Original Research Article

Climate Perceptions of Small Ruminant Farmers in the Mouhoun Province of Burkina Faso

ABSTRACT

Perception is all about taking in, taking for oneself, taking hold of. Thus, a false perception of climate change can lead to a lack of adaptation or to maladaptation. Climate change represents a threat to the livestock farmers of the MP, whose main source of income is the exploitation of natural and animal resources. The problematic of this study is based on the good perception of the stockbreeders which were necessary to them to adapt to the climatic crises already occurred. The aim of this study is to analyze the perception of climate change by small ruminant breeders in the Mouhoun Province of Burkina Faso. To this end, 286 breeders, including agro-pastoralists and agro-pastoralists, i.e. 22 breeders per village, were surveyed. In addition, a focus group was held in each village, for a total of thirteen (13). Phinks software was used to process the individual survey data. The results indicate a drop in rainfall intensity (78.7%), a rise in temperatures (90.7%), a withdrawal from grazing areas (86%), a drop in milk production (81.3%) and lactation duration (86%). This study leads to the conclusion that the changes perceived by farmers are relevant to the development of climate change adaptation strategies.

Key words: Breeders, ruminants, climate change, perceptions, Burkina Faso.

1. INTRODUCTION

Climate change is a major constraint to the socio-economic development of rural populations (ZAN, 2019, p. 41). On a global scale, it is leading to a rise in temperature and a poor spatiotemporal distribution of rainfall (FAO, 2019, p. 12). In this global context, sub-Saharan Africa, where agriculture is the main source of employment and income for the majority of the population, appears to be the region of the world most exposed to climate change (FAO, 2020, p. 22).

Burkina Faso, a Sahelian country with an arid and semi-arid climate, is a rural country (82.5% of the population) with a poverty index of 40.1% in 2014 and a human development index (HDI) of 0.420 (PNDES, 2016-2020, p. 1). Located in the Boucle du Mouhoun region, Mouhoun Province (MP) is divided between the Sudano-Sahelian sector with average annual rainfall of 700 to 900 mm and the Sudanian sector with average annual rainfall of over 900 mm. Although livestock farming is the 2nd most important activity after agriculture, the sector is heavily dependent on spontaneous pastoral resources, and suffers the effects of climatic variations, the corollary of which is a drop in livestock productivity (MOUHOUS, 2015, p. 173).

This article therefore analyses the climate perception of ruminant farmers in the MP, in a context marked by a downward trend in climatic parameters.

Data was collected in thirteen (13) villages in the province, with a total of 286 livestock farmers, including agro-pastoralists and agro-pastoralists, i.e. 22 farmers per village. In addition, a focus group was carried out in each village, i.e. thirteen (13) in total. Phinks software was used to process the individual survey and focus group data.

The aim of this study is to analyse the perception of climate change by small ruminant breeders in the Mouhoun Province of Burkina Faso. The hypothesis is that the latter have good climate perceptions, which have been necessary for them to adapt to the climatic crises that have already occurred.

2. METHODOLOGY

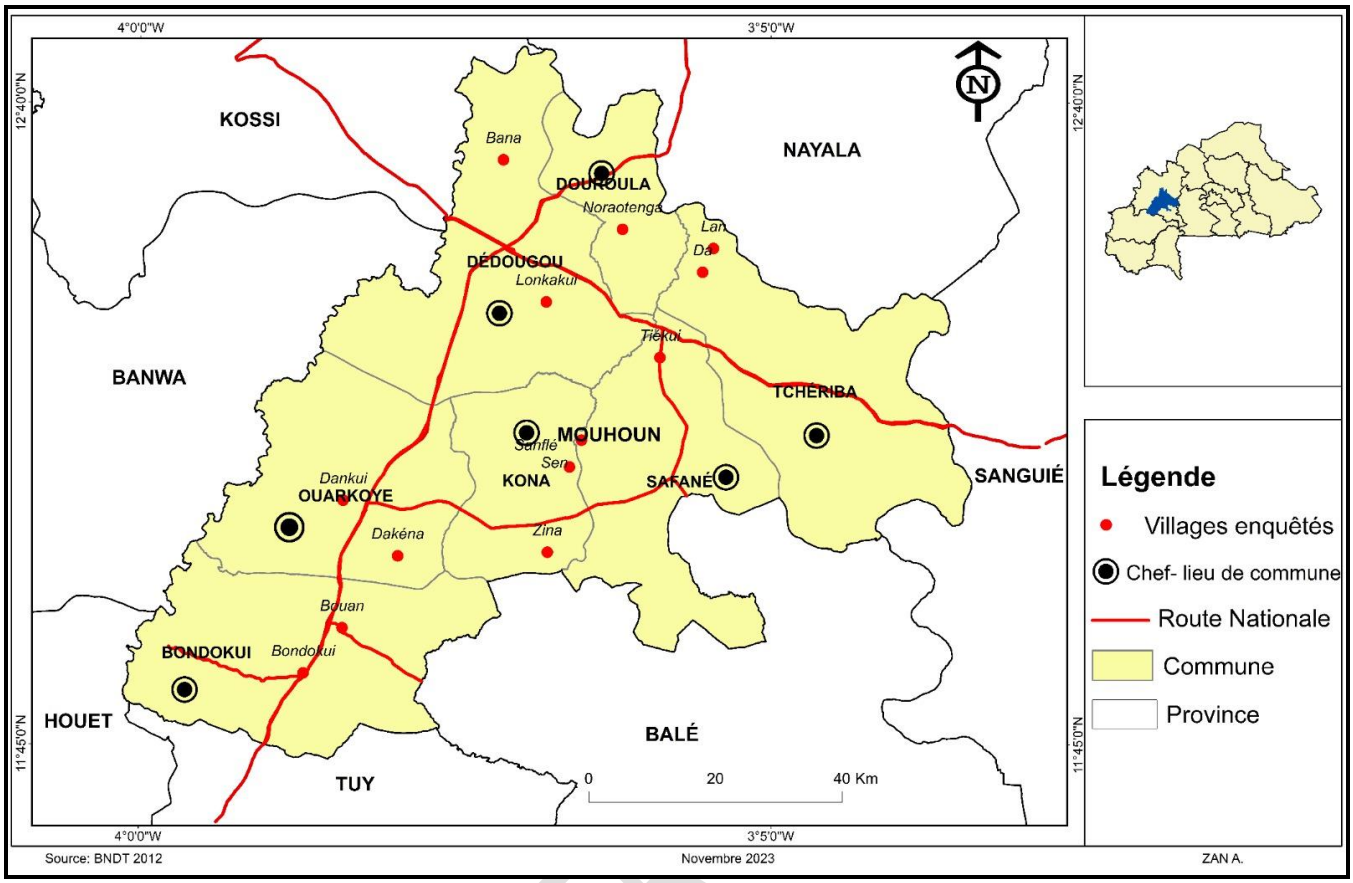
2.1. Presentation of the study area

Mouhoun Province is located in the north-western part of Burkina Faso between longitudes 2° 26' and 4° 38' West, and between latitudes 11° 15' and 13° 44' North (TRAORE, 2018, p. 10). It is bordered to the east by the province of Sanguié; to the north by the province of Nayala; to the north-west by the province of Kossi; to the west by the province of Banwa and Houet; and to the south by the province of Balé (Figure 1). The Mouhoun belongs to the Sudano-Sahelian climate zone, with three (3) variations: In the north, the South-Sahelian sector with average annual rainfall of 500 to 700 mm; In the centre, the Sudanian sector with average annual rainfall of 700 to 900 mm. It extends over the southern part of Kossi province, the

whole of Nayala province and the northern parts of Mouhoun, Balé and Banwa provinces; in the south, the southern Sudan sector, with average annual rainfall of 1,000 to 1,400 mm (RGPH, Monographie de la Région de la Boucle du Mouhoun, 2006, p. 24).

The average maximum temperature recorded during the hot period (March to May) is 40°C and the average minimum temperature recorded during the cold period (December to February) is 24°C (MATDS, 2011, p. 14). Livestock farming is the second most important economic activity for people in the area, some of whom come from pastoral communities (Peulhs). It is characterised by its extensive nature and is practised at the same time as agriculture by most households. The livestock is made up of cattle, sheep, goats and donkeys. Large herds are entrusted to Fulani herdsmen (TRAORE, 2018, p. 15).

This is traditional extensive livestock farming, which plays a savings role for households. However, because of the more or less favourable climatic conditions, there are large quantities of plant biomass, attracting many herders from the interior of the country as well as from neighbouring countries such as Mali. One of the sector's biggest problems remains climate variability and change, combined with insecurity linked to the presence of unidentified armed groups.



Map 1. Location map of the study area and survey sites

2.2. Data collection and analysis

Data were collected in thirteen (13) villages in the province. On the basis of criteria (accessibility and number of ruminant breeders in the village) defined with local technicians, the villages of Tiékui and Sin were identified in the commune of Safané; the villages of Lan and Dah in the commune of Tchériba; the villages of Fakena and Dankuy in the commune of Ouarkoye; the village of Tiékui in the commune of Tchériba; and the village of Tiékui in the commune of Tchériba; the villages of Fakena and Dankuy in the commune of Ouarkoye; the village of Noraogtenga in the commune of Douroula; the villages of Bondokuy and Bouan in the commune of Bondokuy-rural; and the villages of Zina and Sanflé in the commune of Kona. In each commune, two villages were identified, except in the commune of Douroula, where only one village was identified and surveyed because of accessibility problems linked to insecurity.

The age group of people concerned by this survey is 50 and over. This age group is able to provide us with the necessary information on climate change (CC),

changes in pastoral resources and ruminant farming in the study area. The choice of villages to be surveyed was based on the following criteria: the geographical location and accessibility of the locality (aspects linked to insecurity), and its representativeness in terms of the desired typology (transhumant, sedentary and nomadic).

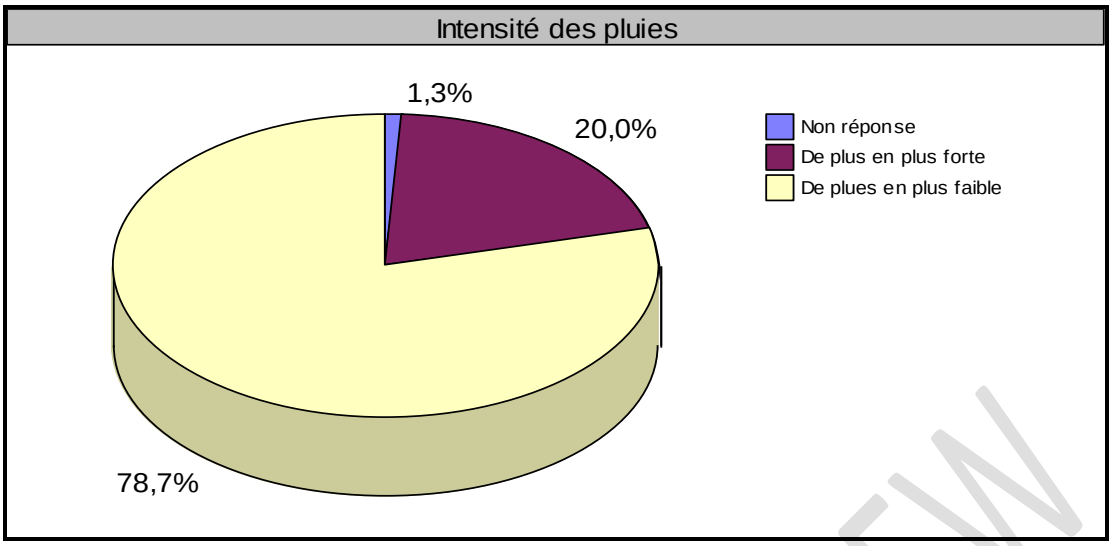
A total of 286 livestock farmers, including agro-pastoralists and agro-pastoralists, were surveyed, i.e. 22 farmers per village. In addition, a focus group was carried out in each village, for a total of thirteen (13). Phinks software was used to process the individual survey and focus group data.

3. RESULTS

Climate change is perceived by farmers in the MP as an increase in temperature and a decrease in rainfall. This study thus highlights a trend towards an increase in extreme climatic events (intense rainfall, temperature rises, violent winds) in recent years in the MP. Analysing farmers' perceptions of climate change is a useful way of understanding how people behave in the face of these problems. In addition, several studies conducted on farmers' perceptions of the climate have taken these parameters into account (OUEDRAOGO, 2015; ZAN, 2019; MANOLI, 2012), etc.

3.1. Farmers' perceptions of changes in rainfall

CC is closely linked to weather conditions, although there are subtle differences between the two (IPCC, 2007, p. 22). In Mouhoun province, for example, local people remember abundant, regular rainfall in the past and longer rainy seasons. The majority of respondents, i.e. 78.7%, believe that the intensity of rainfall has been decreasing (Figures 2 and 3). In fact, only 20% of respondents thought that the rains were getting heavier, compared with 1.3% who thought that they were getting lighter. This proportion suggests that some respondents are unfamiliar with the phenomenon of rainfall variability. In addition, 46.7% of respondents thought that the seasons were getting shorter, compared with 29.3% who thought that they were getting wetter and shorter. A further 12% confirmed that the seasons are rainy and long. This wide range of responses reflects the great inter-annual variability in rainfall.



Source: Field survey, 2022

Fig. 1. Rainfall intensity

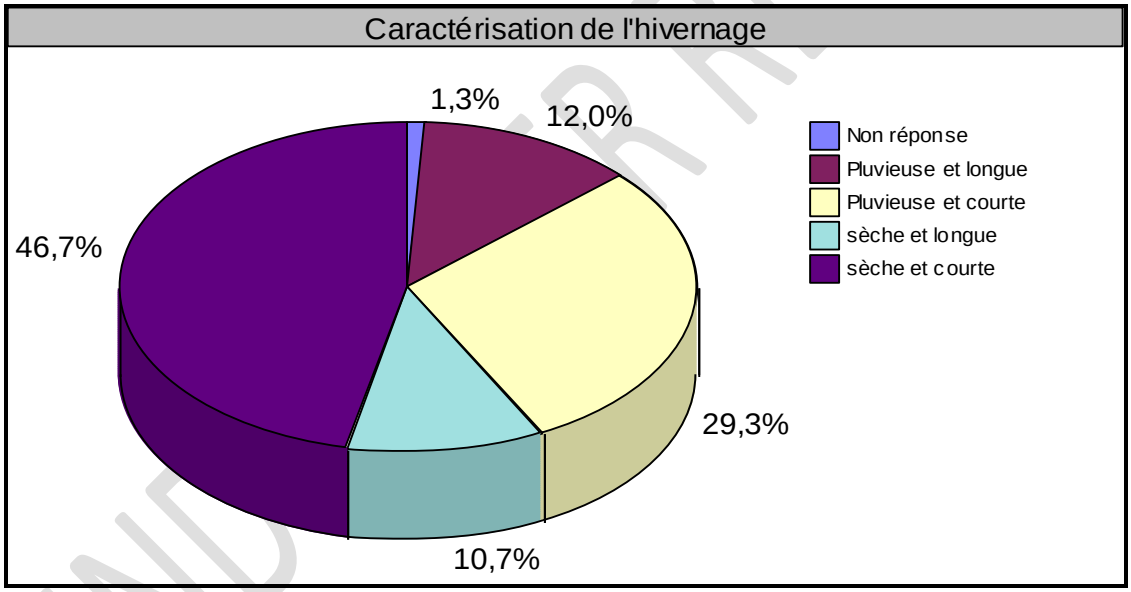


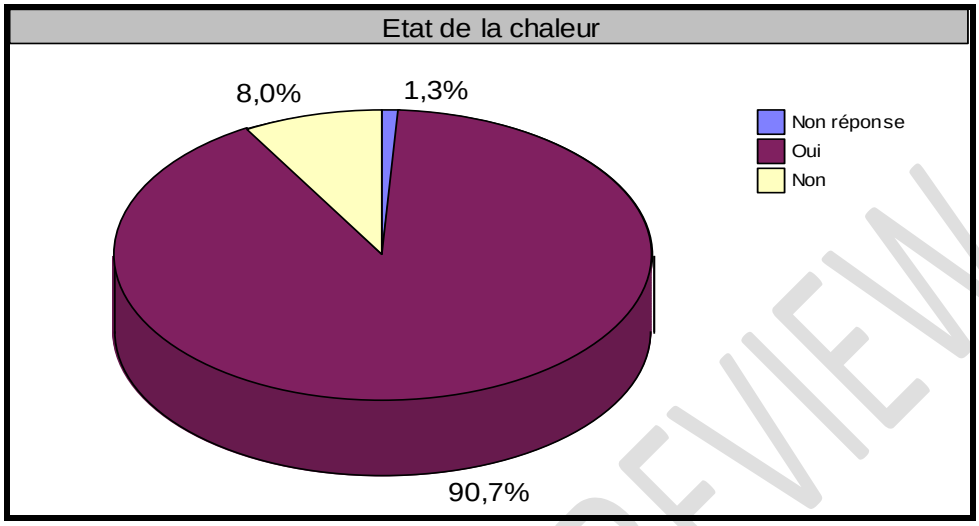
Fig. 2. Wintering characterisation

Source: Field survey, 2022

3.2. Farmers' perceptions of temperature change

Farmers' perceptions of temperature change are measured through the sensation of ambient heat (VISSIN E W, et al. 2015; cited by OUANDE, 2015, p.70). The survey on the perception of climate variability at the level of livestock stakeholders in Mouhoun Province resulted in an almost unanimous opinion (90 .7%) of respondents

who stated that the increase in temperature is unequivocal, with hot, dry winds whose speed has decreased and which are unbearable by weakened animals. Only 8.0% agreed that the heat had decreased and 03% had no response (Figure 4).

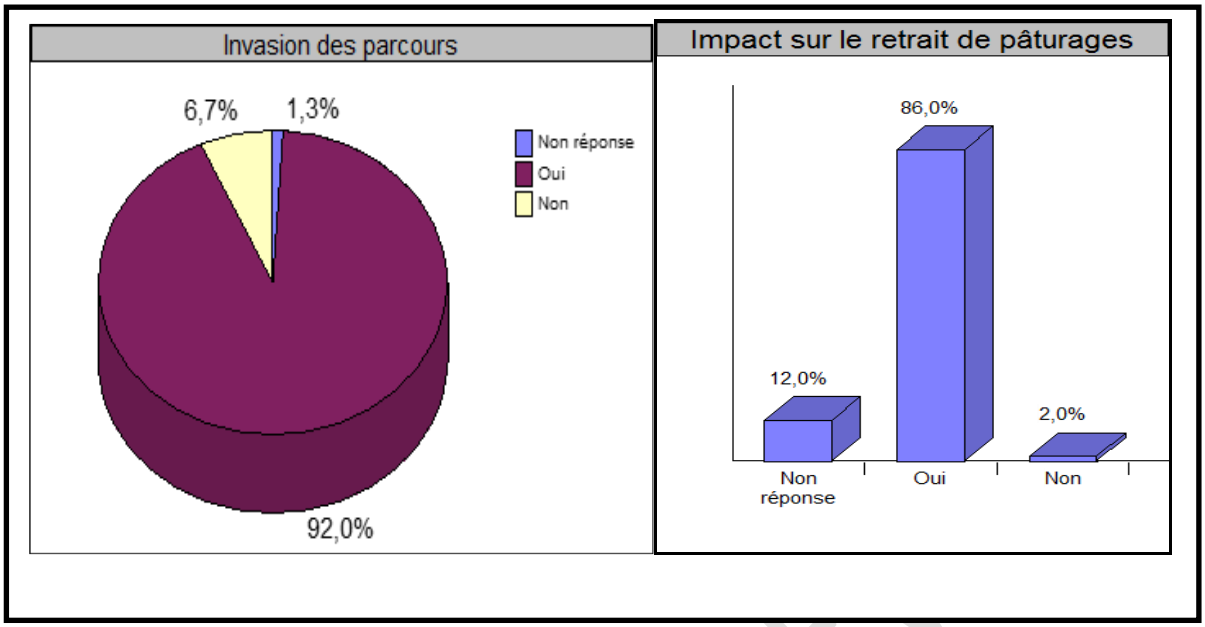


Source: Field survey, 2022

Fig.3. The state of the heat

3.3. Perceptions of the state of grazing areas

Figure 5 shows the state of withdrawal from grazing areas and the invasion of rangelands. The availability of fodder is threatened above all by the existence of invasive species such as Andropogon Pseudapricus. This situation has increased tensions between farmers and breeders, and even between breeders themselves, and is weakening the health of the animals. This is one of the reasons why 86% of farmers said that the productivity of grazing areas had fallen. 92.0% of those interviewed said that rangelands had been invaded. This situation is due to the combined effect of urbanisation and CC. All of which has led to an increase in conflicts between farmers and herders. All (100%) of the respondents interviewed noted a deterioration in the fodder supply from natural rangelands.

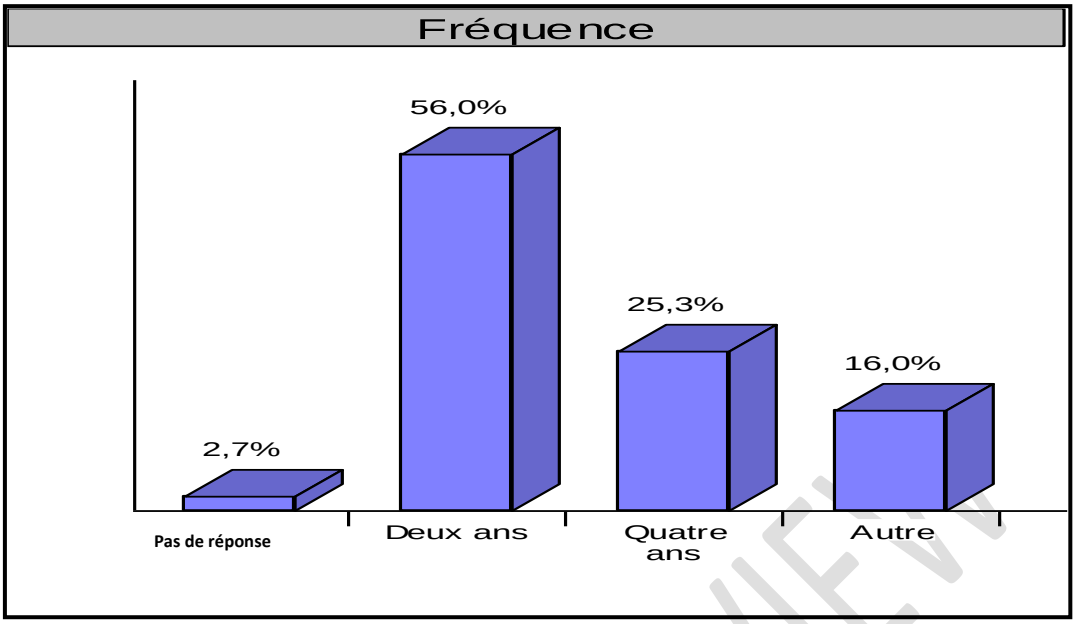


Source: Field survey, 2022

Fig.4. Invasion of rangelands and withdrawal of grazing land

3.4. Perceptions of the frequency of twin births

Figure 6 shows the frequency of twin births, which was around two years, i.e. approved by 56.0% of the farmers surveyed, compared with four (4) years for 25.3% of the respondents. Only 2.7% of respondents gave no answer. The rate of twin births is related to the state of the livestock's diet. The better fed the animals, the higher the rate of twin births. This is confirmed by HASSAN, (2012).

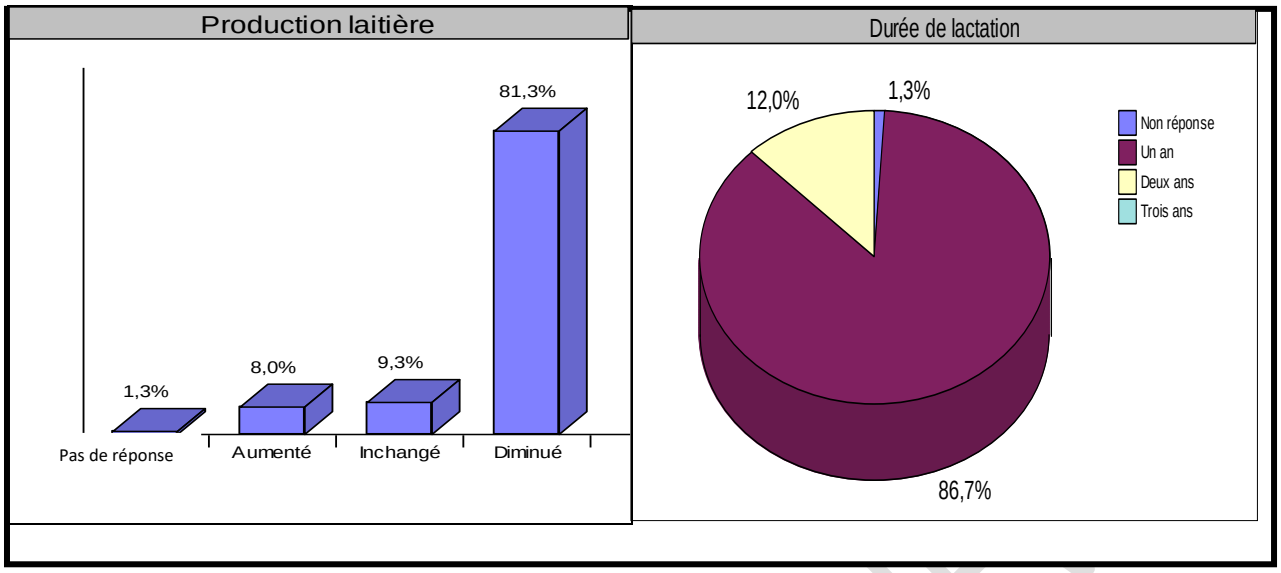


Source: Field survey, 2022

Fig.5. Frequency of twin births

3.5. Farmers' perceptions of milk production and lactation length

Good nutrition is the key to prolific small ruminant farming. However, when the animals are free-ranging, they feed on almost anything, including paper or plastic. In general, they graze on grass, thorny plants, green plants and tree branches. Any change in food quality also has an impact on milk production and reproduction. As a result, the interval between births is increasingly prolonged, due to the poor quality of the diet of the females in particular and the livestock in general. Low fodder production in grazing areas has an impact on the calving interval. For most respondents (87%), the calving interval has increased. In addition, 81.3% of respondents reported a drop in milk production compared with 8.0%. In addition, 86.7% saw a decrease in lactation length.



Source: Field survey, 2022

Fig. 6. Milk production and lactation length

4. DISCUSSION

The perception of climate change by the population of the MP through the decrease and irregularity of rainfall, the decrease in rainfall intensity, the decrease in milk production and lactation duration, and the decrease in the frequency of twin births confirms previous work (SARR, KAFANDO, & ATTA, 2011; FAO, 2020; ZAN, 2019; MOUHOUS, 2015; HASSAN, 2012; MOUHOUS, 2015). This variability confirms the work of POUYAUD, (1973, p. 13) of the ORSTOM Centre. Although he worked in different climatic zones, NOUHOU, (2012, p. 21) noted that the proportion of respondents who had the impression that cumulative rainfall was decreasing was 83% in Damana, 93% in Farié Haoussa and 92% in N'Dounga. These results are corroborated by a study on the assessment and management of climatic risks to agro-pastoral systems: the case of the communes of Say and Tamou in Niger, conducted by Zika (2012, p. 39), which came to the same conclusions regarding rainfall. In addition, DJOHY, et al. (2022, p. 1), who worked on "Perception et adaptation des éleveurs de bovins aux changements climatiques dans le bassin de l'Ouémé Supérieur au Bénin" (Perception and adaptation of cattle breeders to climate change in the Upper Ouémé Basin in Benin), showed that almost all the farmers interviewed, viz. 99.7%, said that climate change was a reality in the Upper Ouémé Basin of Benin and that it was having a negative impact on water resources by

reducing them. The decrease in rainfall was noted by 46% of respondents. Furthermore, on page 13, the author points out that among the farmers surveyed in the communes of Tchaourou and Djougou in Benin, deforestation (94%) and divine punishment (6%) were the main causes of climate change.

Farmers' perceptions of temperature changes were measured by the sensation of ambient heat (OUANDE, 2015, p. 70). This positive perception of atmospheric warming is also reflected in the findings of several researchers in the country (YANOGO, 2012, p. 73; OUOBA, 2013; DJOHY, et al., 2022); temperatures are rising more and more and it is hot both during the day (98.3%) and at night (85%). Analysis of historical data therefore corroborates the results obtained from the population's perception that temperatures are constantly rising. The survey on perceptions of climate change, particularly temperature, was consistent with meteorological observations and the literature on climate variability and change. Heat is increasing and the seasons are short for 50% of the people interviewed in Damana (NOUHOU, 2012, p. 34). In addition, the author presents results according to which the current temperature has risen compared to the past. However, the proportion of respondents who share this opinion is lowest in Farié Haoussa (38%) and only 22% in N'Dounga.

According to DJOHY, et al, (2022, p. 14), for the herders surveyed, palatable species have become increasingly rare on rangelands because of the extension of fields (43%), the drop in rainfall (29%), the proliferation of invasive species (15%) and demographic pressure (13%). The proliferation of invasive species, notably Mesosphaerum suaveolens and Chromolaena odorata, is not to be outdone. According to the interviewees, the causes of resource degradation are linked to rainfall (78.7%). This is also the reason why the registration of twin births has become an extraordinary phenomenon, even for goat species (HASSAN, 2012, p. 56). This is why, in the opinion of breeders, 74% reported a decrease in the frequency of twin births (HASSAN, 2012, p. 56).

In our results, 81.3% reported a drop in milk production, compared with 8.0%. In addition, 86.7% perceived a drop in lactation duration. According to ZIKA (2012, p. 66), milk production normally decreases due to various factors. This decrease in milk production can vary from 10 to more than 25%. NOUHOU, (2012, p. 46), adds that the drop in production is currently 47% in normal times (absence of

drought) in Damana, 65% in Farié Haoussa and 30% in N'Dounga. Our findings point to a decline in twin births (56.0%), which falls short of the work of HASSAN, (2012, p. 56), who found a 74% decrease in the frequency of twin births.

5. CONCLUSION

The results of this study show that farmers in MP are aware of climate change. However, they need to be compared with meteorological data. In addition, although the people of MP are aware of climate change in terms of decreasing rainfall, increasing temperatures and more violent winds, these climatic hazards have a negative impact on the environment. These climatic hazards have a negative impact on the biophysical environment, affecting feed resources, animal health, milk production and lactation periods. It is therefore essential to build the adaptive capacity of livestock farmers in the province through training and awareness raising (ZAN, 2019; ZIKA, 2012).

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