

Land Use Dynamics and Access to Land in the Sakadamna Commune (Dosso Department, Niger)

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Abstract:- In the commune of Sakadamna in Niger, land constitutes the primary resource of the rural world. However, for several decades, this resource has been subject to the vagaries of climate change in the 1970s. Also, with regard to the national land context in general and the commune of Sakadamna in particular (demographic growth), the rural land security of all stakeholders proves essential. The objective of this work is to correlate the dynamics of land use with current land tenure in the rural commune of Sakadamna. The methodological approach is structured around research into previous work, surveys and field observations and interviews carried out with the main institutions in charge of land and agricultural issues. The sampling allowed the administration of questionnaires at the household level of the three villages where 117 households were interviewed. The results of the study show that the agricultural land tenure system has evolved in the commune of Sakadamna, whether it is mastery, control or the mode of access. Land use is very dynamic, such that it is not only to the detriment of pasture areas and pastoral rangelands but also leading to a change in land practices, resulting in strong tensions between farmers and breeders. A progressive improvement in land security for farmers is noted in land management, an initiative made by land structures operating in rural areas, but much remains to be done.

Keywords:- Land use, Sakadamna, land dynamics, land management, land security.

I. INTRODUCTION

Country located in the heart of West Africa, landlocked and completely desert. Niger's economy is essentially based on agriculture and livestock. Unfortunately, they come up against multiple climatic and human constraints which mean that the main resource (land) becomes scarce overnight. Today, the rural agricultural world of Niger is faced with a serious land problem linked essentially to the excessive fragmentation of agricultural land, climatic conditions, the development of the land market and the uncontrolled growth of cities (Oumarou, 2008). The reasons which explain this pressure on agricultural land can be summed up: strong demographic pressure, the frequency of rainfall deficits, the deterioration of social relations and the persistence of poverty and precariousness which characterize the rural world (Sitou, 2014). The commune of Sakadamna has

numerous land potentials favorable to the intensification of agricultural activities. The latter also encourage intensifying competition for access to land by new players and have shown how often the land issue is delicate and therefore deserves special treatment for rational and sustainable management of natural resources. So what are the constraints in accessing land in the commune of Sakadamna? The methodology used is based on documentary and cartographic research. The collection tools used are questionnaires and interviews. The sampling concerned 10% of agricultural households spread over three villages. The results show that between 1990 and 2022, the dynamics of land use is marked by a strong human influence in the study area with a predominance of spaces occupied by agricultural activities, notably rainfed crops, on nearly 2/3 of the area. the total area. Regarding the dynamics in access to land, it should be noted that open-ended loans are becoming rarer due to demographic pressure and social crises and have allowed the emergence of fixed-term loans.

II. METHODS AND DATA

A. Documentary research and data collection tools

Documentary research is oriented towards a systematic exploitation of everything that is written relating to the field of research. This is the determining phase of the work which consists of consulting and carefully exploiting the documents produced on the region.

Several data collection tools were used in carrying out this work. These are the information collection sheets in the field (interview guide and questionnaires) and the digital camera for taking photos in the field. Also, a tape recorder for audio recording during interviews was used.

B. Technical questionnaire and interview:

This phase concerned all the sampled villages and made it possible to see the extent of the dynamics of access modes and agricultural land tenure in the study area. The objective pursued by the standardized questionnaire is to collect the opinions of farmers on access to agricultural land but also to understand the methods of acquisition of the land they exploit and their developments in the municipality.

Individual interview guides were used to study the phenomenon of the dynamics of agricultural land tenure among resource people involved in agricultural land management. These are mainly the Mayor of the commune,

the head of the sector of the commune, the village chiefs and Imams of the different villages sampled, the heads of technical services such as the permanent secretaries (SP) of COFOCOM/COFODEP and the director municipal agriculture. In this study, the qualitative method was favored to collect information on the different developments in land tenure in the municipality.

C. Sampling

Given the immensity and number of villages that make up the commune, three (3) villages were chosen. Indeed, the first step consists of meeting the village authorities and the heads of households, considered here as those responsible for each production unit). In addition, a simple random technique was used to choose the people surveyed in the chosen villages. The sampling concerned 117 out of 1172 agricultural households, or 10% of agricultural households. It should also be noted that in the 117 sample chosen, 47 households come from the village of Sakadamna, i.e. 40%, 40 from Baro, i.e. 35%, and 29 from Bangnagondi, i.e. 25%, taking into account their numbers.

D. Mapping

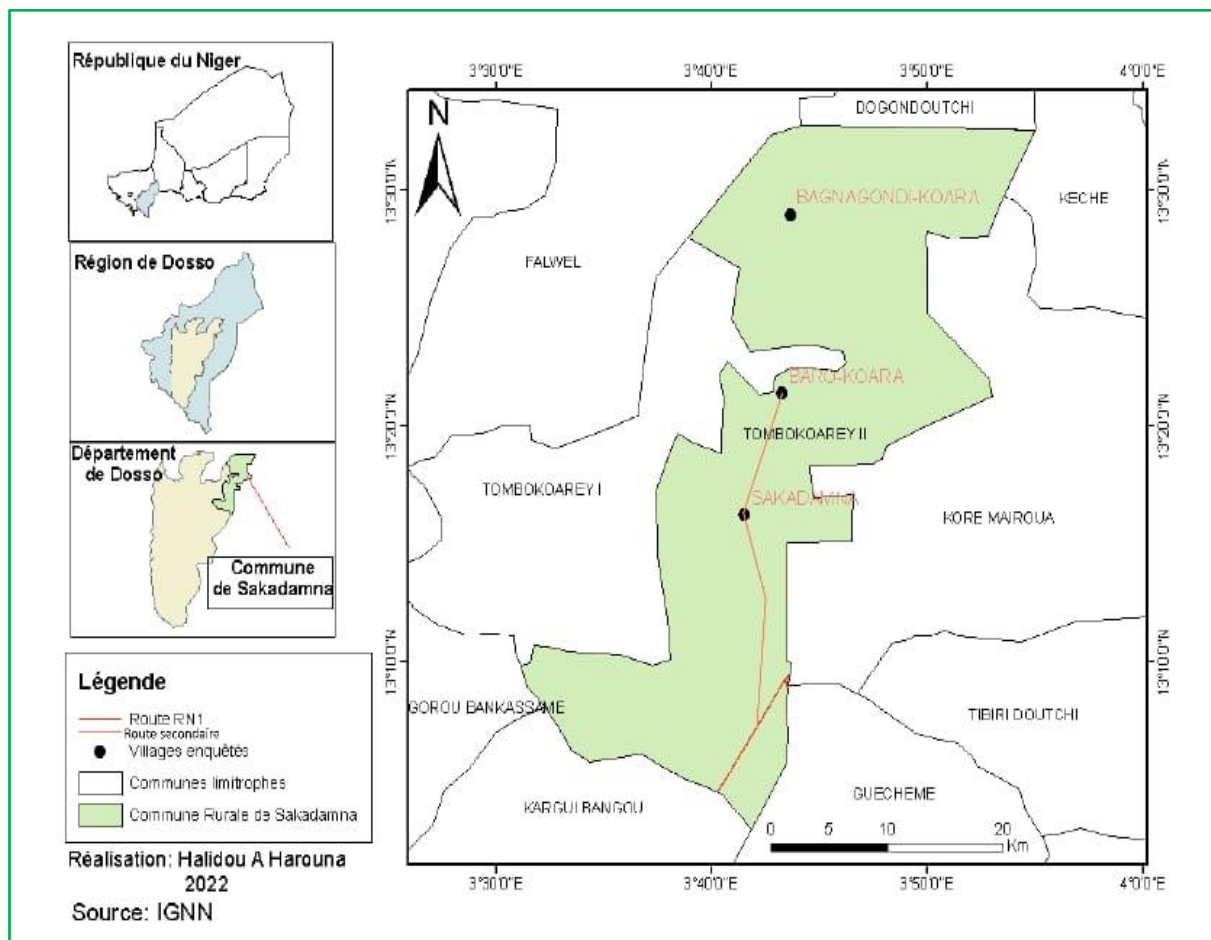
This cartographic phase made it possible to produce different maps in order to evaluate the dynamics of the agricultural landscape. Thus, it involves producing maps representing the location of the area, land use maps of the area and graphs.

E. Data processing and analysis

The analysis was carried out as data collection in the field progressed. The following software was used: Word, Excel, Sphinx software and SPSS for data processing and analysis and Arc View and ArcGIS for creating maps. The statistical analyzes carried out made it possible to identify the different modes of access to land. The aim is to know the current dominant trend.

III. PRESENTATION OF THE STUDY AREA

Created by article 18 of Law No. 2002-14 of June 11, 2002, the rural commune of sakadamna is located in the northern part of the said department between 13°15'59" and 11°45' north latitude; and between 03°41'39" east longitude. It extends over an area of 777 km2 (PDC, 2014). It is the largest municipality in the department. The capital of the commune is 95 km from the capital of the department (Dosso) and 235 km from the capital (Niamey). Sakadamna (a sample village) is also the capital of the commune of Sakadamna. The rural commune of Sakadamna is limited: To the North by the urban commune of Dogondoutchi and Kiéché; To the South by the rural commune of KarguiBangou and Guéchémé; To the east by the commune of Koré Mairoua; To the West by the rural communes of TomboKoiré I and Falwel.



Map 1: location of the study area

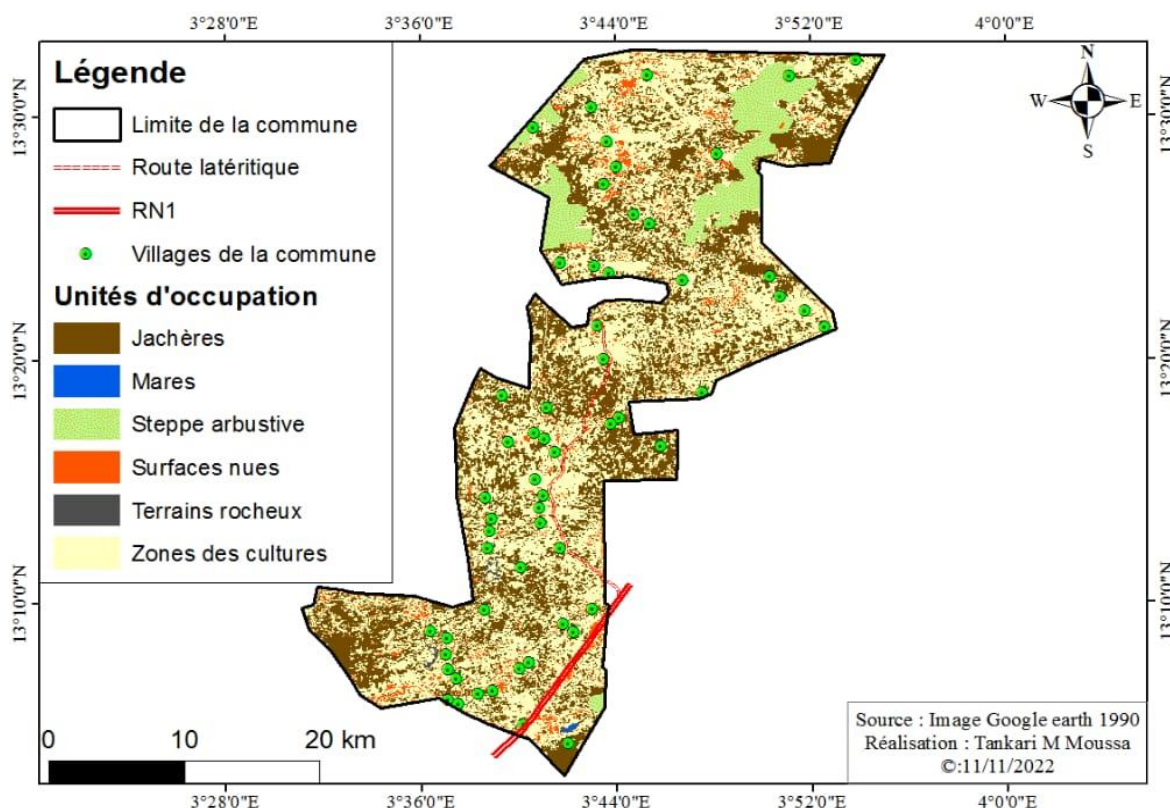
IV. RESULTS AND DISCUSSIONS

A. Dynamics of land use from 1990 to 2020

Several land cover classes were identified following the classification of satellite images, and only eight were retained for the purposes of this study. This is the natural vegetation represented by the shrub steppe, crop areas, fallows, ponds, riparian belts, rocky terrain, bare surfaces and residential areas.

➤ Land use in 1990

The analysis of map 2 shows a relatively appreciable distribution of occupation units. Thus, 46,051.42 ha or 52.40% of the municipality are covered by cultivation areas. The second occupation unit corresponds to fallow land which amounts to 31,169 ha or 35.46%. As for the plant cover, it was formed by a shrub steppe with an area of 6083.77 ha or 6.92% of the territory of the municipality. Likewise, bare areas represent 4394.20 ha or 5% of the total area of the municipality. As for the lowest occupation units, they are found in the class of rocky terrain with an area of 153.84 ha or 0.18%, followed by the classes of ponds, human installations and rupicole cordons with very large areas. weak (map .2).

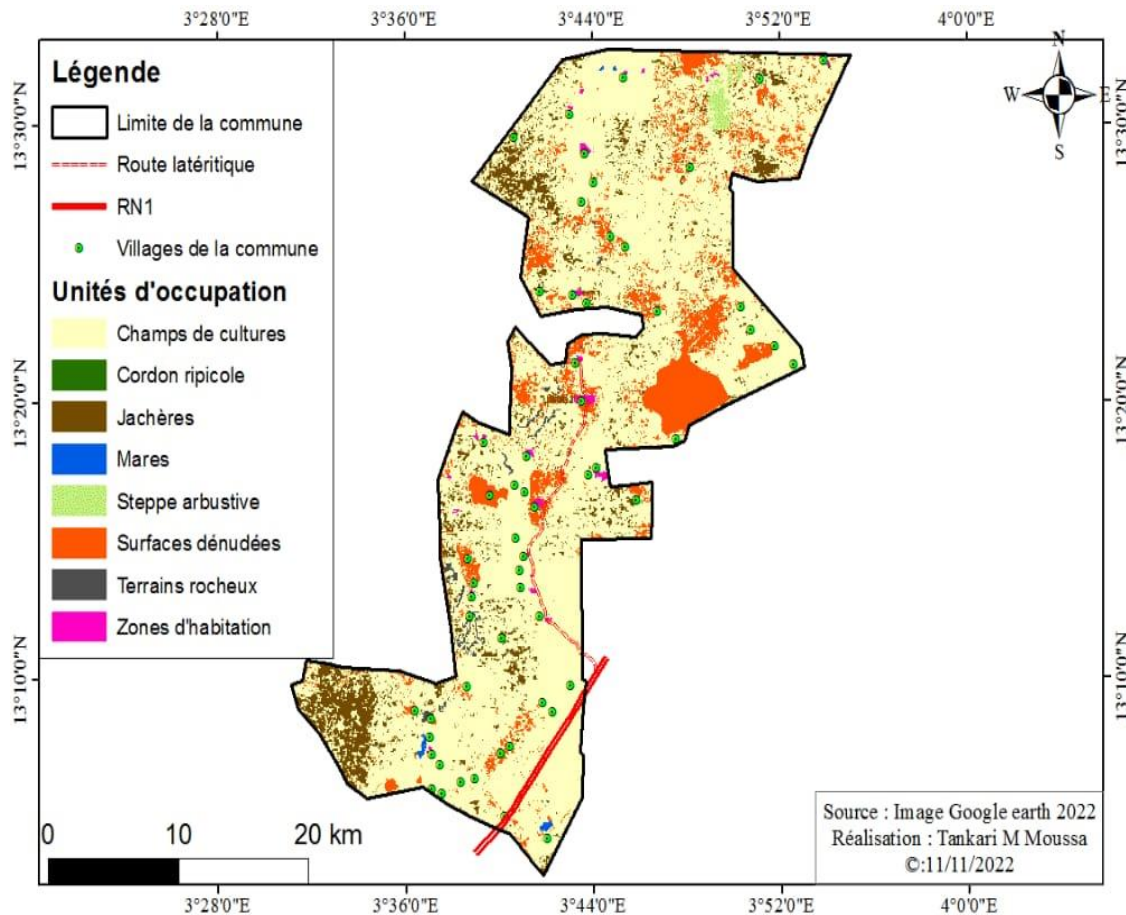


Map 2: land use in 1990

➤ Land use of 2022

This period is marked by a strong human influence in the study area with a predominance of spaces occupied by agricultural activities, particularly rainfed crops, over nearly 2/3 of the total area. They occupy 67,640.30 ha or 76.98% (map.3). This progression is essentially the result of a considerable increase in areas devoted to crops to the unprecedented detriment of the shrub steppe and fallows with respectively 0.60% and 8.90% unlike the 1990s which were 6.92% and 35.46% (card.2 and card.3). In addition, we are also seeing a clear increase in bare surfaces. They

increased from 4394.20 ha (i.e. 5%) in 1990 to 10684.93 ha (i.e. 12.16%) in 2022. Rocky lands occupy 494.02 ha or 0.56% in 2022 and are located in the foothills. hills, unlike in 1990 with 153.84 or 0.18%. This increase is explained not only by the actions of man through the cutting of wood, the continued cultivation of land but also by the generalized drop in rainfall. The riparian cordons occupy 19.16 ha or 0.02% of the total surface area of the zone. They run along bodies of water. As for the ponds, they occupy 119.02 ha or 0.14%, the majority of which are temporary and used for construction and watering animals.



Map 3: land use in 2022

B. Changes from 1990 to 2022

The comparative analysis of the areas of land use units between 1990 and 2022 made it possible to highlight the observed changes. Indeed, the latter are preserved in almost all units and manifest themselves either by an increase or by a regression. These are the growing areas which recorded the strongest progression, going from 52.40% to 76.98%, i.e. a progression rate of 46.88%. This ever-increasing need for cultivated land can be explained by demographic pressure and its corollary, the need for cultivated land. The increase in the area of cultivated land was mainly to the detriment of shrub steppe and fallow land. Indeed, we are witnessing a loss of half of the surface area of steppe formations corresponding to -5556.35 ha approximately -91.33%. This situation can be explained by the fact that a large proportion of the steppes have been cleared for the installation of rainfed crops combined with the cutting of firewood and/or construction wood. As for fallows, they have undergone major changes. Almost the entire surface area recorded in 1990 with 35.46%, a change in status. According to the image of the maps and field observations, we see a real disappearance of fallows. These fallows formerly preserved in the area, practically disappeared in 2022 with 8.90% in favor of rainfed crops continuing by 76.98% with a regression rate of -74.90%. Those that exist are very recent (2 to 3 years) and therefore do not allow reconstruction of the soil and plant cover. The areas of bare land, on the contrary, were doubled, from 5% to 12.16% between 1990 to 2022 with a progression rate of 143.16% (table.1). The

progression of these areas is due to the advance of the agricultural front but also to the excessive cutting of wood which has weakened and exposed the soil to the effects of wind and water. Furthermore, it emerges from the analysis of the results of the study that, although less frequent in the study area, ponds have undergone a slight change; they have seen their number increase as well as their surface area increasing from 0.04 to 0.14% from 1990 to 2022, i.e. 209.46% progression (table 1). This dynamic is explained by the appearance of certain ponds although others disappear due to silting, but also by the importance of sedimentary inputs from the slopes. This increase is justified by the reduction in plant cover of -91.33% observed during this period but also by the importance of the acceleration of runoff towards the reservoirs located in the depressions (table.1). Rocky terrains in turn increased from 0.18% to 0.56% between the period 1990 - 2022, i.e. 221.13% progress. This increase is due to the stripping which exposes the rock outcrops. Finally, the riparian cordon units were undoubtedly developed thanks to the formation of ponds.

C. Evolution of the surface area of land use units from 1990 to 2022

Table 1: Evolution of the surface area of land use units from 1990 to 2022

Units	1990		2022		Variation	
	en ha	en %	en ha	en %	en ha	en %
Fallow	31169,44	35,46	7823,97	8,90	-23345,47	-74,90
ponds	38,46	0,04	119,02	0,14	80,56	209,46
Shrub steppe	6083,77	6,92	527,42	0,60	-5556,35	-91,33
BareSurfaces	4394,20	5,00	10684,93	12,16	6290,73	143,16
rocky land	153,84	0,18	494,02	0,56	340,18	221,13
Crop areas	46051,42	52,40	67640,30	76,98	21588,88	46,88
Ripariancord	-	0,00	19,16	0,02	19,16	-
Houses areas	-	0,00	553,53	0,63	553,53	-
Total	87891,13	100,00	87862,34	100,00		

D. Dynamics of modes of access to land over time.

An analysis of the modes of access to land by the stakeholders surveyed shows that the commune's farmland was originally controlled by the first arrivals, who acquired it by clearing land. Succession by inheritance was the only means of transmission and is the sole responsibility of the natives: 99% (fig.1) of those surveyed share this opinion. This rate demonstrates the exclusive control of all land by the natives, who allocate it according to demand from other residents. Our field work showed us that, at the time, the natives were looking for foreigners. And it is to satisfy the needs of the latter that they have developed other methods of acquiring land, namely the gift and the open-ended loan mentioned respectively with 83% and 68% (fig.1) by the surveys. This is explained by the high availability of land and the very low demographics. Today, a new dynamic has emerged in the relationship of the land system in the study area. This is the natural growth of the population, climate variability. Indeed, following strong demographic growth, certain families, particularly wealthy families, have adopted a logic of expanding their land reserves outside of those occupied by the lineage. Furthermore, the operators think that, given the level of the ground, only the surface area counts to have a good yield, that is to say to have a good yield for a vulnerable population which in no way has the necessary means to amend the soil, only the large area can fill this void. Thus, these attitudes have contributed

enormously to the evolution of modes of access to land. Which authorizes less and less the practice of these so-called methods of access to land. It is necessary to underline the legal process combined with the deterioration of social relations, which also influenced the modes of access, leading not only to new forms of access to land but also to the increasingly significant reluctance of certain modes of land tenure. . This is the case of the exceptional regime of the late Colonel Kountché (former head of state of Niger from 1974 to 1987) who said on the occasion of a policy relating to land management "the land belongs to the one who works it". This attitude has had remarkable effects on the tenure of agricultural land to the extent that it has contributed to the emergence of certain alternative methods according to farmers. Thus, throughout the study area we are witnessing a significant decline in donations and loans which amount to 3% and 16% respectively (fig.1), according to the respondents, unlike in the past in favor of the 7% pledge, rental 1% and especially sales with 25% (fig.1). It should be noted that open-ended loans are becoming rarer due to demographic pressure and social crises and have allowed the emergence of fixed-term loans, which explains the importance of loans according to those surveyed. The operators of the municipality use all methods of acquisition to supplement their small share of inheritance, whether shared or not.

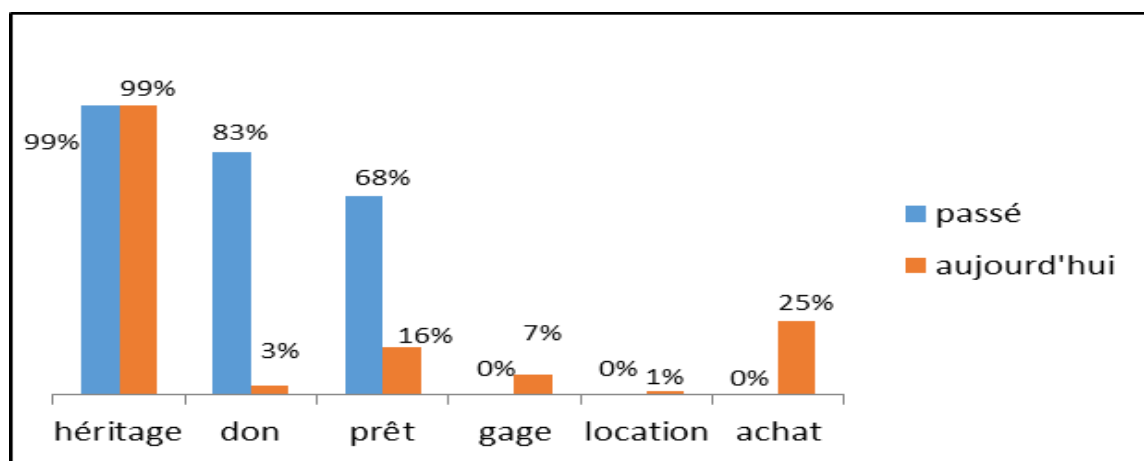


Fig. 1: mode of access to land over time of the actors surveyed

Source: fieldwork, 2022

E. Analysis of the Typology of modes of access to land in Niger and in the commune

The different mechanisms used, apart from the cases of the first clearings for the first inhabitants, exist in the localities studied, although with specificities. These mainly concern inheritance, gift, loan, customary pledge, purchase and rental. This is due to an overlap of customary and modern rights.

➤ Legacy (*tubandi*)

Most agricultural land is acquired through inheritance, the means par excellence of acquiring land following the disappearance of the father or mother in all the villages surveyed, 99% (fig.2) of those surveyed.

➤ Purchase (*nerayan*)

Regarding access by purchase which is increasingly emerging in the municipality, it always occupies second place according to the ranking of our surveys in terms of percentage at 25% (fig.2) of the population surveyed. This method of land acquisition confers the exclusive right of ownership to the buyer.

➤ Ready (*hiyan*)

The third method of acquiring land is the 16% loan, a temporary access system which gives the lessee a precarious and revocable status (fig.2). Originally in the commune according to the respondents, this form of access is provided

for farmers who do not have enough land or for foreigners who wish to settle in the village. This method of access to land is very common, mainly in villages where the land is not very fertile.

➤ Gage (*tolmé*)

The pledge which constitutes the fourth mode of land acquisition in the villages studied covers a proportion of 7% (fig.2) of the heads of target households. This form of arrangement contract is the first form of transaction which gives land a monetary value in the municipality.

➤ Don (*noyan*)

Donation as a method of acquiring land recognizes the beneficiary's absolute property rights; it occupies 5th place with a proportion of 3% (fig. 2) of the heads of households met. It is less and less common today, following population growth which leads to land scarcity and the conflicts it often causes after the death of the donor.

➤ Rental (*tolmekatachi*)

Finally, rental or Tolmekatachi represents 1% of the target population (Fig. 2). Land rental has become a strategic means between large landowners and classes farmers with a weak land base or sometimes farmers who do not have enough rich land to have sufficient access to arable land.

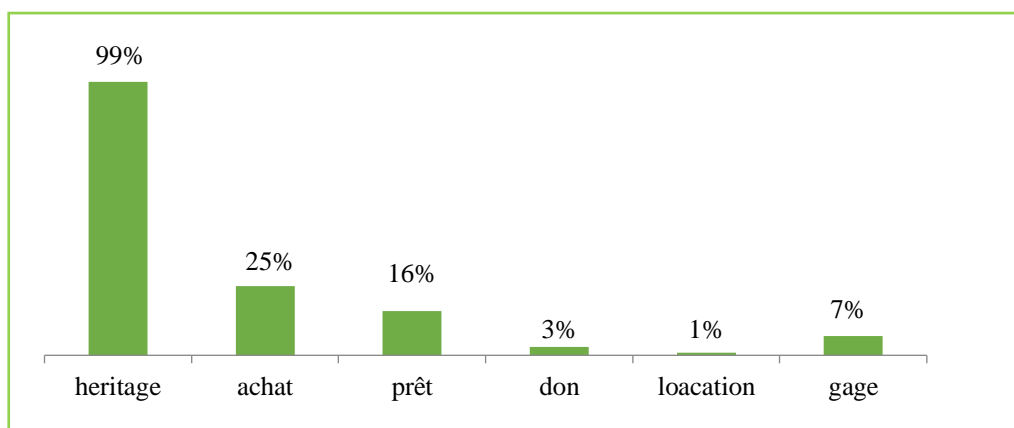


Fig. 2: modes of access to land in the study area

Source: fieldwork, 2022

In view of the results, among the different modes of land acquisition encountered in the commune, inheritance remains and remains the main mode of land acquisition, i.e. 99% of household heads claim to have received their field or the majority of their earth via this mode (fig.2). It should be noted that currently land is acquired by inheritance during the lifetime of the farm manager, a situation which according to many of the respondents did not exist in the past. Indeed, in the past even if there is a separation within the farm, the new farms will remain on the same lands of collective heritage. A situation which could be explained by the low population density and the high availability of agricultural land. Nowadays, this trend is degraded following strong demographic growth and the deterioration of social relations which means that farm managers give them away while they are alive to avoid possible conflicts. After inheritance comes purchase, this form of acquisition, it

must be specified although it is new to the land management of existing companies, seems to become the main mode of acquisition of land after inheritance with 25% of people surveyed. Land lending in the commune is very dynamic, several heads of households have informed us of its importance. In fact, according to them, its initial form, which consists of operating one on a permanent basis, no longer exists. Its numerical importance 16% of farm managers are owed by the loan of limited duration. The loss of land fertility which leads to a reduction in agricultural yield and population growth are at the basis of this dynamic. The pledge, with 7% of people surveyed, appears to be the first form of market transaction. The emergence of this form of land acquisition in the past can be explained by conservatism and control of land heritage by lineage. However, with the individualization that reigns in collective social structures, this arrangement contract is in decline and

allows the emergence of sales. Donation is in decline or even disappearance in the municipality. As for renting 1% of households, it is mentioned by many people even if during the survey we did not meet any holder of this contract. The only case encountered gave way. It should be noted that rental seems to be a method imported from neighboring municipalities and dependent on the level of land fertility.

V. DISCUSSION OF RESULTS

According to the respondents, in addition to land clearing, inheritance was the only way to access agricultural land with 99% (fig.1). The arrival of neighbors and foreigners has led to other more or less sustainable modes of access to land. This is the case of donations with 83% of respondents and open-ended loans with 63%, which constitute the primary methods of acquiring land for non-natives (fig.1). Access through purchase constitutes the second dominant mode. It represents 25% of respondents (fig.1). Then comes the loan with 16% (fig.1). It should be noted that this percentage is largely explained by loans with limited duration due to strong population growth and climate variability. Farmers told us that a large area was necessary to invest and get good returns. This result aligns with that obtained by Reenberg (2001) according to which transfer through loans is essential for the flexibility of African land tenure systems even if it is a source of conflict. The pledge, the gift and the rental are weakly represented with respective rates of 7%, 3% and 1% (fig.1).

Indeed, the reasons which explain the emergence of modes of access to land are demographic growth, social crises, climatic hazards and the monetization of land. The combination of these factors has led to a new situation in land management, which replaces old modes of land tenure (inheritance, donation and loan) in favor of new modes of access (purchase, pledge and rental). Changes in land use patterns create less discontent at the local level because populations are taken into account in all strategies. These results are similar to those obtained by Saibou (2007), who showed that in SokondjiBirni (Gaya commune), customary agricultural land management practices and land control are increasingly abandoned for the benefit of agricultural practices. modern. Also, those found by Sitou (2011) and Nafiou (2022) confirm that the old methods of land acquisition have undergone profound changes with regard to demographic growth and the impoverishment of the rural world.

In Sakadamna, as in most rural areas, the search for new resources aggravates land pressure and accelerates the processes of disappearance of plant cover and soil degradation. Thus, the establishment of land use maps allowed us to perfectly highlight the current dynamics of change occurring in the area. The analysis of the results of the land use maps, during the period 1990 to 2022, highlights a certain number of changes in land practices (pastures and pastoral rangelands) leading to strong tensions between farmers and breeders. Initially, the change relates to the regression of plant formations with -91.33% (table.1). This regression is the combined fact of the cutting of firewood following demographic pressure and cultivation at

the expense of fallow land. The second unit is progressive linked to the extension of agricultural areas (46.88%) to the detriment of fallows, the surface area of which has experienced an intense decline, where the areas went from 35.46% in 1990 to 8.90% in 2022 and also the increase in bare surfaces from 5% in 1990 to 12% in 2022 (table.1). This situation confirms the result obtained by Sitou and Yamba, (2014) reported by Bodé (2017) who explain that agricultural colonization had as a corollary the dynamics of land occupation here and there in Niger in general and in the Maradi region especially

Indeed, the need for agricultural land thus accentuates the phenomenon of land saturation by leading to a reduction in yields. These conclusions were reported by Abdou (2016) on the impacts of climate variability and change on the agricultural production systems of Korama (South Zinder) in Niger) and those of Souley (2008) confirm that the most important aspects affected were the significant reduction in plant cover, the gradual disappearance of fallows to the detriment of agricultural areas, soil degradation with the loss of potential, resulting in a fall in agricultural yields. In addition to these changes, rocky terrain has experienced very significant growth. Their surface area increased from 0.18% in 1990 to 0.56%. It is also observed in Sakadamna, a slight increase in the surface area of ponds during the period 1990 to 2022, going from 0.04% to 0.14% (table.1). This situation is explained by the disappearance of the plant cover and the strong acceleration of runoff towards the depressions. This same trend is observed in Dogonkiria by Moussa, Toure et al (2020) and Favreau (2000) in the square degree of Niamey. In addition, Nafiou (2022) shows that all land occupation units in the administrative entities of Gazaoua and Aguié experienced a significant change particularly during the period 1988-2015.

VI. CONCLUSION

In Sakadamna, as in most rural areas, the search for new resources aggravates land pressure and accelerates the processes of disappearance of plant cover and soil degradation. The comparative analysis of the areas of land use units between 1990 and 2022 made it possible to demonstrate that changes have taken place in almost all units and are manifested either by an increase or by a regression. However, it is the growing areas that recorded the strongest growth.

The analysis of the methods of access to land of the actors surveyed shows that originally, the agricultural land of the municipality was controlled by the first comers, who acquired it through clearing. Succession by inheritance was the only means of transmission and is the sole responsibility of indigenous people, i.e. 99% (fig.1) of respondents share this opinion.

With population growth, large areas must be cultivated to obtain an acceptable yield. It is important to revolutionize agriculture in order to increase productivity and ensure food self-sufficiency.

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