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Influence of Native Commutable Approaches to Climate Dispositions among Pastoralist in Nigeria. A Critical Literature Review

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Abstract

Purpose: Complementary sources of income, sex of household heads, age of the household head, number of dependents, illiteracy, early warning information, employment status, and weak institutional structures determine vulnerability to climate variability and affect pastoralists. The overall objective of this study was to examine influence of indigenous adaptive capacity strategies to climate variability in Nigeria. A critical literature review

Methodology: The paper used a desk study review methodology where relevant empirical literature was reviewed to identify main themes and to extract knowledge gaps.

Findings: This study concluded that traditional mechanisms of predicting weather in Nigeria include observing the movement of clouds, wildlife, and domestic animals, observing intestines after slaughter, flowering and greening trees, and observing stars. The climate variability coping strategies among Nigerian pastoralists is eating less (9.9%), depending on food aid (42.8%), migrating to other areas (0.7%), and selling livestock (11.2%). These coping strategies increase the risk of being vulnerable to climatic shocks. The decline of food yields, loss of income, livestock death, poor access to water and pasture, and the death of loved ones are the main effects of climatic shocks.

Unique Contribution to Theory, Policy and Practice: This study recommended that the Government in Nigeria should also improve the cash transfer programs. Insurance programs will also benefit the pastoralists because they will cushion them against harsh climatic conditions. The government should also introduce better livestock rearing projects such as stall-fed and pasture grazing. Moreover, value addition programs for livestock and livestock diversification, such as donkeys' introduction in the area for sale, milk, and cultivation, will be essential.

Keywords: *Examine, Influence, Indigenous, Adaptive Capacity, Strategies, Climate Variability, Nigeria*.

INTRODUCTION

Africa face challenges such as difficulty accessing natural resources due to climate variability and limiting mobility. However, several activities such as workshops and policy dialogues have been developed to build resilience to climate variability among pastoralists (CTA, 2016). Pastoralism from the ASALs meets most Kenyan meat demand and contributes to 4% of the GDP (Kagunyu et al., 2013). However, the lack of social and political support in education, markets, and empowerment to influence policies increases pastoralists' vulnerability and reduces their adaptive capacity to climate variability.

Pastoralists are fully aware of climate variability, and their perception is similar to that of the actual recent trends that indicate climate variability (Berhanu and Beyene, 2015). They have adopted livestock diversification but kept their mobility culture even in the face of vulnerabilities; thus, introducing ideas and policies that ignore the pastoralists' mobile nature might receive a hostile reception. Before initiating new policies and programs, effective communication with the pastoralists enhances a receptive reaction toward the programs (Swiss Agency for Development and Cooperation, 2016). The effectiveness of projects that enhance adaptive capacity depends on how receptive the communities are to the projects (Brooks and Adger, 2004). According to Wandera (2011), pastoral communities in Marsabit have benefited from pilot projects that increased their willingness to try new approaches to enhancing adaptive capacity.

Therefore, intensive research on ASALs should be conducted before introducing new policies and strategies to pastoralists. It helps to preserve traditional pastoralism and avoid conflicts and poor reception. According to Nawrotzki and Kadatska (2010), many countries cannot utilize sophisticated technology to cope with climate variability, but governments and non-governmental organizations have introduced such methods anyway. However, many communities end up abandoning the new technologies due to the failure to use the available resources. Moreover, most projects are run by donors and not community members. Herrero et al. (2016) note that communities are willing to adapt to new coping strategies whose benefits are evident. They also need to run the projects instead of donors running projects to enhance sustainability. Project ownership and community involvement ensure project sustainability (Tanga and Mundau, 2014).

Pastoralist social-economic aspects such as the economic size of households, age, sex of the house ends, and employment status influence their vulnerability and expose them to climate variability shocks. Moreover, skirmishes due to competition for natural resources and environmental degradation of the ASALs have increased their vulnerability (Duguma, 2013). Therefore, vulnerability lowers their adaptive capacity to climate variability. Monitoring climatic trends will help develop coping strategies tailored to suit each pastoral community to counter challenges such as food insecurity. Additionally, incorporating indigenous knowledge with modern climate monitoring strategies will help pastoralists to counter climate variability because the use of indigenous knowledge alone has proven to be no longer helpful. Finally, it is essential to introduce development projects such as education, peacebuilding, reconciliation policies, and community

development projects to diversify livelihoods and achieve the adaptive capacity to climate variability. The literature reviewed above proves that climate variability has affected pastoralism, and the existent traditional coping strategies that they are dependent on have proven futile. They have also shown a need to incorporate new coping strategies because of the ever-changing climate. However, it is essential to note that the literature review has not captured the adaptive capacity in the health sector, considering the challenges that climate variability and change shocks pose to the health sector. Thus, this is a knowledge gap for research to be carried out on the effects of climate variability on human health, especially mental health. Other health issues posed by climate shocks include respiratory diseases, injuries, and premature death. Climate health research is vital to deduce climate sensitive health outcomes, future projects on climatic impacts on human and livestock health, and how energy access impacts health. Also, research needs to be carried out on the effects of food insecurity on children's and adult health.

Climate variability and change have adversely affected pastoralism, one of the primary sources of livelihood contributing to food security and employment in rural areas (Ochieng et al., 2016). The situation is expected to worsen in the future. Thus, there is a need to monitor the climatic trends in local areas so that research can be carried out to develop strategies to cope with extreme conditions. Monitoring the local trends also provides data and information that allows experts to understand and formulate appropriate climate models (Ceccato et al., 2014). In addition to weather and climate data, it is necessary to monitor local food systems for proper management. It is essential to note that climatic trends data should be integrated with the current climatic conditions with agricultural practices and market conditions knowledge. Such information provides informed decision-making based on which varieties are suited for specific climates and the naturally occurring hazards expected in a year (Johansson et al., 2015). Monitoring disease outbreaks is also essential because most diseases arise with changes in weather and climatic conditions. Moreover, there is a need for effective communication between lawmakers and scientists so that information on climate variability can effectively enhance climate variability. Comparing current and historical climate trends and observations helps monitor output locally and internationally

Statement of the Problem

Pastoralism has a high potential to alleviate poverty and manage the environment. Moreover, it can create economic growth, improve adaptability to climate variability, and achieve climate change resilience (Rota and Sperandini, 2009). However, increased poverty among the pastoralists, who constitute 80% of many County residents (Gamba, 2011), increased their vulnerability and reduced their adaptive capacity to climate variability. Nigerian pastoralist residents make up 5% of the Nigerian Population (KNBS, 2009). They live in a harsh marginalized environment commonly affected by drought, human-wildlife conflicts, famine, and flash floods during the rainy seasons (IRIN, 2011). Therefore, the study proposed examining the adaptive capacity of Nigerian pastoralists to climate variability and looked into the residents' willingness to adopt these strategies and accept the responsibility for adaptation. Information collected from this study will enable

informed decision-making to develop coping strategies for climate variability and improve livelihoods. The study faced time and financial constraints, insecurity due to tribal clashes, and language barriers. Additionally, there were inaccessible roads, human wildlife conflict, and a community expecting aid because they are used to aid. This study will therefore examine influence of indigenous adaptive capacity strategies to climate variability. A critical literature review

Objective of the Study

The overall objective of this study was to examine influence of indigenous adaptive capacity strategies to climate variability in Nigeria. A critical literature review.

Significance of the Study

The most vital impacts of climate variability experienced in the agriculture sector, are in poultry farming, crop farming, and livestock rearing. Therefore, these changes in climate patterns are linked to human livelihoods and economic growth of well-being (IPCC, 2012). This phenomenon of climate and economic dynamics poses human uncertainty for present and future generations. Thus, there is a desire to research and study the connection between climate and livelihoods on local, regional, and international scales to grasp and solve complex socio-economic problems within our societies. However, the transfer of these traditional interventions within our community to the current and future generations using the trendy science of trans-disciplinary approach and intergenerational equity is necessary.

In conclusion, it is better to integrate indigenous community-based methods to understand these concepts of climate variability pastoralism especially in Nigeria, which will finally advance our development agendas (Qian-qian et al., 2015). The research study gives a fundamental outlook on the comprehensive and valuable guide into the relevant agencies that can be involved in the research and policy practice, especially the government embarking on projects that would exploit the benefits of pastoralism.

LITERATURE REVIEW

Indigenous Adaptive Capacity Strategies to Climate Variability

Pastoralists have been coping with hostile environments for the longest time (Brooks, 2006). They commonly live in areas characterized by insufficient resources and harsh climatic conditions, making them vulnerable to climate variability. However, they have developed mechanisms that cope with various climatic conditions (GebreMichael et al., 2010). Some include studying animal behavior to indicate weather conditions and astrological phenomena (Solomon, 2013). They also settle around water points and exchange their animals for other food supplements. However, the impacts of climate change have exceeded human and ecosystem tolerance. Therefore, the pastoralists' indigenous knowledge can no longer be useful (Boko et al., 2007). Additionally, Macchi (2008) notes that the magnitude of future climatic hazards is likely to exceed marginalized pastoralists' adaptive capacity, and their indigenous knowledge is expected to be ineffective.

Furthermore, a study conducted by Abate (2016) discovered that some indigenous coping strategies of pastoralists in Southern Ethiopia had become less effective and could not be scaled up easily to other areas.

Therefore, modern-day coping approaches should be integrated with indigenous knowledge and have gender roles in mind to counter climate variability (Daze, 2012). Additionally, Kihila (2018) notes that sustainable indigenous methods can enhance climate variability management if communities overcome the existing limitations. Thus, Nawrotzki and Kadatska (2010) recommend resource mobilization while using indigenous knowledge because many projects fail to recognize resources in the community for indigenous knowledge. Moreover, indigenous knowledge is becoming ineffective due to acculturation and western influence. It is essential to formulate culturally sensitive documentation strategies and databases to preserve indigenous knowledge. Moreover, culturally sensitive technology transfer will be appropriate to integrate indigenous and scientific coping strategies to tackle the growing magnitude of climatic hazards.

External and Internal Hindrances to Adaptive Capacity among Pastoralists

Pastoralists face both internal and external barriers to climate variability adaptation. Conflicts between them and other neighboring tribes over grazing land, water points, boundaries, and agricultural expansion are external barriers (Eriksen and Marin, 2011). Internal barriers to adaptive capacity include family feuds, cattle rustling, and vector borne diseases. Other external hindrances are limited access to markets, information, financial support, illiteracy, knowledge, skills, water sources, grazing land, veterinary services, environmental degradation, and population pressure, failure of inclusion in community participation, and insufficient government policies and coordination (Riche et al., 2009). Additionally, customs and traditions such as allocating roles and responsibilities to men and women hinder high adaptive capacity because women remain the most vulnerable people when drought and famine hit (Omolo, 2010).

Empirical Review

Kangai (2021), conducted a study on extent of variation in temperature and rainfall, analyze the economic impact of climate variability on crop and livestock production, examine climate variability risk perceptions, adaptation mechanisms and how they influence rainfed agricultural practices, determine farmer and farm characteristics that influence climate variability perceptions and adaptation, and assess the effectiveness of institutions and information channels in facilitating climate variability adaptation mechanisms and risk perception. The research design involved a descriptive survey that allowed the collection of both qualitative and quantitative data. The sampling procedure involved a multi-stage sampling procedure to obtain 411 respondents, purposive sampling for 10 key informants, and quota sampling techniques to select 5 focus groups. Data were analyzed by the use of descriptive statistics, the Mann Kendall test, Logit regression, chi-square, Likert scale analysis, and the use of variables produced through the Ricardian model and Heckman approach. Results show that there is climate variability and the rise in maximum

temperature and rainfall variability are significant at P<0.002 with a 0.02ºC increase in temperatures and a 10.2 mm decline in rainfall amount per year. Economic impact on crop and livestock production indicated that temperature rise affects crop net revenue negatively and that of mixed farming positively respectively at p≤0.05.The study however presented a contextual gap as it focused on variation in temperature and rainfall, analyze the economic impact of climate variability on crop and livestock production while our study will focus on influence of indigenous adaptive capacity strategies to climate variability.

Otieno (2019), conducted a study on the effects of climate change on agricultural productivity in Kenya. The study adopted time-series data on all the variables under study. The study employed Ricardian Regression Model to analyze time-series data. A diagnostic research design was employed to carry out the study as it explored secondary sources of data which was analyzed using multivariate regression model and Augmented Dickey Fuller (ADF) was carried out to check the stationary of the data. The study found out that temperature and relative humidity significantly affect agricultural productivity. Relative humidity was found to be positively related to agricultural productivity, temperature has negative relationship. The study recommended that government should sensitize the farmers on the need to carry out smart agriculture to reduce losses as a result of climatic change. The study also found out that rainfall positively related to agricultural productivity. Therefore, the study concluded that indeed climate change affect agricultural productivity in Kenya. The study however presented a methodological gap as it utilized diagnostic research design while our study will utilize desktop review approach.

Kiarie (2016), conducted a study that evaluated trends in rainfall and temperature between1983 and 2013, assessed how these trends of climate variability have affected farmers' perception in climate variability and also explored small-scale farmers' adaptation strategies. Results of the study established that small scale farmers in Kijabe experienced climate variability in the period 1983-2013. The results of this study established a positive relationship between temperature variation and adaptation by small scale farmers in Kijabe. Small scale farmers who detected an increase in temperature were more likely to adapt compared to those who have not detected any increase in temperature (r= 0.015, p<0.020). The study further showed that small scale farmers who detected an increase in rainfall were less likely to adapt compared to those farmers who detected a decreased in precipitation (r= -0.014, p<0.001). The study presented a conceptual gap as it focused on trends in rainfall and temperature between1983 and 2013 while our study will focus on influence of indigenous adaptive capacity strategies to climate variability in Nigeria.

Kangure (2015) conducted a study on assess perception of farmers to climate variability effects and coping strategies among farming communities in Bufundi Sub-catchment. Rainfall and temperature data covering the period from 1991-2011 were acquired from the Department of Meteorology and analyzed. Semi-structured questionnaires were administered to 95 respondents, and three focus group discussions conducted using guiding questions. Key informant interviews and field observations were also conducted. Annual rainfall and temperature were subjected to

regression analysis for temporal trends, and to ANOVA for testing variability. Semi-structured questionnaire were subjected to descriptive statistics to establish household perceptions on climate variability and how it has affected availability of resources, coping strategies adopted by farmers in response to climate variability effects. Chisquare ($\chi 2$) test was used to test for association between different household coping strategies among different households. Qualitative data was transcribed and organized under different themes and coded for analysis. Annual rainfall amount and average maximum temperature did not follow any significant linear trend; while minimum temperature increased gradually with time (R2=0.476). Respondents experienced floods (83.2%) and landslides (92.6%) as the major hazards linked to extreme climatic events in the micro-catchment. The study presented a geographical gap as it majored on Bufundi while our study will focus pastoralist in Nigeria

Munyiri (2015) conducted a study on impacts of climate change on the tourism sector from both supply and demand side and the resultant adaptation practices, analyzing the policy framework in Kenya and estimating the vulnerability level, using explanatory sequential design. Through triangulation, information was sought from tourists, hotel managers and tourism / climate change experts from three major tourism regions in Kenya. A total of 36 hotel managers and 352 tourists filled questionnaires whose results were verified by 20 experts. Further, tourist's numbers were compared against precipitation over a 40 year period. Content analysis, Chi-Square, ANOVA, correlation and regression are among the statistical methods used for data analysis. Results generally indicated that climate change impacts are currently affecting the tourism sector in the country and that the supply side is more affected by these impacts than the demand side. Sensitivity of tourism to climate change depends on the type of indicators; the source market; the purpose of travel; the age of tourists; the class of accommodation facilities and marital status. Exposure depends on the type of climate change indicators; the geographical location of tourist facilities and the nature of occurrence of the indicators. The study presented a contextual gap as it majored on tourism sector while our study will focus on pastoralist in Nigeria.

METHODOLOGY

The study adopted a desktop literature review method (desk study). This involved an in-depth review of studies related to examine influence of indigenous adaptive capacity strategies to climate variability in Nigeria. Three sorting stages were implemented on the subject under study in order to determine the viability of the subject for research. This is the first stage that comprised the initial identification of all articles that were based on examining examine influence of indigenous adaptive capacity strategies to climate variability in Nigeria. The search was done generally by searching the articles in the article title, abstract, keywords. A second search involved fully available publications on the subject on examine influence of indigenous adaptive capacity strategies to climate variability in Nigeria. The third step involved the selection of fully accessible publications. Reduction of the literature to only fully accessible publications yielded specificity and allowed the researcher to focus on the articles that related to examine influence of indigenous

adaptive capacity strategies to climate variability in Nigeria which was split into top key words. After an in- depth search into the top key words (examine, influence, indigenous, adaptive capacity, strategies, climate variability, Nigeria) the researcher arrived at 5 articles that were suitable for analysis. This were findings from:

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SUMMARY, CONCLUSION AND RECOMMENDATIONS

Conclusion

This study concluded that traditional mechanisms of predicting weather in Nigeria include observing the movement of clouds, wildlife, and domestic animals, observing intestines after slaughter, flowering and greening trees, and observing stars. The climate variability coping strategies among Nigerian pastoralists is eating less (9.9%), depending on food aid (42.8%), migrating to other areas (0.7%), and selling livestock (11.2%). These coping strategies increase the risk of being vulnerable to climatic shocks. The decline of food yields, loss of income, livestock death, poor access to water and pasture, and the death of loved ones are the main effects of climatic shocks.

Recommendations

This study recommended that the Government in Nigeria should also improve the cash transfer programs. Insurance programs will also benefit the pastoralists because they will cushion them against harsh climatic conditions. The government should also introduce better livestock rearing projects such as stall-fed and pasture grazing. Moreover, value addition programs for livestock and livestock diversification, such as donkeys' introduction in the area for sale, milk, and cultivation, will be essential.

REFERENCES

Abate, T. (2016). Contribution of Indigenous Knowledge to Climate Change and Adaptation Response in Southern Ethiopia. *Journal of Earth Science and Climate Change*, 7(11), 1-9.

ADA. (2015, July). Resource Atlas of Isiolo County, Kenya: *Community-based Mapping of Pastoralist Resources and their Attributes*. Retrieved from adaconsortium.org: https://www.adaconsortium.org/index.php/component/k2/item/download/42_acdb 1fb70a0035a04f62515108d371a4

Audefroy, J. F., & Sanchez, N. C. (2017). Integrating Local Knowledge for Climate Change Adaptation in Yucatan, Mexico. *Science Direct*, 6(1), 228-237

Bede-Fazekas, A., Czucz, B., & Somodi, I. (2017). Vulnerability of Natural Landscapes to Climate Change- A Case Study of Hungary. *Quarterly Journal of the Hungarian Meteorological Service*, 121(4), 393-414.

Chaudhury, M. (2017). *Strategies for Reducing Vulnerability and Building Resilience to Environmental and Natural Disasters in Developing Countries*. New York: United Nations Department of Economic and Social Affairs.

Chen, W.-Y., Suzuki, T., & Lackner, M. (2017). *Handbook of Climate Change Mitigation and Adaptation*. Cham: Springer International Publishing.

Dinku, A. M. (2018). Determinants of Livelihood Diversification Strategies in Borena Pastoralist Communities of Oromia Regional State, Ethiopia. *Agriculture & Food Security*, 7(41).

Few, R., Morchain, D., Spear, D., Mensah, A., & Bendapudi, R. (2017). Transformation, adaptation, and development: Relating concepts to practice. *Palgrave Communications*, 3(1). https://doi.org/10.1057/palcomms.2017.92

Ford, J. D., Pearce, T., McDowell, G., Berrang-Ford, L., Sayles, J. S., & Belfer, E. (2018). Vulnerability and its discontents: The past, present, and future of climate change vulnerability research. *Climatic Change*, 151(2), 189-203. https://doi.org/10.1007/s10584-018-2304-1

Jacobs, B., Nelson, R., Kuruppu, N., and Leith, P. (2015). An Adaptive Capacity Guide Book: Assessing, Building, and Evaluating the Capacity of Communities to Adapt in a Changing Climate. *Southern Slopes Climate Change Adaptation Research Partnership (SCARP)*, The University of Technology Sydney, and The University of Tasmania. Hobart, Tasmania

Masson, V. L., Benoudji, C., Reyes, S. S., & Bernard, G. (2019). How violence against women and girls undermines resilience to climate risks in Chad. *Disasters*, 43(3), 245-270.

Muricho, D. N., Otieno, D. J., & Oluoch-Kosura, W. (2018). The Role of Pastoralists' Indigenous Knowledge and Practices in Reducing Household Food Insecurity in West Pokot, Kenya: A Binary Probit Analysis. *Journal of Development and Agricultural Economics*, 10(7), 236-245

Omolo, N., & Mafongoya, P. L. (2019). Gender, Social Capital, and Adaptive Capacity to Climate Variability: A Case of Pastoralists in Arid and Semi-arid Regions in Kenya. *International Journal of Climate Change Strategies and Management*, 11(5), 744-758.

Pingali, P., Aiyar, A., Abraham, M., & Rahman, A. (2019). *Managing Climate Change Risks in Food Systems*. Springer International Publishing.

Thathsarani, U. S., & Gunaratne, L. H. (2018). Constructing and Index to Measure the Adaptive Capacity to Climate Change in Sri Lanka. Procedia Engineering, 212, 278-285.

Wayua, F. (2017). Nutritional and Health Challenges of Pastoralist Populations in Kenya. *African Journal of Food, Agriculture, Nutrition, and Development*, 17(1), 1-11.

Zakari, F. O., Ayo, J. O., Kawu, M. U., & Rekwot, I. (2015). The Effect of Season and Meteorological Stress Factors on Behavioural Responses and Activities of Donkeys (Equus Asinus) – A Review. *Annals of Animal Science*, 15(2), 307-321

Zidago, A. P., & Wang, Z. (2016). Charcoal and Fuelwood Consumption and Its Impacts on Environment in Cote d'Ivoire (Case Study of Yopougon Area). *Environment and Natural Resources Research*, 6(4), 26-36