

Farmers' Perceptions of Land Degradation and Adaptation Strategies Adopted by Farmers in the Geographical Area of Bagaroua in Niger

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Abstract

The study was conducted in the commune of Bagaroua, (Tahoua region). The Tahoua area has agro-climatic characteristics favorable to agricultural production. This area is now threatened by the rapid degradation of its natural resources due to climatic hazards and human activities. It is in this context that the present study proposes to analyze the perceptions of farmers on land degradation and the adaptation strategies of producers faced with the impact of this degradation. The data was collected by interview using a questionnaire submitted to 254 agricultural producers sampled using the formula $n = \frac{t^2 * p * (1-p)}{m^2}$. The results showed that agricultural producers clearly perceive the manifestations of soil degradation by the appearance of glakis with percentages by 66% of respondents; formation of "erosion" ravines (13.17%); presence of pebbles and sandy bulge (10.07%). Farmers perceive the impacts of this soil degradation through parameters such as the reduction in cultivable areas (12%); attacks by crop enemies (7%); increased food insecurity (32%); the influx of able-bodied young people to big cities (11%) inside and outside the country and delinquency (6%). This situation puts the population in a situation of extreme poverty (16%), indebtedness (8%) and conflicts between households (8%). Faced with this shock, producers adopt adaptation strategies, the most widespread of which are, among others, the use of water and soil conservation techniques, the use of organic and mineral manure, the use of improved varieties early.

Keywords: land degradation, peasant perceptions, adaptation, Bagaroua, Niger

1. Introduction

Soil degradation is a deterioration of the physical, chemical and biological properties of soils. In the Sudano-Sahelian zone, the degradation of soil productivity comes from the imbalance of the balance of organic and mineral matter induced by repeated fires, overgrazing, clearing and unsuitable cultivation work. This imbalance is further accelerated by erosion (Roose, 1980; Breman and Uithol, 1986). According to FAO (2008), land degradation has worsened globally in recent decades, threatening the survival of 1.5 billion people who depend directly on the land. This degradation of natural resources remains a major problem for the agro-sylvo-pastoral development of the arid and semi-arid zones of West Africa (Sawadogo, 2001). Indeed, Niger, a semi-arid country located in the heart of the Sahel, is highly threatened by this phenomenon. The consequences linked to land degradation are, among other things, the reduction of useful agricultural land, a drop in soil fertility which results in a reduction in land productivity, which constitutes an obstacle to the increase in agricultural production. It would lead to an annual fall of nearly 3% in agricultural production, thus compromising food security in the region (FAO, 2008). Drought and erosion are among the factors limiting agricultural production in the arid and semi-arid areas of West Africa (Ambouta, 2004). In addition to drought and erosion, Niger is a country experiencing rapid population growth, with a natural growth rate of around 3.9% per year, one of the highest in the world. At this rate, the country will experience a doubling of its population every twenty (20) years (INS, 2016). This galloping demographic growth

of the population accentuates land degradation through overexploitation and overgrazing. These actions lead to compactness, crusting of the land and the disappearance of plant cover. Indeed, according to the ECOWAS water resources coordination center (CEMR /ECOWAS, 2010), 40% of the land is degraded, that is approximately 3.9 million hectares. Faced with these consequences linked to land degradation, farmers adopt different strategies such as SWC and DRS activities. In such a context, the rehabilitation of degraded lands and the improvement of land productivity through water and soil conservation (SWC) techniques would be an alternative.

In Bagaroua (Tahoua region, Illéla department), farmers perceive this land degradation from various angles. in this area. The rocks are exposed following the erosion produced by violent rains for only 2 or 3 months; these rains carry sand and plant matter towards the rivers, the woody vegetation preventing gully erosion has almost disappeared, either as a result of deforestation or the excessive cutting of trees. In order to minimize the impact of land degradation on agricultural production (in particular that of millet and sorghum) in Niger, it is essential to study farmers' perceptions of these phenomena, to carry out land recovery work by works. Thus, this study will mainly focus on identifying the different indicators, causes and consequences of land degradation in the geographical area of Bagaroua in Niger and the different strategies adopted by this population to deal with it.

2. Materials and Methods

2.1 Presentation of the Study Area

The study was conducted in the municipality of Bagaroua located west of the Tahoua region in Niger (Figure 1). The commune of Bagaroua is located between $14^{\circ}38'22''$ North latitudes and $04^{\circ}27'827''$ East longitudes. It covers an area estimated at 2,947 km² (PDC, 2015). It is limited to the northeast by the urban municipality of Illéla; to the west by the communes of Dogonkiria and Sanam; to the south by the commune of Allela and to the north by the communes of Tébaram and Bambeye.

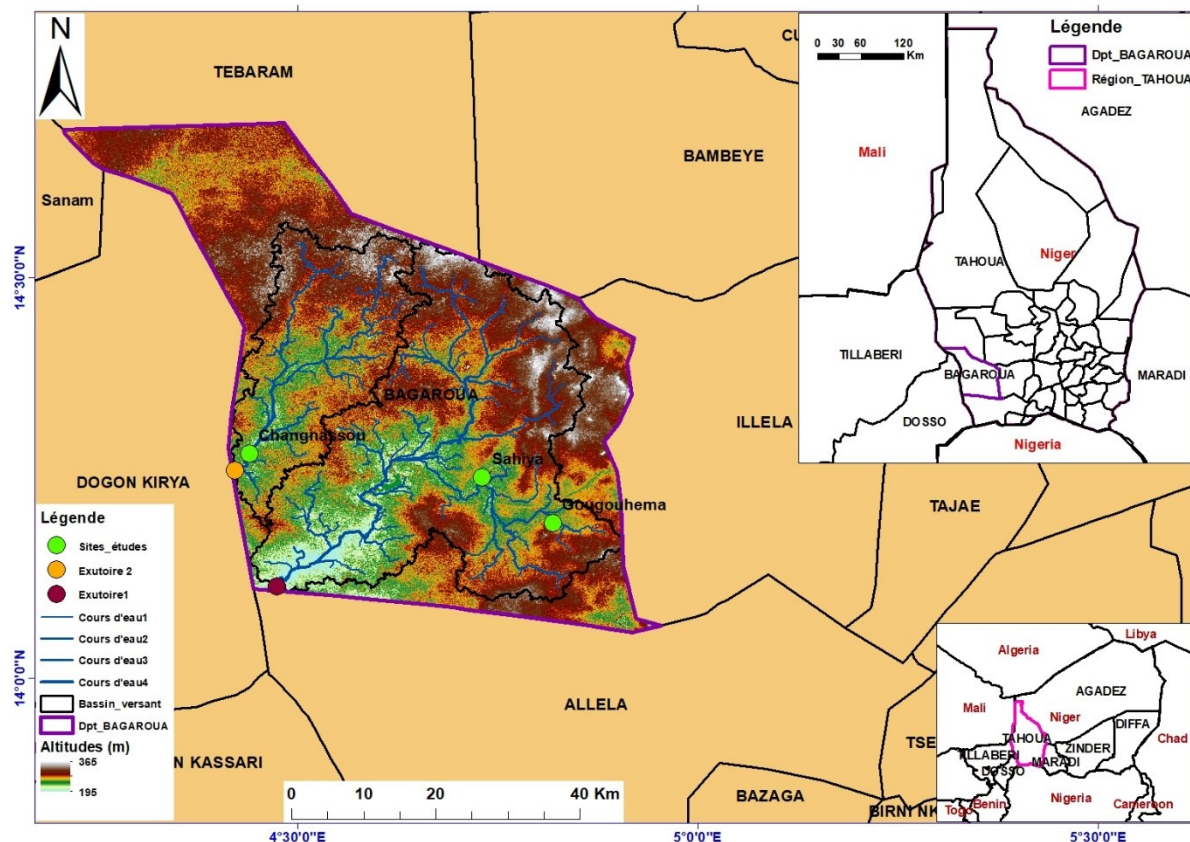


Figure 1. Geographic Location of the Study Area

2.2 Collection of Data

2.2.1 Field Surveys

The choice of the villages surveyed was made on the basis of the construction activities carried out by PAM. Three villages in the commune of Bagaroua were selected: Changnassou, Sahiya and Gougouhema. Respondents were chosen on the basis of the following criteria: being a producer, head of household and landowner or not and having agricultural works in the field (mainly half-moons). Data concerning the method of land acquisition, indicators, causes and manifestations of land degradation according to peasant perception were obtained through individual surveys, focus groups using a data sheet. The survey submitted to the producers sampled as follows: the targeting of the beneficiary households of the half-moon production activities is based on the socio-economic profiles defined by the survey. Systematic sampling was carried out. To select the respondents for the sample, formula $d + (N/n - 1)(1)$ was used with N = total number of vulnerable households listed by the WFP in the three villages, n = the retained sample size in each village and d the first chosen individual ($1 < d < N$). With the formula, for the three villages, we arrived at a total sample size of 254 surveyed households, i.e. 21% of the total number of vulnerable households in the three villages, which amounts to 5,334. sample per village amounts to 110 people to be surveyed for the village of Changnassou, 82 people to be surveyed for the village of Gougouhema and 62 surveyed for the village of Sahiya. The choice of people to be surveyed by village was made using a list of vulnerable households listed by the WFP, on this list the following formula is used $n = t^2 * p * (1 - p) / m^2(2)$ for the identity of the household.

n : Minimum sample size to obtain significant results for an event and a fixed level of risk;

t : Confidence level (typical value of 95% confidence level will be 1.96);

p : Estimated proportion of the population that exhibits the characteristic;

m : Margin of error (generally fixed at 5%).

The technical data collection equipment for the socio-economic survey includes a semi-structured interview guide and a GPS device for taking the geographical coordinates of the sites.

To define the concept of land degradation, the causes and the consequences according to peasant perception, percentages have been assigned to each indicator of land degradation.

2.2.2 Data Analysis Methods

For data analysis, a sorting of variables with SPSS and Excell software was carried out according to the indicators, causes and impacts of land degradation within the study area. These parameters were used as variables to analyze farmers' perceptions on land degradation. Regarding the strategies adopted by these households surveyed on land degradation, descriptive statistics have made it possible to detect at the level of each shock the different local strategies adopted by producers to remedy the effects of land degradation.

3. Results

3.1 Indicators of Land Degradation in the Terroir

Peasant perceptions on land degradation were detected through land degradation indicators observed with agricultural producers in the rural commune of Bagaroua. These indicators have been classified according to their impacts on land degradation. Regarding the appearance and formation of glazes, these indicators were perceived by 59% of the producers surveyed, while the physical indicators were listed by 34.24% of the producers. As for the indicator of soil infertility, it is perceived globally by only 7% of the farmers surveyed. Table 1 presents the percentages of land degradation indicators according to farmers' perception.

Table 1. Land Degradation Indicators

Indicators	Farmers' perception of land degradation	Proportion (%)
Physical indicators	Appearance and formation of glazes	59
	Stripping, stripping and silting	14.17
	Erosion marks (ravines and streams)	10.07
	Presence of pebbles, sandy bulge	10
Indicator of soil infertility	Vegetation cover (absent or almost absent), drop in production	7

3.2 The Causes of Land Degradation According to Peasant Perception

The main causes cited by the people surveyed are: Wind and water erosion caused by rain and wind, the overexploitation of land due in large part to the high rate of natural increase and the lack of arable land, the decline and Irregular rains, rising temperatures, these three causes are linked to climate change, deforestation linked to the enormous need for firewood and building materials. All these causes lead to leaching and poor soils. Figure 2 presents the rate of causes of land degradation, according to the perception of the population, in order of importance.

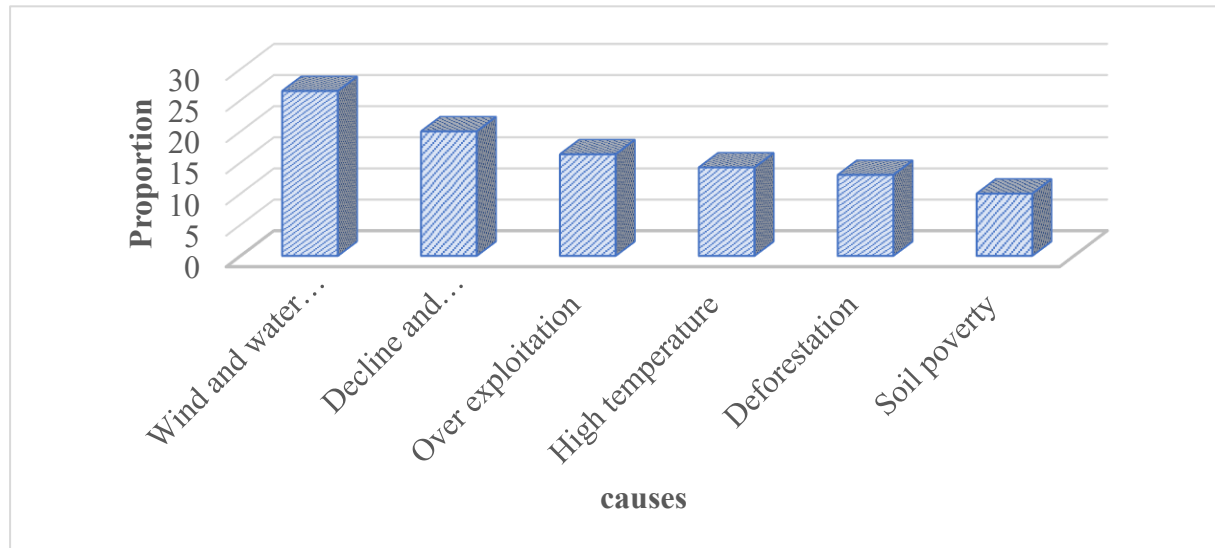


Figure 2. Causes of Land Degradation According to Respondents

3.3 Opinion of Farmers on the Consequences of Land Degradation

The main consequences cited by the people surveyed are: food insecurity (32%), household poverty (16%) and the reduction in arable land (11%) (Figure 3). All these problems cause the drastic drop in agricultural production (42%) thus leading to food insecurity which pushes the able-bodied youngsters to opt for migration (11%) and delinquency (6%).

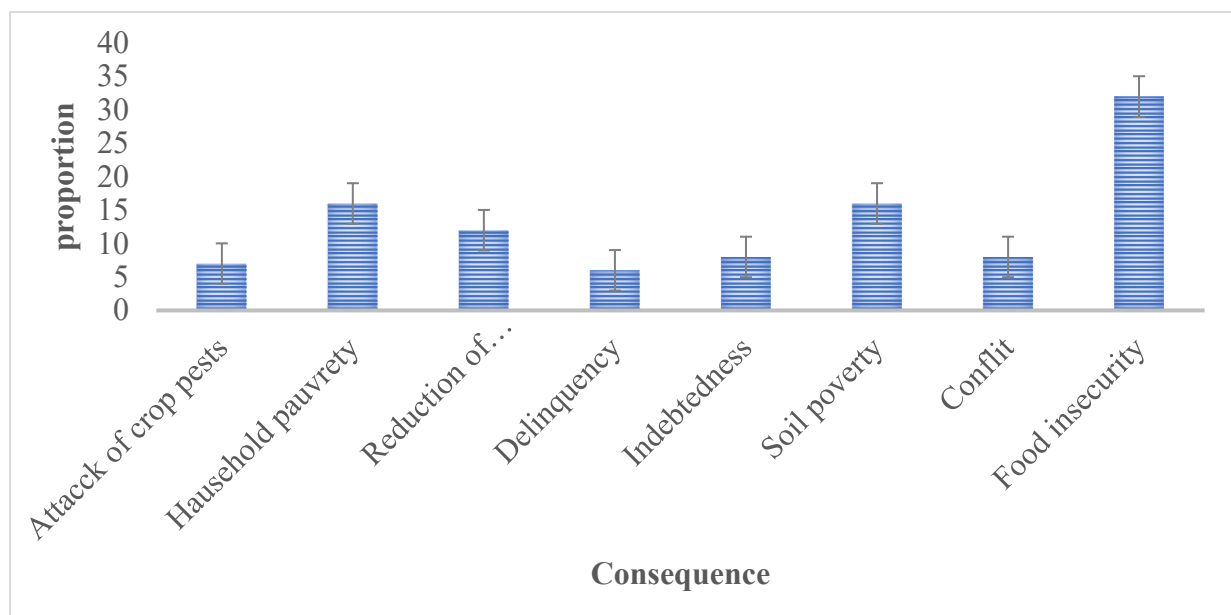


Figure 3. Consequence of Land Degradation

3.4 Strategies Adopted by Farmers to Cope with the Impact of Degradation

The analysis of the adaptation strategies employed by producers in the face of land degradation shocks has made it possible to identify three homogeneous classes. The first class is that of the exodus and the use of organic manure as local strategies adopted by the producers of the three target villages of the municipality of Bagaroua in the face of the shock of land degradation; the second is land reclamation activities. The last corresponding to the third class is that of the strategies innovated but adopted by the producers faced with the drastic drop in production linked to the irregularity of the rains.

3.4.1 Intensification of Secondary Activities

Exodus is the main activity which occupies 55% of the households surveyed in this area at the end of each agricultural campaign before the construction of the works. Indeed, young people most often travel to large cities or border countries such as Ivory Coast, Nigeria, Ghana, Senegal, etc. On the other hand, 29.52% of vulnerable households surveyed engage in petty trade and 14% practice livestock farming.

3.4.2 CES/DRS Land Recovery Activities



Figure 4. Half Moons at the Level of the Glazes

Five (5) types of soil are present in the commune, these are dune soils, sandy-clay soils, clay soils in the valleys, glaciis soils which are impermeable and very hard for farming and the soils of the plateaus or rocky. Rainfall is between isohyets 300 and 650 mm with an average of 324.43 mm of annual rainfall calculated over the last eight (8) years (2012-2019). Precipitation is random and variable depending on the year and is poorly distributed in space and time. The most common means of combating land degradation in the region are half-moons with 98% of households surveyed, Zaïs, Assisted Natural Regeneration and the addition of organic manure. These recovery activities were mentioned by 55% of the respondents, followed by the planting of trees, anti-erosion benches, trenches, mini-dams, spreading weirs and stone barriers. Thus, land recovery activities at the level of the three villages are practiced by 97%, 98% and 98.80% of the households surveyed respectively in Changnassou, Gougouhema and Sahiya. For the vast majority of peasants, the making of half-moons is the dominant activity. The reasons for making half-moons are diverse. It is mainly about the increase in cultivable areas, the flexibility of the realization of the half-moons which does not require a great training, the lifespan of the works once well carried out (up to 5 years), unlike in the Zaïs which are easily silted up (maximum lifespan of 2 years) and ultimately the increase in yield for the food needs of the household and to satisfy certain social needs of the

producers. To this is also added the income generated by the activities of making half-moons through Cachs for Works, these incomes are sometimes used to buy food in order to fill the food deficit and certain household needs (schooling fees, weddings, baptisms, parties, etc.) and donations such as (rice, cowpea, oil, salt, and improved seeds). These donations and revenues are obtained by the peasants through certain Projects and NGOs.

3.4.3 Use of Mineral and Organic Manures

The use of mineral manure is very rare among producers with a very low percentage (8%). They use the following mineral fertilizers NPK (15-15-15) and urea 46% nitrogen, with an average application rate of between 150 to 200 kg / ha for NPK and 75 to 100 kg / ha for the urea. The doses applied recommended and popularized by research structures range between 200 kg/ha of NPK and 100 kg/ha for urea. Contrary to mineral manure, still Table 4, organic manure is used by 92% of producers in this area at a dose of 150 to 300 kg/ha. It is made up of organic materials such as compost, household waste, poultry droppings, goat and sheep droppings and cow dung. Land degradation combined with the depletion of agricultural land due to lack of fallowing lead to a total decline in soil fertility, so to have good production at the level of these half-moons, the use of mainly organic fertilizers associated to the works (half-moon) has proven to be essential for agricultural production to enhance soil fertility. This technique is a strategy adopted by growers to improve productivity on degraded soils. In addition, the number of vulnerable households per village with livestock is 194 out of the total sample of households, or 73.76% (large and small ruminants). This shows that a large amount of manure can be produced for site fertilization.

3.4.4 Use of Improved Varieties

As strategies for adapting to the impact of land degradation, farmers also resort to the use of improved varieties. These varieties are early varieties with a short cycle to cope with any early stoppage of the rains at the end of the campaign. This varietal choice focused on short-cycle varieties is also motivated by recurrent delays in the first useful rains reported by farmers. As a result, a large number of respondents (54%) mainly use the improved varieties, (42%) use both varieties (early and late varieties) and 4% only use the local variety.

3.5 The Effects of Different Strategies on Household Living Conditions

3.5.1 Secondary Activities

The rural exodus is an activity that occupies a percentage of (55.51) before the realization of the land recovery activities, this percentage must have dropped with the activities of the realization of the half-moons. The exodus rate is 6.29% with land recovery activities. For these farmers surveyed before the construction of the half-moon structures, the rural exodus is the only option, thus the exodus provides significant sources of income to cover and meet the needs related to the food deficit. Table 2 indicates the main secondary activities of households before and after the construction of the works.

Table 2. Degree of Secondary Activities before and after Construction

Activities	Baseline	Study	Difference	Rate of increase
Exodus	141	26	-115	-442.30%
Breeding	38	49	11	22.44%
Trade	75	57	-18	-31.57%
Realization of works	0	122	122	100%

3.5.2 Household Strategies on Productive Means

a) Land feature

Land is an essential step in the field of agriculture and household income. It is with this in mind that the mode of land acquisition in the study area was determined. Table 3 shows the mode of land acquisition in the study area.

Table 3. Mode of Acquisition of Land per Household

Acquiring mode	Workforce	Percentage	Percent valid	Cumulative percentage
Heritage	233	91.7	92.0	92.0
Purchase	17	6.4	6.5	98.5
Ready	3	1.1	1.1	99.6
Pledge	1	0.4	0.4	100.0
Total	254	99.6	100.0	

The most dominant mode of access to land is inheritance with a percentage of 91%. With increased household income, farmers have purchased degraded agricultural land and created agricultural half-moons to improve production. This action shows a positive increase in the income of the populations.

b) productive asset

Table 4 presents the household production assets obtained at the end of the surveys carried out in the study area.

Table 4. Household Production Asset

Productive Asset	Workforce	Percentage	Valid percentage	Cumulative percentage
Cart	177	69.68	70	70
Others	77	30.32	30	100.0
Total	254	100	100.0	

69.68% of the households surveyed own carts as a production asset used for purposes as a means of transport to go to the fields or from one village to another and as a means of transporting organic manure and harvest goods. These carts are also rented for income. More than 80% of these carts were purchased with the activities of making the half-moons, these funds for the purchase of these carts come either from the Cachs for Works, a donation from the PAM project or from income from production.

3.5.3 Increase in Cultivable Areas

Given the importance of these land recovery activities, 73% of the households surveyed have carried out works of an area of 1 ha each either on their own funds or with project financing, 27% of households have recovered more than one to 3 hectares. These results show that it is several hectares of degraded fields that have been recovered by the projects intervening in the peasant fields of the study area. Table 5 presents the areas recovered with the works, the half-moons by household.

Table 5. Areas Recovered by Households

Area recovered	Workforce	Percentage	valid percentage	Cumulative percentage
1 ha	186	73.23	73.23	73.23
1 to 3ha	68	26.77	26.77	100.0
Total	254	100	100.0	

3.5.4 Level of Education

The level of education is a very important factor for the development of agriculture. As a result, as shown in Table 6, producers have resorted to literacy (25.59) and Koranic studies (23.63) to raise the level of education of vulnerable households. Table 6 presents the level of education of producers.

Table 6. Educational Level of Producers

Educational level	Workforce	Percentage	valid percentage	Cumulative percentage
Schooled	97	38.18	38.18	38.18
Literacy	65	25.59	25.59	63.77
Koranic	60	23.63	23.63	87.4
Not in school	32	12.60	12.60	100
Total	254	100	100	

In the study area, the school enrollment rate is low, hence, with the awareness of the peasants to raise the level of education, they decide to take charge of the children's schooling, the adults devote themselves to literacy courses and Koranic. Some of the students are even supported by NGOs with support from quarterly scholarship donations.

4. Discussion

In the Sahelian zone such as Niger, land degradation is the main cause of the drastic drop in cereal production yields. Surveys carried out among the populations of the commune of Bagaroua, Tahoua region in Niger show that

millet and sorghum are the two main crops grown in this area. According to the Department of Statistics of the Ministry of Agriculture (MA/DS., 2013), in the center north of Niger, millet and sorghum are the main crops. This could be explained by the strong capacity of adaptation of these two cultures to degraded soils and poor in organic matter because the lands of these terroirs are mainly in a state of beginning stage (55%) or advanced stages (45%) of degradation. With regard to the indicators of land degradation in the commune of Bagaroua, the study made it possible to determine a number of indicators on land degradation, the most important of which are the formation of glacis caused by rainfall and the speed of the wind. This is explained by the fact that rainfall is the most important climatic factor since it strongly influences food production in Sahelian and Sahelo-Sudanian climate conditions (Ali, 2010; Jouve, 2010). The presence of erosion marks (wind and water), desilting with the presence of pebbles on the surface were mentioned by the farmers, in fact the heavy rains lead to erosion, the formation of slaking crusts on bare soils and flooding. The strong intensities of the rains result in soil erosion, this erosion is very extensive and causes cracks in the earth depending on the structure of the soil. Indeed, the aridity of the soils exposes them to the processes of wind and water erosion leading to the departure of the arable and fertile part of the soils, slows down the biological processes at the level of the soils and notably leads to a drop in their fertility. These results are similar to those of Ambouta et al. (2004). Indeed, according to farmers' perceptions of land degradation, rainfall, high temperatures and violent winds that were cited by farmers are the most determining climatic parameters in the process of land degradation. These parameters have a direct influence on agricultural production and are decisive for a good or bad agricultural season. Poor rainfall during an agricultural campaign leads to poor development, withering of leaves, crop burns due to the increase in temperature, Guibert et al. (2010) and Bambara et al. (2013) noted similar peasant perceptions in the responses to a survey conducted, respectively, in the cotton-growing area of northern Benin and in Burkina Faso, whose climate is similar to the area of this study. The results of the studies by Nicholson (2005), Lebel and Ali (2009), carried out in the African Sahelian zone and relating to peasant perceptions of the indicators of rainfall changes, are in line with the observations made in this study. Similar perception rates for temperature increases and high winds were reported by Ouédraogo et al. (2010) in Burkina Faso and by Agossou et al. (2012) in Benin. On the other hand, the work of Ouédraogo et al. (2014), relating to perceptions and coping strategies to changes in rainfall cited declining rainfall, seasonal disruption, erratic rainfall, pockets of drought, heavy driving rains and floods as inherent indicators. The study of the causes of land degradation has made it possible to identify causes including, among others, rain and wind, poor soils, temperature and, finally, human actions (deforestation and overexploitation of land). These results are similar to those of (Ali, 2010; Jouve, 2010) who indicated the importance of rainfall in the production of food crops with Sahelian and Sahelo-Sudanian climate conditions. The pressure of human actions through deforestation and overexploitation of land have an influence on the process of land degradation, these causes have been listed by the population with the disappearance of certain plant species and wild animals in the area, 5 years ago, there were natural resources in the land such as bushes, dense forests in certain places, the presence of wild animals. Today, the population is fully aware of the changes that its environment has undergone in recent decades. The scarcity or even the disappearance of certain plant species (case of *Grewia bicolor*); the decrease in the population of *Combretum nigrum* and other animal species (hare and wild guinea fowl) were mentioned during the surveys, to this was added the appearance of certain pests that did not exist before. These results corroborate those of Hanspeter et al. (2011), people and their actions are the main causes of land degradation. With regard to the consequences, the main consequences cited by the people surveyed are household poverty, the reduction of cultivable land and the drastic drop in agricultural production, thus leading to food insecurity which was perceived with a higher (32%) compared to the other indicators. Indebtedness and population migration are also seen as direct or indirect consequences of the effects of land degradation. These last two elements are identified in the literature as being rather reactive adaptation strategies in the face of climate change (IUCN, 2011; Kanté, 2011). Poverty and indebtedness are signs of the suffering of producers due to the decline in agricultural productivity linked to land degradation (UNCCD, 2008), this suffering pushes young people towards migration and delinquency.

Faced with the variability of the seasons, producers have also developed adaptation strategies that limit land degradation through agricultural practices that store water or increase soil fertility, such as land recovery activities using excavated structures (half moons), use of mineral and organic manures and the use of improved varieties in works. Water and soil conservation techniques such as half-moons, which are physical devices for capturing runoff water and improving soil fertility. These land recovery activities with half-moon excavations are used by 98% of producers. These results are similar to those obtained by Reij (1996), according to whom water and soil conservation techniques (CES) represent all the practices that contribute to soil and water management. The application of these techniques aims to avoid or reduce soil degradation and to improve the physical, chemical and biological properties of the soil, and therefore they allow to improve the productivity of the land (Sawadogo, 1995; Reij et al., 1996; Doro, 1991). Concerning the decrease and irregularity of rains, farmers also resort to the use of

improved varieties (54%) of households mainly use improved varieties, (42%) use both varieties (early and late varieties). On the other hand, most producers use improved varieties (in particular early varieties with a short cycle), in order to cope with the impact caused by the late onset or the early cessation of the rains. Indeed, many studies recommend the use of short-cycle varieties (90-100 days) to replace local cultivars, especially if the rains are late (Reddy, 1988; Klaij et al. 1994 cited by Buerkert, 1995 de Rouw, 2004). These results are also in line with those of Roncoli et al. (2000) who report that the use of short-cycle plants is a palliative strategy for seasonal variations in rainfall. For Kouressy et al. (2008), it is clear that the decrease in rainfall has led farmers to adopt varieties with shorter cycles than traditional cultivars. Droughts and reduced rainfall have led to a loss of plant cover, leading over time to a decline in soil fertility. In addition, the use of organic and mineral manure is widespread among producers in the study area because of the extreme poverty of agricultural land. Thus, in order to improve production at the level of dug works, farmers resort to the use of fertilizers, 92% of households use organic manure and 8% resort to the use of mineral fertilizers to the detriment of organic manure, these fertilizers are a necessity without which the producer would not obtain good production. Thus, several studies have shown the importance of the contribution of organic amendment in maintaining the agronomic quality of soils (Hartemink and Bridges, 1995; INERA, 2000; Hibra-Samgue, 2004; FAO, 2007; Masto et al., 2008). Livestock breeding is also a well-established activity in the daily lives of Bagaroua producers, it is practiced by 14.96 % of the producers surveyed, therefore the availability of organic manure does not constitute a problem to ensure the addition of amendments in excavated works. In addition to these strategies mentioned above, there is the intensification of secondary activities such as petty trade which is practiced by 29.52% of households while others migrate to exodus which is practiced by 55%. producers of able-bodied men and women, the exodus is a form of migration of populations within the same country or sometimes outside the borders. Similar results were revealed in Benin by (Vodounou and Onibon, 2016; Ayedegue et al., 2020). Regarding the exodus according to the peasant perception, it is also perceived as a consequence and both as an adaptation strategy in the face of the impacts of land degradation. These results corroborate those of Kanté who identified exodus in the literature as being rather a reactive adaptation strategy in the face of climate change (IUCN, 2011; Kanté, 2011). Land reclamation activities in the study area have resulted in lower threshold household poverty, this improvement in the standard of living of households was possible with the increase in land area and the use of improved varieties associated with the use of organic manure allowed an increase in production. The percentage of young migrants heading for exodus also fell with payments from Cachs for Works, donated by the various projects operating in the study area. These results corroborate those of ACTED (2012), according to which transfers and remittances from exodus are important sources of income for these households. The level of education is a very important factor for the development of agriculture. As a result, land recovery activities associated with donations made by NGOs have made it possible to raise the level of education of vulnerable households with the involvement of parents in taking charge of children's schooling and Koranic and literacy courses. for adults.

5. Conclusion

This study has analyzed the strategies of adaptation to the effects of land degradation in the municipality of Bagaroua. With regard to the manifestations of land degradation as well as their negative consequences on the means of existence are perceived by the peasants of the zone through the indices reflecting 66% of the producers who agree with the appearance of the glakis, 13, 17% with gullies, 10.07% presence of pebbles and sandy bulge, they also notified the impact of land degradation through parameters such as the reduction of cultivable areas (12 %) , enemy attacks of crops (7%), the increase in food insecurity (32%), the influx of able-bodied young people to the big cities (11%), inside and outside the country and delinquency (6%). This situation places the population in a situation of extreme poverty (16%), indebtedness (8%) and conflicts between households (8%). Faced with this shock, producers are adopting adaptation strategies, the most common of which are, among others, land recovery work, the use of organic manure and the use of early improved varieties. According to this study on farmers' perceptions, proposals and suggestions go to farmers and political decision-makers. With regard to farmers, good adoption of technological innovations for land recovery and improved varieties is necessary. For the state, taking into account the socio-economic constraints of these farmers by the state by supporting the farmers through donations or subsidies of improved varieties are necessary, fertilizers or production equipment, popularization of irrigation in case of water shortage.

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