An assessment of determinants of adaptive capacity of livestock farmers to climate change in Omusati Region, North Central Namibia

Cecil Togarepi[1], Cornelia Haukongo[2]

Abstract

Livestock is a source of wealth, status and cash reserve in rural areas in Namibia, and contributes over 60% to agricultural GDP for the country. The sector faces several challenges attributed to climate change which forces farmers to employ several strategies to sustain their livestock. However, their ability to do so is influenced by their adaptive capacity – which, in turn, is influenced by several factors. Research finds that farmers' adaptive capacity to climate change is very low and seems to be influenced by both their cultural beliefs and the unattractive market prices for their livestock.

Keywords: *Adaptive capacity, Culture, Drought, Livestock, Namibia*

Introduction

Livestock are negatively affected by the impacts of climate change (Kebede, 2016) - climate variation is a major risk to the sustainability of livestock systems globally. Climatic extremes and seasonal fluctuations in pasture quantity and quality and water demand affects the well-being of livestock, and leads to declines in production and reproduction efficiency. The impact of climatic changes is expected to heighten the vulnerability of livestock systems and reinforce existing factors that are already affecting livestock production systems (Anim, 2013). Livestock losses may force households dependent on livestock into chronic poverty and have a lasting effect on livelihoods (Calvosa, Chuluumbaatar, & Fara, 2010).

In many rural communities in Namibia, especially in the north, livestock is a source of livelihood and wealth of many households, and is the major asset of the poor used as a cash reserve, dowry and/or gift for traditional ceremonies and offerings; however, the sector is highly vulnerable to climate variability and extremes (FAO, 2008). Losses have been increasing due to droughts/floods and other climatic related conditions which threaten livelihoods of many. Rangelands are degraded and pastures last only for a few months, while carrying

[1] Department of Agricultural Economics, University of Namibia, Ogongo Campus, Namibia

Email: ctogarepi@unam.na

[2] Department of Integrated Environmental Science, University of Namibia, Ogongo Campus, Namibia

capacities have long been exceeded which compounds the shortage of pasture. Many farmers have been experiencing livestock deaths especially during prolonged droughts and sometimes during floods (ORC, 2010). It is thus imperative to find ways that may improve livestock production and adaptation to these effects of climate change for the livestock farmers.

Adaptation to, and mitigation of, the detrimental effects of extreme climate can play a major role in combating the negative impact on livestock (Belay, Recha, Woldeamanuel, & Morton, 2017). Adaptive capacity enables a system to adapt effectively and to cope in relation to the impacts. High adaptive capacity may reduce the system's vulnerability to disturbances that might occur in the future (Kelly, Anwar, Macadam, & Liu, 2012), in an anticipatory manner or to disturbances that occur slowly, either reactively or separately (Abid, Scheffran, & Scheider, 2015). A focus on increasing adaptive capacity highlights the resources available for adaptation within a specific context, rather than the most desirable adaptation actions (Belay, Recha, Woldeamanuel, & Morton, 2017). The purpose of this research is to identify livestock farmers' perceptions on climate change and to determine the level of their adaptive capacity, as well as the factors influencing the adaptive capacity.

Methodology

A purposive sampling method was used to select households that keep livestock in seven villages in the Omusati region using a survey questionnaire and mixed gender group discussions to enable researchers to obtain information from relevant farmers who own livestock. Data was collected on the farmers' observations on the changes in climate, availability of grazing, changes in livestock numbers and causes of those changes, the actions that they take to deal with these changes, and the assets available to them. Moreover, information was collected on perceived factors that influence their adaptive capacity to deal effectively with changing climate and variability. The determinants that were used to measure adaptive capacity on a Likert scale of 1(low) to 5 (high) were: information, technology, economic resources, institutions and social networks, infrastructure and equity. The categorisation was determined as: 1-2.9 - low, 3 – moderate, and an average ranking of 4 and above is high. These factors where then ranked to determine their strengths on whether they become barriers or enablers to adaptation to climate change and variability. Implications of factors that are barriers are that more will need to be done to remove the barriers so that farmers are enabled to adapt, and where enablers are identified, they need to be enhanced and extrapolated to other areas.

Findings

The respondents were gender balanced, with the head of the households being equally split (50% female and 50% male), of which 66.7% were married and 10% single. The majority (50%) of household heads only had basic education, 30% had secondary education, and 16.7% had no

formal education. The majority of households acquired livestock through purchases (67%), inheritance (23.3%) and 13.3% kept livestock on behalf of other family members. The majority of respondents kept livestock for home consumption and traditional purposes (93.3%), while only 6.7% kept for commercial purposes.

Variable		Percent
Gender	Female	50
	Male	50
Marital status	Married	66.7
	Single	10
	Widowed	23.3
Source of livestock	Bought	66.7
	Inherited	33.3
Reason for keeping livestock	Home consumption, traditional and other	93.3
	Commercial	6.7
Number of livestock	Current numbers (average)	Deaths in the last 5 years (average)
Goats	25	17
Cattle	16	14
Sheep	4	4

Respondents also indicated that selling livestock, especially cattle, to formal channels was equivalent to making "*an offering to the church*" as they do not get the value that their livestock is worth which is an average of R45.95/kg for A grade while C grade fetches R40/kg per carcass weight with a penalty of R8.50/kg for 0% fat (MeatCo, 2018). Most animals were required to be quarantined and during the process the loose body condition thus graded lowly and then fetches low prices as a result. Farmers on the other hand perceive that they get higher prices on their cattle if they sell to individuals as they are able to put whatever price they want and negotiate with the buyer (ranging from R4000-R12000 per live animal depending on size) compared to the formal market where the price is fixed based on grade of animal. Farmers also believe that the bigger the size of an animal the higher the price it should fetch but formal market uses meat quality and tenderness for grading. The more tender the meat of an animal (young animal) the higher the price and vice versa. On average, farmers owned 16 head of cattle, but experienced an average mortality rate of 14 cattle in the previous 5 years, and 25 goats with an average of 17 goat deaths in the previous five years. When asked about availability of pasture, the respondents indicated that pasture lasts for between 3 to 5 months in a year due to shortened rainfall seasons, which have late onset and early cessation compared to past years. The farmers indicated that the major effect of drought was livestock deaths due to limited

grazing and possibly caused by God, not necessarily climate change and do not perceive the increasing livestock numbers to be of any effect on the environment.

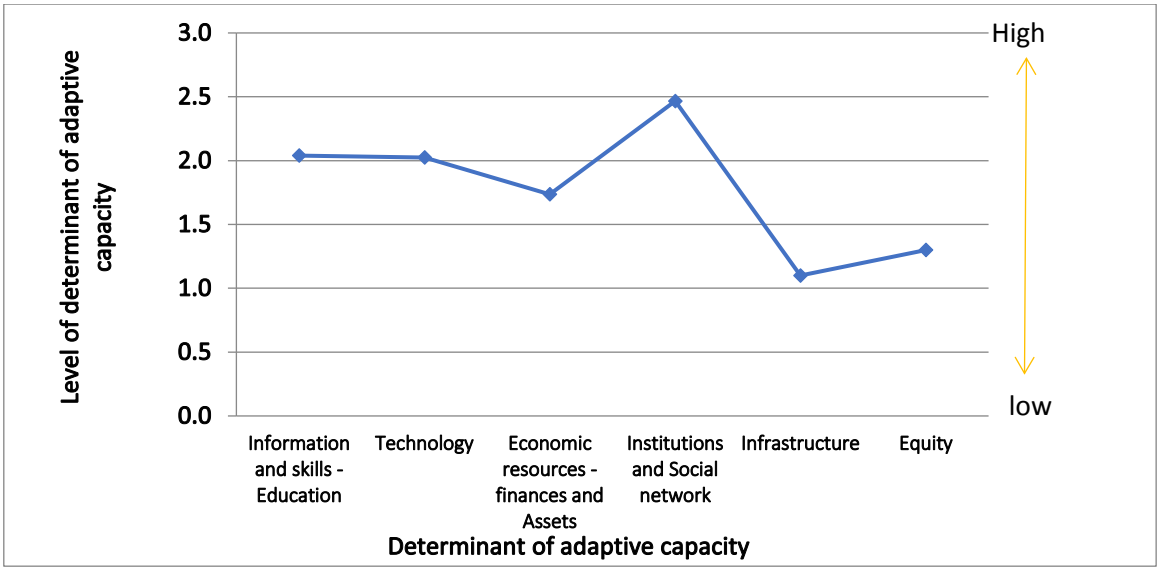

Figure 1: Determinants of adaptive capacity (Source: Authors own, Survey data using Likert scale (1, low and 5 high))

Overall, the adaptive capacity of livestock farmers varies according to gender and age, as well as diversity of incomes and level of education, but is very low (an average ranking of 1.8 across the 6 determinants). Farmers perceive that their level of education is an impediment to the improvement of their livestock production as they feel that there are many aspects of livestock production which they do not understand and often when information is shared it is sometimes too complicated for their level. Moreover, the majority of the farmers felt that they often find it difficult to market their livestock when the need to sell arises as there is inadequate marketing infrastructure which when available is very far (**Figure 1**). However, farmers felt that they rely on their social networks for information and assistance when required for their livestock as neighbours and relatives often chip in to assist. Their resource endowment was perceived to be low making it difficult to fall back on them when need for diversification or purchase of vaccines arises. They also felt that better off households are better equipped to take care of their livestock and are always at an advantage as far as livestock production is concerned as they will be able to supplement feeding to their animals as well as fence off grazing areas at the expense of the rest of the farmers.

Adaptive Capacity and determinants

- **Economic resources:** Most farmers lack financial resources to purchase fodder, vaccinations, and restock and diversify their livelihoods due to social constraints and poverty.
- **Technology:** most livestock farmers are not able to access technology that is required for improvement of livestock production such as supplementary feeding formulas and breeding material such as synchronised production.

- **Informational and skills:** Although information is available, the format in which it is shared is not easily accessible due to language barriers and the media used, as some farmers have limited levels of literacy.
- **Infrastructure:** Available infrastructure, such as auction pens, markets and veterinary services, is often far away and inadequate to serve the purposes of the farmers.
- **Institutions and social networks:** Institutions such as extension and veterinary services are available but often do not address the farmers' specific needs, such as feed or water for livestock, as these require resources; however, they are reliant on social networks when in need of assistance with livestock production, especially from their kin and neighbours.
- **Equity**: some well-off and influential farmers have fenced off huge tracts of land meant for communal grazing to the detriment of the majority, thereby limiting their available options to take action when their livestock need grazing.

Conclusion

Livestock is kept for cultural and traditional purposes like weddings, funerals, special occasions, and social status - most livestock farmers are not driven by income. While droughts are experienced as the most detrimental climate impact, affecting livestock mortality, some farmers are fatalistic, believing that climate change is an act of God and they do not need to do anything in response to impacts. Adaptive capacity of livestock farmers is very low as a result of socio-economic and cultural factors. Farmers that have limited resources are not able to improve their adaptive capacity when the need arises, particularly if financial resources are required. When livestock belongs to family members that are far away or the livestock was inherited, the ownership of livestock often impedes decision making, because decisions need to be taken collectively. There is a need to understand the needs of farmers and also consider their cultural perspectives before offering incentives or subsidies to them. Favourable market prices alone are not adequate – farmers have other trade-offs to consider such as traditional obligations that include wedding gifts and funeral contributions, thus need to be involved in planning for solutions.

References

Abid, M., Scheffran, J., & Scheider, U. A. (2015, May 11). *Farmers perceptions of and adaptation strategies to climate change and their determinants: Case of Pujab Province, Pakistan*. International journal of development and sustainability, *1*(3).

Anim, J. (2013). *Climate change and livestock production: A review with empasis on Africa. 43*(3).

Belay, A., Recha, J. W., Woldeamanuel, T., & Morton, J. F. (2017). *Smallholder farmers adaptation to climate change and determinants of their adaptation decisions in the Central Rift Valley*.

Calvosa, C., Chuluumbaatar, D., & Fara, K. (2010). *Livestock and Climate Change.* IFAD.

FAO. (2008, March 7). *Climate change adaptation and mitigation in the food and aagriculture sector*.

Kebede, D. (2016). *Impact of Climate Change on Livestock Productive and Reproductive Performance*. Livestock Research for Rural Development, 28(12).

Kelly, G., Anwar, M. R., Macadam, I., & Liu, D. L. (2012, October 12). *Adapting agriculture to climate change: a review*.

ORC. (2010). *Profile of Omusati Region.* Outapi: Omusati Regional Council.