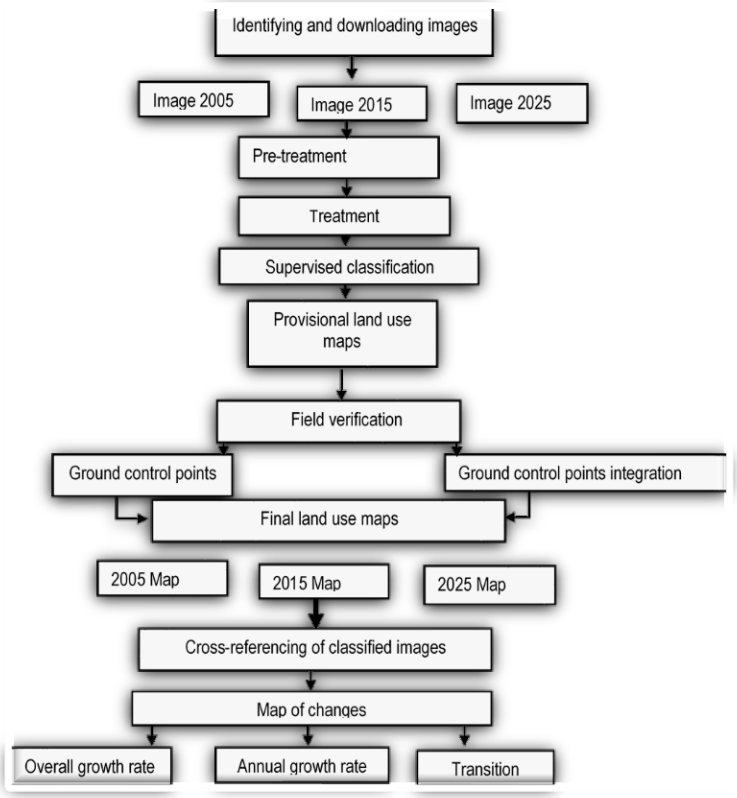

Fig. 2: Conceptual diagram for data processing and analysis

RESULTS

Land occupation situation in the municipality of Droum

The cartographic results of land occupation in the municipality of Droum are given by figures 3, 4, and 5. Overall, there is a regression of plant resources, particularly the wooded-shrubby steppe as well as the area of sand encroachment. On the other hand, the rainfed crop/fallow mosaic unit has expanded, while the rocky outcrop unit has remained relatively stable.

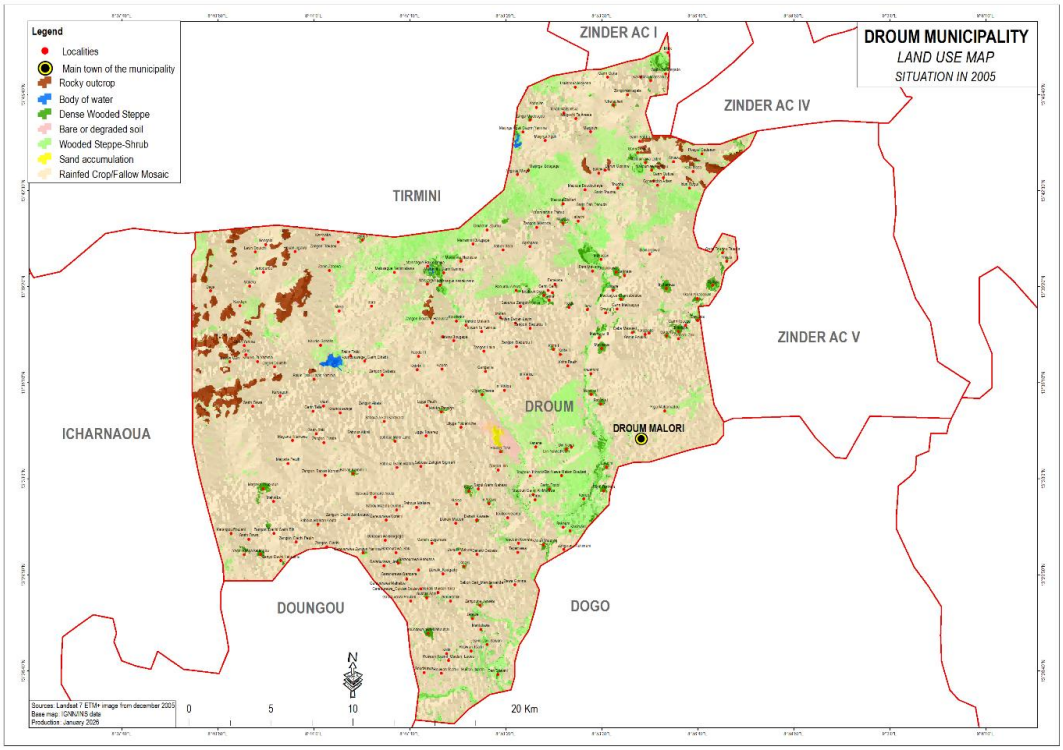

Fig. 3: Land use map of the municipality of Droum in 2005

In 2005, dense wooded steppe occupied 0.94% of the total area of the study sector with 710.12 ha, compared to 12.90% and 79.87% respectively for the wooded-shrubby steppe and the rainfed crop/fallow mosaic. Bare or degraded soils covered 4.83% of the municipality, compared to 1.98% for rocky outcrops and 0.28% for water bodies.

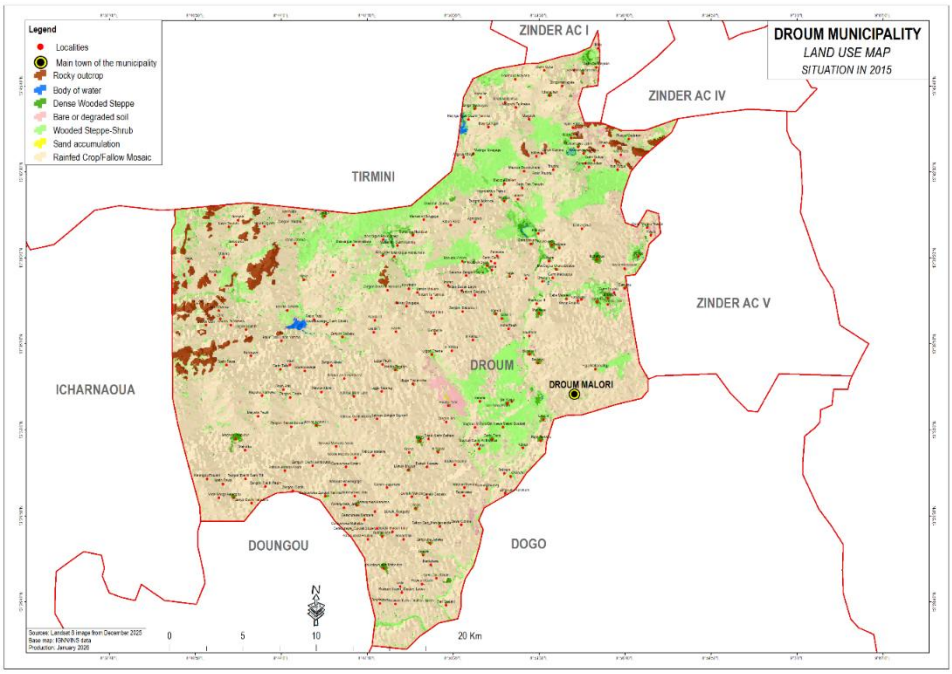

Fig. 4: Land use map of the municipality of Droum in 2015

The analysis of the 2015 land occupation map shows that 82.11% of the area of the study area was occupied by the rainfed crop/fallow mosaic with 61601.98 ha, compared to 9656.38 ha (11.94%) and 721.061ha (0.96%) respectively for the wooded steppe shrubby and dense wooded steppe. Bare or degraded soils represented 1.54%, compared to 0.27% for bodies of water and 0.006% for areas of sand accumulation, while rocky outcrops have a relatively stable area.

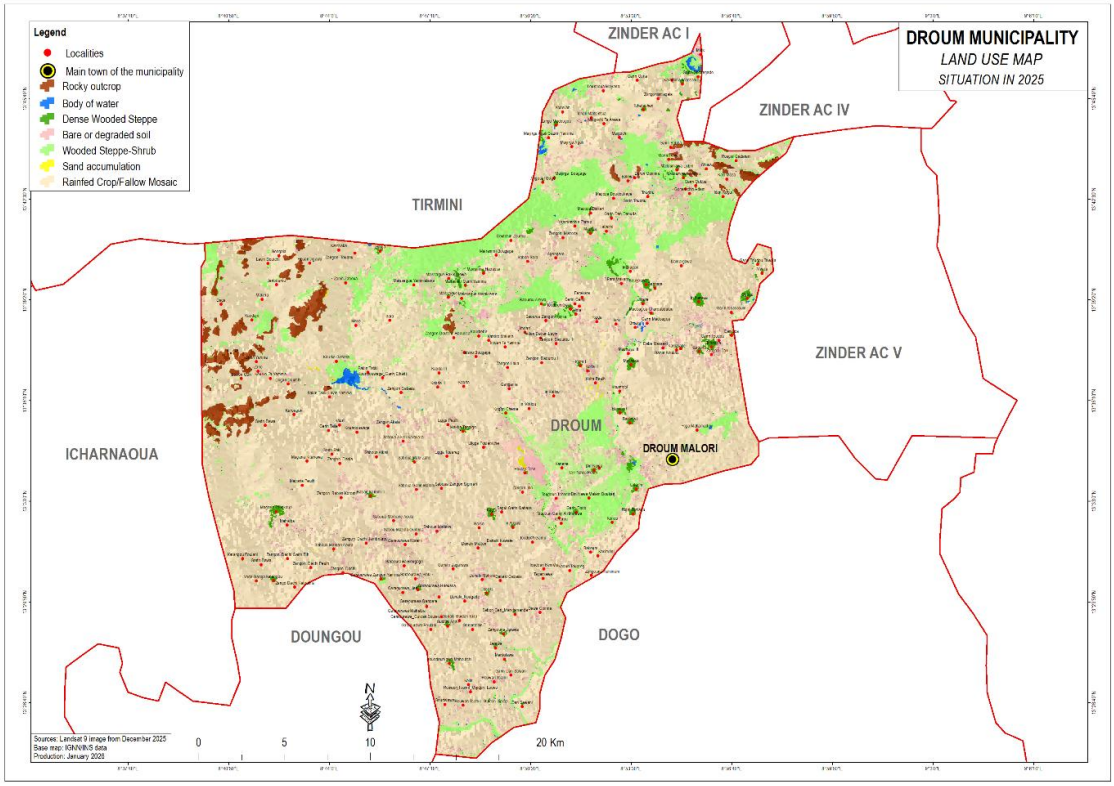

Fig. 5: Land use map of the municipality of Droum in 2025

In 2025, the landscape of the municipality of Droum is characterized by a regression of the wooded steppe-shrub unit, which covers only 5.90% of the area of the study area, compared to
11.90% in 2015 and 12.90% in 2005. On the other hand, there is an extension of the surfaces of the rainfed crop/fallow mosaic unit, which increases from 79.87% in 2005 to 90.03% in 2025. As for the dense wooded steppe, it has experienced a slight progression, increasing from
0.94% of the area of the study sector in 2005 to 0.96% in 2015 and then 1.27% in 2025.

Dynamics of land use between 2005 and 2025

The results of the spatio-temporal evolution of land use units in the municipality of Droum show that the wooded steppe-shrub is the most affected unit, with a reduction in its area from 12.90% in 2005 to 5.90% in 2025. On the other hand, the dense wooded steppe has seen an increase in its area, which increases from 0.94% in 2005 to 1.270% in 2025. The same applies to the rainfed crop/fallow mosaic unit, which increases from 79.87% in 2005 to 90.03% in 2025. As for bare or degraded soils, they have shown a regression in their areas, with a percentage of 4.83% in 2005 to 0.53% in 2025. Detailed statistics are given in table 3 below, while the dynamics of each land use unit for the years 2005, 2015 and 2025 is illustrated by figure 6

Tab. 3: Statistics of land use units of the municipality of Droum from 2005 to 2025

Land use units	2005		2015		2025	
	Area in ha	Percentage	Area in ha	Percentage	Area in ha	Percentage
Body of water	210.73	0.28	204.54	0.27	107.55	0.14
Dense Wooded Steppe	710.12	0.94	721.06	0.96	950.54	1.27
Bare or degraded soil	3617.52	4.83	1158.49	1.54	403.83	0.53
Rocky outcrop	1488.73	1.98	1488.73	1.98	1488.73	1.98
Wooded Steppe-Shrub	8956.10	12.90	9656.38	11.96	4417.21	5.90
Sand accumulation	76.72	0.10	5.18	0.006	90.98	0.12
Rainfed Crop/Fallow Mosaic	59776.55	79.87	61601.98	82.31	67377.49	90.03

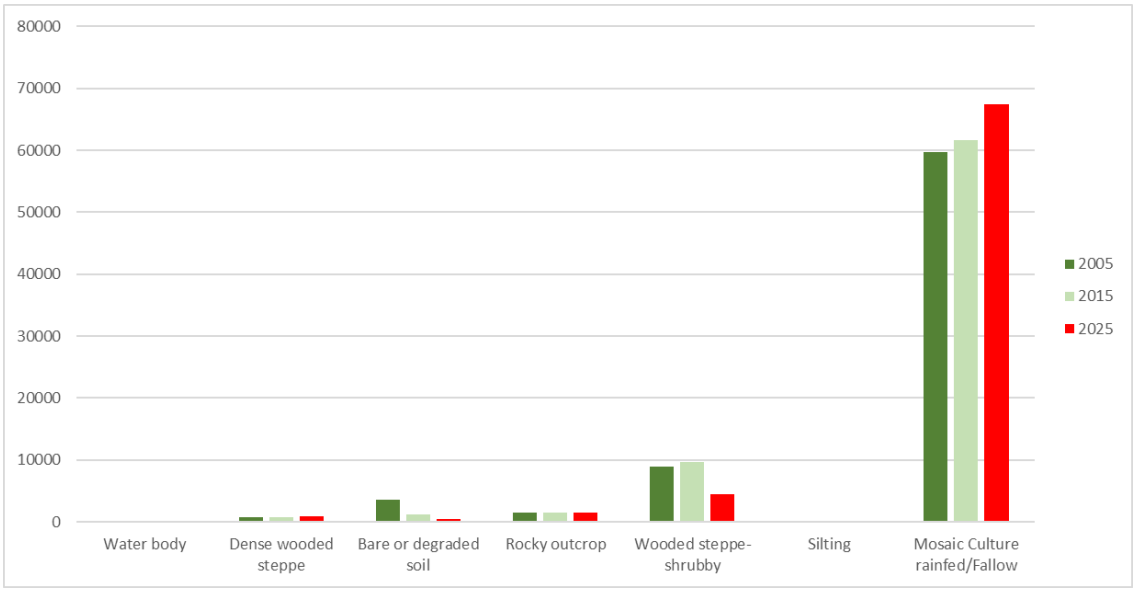

Fig. 6 : Evolution of land use units in Droum (2005-2025)

The overall rate of change of land use units 2005 and 2025

The analysis of the spatio-temporal evolution rate of land use units highlights a regression of the wooded steppe-shrubby, with a rate of **-1,98%**, and **-2,54 for silting.** Regarding this last unit, the observed decline is partly linked to the actions of restoration of degraded lands carried out in the municipality. On the other hand, the other units have progressed with rates that vary between **2,54%** for the mosaic Culture unit rainfed/Fallow and **5,83%** for the dense wooded steppe.

Tab. 3: Rate of change of land use classes in the municipality of Droum from 2005 to 2025

Land use units	**2005-2015**	**2015-2025**	**Nature**
Water body	-0,15	-0, 00	Regression
Dense wooded steppe	0,08	5,83	Progression
Bare or degraded soil	-5,69	0,79	Progression
Rocky outcrop	0,00	0,00	Relative stability
Wooded steppe-shrubby	0,38	-1,98	Regression
Silting	-13,47	-2,54	Regression
Mosaic Culture rainfed/Fallow	0,15	2,54	Progression

The analysis of figure 6 shows that the conversion rates between 2005 and 2025 vary according to the land use units considered. Over this period, bare or degraded soils, wooded steppe-shrubby as well as water bodies have decreased in area (negative values), while other units have progressed (positive values), with the exception of rocky outcrops which have remained relatively stable (zero value).
Figure 7 presents the annual rates of change of land use units in Droum (2005-2025).

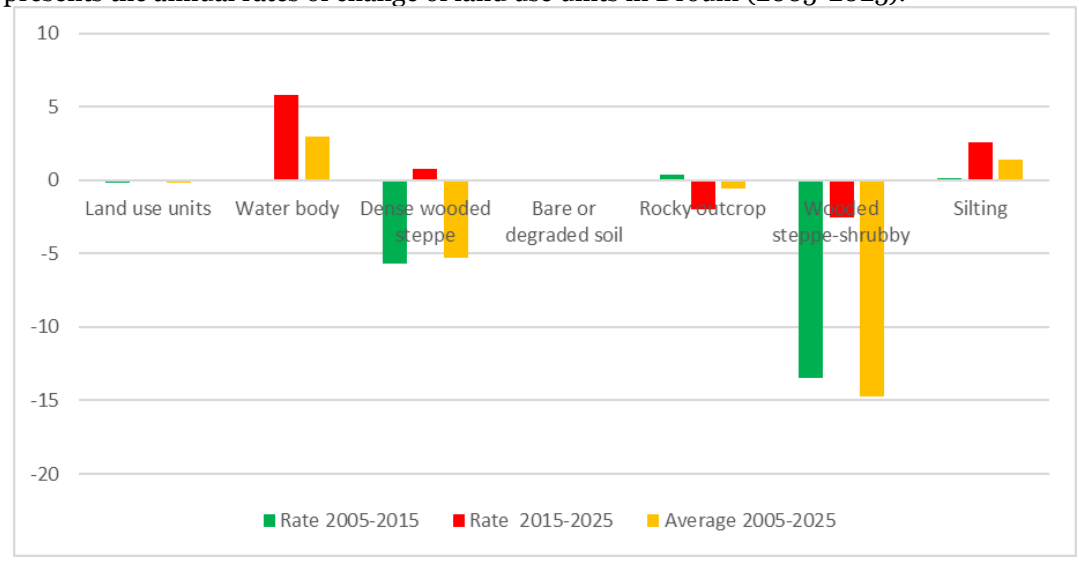

Fig. 7: Annual rates of change of land use units in Droum (2005-2025)

Identification of changes in land use

Regarding the diachronic study, the changes observed within each land use unit characterize their transformations in the landscape. The transition matrices expose the values for the years 2005-2015 and 2015-2025 through tables 4 and 5. Tab.4:
Concernant l'étude diachronique, les mutations observées au sein de chaque unité d'occupation des terres caractérisent leurs transformations dans le paysage. Les matrices de transitons en exposent les valeurs pour les années 2005-2015, et 2015-2025 à travers les tableaux 4 et 5.

Tab. 4 : Transition matrix in percentage (%) of land use units between 2005 and 2015

Classe (2015-2025)	Water body	Dense wooded steppe	Bare or degraded soilé	Rocky outcrop	Wooded-shrubby steppe	Sand accumulation	Mosaic Rainfed/Fallow	Total
Water body	0,990		0,010	0,000	0,000	0,000	0,000	1,000
Dense wooded steppe	0,004	0,992	0,000	0,000	0,000	0,000	0,004	1,000
Bare or degraded soil	0,010	0,000	0,988	0,000	0,000	0,002	0,000	1,000
Rocky outcrop	0,000	0,000	0,000	1,000	0,000	0,000	0,000	1,000
Wooded-shrubby steppe	0,000	0,005	0,398	0,000	0,228	0,001	0,368	1,000
Sand accumulation	0,000	0,000	0,000	0,000	0,000	0,984	0,016	1,000
Mosaic Rainfed/Fallow	0,002	0,000	0,084	0,000	0,026	0,001	0,887	1,000
Total	1,006	0,997	1,480	1,000	0,255	0,987	1,275	7,000

Tab. 5: Transition matrix in percentage (%) of land use units between 2015 and 2025

Classe (2015-2025)	Water body	Dense wooded steppe	Bare or degraded soilé	Rocky outcrop	Wooded-shrubby steppe	Sand accumulation	Mosaic Rainfed/Fallow	Total
Water body	0,970	0,020	0,010	0,000	0,000	0,000	0,000	1,000
Dense wooded steppe	0,004	0,993	0,000	0,000	0,000	0,001	0,002	1,000
Bare or degraded soil	0,010	0,000	0,986	0,000	0,002	0,002	0,000	1,000
Rocky outcrop	0,000	0,000	0,000	0,985	0,015	0,000	0,000	1,000
Wooded-shrubby steppe	0,001	0,078	0,398	0,000	0,228	0,002	0,293	1,000
Sand accumulation	0,000	0,000	0,000	0,000	0,000	0,984	0,016	1,000
Mosaic Rainfed/Fallow	0,002	0,010	0,011	0,000	0,001	0,000	0,976	1,000
Total	0,987	1,101	1,405	0,985	0,246	0,988	1,287	7,000

The analysis of tables 4 and 5 highlights the changes that have occurred in certain land use units for the periods 2005-2015 and 2015-2025. These matrices present, for each pair of years, the percentages of the transformations observed, the main characteristics of which can be summarized in terms of regression and progression. Thus, between 2005 and 2015, 0.77% of the area of wooded-shrubby steppe was transformed into other units, compared to only 0.11% for the rainfed/fallow mosaic cultivation unit. In addition, water bodies (0.77%), dense wooded steppe, bare or degraded soils, and sand accumulation zones have generally retained most of their areas.

Between 2005 and 2015, significant changes were observed within certain land use units. Thus, 0.77% of the areas covered by wooded-shrubby steppe were transformed into other units, including 0.36% into rainfed crops, 0.39% into bare or degraded soils, and 0.05% into dense wooded steppe, compared to only 0.22% that remained stable. As for the dense wooded steppe, it retained 0.99% of its initial area intact, while 0.008% was transformed. The rainfed/fallow mosaic cultivation unit also experienced changes, with 0.88% of its surface

remaining stable, while 0.11% mutated. Rocky outcrops are a relatively stable unit. Similarly, 0.99% of the areas of water bodies were conserved, compared to 0.01% transformed.

Between 2015 and 2025, the major transformations concerned the wooded steppe shrubby, which retained only 0.22% of its area, while 0.77% was transformed, including 0.29% into rainfed/fallow mosaic cultivation and 0.39% into bare or degraded soils. The other units retained most of their initial areas, with values between 0.98% for bare or degraded soils and 0.93% for dense wooded steppe. Rocky outcrops experienced a slight transformation, with 0.015% of their areas converted to wooded-shrubby steppe.

Assessment of land use unit conversion rate

Figure 5 presents the comparative histogram of land use unit conversion rates for 2005, 2015 and 2025 in the municipality of Droum.

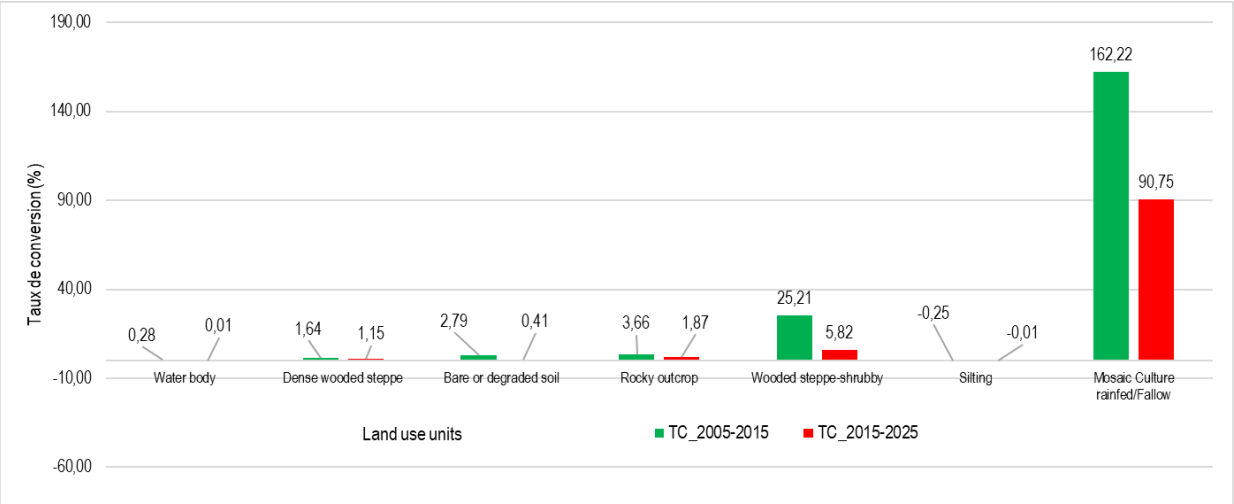

Fig. 8 : Comparative histogram of land use unit conversion rates in the municipality of Droum

The analysis of this graph reveals that conversion rates vary according to the study periods and land use units. **Between 2005-2015**, the most significant changes mainly concerned the wooded-shrubby steppe units and the rainfed crop/fallow mosaic, whose highest values of this indicator are 162.22% and 25.21% respectively. This shows that the transformations were relatively faster than in the other land use units. Conversely, the lowest values are observed mainly in the silting, with negative values (-0.25%), but also in the dense wooded steppe with 1.64%, reflecting a relatively slow evolution on these land use units.

Between2015 et 2025, the highest conversion rates concern the units rainfed crop/fallow mosaic (90.75%), wooded-shrubby steppe (5.82%), rocky outcrops (1.87%) and dense wooded steppe (1.15%). This indicates relatively rapid mutations on these units, although these values are significantly lower than those observed for the period 2005-2015. On the other hand, low or even negative rates are recorded for bare or degraded soil (0.41%), bodies of water (0.01%) and silting (-0.01%), reflecting a generally slow transformation of these land use classes

Governance of natural resources in the municipality of Droum

The municipality of Droum is currently experiencing a significant change in its natural environment, encouraging actors, particularly rural populations, to adopt new behaviors with regard to access to and management of community renewable natural resources. The latter constitute the main economic potential of the municipality and represent the basis of the daily life of rural populations, whose livelihoods largely depend on agro-sylvo -pastoral activities. The current context, marked by a generalized degradation of these natural resources due to the combination of anthropogenic pressure and the impacts of climate change, threatens the viability of rural activities. In this context, the need for rational and sustainable management of community natural resources makes it imperative to change legislation and practices in this area. Furthermore, the municipality of Droum has mechanisms for securing and sustainably managing these resources. With the advent of the decentralization process, the State has entrusted to the local authorities play a central role in the local governance of shared resources, thereby strengthening community responsibility and local participation in their management.

The mechanisms for managing conflicts related to the exploitation of natural resources

The various diagnoses carried out in the municipality reveal the existence of several types of conflicts, the most frequent of which are those that pit certain rural actors against each other (farmers-farmers, herders-herders,) or against other categories of actors (farmers-herders). The most observed disputes are those between farmers

and herders, followed by those occurring between farmers themselves. However, it is difficult to draw up an exhaustive inventory, insofar as the various issues related to the exploitation of community natural resources are dealt with at several levels where written records are generally lacking. However, at the level of the Droum canton chiefdom, an average of 70 to 80 conflicts related to the exploitation of community natural resources are recorded annually. Traditionally, rural conflicts are mainly resolved amicably between the belligerents under the authority of customary leaders. Others are dealt with by institutions such as the Basic Land Commissions (Cofocob), the Communal Land Commission (Cofocom), or the Departmental Land Commission (Cofodep), and as a last resort by the courts. In addition to these mechanisms, the municipality has had a Local Convention for the management of natural resources since 2015, which reinforces existing local governance. This is a set of provisions, standards and local rules determining access to and use of natural resources in a given area as well as the sanctions decided. The aim is to better manage natural resources in order to avoid conflicts related to their use and also to preserve them for future generations.
Indeed, local conventions raise the problem of a global management of natural resources taking into account both practical and organizational conditions. In the sense that they represent a tool is a local strategy to make the management of natural resources more effective, despite the complexity that lies in taking into account the diversity of actors present, and the integrated responses to be provided to environmental, social, cultural etc. dimensions. [30].

DISCUSSION

This study highlights the potential of satellite imagery for the analysis of land use changes in the municipality of Droum. The results obtained reveal that the changes that have occurred and are underway are marked by strong anthropogenic pressure exerted on natural resources, in particular on plant formations, the most affected of which is the wooded-shrubby steppe.
Indeed, this land occupation unit, which covered 12.90% of the municipality's area in 2005, has strongly regressed to represent only 5.90% in 2025. This trend towards regression is corroborated by several authors who have worked on land use changes [21], [31]; [32]; [33]; [34], [35]. Similarly, the work of [36] and [37] carried out in South- East Niger confirms a generalized decrease in plant formations. Concerning the dense wooded steppe, the study highlights a progressive evolution of this unit. With an area that covered 0.94% of the municipality's area in 2005, it increased to 0.96% coverage in 2015, to reach 1.27% in 2025. These results confirm those of [38], [39]; [40]; [41] who noted an improvement in vegetation cover. The rainfed crop/fallow mosaic is one of the units that has undergone the most change, given the importance of its spatial extension. Indeed, it occupied 79.87% of the study area in 2005 and reached 90.03% in 2025. The expansion of this unit has occurred at the expense of others, particularly the wooded-shrubby steppe, and is probably linked to the conquest of new agricultural land due to population growth. Numerous studies have also highlighted the impact of population growth on the expansion of cultivated land [42]; [43]; [44]; [45]; [46]. In the commune of Droum, bare or degraded soils and areas of silting have experienced contrasting dynamics over the course of time. The first unit covered 4.83% of the study area in 2005, compared to 1.54% in 2015, then only 0.53% in 2025, reflecting a continuous regression. As for silting, its area evolved irregularly between the three observation dates, going from 0.10% in 2005 to 0.006% in 215, before rising to 0.12% in 2025. The results of several studies confirm this trend, notably those of [47]; [48]; [49]. The areas of water bodies represented 0.28% of the total area of the study area in 2005, compared to 0.27% in 2015, then only 0.14% in 2025, reflecting a progressive regression. This evolution is closely linked to the rainfall variability that characterizes the commune. The results of the present study corroborate those of [50] and [44], who also observed a decrease in water bodies with respective rate of decline of -23.16%, -11.67%, and -8.94% in their study areas. In terms of local governance of shared resources in the commune of Droum, several mechanisms are mobilized, including traditional practices of prevention and management of conflicts related to these resources, complemented by state rules. However, faced with the inadequacies of these mechanisms, the Local Convention for the management of natural resources has been adopted since 2015 as the preferred mode of local governance. The latter has demonstrated its relevance in access to resources, their sustainable exploitation, as well as in the prevention and management of conflicts related to community natural resources. Several authors have also confirmed the effectiveness of this mechanism, notably [51]; [52]; [53]; [54].

CONCLUSION

The diachronic study of the evolution of land use of the commune of Droum, based on the use of satellite imagery has made it possible to highlight the transformations that occurred between 2005 and 2025. The results reveal a significant modification of the natural environment, which is characterized by the regression of certain units (wooded shrubby steppe), the expansion of others (rainfed crop/fallow mosaic), and a relative stability (rock outcrops). Furthermore, the study shows that the dynamics of land use generate changes characterized by variable conversion rates depending on the units, reflecting differentiated rates of spatial evolution. Faced with this increasingly marked degradation of community natural resources in the commune, several local governance mechanisms have been implemented, including the Local Convention for the management of natural resources, adopted since 2015 with the support of technical partners.

BIBLIOGRAPHICAL REFERENCES

1. Mahamadou S., Saley M.B, Kouame K.J, Ambouta J M K, Ibrahim Mamadou I., N'doh Ange F.2024. Analyse de l'occupation des sols dans le contexte de changement climatique à l'échelle du bassin versant de Karey Gorou (Sud-Ouest du Niger). *Journal of Research in Environmental and Earth Sciences Volume 10 ~ Issue 10 (2024) pp: 09-21 ISSN(Online) :2348-2532*
2. Ouédraogo A. (2006). Diversité et dynamique de la végétation ligneuse de la partie orientale du Burkina Faso. Thèse de doctorat (Université de Ouagadougou, Ouagadougou). 196 pages
3. Dan Guimbo I. (2011). Fonction, dynamique et productivité des parcs à Vitellaria paradoxa C.F. Gaertn. et à Neocarya macrophylla (Sabine) Prance dans le sud-ouest du Niger. Thèse de Doctorat (Université Abdou Moumouni de Niamey, Niamey, Niger). 158 pages.
4. **.** Alohou, EC., Ouinsavi, C., Sokpon, N. (2016)**.** Fragmentation des écosystèmes forestiers : Définitions des concepts et évolution des méthodes d'évaluation. *International Journal of Innovation and Applied Studies*, 17(2): 474-486..
5. Jofack SVC, Kouamé FK, Dibi N'da H,Tankoano B, Akpa YL, Ngounou NB, 2016. Cartographie de l'occupation de sol des Hauts Plateaux de l'Ouest Cameroun par réseaux de neurones appliqués à une image LANDSAT 8 OLI. International Journal of Innovation and Scientific Research, 23(2): 443-454
6. Pelletier, C.,2017. Cartographie de l'occupation des sols à partir de séries temporelles d'images satellitaires à hautes résolutions Identification et traitement des données mal étiquetées. Thèse de doctorat, Université de Toulouse, Toulouse, p. 259.
7. Sitou Lawali, Marc Mormont et Boubacar Yamba, « Gouvernance et stratégies locales de sécurisation foncière : étude de cas de la commune rurale de Tchadoua au Niger », VertigO URL:http://journals.openedition.org/vertigo/14723.
8. Granier, L.,2010. Les conventions locales, des outils efficaces de gestion concertée des ressources naturelles ? 4 pages.
9. Lavigne Delville, Ph.,2009. Des conventions locales pour gérer ensemble les ressources naturelles ? 2 pages
10. Wade, R., 1987. The Management of Common Property Resources: Collective Action as an Alternative to Privatization or State Regulation, Cambridge Journal of Economics, 11, pp. 95-106.
11. Bertrand, A., 1998. Gestion étatique ou gouvernance locale ? Ph. Lavigne Delville, Quelles politiques foncières pour l'Afrique rurale ? Paris, Karthala/Coopération française, pp. 40-45
12. Rochegude, A., 1998.Les instances décentralisées et la gestion des ressources renouvelables, Ph. Lavigne Delville, Quelles politiques foncières en Afrique noire rurale ? Réconcilier pratiques, légitimité et légalité, Paris, Karthala/Coopération Française, pp. 403-421.
13. Vincent, P., 1998. Quelle place pour les autorités foncières locales ? Ph. Lavigne Delville (dir.), Quelles politiques foncières en Afrique noire rurale ? Paris, Karthala/Ministère de la Coopération, pp. 338-350
14. .Ribot, C.J., 2009. « Authority over Forests: Empowerment and Subordination in Senegal's Democratic Decentralization », Development and Change, vol. 40, n° 1, pp. 105-129.
15. Souleymane, I. M. S., Babaye, M. S. A., Alhassane, I., Issoufou, S., & Boureima, O. (2020). Caractérisations Hydroclimatiques et Estimation du Taux de Recharge de la Nappe Libre du Haut Bassin Versant de la Korama, Commune de Droum/Région de Zinder/Niger. European Scientific Journal, ESJ, 16(3), 318. https://doi.org/10.19044/esj.2020.v16n3p318
16. Plan de developpement communal de la commune de Droum, 2011-2014, 42 p
17. . Jofack SVC, Kouamé FK, Dibi N'da H,Tankoano B, Akpa YL, Ngounou NB, 2016. Cartographie de l'occupation de sol des Hauts Plateaux de l'Ouest Cameroun par réseaux de neurones appliqués à une image LANDSAT 8 OLI. International Journal of Innovation and Scientific Research, 23(2): 443-454
18. Souleymane A.D., Aboubacar A., Nassirou A.M. & Garba I., 2025. Dynamique spatio-temporelle d'occupation du sol dans la zone agropastorale de la commune de Korahane, centre Nord de la république du Niger. European Scientific Journal, ESJ, 21 (14), 111.
19. Moussa Abdou O. et al, 2024. Dynamique spatio-temporelle d'occupation du sol dans la commune de Simiri, ouest-nigérien. International Journal of Applied Research 2024; 10(6): 193-202
20. Oloukoi J., Mama V. et Agbo F. (2007). Modélisation de la dynamique de l'occupation des terres dans le département des collines au Bénin. Télédétection. Vol. 6 (4). p. 305-323.
21. Moussa Abdou O. et al. (2024). Etude de la dynamique de l'occupation du sol dans la commune de Tondikiwindi dans l'ouest-nigérien. AFRIMED AJ - Al Awamia (145). p. 49-59
22. Kpedenou KD, Boukpessi T, Tanzidani T, Tchamie K. 2016. Quantification des changements de l'occupation du sol dans la préfecture de Yoto (Sud Est Togo) à l'aide de l'imagerie satellitaire Landsat. Rev. Sc. Env., 13: 137-156 10.
23. Schlaepfer, R., 2002, Analyse de la dynamique du paysage. Fiche d'enseignement 4.2, Laboratoire de Gestion des Ecosystèmes, Ecole Polytechnique de Lausanne, Suisse, 10 pages.
24. Soufouyane Z., Ismaïla T. I., Omer A. T., Mama D. et Ousséni A. (2018). Application de la Télédétection Et du SIG au suivi des formations végétales de la forêt classée des trois rivières au Nord-Est du Bénin. European Scientific Journal. Vol. 14 (15). p. 450-469

25. Taibou B, Seck D. 2012. Dynamique de l'occupation des sols, cartographie des CLPA, des zones de pêche et mise en place d'un système d'information géographique au Sénégal. Rapport d'exécution University of Rhode Island, Narragansett RI, p. 66.
26. Tchibozo É. A. M.T., 2020. Modélisation De La Dynamique Spatio – Temporelle De L'occupation Du Sol Et Analyse Des Changements Du Territoire De La Lama Au Bénin. European Scientific Journal, ESJ, 16(6), 499.
27. Pecqueur B, 2000, Le développement local, Paris, Syros, Alternatives économiques.132p.
28. PNUD: Decentralised Governance for Development, A Combined Practice Note on Decentralisation, Local Governance and Urban/Rural Development, 2004
29. UICN, 2004, Actes de Congrès mondial de la Nature, 3e session, Bangkok, Thaïlande, 17-24 novembre 2004.
30. Kanembou L., Malam Assane M., 2024. The Local Convention, Governance Tools and Strategy for The Management of Natural and Land Resources in The Rural Commune of Tondikandia, (Tillabéri/ Niger), Educational Administration: Theory and Practice, 30(10), 346-353,Doi: 10.53555/kuey.v30i10.8140
31. Hountondji Y. H. (2008). Dynamique environnementale en zones sahélienne et soudanienne de l'Afrique de l'Ouest : Analyse des modifications et évaluation de la dégradation du couvert végétal
32. Appolinaire, B. T., Brice A. T. et Ibouraïma Y. (2017). Pression agro-foncière et mutations agraires sur le plateau Adja au Sud-Ouest du Benin. European Scientific Journal. Vol. 13 (8). p. 177-199. DOI : 10.19044/esj.2017.v13n8p177
33. Issoufou M., Boureïma O. et Ado D. (2018). Evolution de l'occupation des sols dans la partie Nord du Dallol Bosso, départements de Filingué et Balleyara, région de Tillabéri-Niger. European Scientific Journal. Vol. 14 (30). p. 391-407. DOI : 10.19044/esj. 2018.v14n30p391
34. Brun L., Gaudence D., Gibigaye M. et Tente B. (2018). Dynamique de l'occupation du sol dans les zones humides de la commune d'Allada au Sud-Benin (Sites Ramsar 1017 Et 1018). European Scientific Journal. Vol. 14 (12). p. 59-77. DOI : 10.19044/esj.2018.v14n12p59
35. Bouko, B. S., Dossou, P. J., Amadou, B., & Sinsin, B. (2016). Exploitation Des Ressources Biologiques Et Dynamique De La Foret Classee De La Mekrou Au Benin. European Scientific Journal, ESJ, 12(36), 228. https://doi.org/10.19044/esj.2016.v12n36p22
36. Tidjani, A. D., Bielders, C.L. et Ambouta, K. J. M. (2009). Dynamique saisonnière des paramètres déterminant l'érosion éolienne sur les pâturages dunaires du Niger oriental. Geo-Eco-Trop. 33. p. 39-56
37. Kanembou, L.; & al (2025). Changes in Land Occupation in the System Oasien of Southeastern Niger, Goudoumaria in Niger. *International Journal of Innovative Science and Research Technology*, 10(11), 1923-1937. https://doi.org/10.38124/ijisrt/25nov1323
38. Soulama, S. et al. 2015. Impact des activités anthropiques sur la dynamique de la végétation de la réserve partielle de faune de Pama et de ses périphéries (sud-est du Burkina Faso) dans un contexte de variabilité climatique. Journal of Applied Biosciences 87 :8047– 8064
39. Zabeirou.T, Guéro.M, Amadou.B, 2004. Etude sur la dynamique de l'ensablement dans le Département de Maïné-Soroa, 28 pages.
40. Olsson, L., L. Eklundh et J. Ardo, 2005, A recent greening of the Sahel-trends, patterns and potential causes, Journal of Arid Environments, 63, pp 556–566.
41. Hermann, S., A. Anyamba, C.J. Tucker, 2005, Recents trends in vegetation dynamics in the African Sahel and their relationship to climate, Global Environmental Change, 15, pp 394-404.
42. Kanembou L, Ambouta J M Karimou, WazirI Mato M ,2009. Dynamique des aires pastorales dans le département de Gouré: apport de la télédétection et du SIG. Revue du Laboratoire de Recherches Biogéographiques et d'Etudes Environnementales (LaRBE), n° 005, pp. 119 à 143
43. Hamidou A., Morou B., Mahamane A., Saadou M. et Issaka A. (2012). Caractérisation de la dynamique spatio-temporelle de l'occupation des terres dans le complexe des forêts de classées de Dan kada Dodo - Dan Gado (région de Maradi, Niger). Journal des Sciences de l'Environnement. Vol. 1 (1). p. 16-26
44. Abdou B., Souleymane S. T., Baba C., Cheick Hamalla D., Moriké D., Alou T. et Sidi D. (2016). Pressions anthropiques et dynamique d'occupation des terres dans le terroir de Ziguéna, zone cotonnière du Mali. European Scientific Journal. Vol. 12 (5). p. 90-99. DOI : 10.19044/esj. 2016.v12n5p90
45. Abdo M. (2014). Pratiques, techniques et technologies de restauration des paysages dégradés du Sahel. African Forest Forum. Working Paper Series. Vol. 2 (3). 47 pages.
46. Soufouyane Z., Ismaïla T. I., Omer A. T., Mama D. et Ousséni A. (2018). Application de la Télédétection Et du SIG au suivi des formations végétales de la forêt classée des trois rivières au Nord-Est du Bénin. European Scientific Journal. Vol. 14 (15). p. 450-469.
47. Abdourhamane T. A., Rajot J. L., Garba Z, Marticorena B., Petit C. et Sebag D. (2011). Impact of very low crop residues cover on wind erosion in the Sahel. Catena, Vol. 85 (2011). p. 205-214.
48. Kanembou L, Karimoune S, 2013. Processus d'ensablement des cuvettes et suivi par télédétection dans le département de Gouré. Revue de Géographie de l'Université de Ouagadougou (RGO), n°002, pp. 173 à 197
49. Malam Assane, M. & al (2021). Les cuvettes oasiennes du Manga, Sud-Est Niger : un patrimoine à forte productivité agricole menacé d'ensablement, protégé par la fixation des dunes. Afrique SCIENCE 18(5) (2021) 102 – 117

I. BIGA et al, 2020. Dynamique spatio-temporelle de l'occupation des sols des communes de Torodi, Gothèye et Tagazar de la région de Tillabéry au Niger. Int. J. Biol. Chem. Sci. 14(3): 949-965, 2020
50. Banzhaf, M.,2005. Les impacts socio-économiques de la gestion décentralisée des ressources naturelles. La contribution des conventions locales à la lutte contre la pauvreté, Réseau Sectoriel Développement Rural Afrique.
51. Tall, S.M. & et GueyE, M.B., 2003. *Les conventions locales : un outil de co-gouvernance en gestion des ressources naturelles*, IIED Sahel, novembre
52. Hilhorst, T.& COULIBALY, A.,1998. Une convention locale pour la gestion participative au Mali, Programme Zones arides.
53. Bachir, A., Vog, G. et Vogt, K., 2007. La convention locale au Niger. L'expérience de la forêt classée de Takieta, IIED Afrique, no 4.