Strengthening Livestock Systems through Climate-Smart and Gender-Sensitive Approaches: An Overview of Nigerian Livestock Production

Onyemekonwu, R. C. and Meludu, N. T.

Department of Agricultural Economics and Extensions, Nnamdi Azikiwe University, Awka

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ABSTRACT

The livestock industry is an economic enhancer for most countries in the world including Nigeria. Livestock development remains one of the worst hits of climate change resulting to open grazing, low produce and conflicts. This has affected the herders, farmers (especially women farmers), communities and livelihoods. The ability for women to adapt to climate change mostly depend on their ability to access to farm land, credit, security of land tenure, and active participation in decision making regarding land and water resources. Climate change and its effects on livestock production as well as the vulnerable farmers and gender disparity on men's and women's need and priorities in adapting to climate change irrespective CSA initiatives were highlighted. Climate-smart livestock production strategies as well as CSA practices for improving livestock production and the roles of roles of agricultural extension in strengthening livestock systems through climate-smart and gender sensitive approaches were equally emphasized. There is therefore, the need for capacity building of both genders on the strategies to tackle the issues of climate change for enhanced production to achieve sustainable food production. Also, Climate-smart agricultural practices that require specific farm inputs should be made available to livestock farmers. This can be achieved through proper extension service delivery system tailored towards the immediate felt need of the livestock farmers without gender disparity.

*CORRESPONDING AUTHOR

chukwukaraymond@gmail.com

INTRODUCTION

Climate change takes the form of unreliable rainfall, prolonged period without rainfall, flooding, extreme variability of increase and decrease in temperature, influences agricultural production all over the world, thus threatens the survival of farmers. Food production in Africa has not significantly increased to meet the food need of the increasing population resulting from climate change and farm and non-farm related challenges (Rosegrant *et al*, 2008). Poor farmers who suffer from marginalization are mostly vulnerable to the serious impacts of climate change reason being that they are highly dependent on climate change prone sectors and has limited human resources, institutional power and financial capabilities to cope with the negativities impacts by climate change (Lambrou and Nelson, 2010). Climate change disproportionately disturbs farming girls and women due to their greater susceptibility to extreme weather-related activities, such as droughts, floods, extreme hot and cold conditions (Woolf *et al*, 2018).

Gender disparities, with reference to climate change effects on agriculture and livestock production, are attributed to social position and roles that women play within families and societies. The ability for women to adapt mostly depend on their ability to access to agricultural land, credit, security of land tenure, and active participation in decision making regarding land and water resources. Most times because of the position of women, they are unable to air voice to precise needs even irrespective of the fact that climate change have a varying effect on women and men in the production process (Bäthge, 2010) Irrespective of the role of women in feeding their various families and being more dependent on natural resources like as land, water and wood, their ability to access some of these resources is sometimes constrained due to some socio-cultural factors. The vulnerability of women to climate change arises from the gendered roles across society; for example, due to common restrictions on women mobility, they are less likely to get urgent information at the appropriate time to work on it (ADB, 2013). In Nigeria, studies on gender-based vulnerability climate-change effect have shown that women were more vulnerable to the effect of climate change than men (Amusa *et al*, 2015)

Livestock production accounts for the livelihood of millions of rural populations across the world irrespective of gender. Pastoral farming communities which are mainly dependent on livestock production to earn a living are not immune to the effect of climate change, but they remain one of the worst hits of climate change resulting from the response of livestock to climate variability (FAO, 2020). The impact of climate change is severe in water sources including pasture ecosystems that livestock depends on largely for survival and the increased rate of vector-conveying disease-causing organisms. Livestock farmers who majorly reside in the rural areas forms the bulk of farmers who are adversely affected by climate change. This therefore calls for an urgent need for alternative response in the form of climate-smart agricultural practices, to enable the farmers remain in production.

The link that exists between livestock production and climate change still remains unclear. However, raising animals for consumption entails the use of high amounts of water, leading to deforestation and highly contributing to greenhouse gas emissions; thus, making livestock farming to adversely damage the climate and planetary health. Researchers have suggested a number of shifts to combat this problem, including changes in diet, that can help reduce climate emissions relating to food (Hussain, 2022). The two key greenhouse gases created by farming are methane and nitrous oxide. Universally, rearing animals for consumption contributes a minimum of 16.5%_of greenhouse gas with a high pollution impact. Methane, mainly produced by enteric fermentation and manure storage, is a gas that has an effect on global warming 28 times higher than carbon dioxide (Grossi *et al*, 2018; Hussain, 2022). This, therefore, calls for requisite gender-sensitive and climate-smart agricultural approaches that will enhance livestock production without negative health effects, globally.

Climate Smart Agriculture Approaches and Gender in livestock production

A gender-responsive approach to climate-smart agriculture (CSA) implies that particular needs and priorities of men and women are recognized and adequately put into consideration in the design and application of CSA to enable men and women to benefit equally (Nelson and Huyer, 2016). This approach suggests that the particular priorities, needs, and realities of both gender (men and women) need to be recognized and adequately addressed in the design and application of CSA so that men and women will benefit equally (FAO, 2015). This will entail the inclusion of women in programs enhancing agriculture and climate responsiveness so as to achieve food security and other broader development objectives in the face of changing climate and increasing food demand (Aweke, 2017). Evidence revealed that CSA initiatives have made efficient and effective productive and resilient technologies, practices, and approaches more available (Mersha and Van Laerhoven, 2016). CSA intervention initiatives have also led to increased yields, high productivity in animals, diversified crops, improved soil fertility, saved labor, and other benefits leading to efficiency in production (Sterrett, 2011). Despite these achievements, CSA initiatives repeatedly fail to account for the differences in men's and women's needs and abilities to adapt to climate change, instead have tended to have an implicit male bias with the needs and priorities of men being catered to the detriment of the women, especially in the distribution of opportunities and resources (Skinner, 2011). In Nigeria, research has shown that men were more empowered than women for the adoption of climate-smart agricultural practices (Kehinde and Shittu, 2019; Oyawole, *et al*. 2020). The attainment of positive results through interventions should be dependent on whether the measures have considered gender dimensions of climate change adaptation. For instance, understanding the cultural construction underlying the choices of animal breeds made by female and male farmers is important in devising gender-sensitive experimentation to help identify animals with high resistance to the adverse impacts of climate change. However, understanding men's and women's reactions to low production due to climate change is important to finding effective entry points for building resilience and for sustainable development. For example, men often respond to the effects of climate change by investing in short-term production of certain animals with the aim of quick income generation, while women respond by producing low-value subsistence crops and animals to meet the food demands of the family (Perez *et al*, 2015).

Climate-Smart Livestock Production Strategies

To support the design of development interventions for climate-smart livestock production, Iyiola-Tunji (2021) identified the following elements:

1. Collaborative management of natural resources: there should be a participatory approaches to sustainable management of natural resources such as land water forest and other resources so as to develop a long-term sustainable strategies. In this case, decision making processes should be designed in such a way that all the stakeholders concerned (farmers, pastoralists, herders etc.) are captured considering their peculiarities and their environment.

2. Community involvement in adaptation strategies: it is practically impossible to develop a successful adaptation strategies in isolation. Community participation in the identification of new solutions is basic to ensure the long-term sustainability of interventions. According, adaptation strategies need to be developed taking into account environmental, health and social issues such as increased migration, conflict.

3. Incentives and tailored responses: financial incentives and regulations for improving natural resource management and livestock production systems through proper pasture/land management and feeding management can be used as incentives to encourage GHG mitigation and adaptation. Indeed, the introduction of tailored index-based insurance schemes and rural finance initiatives are the keys to support livestock keepers better cope with climate change risks.

4. Subsidies: through the inclusion of subsidies or other enticements incentives in development process, cautious attention will need to be given to their effects. Though in some cases they might support adaptation strategies (i.e. promoting the introduction of heat-resistant breeds, subsidizing vaccinations to reduce vulnerability to the spread of new diseases) in others subsidies could negatively affect adaptation/mitigation strategies

5. Risk management measures: appropriate risk management mechanisms and preparedness measures are needed need to be put in place to cope with the impacts of more frequent and extreme climatic events. Preparedness approaches, early warning systems and other risk mitigation activities (i.e. strengthening infrastructures, insurance systems, forecasting, etc.) will be needed to reduce the impacts of severe weather events to prevent loss of livestock.

6. Awareness and education: availability and accessibility of relevant information regarding climate change is a vital aspect of adaptation, therefore efforts should be geared towards ensuring that knowledge among local farming communities. An understanding of the patterns of climate variability of current and projected climate and seasonal forecasts is key to anticipating shock and losses and enabling external agencies to provide necessary assistance to targeted herders.

7. Mitigation: to support the mitigation of GHG emissions efforts should focus on reforestation, improved grazing management, restoration of degraded lands, livestock manure management, improved feeding management, improved energy/feed efficiency, selection of more productive animal breeds and transhumance practices.

8. Innovation, Research and Technology development: promoting the necessary development and improved access to needed technologies and sharing knowledge on sustainable and climate-friendly farming practices is crucial. Country specific research is needed to inform the development of adaptive strategies and more focus needs to be given to 'the development of improved crop varieties and animal breeds, as well as more sustainable and integrated management of crops, animals and the natural resource base that sustain their production, while providing other important services for farmers and the environment' (IFAD, 2009) to increase resilience of developing countries.

9. Gender dimension: adaptation and mitigation strategies should consider the different roles of women and men and the way in which climate change will impact on them. Climate change clearly offers an opportunity to rethink gender inequities and to involve both women and men in proffering innovative solutions that can respond to common environmental challenges.

10. Indigenous knowledge: the in-depth understanding of the environments that local communities and indigenous peoples have, together with their experience in adapting to climate variability are key for the development of adaptation and mitigation strategies. There is therefore a need to understand the indigenous knowledge and practices of farmers so as to know which adaptation strategy that will be useful and acceptable to farmers across various locations.

Climate-Smart Agricultural Practices for Improving Livestock Production

According to FAO (2017), one way of improving livestock production is through productivity improvements to reduce emission intensities and this could be achieved through the following:

i. Feed and Nutrition: the approach of improving feed quality can be accomplished through improved grassland management, improved rangeland management, improved pasture species (e.g. grass and legumes mix), forage mix, feed processing (e.g. chopping, urea treatment) and strategic use of supplements, preferably locally available.

ii. Animal Health and Husbandry: Improving reproductive efficiency and extending the reproductive life of the animal will improve lifetime performance per animal and reduce GHG emission intensities. Reducing the incidence and impact of diseases, parasites and insect burdens will result in higher productivity and efficiency “with lower losses and less unproductive animals that emit GHG.

iii. Animal Genetic Resources and Breeding: Breeding is key to increasing productivity by improving traits such as live-weight gain and milk yield or fertility. It can also improve adaption of livestock to changing environments, resistance to stress or shocks and diseases. Well planned breeding programmes and conservation of animal genetic diversity can ensure farmers have access to the best animals in each environment.

Agricultural Extension Roles in Strengthening Livestock Systems through Climate-Smart and Gender-Sensitive Approaches

Agricultural extension is central to the development of agriculture in every nation. The role of agricultural extension in strengthening livestock systems through climate-smart and gender-sensitive approaches can be summarized as follows:

i. Linking farmers with sources of improved farm inputs in animal production: it is the role of agricultural extension service provider to link livestock farmers with improved farm inputs geared towards climate-smart agriculture. It is obvious that some improved farm inputs for climate smart agricultural practices may not be available and accessible to farmers. In most

cases, even when they are available, because of the newness and peculiarity of these inputs, farmers may not be aware of their usefulness.

ii. Organization of necessary capacity building programmes for livestock farmers on climate smart agricultural practices in Livestock production. This should be combined with farm visits to practically demonstrate these climate-smart agricultural practices that will build the livestock farmers' capacity that will enhance their production performance in face of climate changes. Also, these training programmes which may take the form of seminars, workshops and forth-night trainings should take into consideration the various region or farming environment with their climate change peculiarity in livestock production and should not be gender biased.

iii. Risk management: the agricultural extension service providers should exposed livestock farmers to the available risk management options. This will enable the farmers cope with the risky aspects of their production. This is particularly important because of the risks involved in livestock production due to climate change effects on livestock. For instance, extreme high or extreme cold temperatures that might be detrimental to the health of animals.

iv. Link to sources of finance: Availability of fund is key to livestock production, with the effect of climate change there is a possibility of increased cost of production. Livestock farmers should be linked to available sources of fund. This could be in the form of low interest or subsidized loan or donor agencies who are particularly interested in funding livestock production in the face of climate change.

v. Farmers' indigenous knowledge: Human societies across the globe have specific knowledge with which they cope with changes in the environment. Extension service providers, should identify specific indigenous knowledge systems across locations for possible improvement. This will make the farmers build self-confidence and will facilitate their acceptance of innovations regarding climate-smart agricultural practices.

CONCLUSION

Livestock production accounts for the livelihood of hundreds of rural populations in Nigeria. Few women are into livestock production for only small ruminants while many men engage in cattle production and cattle grazing. Only few women accesses livestock produce (milk, beef, eggs, other meat) for processing and they lack capacity for value addition development. CSA intervention initiatives have led to increased yields, high productivity in animals, diversified crops, improved soil fertility, saved labor, and other benefits leading to efficiency in production. There is need for capacity building of both gender on the strategies to tackle the issues of climate change for enhanced production to achieve sustainable food production. Going by the adverse effect of climate change, there is the need for incentives to be made available to livestock farmers; this could be in the farm of grant and low interest loan and should target both male and female livestock farmers without disparity. This could encourage both gender remain in production in the face of the challenging effect of climate change. Climate-smart agricultural practices that require specific farm inputs should be made available to livestock farmers. This can be achieved through proper extension service delivery system tailored towards the immediate felt need of the livestock farmers without gender disparity.

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