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Transhumant Pastoralism and Farmer-Grazier Conflicts in the Ndop Plain, North West Region, Cameroon

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Abstract

This study examines the impacts of rainfall variability on transhumant pastoralist activities and farmer/herder conflicts in the Ndop plain. Using a mixed methods approach, inter-annual rainfall fluctuations, coefficient of variations (CV) were used to establish variability while the rainfall Seasonality was used to identify seasonal contrast. 150 questionnaires were administered to purposively selected native crop farmers and Mbororo Fulani herders. The annual rainfall variability is shown by a coefficient of variation of 18.11%, decreasing trend, and a high inter-annual variability around the mean of 1802.95mm. The impacts include; drying up of pasture lands and a fall in the quality of pasture 100% (150), shrinking of river courses and water shortages 84% (126), Outbreak of diseases and pests 88.6% (133), and fluctuations in the transhumant calendar 67.3% (101). The result has been conflicts due to competition over constrained resources and stray animals that destroy crops during transhumance. The stakeholders in this sector need to include climate change communication in this domain and improve rangeland management policies to reflect the state of environmental degradation.

Keywords: Rainfall variability, transhumant pastoralism, Farmer/herder, conflicts, Ndop Plain.

Introduction

Rainfall variability in space and time is a very important characteristic of climate change that affects both natural and human systems. In Africa, the agro-pastoral production systems are mostly vulnerable to increased climate variability (Sithole and Murewi, 2014) as they are principally dependant on natural resources. Rainfall variability is considered a principal regulator of plant productivity in semi-arid regions and subsequently has a strong influence on

livestock population dynamics (Ogutu et al, 2007). Subsequently, livestock such as cattle are likely to be driven by climate shocks (Oba, 2001) that may lead to increased mortality (Olaotswe and Nnyaladzi, 2014). The climate of Cameroon is under variation though differences exist from one region to another and from one ecological zone to another.

Livestock mobility allows for flexible response to ecological variability which is seen to reduce pastoralist vulnerability to climatic change and the likelihood of overgrazing (Brottem *et al*, 2014). Transhumant pastoralism can be defined as “a system of animal production characterized by seasonal and cyclical migration of varying degrees between complementary ecological areas and supervised by a few people, with most of the group remaining sedentary” (World Initiative for Sustainable Pastoralism) (WISP, 2010). Transhumant pastoralism is important in the Africa’s livestock sector and involves 70-90% of the Sahel’s cattle and 30-40% of its sheep and goats (WISP, 2010). It occurs mainly in the arid areas (the Sahel countries, northern Nigeria and Cameroon) and is the only activity that valorizes the area.

Transhumance in Ndop is a way of adapting to these conditions and making use of ecological complementarities between the hill slopes and the plain. It is a livestock system based on practical and economically viable management of pastoral resources that has enabled pastoral people such as the Mbororos and the Fulanis to survive the major ecological and climatic crises common in this area. The wetlands of Ndop were at first farming land but the introduction of transhumance has changed this land use type to mixed farming (Sushuu, 2005). The grazing land per hectare in the whole of Ndop plain was 932ha for over 320 grazers with cattle population of 7329 cattle (Kometa and Mua, 2017). Herders carry their cattle down to the plains in the dry season and back to the hills in the rainy seasons. Natural conditions and environmental characteristics have brought great discrepancy in pasture endowment between areas of origin and destination of animals in transhumance. Rainfall variability has disrupted the seasonal movements, leading to conflicts between farmers and grazers. This paper seeks to examine the impacts of rainfall variability on transhumant pastoralism and conflicts between herders and crop farmers in the Ndop plain.

2. MATERIALS AND METHODS

2.1. The study area

Ndop is a highland inter-montane plain found within the Western Highland agro-ecological zone of Cameroon (Figure 1). It is located between latitude 5° 37' N to 6°14'N of the equator

and between longitudes 10 ° 23'E to 10 ° 33'E of the Greenwich Meridian. Climatic conditions favour agro-pastoral activities such as livestock rearing and rice cultivation on the extensive swamps. It has a total population of about 200,000 inhabitants and agriculture involves an important proportion of the total population (Ndzeidze et al, 2016)

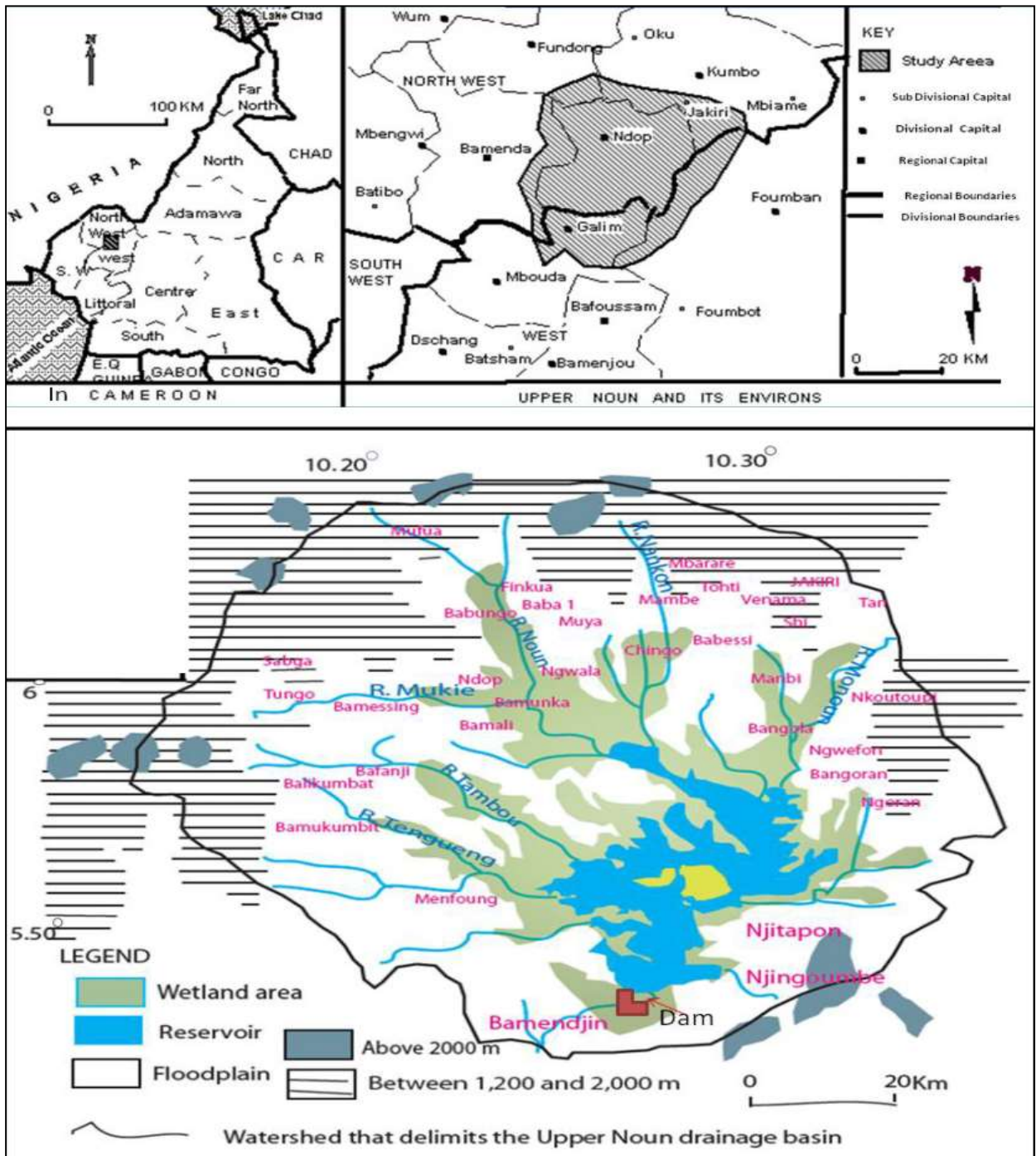


Figure 1: Location of Ndop Plain and its environs

Source: Adapted from Mbihet *al.*,(2016)

Prominent on this plain is the Bamindjin Dam in 1975 across the river Nun. Before the construction of the Bamendjim dam and the introduction of rice cultivation, Ndop plain had a total grazing land of 30,000 hectares with a cattle population of about 50,000 cattle. This has been drastically reduced to about 10,000 hectares by the ever-expanding lake of the Bamendjimdam (Ngwa, 2003). The reduced pasturage had set off a wave of transhumance, especially during the dry season. The Bororos herdsmen migrate to the rice swamps for 3 months in a year, between November and March in search of pasture. This is when the rice most have been harvested and the cattle feed on the stocks. Changes in rainfall pattern have disrupted the timing of these activities, leading to farmer-grazer conflicts.

2.2. Data collection and Analysis

The tools used for data collection include; questionnaires, interviews schedules, desk research and observations from the field. 150 questionnaires were administered to purposively selected crop farmers and herders. The crop farmers are mostly the natives while herders are the Mbororo Fulanis. Questionnaire administration was done during the transhumance period, when cattle were already on the wetlands. Interviews were conducted with council authorities, traditional rulers and with authorities at the Divisional Delegation of Livestock for Nguketonjia. They provided information concerning the regulation of transhumant activities and the stakes involved. Rainfall data was collected from the Divisional Delegation of Agriculture and Rural Development (DDARD) for Nguketonjia.

The data collected was treated using both qualitative and quantitative methods. The questionnaires were coded and entered into SPSS version 20.0 for treatment. Charts, tables and graphs were generated using Micro Soft Excel. The study of rainfall variability was done using statistical tools and climatic indices. The mean, standard deviation and coefficient of Variations were computed to determine rainfall variability.

RESULTS AND DISCUSSIONS

Rainfall variability and observed trends in the Ndop Plain

Ndops' annual rainfall variability is shown by a Coefficient of Variation of 18.11%. The coefficient of variation value of 18.11% implies that the overall deviation of rainfall from the mean of 1802.95 mm is relatively low. This suggests that rainfall is reliable for agro-pastoral activities. If the value could go beyond 20–30 %, it would mean that there is a high fluctuation around the mean and rainfall will not be reliable. However, the CV of 18.11% is an indication that there is substantial fluctuation in the pattern of rainfall. This however gives a more

generalized picture of the situation for a period of 23years. It therefore calls for the need to assess variability within shorter periods of 5 years.

There is variation in CV values between the sub periods from 1991 to 2013. The CV values for the period 1991 to 1995 is 10.65%, 18.22% from 1996 to 2000, 19.74% from 2001 to 2005, 16.44% from 2006 to 2010 and lastly 15.35% from 2010 to 2013. This is an indicator of rainfall variability. Climate change has altered not only the overall magnitude of rainfall, but also its seasonal distribution. The seasonality of rainfall refers to the tendency for a place to have more rainfall in certain months than in others. The calculated Seasonality Index for Ndop is 0.84. This value falls within the class limit 0.80–0.99 of the Walsh and Lawler (1981) seasonality Index(SI). Therefore, rainfall in Ndop is markedly seasonal with long drier season. This could be explained by frequent dry spells that occur in the entire region during the wet season. The wet season begins from April and ends in October while the dry season begins from November and ends in March. However there exist seasonal anomalies in fall pattern with implications on the pastoral calendar.

The general trend shows an increase in dry season rainfall amounts from 1991 to 2013 and a decreasing wet season rainfall trend with great anomalous situations. The mean wet season rainfall is 1780.17mm and the mean dry season rainfall for this period is 22.7mm. It equally shows variation between sub periods of positive and negative anomalous situations. For instance, the periods 1991 to 1994, 1999 to 2001 and 2009 to 2010 indicates positive anomalies, though fluctuating as compared to the period from 1995 to 1998 and 2004 to 2008 with negative anomalies. This depict fluctuations in water availability for agro-pastoral activities. Generally, the least amount of rainfall is received in the months of December (3.6mm), January (6.7 mm) and February (13.6 mm). This is the heart of the dry season. It is during this peak period of the dry season that water resources shrink and the water table falls considerably giving way to agricultural and hydrological drought (Tume, 2019). Fluctuations in the number of rainy days in a month and in the dates of onset and termination of rains are very important indicators of rainfall variability in Ndop. Rains in terms of onset have varied from late January (22nd Jan, 2006) to early March (21st March 2011). Trends are changing from the usual mid-march date known in this area. This has not been favorable especially to agriculture as farmers become confused on when the farming season begins. The ending dates are not quite important because it doesn't influence production since it is usually during post-harvest periods. However, it delays maturity and this has been a problem in Ndop because transhumance begins when some farms are not ready for harvest. This has been a potential source of conflicts.

Implications of rainfall variability on agro-pastoral activities

The introduction swamp rice cultivation in Ndop began in 1978. This has made it possible for transhumance to be carried out together with crop farming during the dry season. According to Sushuu,(2005), Ndop presents natural conditions that leads to great discrepancy in pasture endowment between areas of origin and destination of animals in transhumance. It is this discrepancy that makes transhumant pastoralism an important method of animal rearing in Ndop. The areas of origin include the Sabga hills, Babungo hills, and Jakiri and Wainamah hills. These upland areas have natural conditions that favor the growth of grassland vegetation and thus grazing during the rainy season. During this same period, the plains are occupied with the cultivation of crops such as rice, maize and groundnuts. The driving force behind these discrepancies is climate. The seasonal pattern of climate is conditioned by the onset and termination of rains. These conditions oblige cattle herders to carry their cattle down the plains in search of pasture and water. This is because during this period, the swampy plains still contain enough pasture to sustain the cattle, especially the rice fields.

Field observations revealed that rainfall variability have had negative impacts on transhumant pastoralists of the Ndop plain. Their activities have been facing a number of challenges such as encroachment into grazing land by farmers, bush fires, the planting of eucalyptus and other stressors. This have been compounded by the vagaries of weather (Figure 2).

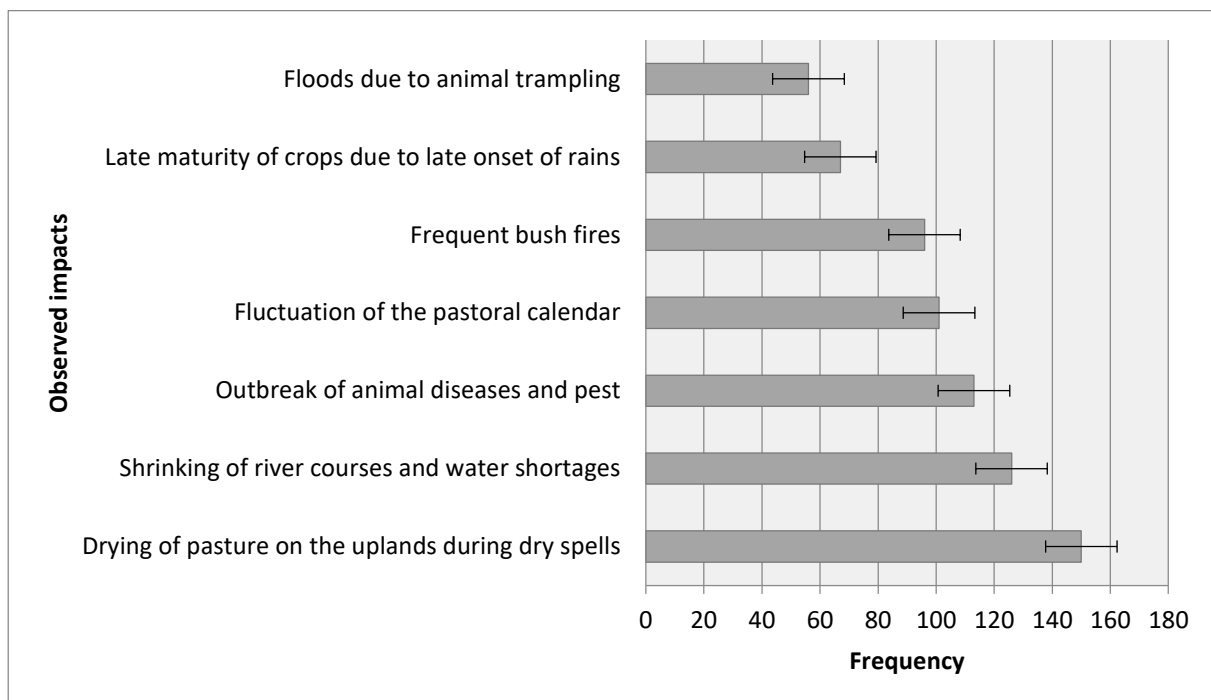


Figure 2: Implications of rainfall variability on transhumant pastoralism

Source: Fieldwork, (2018)

Agro-pastoralists in the Ndop plain identified a number of problems related to rainfall variability (Table 1). The 150(100%) respondents acknowledged the fact that rainfall variability have been responsible for drying up of pasture lands and fall in the quality of pasture available for cattle. 126(84%) also revealed that the shrinking of river courses and water shortages is another consequence of rainfall variability in Ndop. Outbreak of diseases and pests 113(75.3%), fluctuations in the transhumant calendar 101(67.3). frequency of bush fires 96(64%), late maturity of crops 57(44.7) and floods that make the fields muddy for the cattle 56(37.3) are some of the impacts of rainfall variability advanced by the population as hindering their activities. The degrading rangeland conditions as opined in this study has been exacerbated by anthropogenic activities and frequent droughts that make moisture availability a problem. The river courses of the uplands surrounding the Ndop plain have been shrinking considerably. Some dry off completely during the dry season. With this situation, herders are forced to take their cattle down the plains in search of water.

Changes in climatic conditions and rangeland ecology are shown to have influenced the outbreak of cattle pest and diseases. The prevalence of pest and diseases is significantly attributed to the interaction between the climatic parameters of moisture, temperature and relative humidity (Tata et al, 2012). The common cattle diseases include Trypanosomiasis, Tuberculosis, Contagious Bovine-pleuropneumonia and Haemorrhagic septicaemia as well as the effects of endo-parasites caused by round worm and tape worm, ecto-parasitic effects caused by heavy tick infestation and ring and mastitis. Interviews with local authorities showed that the prevalence of these diseases has been on the rise over the past few years and coincides with periods of water stress and dry spells.

The transhumance period in this area lasts for about three and a half months (January to April). In most cases, only part of the family and the herd move from the uplands to the plains and returned to the highlands with the coming of the first rains. Transhumant pastoralism follows a well-established calendar. The transhumance movements are regulated by the Presidential Decree No. 76/420 of the 1976, regulating the movement and exploitation of livestock in the country, which was modified by decree No. 86/755 of the 1986 that includes the provisions of transhumance activities and carving out of transhumance zones and passages (Ngalim, 2015). However, effects of rainfall variability and other environmental and human stressors have disrupted the transhumance code. In the Ndop plain, heavy and prolong rainfall events have

been responsible for floods, leading to water logged and muddy conditions that make the movement of cattle and their herders difficult.

Climate driven farmer/grazier conflicts in the Ndop plain

Generally, farmer/grazier conflicts in the North West region of Cameroon results from competition over land by rearers and farmers. Ndop is a mixed farming zone in which dry season grazing is done alongside dry season cropping. Unlike the usual competition for land, rainfall variability and changes in climatic pattern have disrupted the transhumance calendar, leading to conflicts between farmers and herders as animals constantly get into the rice farms while the crops are still in the farms (Plate 1)



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Plate 1: Cattle in the un-harvested rice fields

Source: Umaru (2019)

Plate shows cattle in the rice field with crops still in the farms. These farmers complained that rice delayed in the farms due to a prolonged rainy season. Usually after maturity, approximately three months after planting and after the grains begin to ripen, the tops begin to drop and the stem yellows. The water is drained from the fields where canals are well controlled. This period requires little rainfall and intense sunshine. That is by the harvesting season, there is already water shortage due to the change in season. As the fields dry, the grains ripen further and harvesting can begin. However, this year became exceptional. Rains started late and prolonged into the dry season and rice delayed in the fields. This generated conflicts because cattle that use to feed on the remnants of the plant came in while rice was not yet harvested. The fulanis who came with the cattle based their arguments on the fact that it was already the period for transhumance without understanding the shift in the rice cropping calendar. Field reports equally indicated that some herders have not been respecting the transhumance code. Years such as 2014 and 2016 were characterized by farmer/grazier conflicts owing to the fact the rains went earlier and pasture on the uplands became scarce. As a response, herders brought down their cattle while crops were still in the farms. The immediate cause of this conflicts stems from that cattle are not properly catered for in the plains and they stray and destroy crops. Apart from rice, market gardening that is steadily gaining importance in this plain via small scale irrigation schemes have suffered from the effects of stray animals during transhumance. The paths followed by the animals are water channels constructed for the irrigation of crops. Animals trample on the raised embankments causing siltation of the canals and destroying irrigation facilities. This has been the activity vulnerable to the whims and caprices of weather. Farmer/ grazier conflicts in Ndop have had economic, social and judicial repercussions. A lot of property has been damaged and many court cases ended with huge financial losses. The management of these conflicts has not been effective despite government's efforts. The government put in place a commission to handle such conflicts. This body assesses the damages and levy charges on the party that deserves them, depending on the extent of the damages and taking into consideration the period during which the crops were destroyed. The management of these conflicts is complex. Their field survey revealed that farmer/herder conflicts are often solved with bias and in most cases in favor of Fulani pastoralists, who have cattle wealth to bribe traditional leaders and state officials to judge in their favor. This has forced many local farmers to take the laws into their hands, thus complicating the conflict situations.

Conclusion and Wayforward

This work looks at the implications of rainfall variability and environmental stressors on transhumant pastoralist activities within the Ndop plain. The binding principle was that rainfall variability and other related stressors have affected pasture and seasonal movements of cattle, leading to conflicts between farmers and grazers. Rainfall variability in Ndop is shown by a Coefficient of Variation of 18.11%. Climate change has altered not only the overall magnitude of rainfall, but also its seasonal distribution. The Seasonality Index for Ndop was computed at 0.84, indicating that rainfall in Ndop is markedly seasonal with long drier season. This could be explained by frequent dry spells that occur in the entire region during the wet season. Another indicator of rainfall variability is the fluctuation in the dates of onset and terminations of rains, with frequent droughts that affects agro-pastoral activities. According to field surveys, 150(100%), rainfall variability have been responsible for drying up of pasture lands and fall in the quality of pasture available for cattle, shrinking of river courses and water shortages 126(84%), outbreak of diseases and pests 113(75.3%), fluctuations in the transhumant calendar 101(67.3). frequency of bush fires 96(64%), late maturity of crops 57(44.7) and floods that make the paths muddy for the cattle 56(37.3). this has led to changes in ecological conditions. Most herders in a response to ecological changes have adopted permanent settlements while moving only their animals and herdsmen during transhumance. Population growth, declining agro-pastoral landscape and increasing rainfall variability are identified as major challenges to transhumant pastoralism in this area. There is competition over degrading agro-pastoral. The movement of herders with their cattle between uplands and floodplains follows a seasonal pattern. However, the disruption of the transhumance calendar climatic changes have generated conflicts between herders and farmers. Animals are seen in the farms while crops have not yet be harvested. Stray animals thus destroys crops leading to conflict.

The management of such conflicts has not been effective. The authorities in charge of rangeland management should include climate policies in their plan of action. The vulnerability of pastoralists to climatic stressors should be assessed so as to proactive adaptation measures. Stakeholders should build capacity of the fulani herders so that they can diversify their livelihoods and also acquire more skills on cattle control during transhumance. Given that Ndop is a mixing zone, regulated by a Presidential decree, famers and herders need to be provided with climate related information and equally assist them exploit their indigenous knowledge correctly. With this, they will know how to adjust their transhumant calendar in

periods of climatic aberrations. This will reduce conflicts and enhance a complete transformation of livelihoods.

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