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**Review article**

## **Strategies and approaches to sustainable livestock production in Sub Saharan Africa**

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### ABSTRACT

Livestock is a dominant agricultural activity in Sub Saharan Africa, which is generally considered a key asset for most rural population and contribute to the livelihoods and nutrition of purely subsistence households. This discussion is a synthesis of possible strategies to consider for sustainable livestock production, focusing on issues of climate change, gender, smallholder livestock support and use of indigenous knowledge systems, and how these may influence livestock production. There are many measures which need to be explored with the aim of making the livestock systems become driving forces of sustainable agricultural development. One of the major factors responsible for the declining livestock productivity in the region is the relegation to the background of the contributions of women in the issues of livestock production. On the other hand, climate change and variability is now widely regarded as the most serious challenge facing Sub Saharan Africa, with consequences that go far beyond the effects on the environment, hence affecting most communities indiscriminately. Despite the negative impact of climate change on livestock production and biodiversity conservation, poor resources peasant farmers are incentivized to engage in these activities because of the wide spectrum of benefits accrued, such as cash income, food, manure, draft power and hauling services, savings and insurance, and social

status and social capital. Since time immemorial, indigenous livestock knowledge systems have been used in smallholder livestock farming sector, while strengthening livestock productivity. These are some of the key aspects in promoting livestock development, through economically and socially empowering local communities, and consequently providing a way to enable rural communities to break the cycle of poverty. In this discussion, some of the strategic steps that can be adopted for future sustainable livestock production, include and not limited to the following: promotion of gender equality and equity in livestock production systems in terms of equal access to livestock productive resources, boosting climate change mitigation strategies, and empowering women in livestock production decision making.

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## **1. Introduction**

Livestock development in Sub Saharan Africa has been mainly directed towards satisfying the rapidly increasing demand for milk, meat and eggs due to sharply rising population. The observed and expected increases in future demand for livestock products in this region provide unique opportunities for improving livelihoods, linked to that, improving stewardship of the environment (Dermott et al., 2014). However, the signs of unsustainability of livestock development has been witnessed as a result of fragile socio-economic capacity in most countries in the region. It is suffice to suggest that if a sharply rising population in Sub Saharan Africa is to achieve a better quality of life through consumption of animal protein, livestock production output must rise more rapidly than population growth. The purpose of this discussion is to explore possible strategies to consider in promoting sustainable livestock development in Sub Saharan Africa. Livestock play important roles in farming systems, as they offer opportunities for risk coping, farm diversification and intensification, and provide significant livelihood benefits and food security. Increasing livestock production is an important component of national development hence attention to climate change issues, gender mainstreaming, promoting smallholder livestock production and use of local indigenous knowledge systems are many approaches to a more efficient, sustainable livestock production systems.

## **2. Climate change and livestock sustainability**

Livestock production has been given an overriding emphasis as one of the core sectors to solve the current challenges on animal product shortage and to bring future sustainability to the world over, however the negative impact of climate change on livestock has been considerable. Elsewhere, regional and global assessments that have so far been made, including discussions of the effects of uncertainty, threshold and surprise, and the possible consequences of climate change on agricultural sustainability and food security (Thornton, 2010), may vary in their applicability to different part of Sub Saharan Africa. Climate change is among the key challenges for sustainable livestock development issues. The negative impact of climate change on livestock production has taken different dimensions. The trade offs and synergies between livestock products availability and climate change effects have not been addressed in the context of conventional livestock sustainability. This is on the background that agriculture is the most susceptible sector to climate change and also predicted that climate change will have a graver effect on Africa than on any other continent and that temperatures will rise significantly (Scholtz, 2012). Therefore, climate change is expected to alter and hence bring changes in hydrological cycle, temperature balance and rainfall patterns (Mwiturubani, 2010) which have a negative effect on livestock productivity. In order to counteract the effects of climate change, approaches to sustainable livestock development should be compatible with the goals of curbing the effects of climate change. Livestock production priorities should be directed towards promoting local livestock genetic resources which are adapted to local conditions and by providing comprehensive research support services on the impact of climate change. Certain segments of Sub Saharan Africa are already

experiencing considerable water stress as a result of insufficient and unreliable rainfall hence more frequent dry spells are expected to increase the likelihood of livestock failure. It is against this background that livestock species that remarkably possess distinctive qualities enabling them to excel efficiently in the context of the uncertainties of climatic variability need to be promoted to reduce vulnerability at household level. Sustainability in livestock production will depend on long term adoption of adequate adaptive measures against climate change in response to adverse environmental effects. Utilization of local animal genetic resources represent a group which is resilient to climate variability and should not only be conserved for future use in the event of climate change but should also be fully utilized to serve the increasing population demand for animal products.

### **3. Supporting the smallholder livestock production sector for sustainable livestock development**

Smallholder livestock keepers represent almost 20% of the world population and steward most of the agricultural land in the tropics (Dermott et al., 2014). Smallholder livestock production on mixed crop–livestock farms has remained and will remain dominant in Sub-Saharan Africa for the foreseeable future (Jayne et al., 2003). Support in diversification into and intensification of smallholder livestock production could effectively contribute to poverty alleviation (Otte, et al., 2005) in Sub Saharan Africa. This means that growth in the smallholder livestock production sector cannot be a passive process, definitely needs to be supported by enabling policies and pro-poor investments in institutional capacities and modern technologies in livestock production. A major contribution of animal products in Sub Saharan Africa is produced by the resource-poor farmers in the smallholder livestock sector. The aim of any livestock development intervention program at the national level should strive to attain as much self-sufficiency as possible to satisfy mainly the increasing population demand, while at the household level, the objective is to improve household nutrition through provision of adequate protein and increase income from sell of animals. Research and innovation today is mostly directed towards intensification of livestock production, whereas the needs of smallholders are in the sustainability and resilience of animal production and farming systems. The potential is immense—billions of people worldwide will benefit from more income and better nutrition (Pathak, 2014). Therefore, it is imperative to evaluate the impact of the indigenous livestock breeding interventions in smallholder livestock production. Smallholders can be competitive in small stock due to over population in certain areas. However, the availability of family labour and the ability of sheep and goats to exploit lower quality available roughage makes livestock production competitive. Smallholders if properly supported may compete well in local markets which are important in agriculturally-based enhancing rural development. Identification of suitable methodologies for quantification of sustainability in smallholder livestock production systems is crucial. Possibility of assessing the sustainability prospects of smallholder livestock production systems, while developing strategies to achieve sustainable livestock production systems in smallholder farming sector is called for. This can only be a success story only if production and marketing systems are improved, and maximum support to smallholders in provision of efficient input services, links to output markets and risk mitigation measures are intensified resulting in higher value products. Innovative public support and links to the private sector will be required for the poor to adapt and benefit as systems are developed. It is also critical that more attention is given to both social and environmental sustainability through understanding tradeoffs and incentives and to bridging important gaps in the perspectives on livestock production.

### **4. Engendered livestock development strategy and sustainability**

The livestock production situation in its current state in Sub Saharan Africa, has a wide spread implications which need urgent solutions. Ensuring adequate meat, milk and eggs to the growing population ought to be a major priority, where majority of the population is estimated to be absolutely poor and malnourished. This can only be possible by understanding the indispensable role of women in improving livestock production and enhancing food security in communities. Acknowledging the crucial role of women in livestock production is the first step in formulating gender sensitive policies in response to animal products shortages. There is without question, a need to address issues related to women's low status that is evident in their minimal access to resources like land, inputs, credits etc, and the fact that productive resources are essential to ensure that women can participate in sustainable development and ensure greater contribution to livestock development. This can only be achieved through equitable allocation of necessary livestock productive resources to strengthen gender sensitive animal agriculture, accompanied by gender responsive livestock extension services as a result enhancing

overall livestock development goal. The signs of unsustainability of livestock development emanate from misguided agricultural policies which fail to recognize women's crucial roles in livestock production and household food security. This has resulted in the current animal products shortage and nutritional crisis, which Sub Saharan Africa is facing. Unfriendly policies have been women's major constraints in livestock production which have compromised their effective participation in livestock development. Public policies and investment are biased against women, inequitable access to land and critical livestock resources and this has perpetuated animal products shortage. The different forms of discrimination women face makes it difficult to disaggregate the various obstacles women encounter when seeking to engage in livestock production in local communities. However, removing obstacles women face in accessing livestock productive resources may translate into increased animal product supply. Challenging the constraints women face must therefore be treated as a key component in the fighting unsustainable livestock development. Removal of these obstacles through gender-sensitive approach would result in significant productivity gains benefiting not only the women concerned, but their households, communities, and the region as a whole. Adoption of policies and enacting laws that would ensure equal access to livestock resources by women and men will improve livestock development. Due to a convergence of appropriate logistical, cultural and economic factors, women are able to benefit fully from livestock developmental programmes and services. Livestock development can be enhanced if livestock intervention programs are more focused, strategic, and aligned with the challenges and capacities of women. Women's equal access to and control over livestock productive resources is critical for the achievement of gender equality and empowerment of women, and for equitable and sustainable livestock production and food security. Overcoming gender disparities in livestock production can have powerful social and economic impacts, resulting in improving the status of women within the household and the community at large. This will have a cascading effects in delivering significant improvements in sustainable livestock production in Sub Saharan Africa. Therefore, gender equality in the livestock resource allocation and services, has positive multiplier effects for a range of key livestock development goals, including animal products food insecurity reduction and the welfare of household food needs. Gender-blindness in failure for women to participate fully in livestock production activities is partly the result of a paternalistic bias, but also of the attitudes of women themselves, who may have been conditioned by their culture and society to undervalue the worth of the work they do and livestock knowledge information which they possess. In smallholder livestock production systems, women provide labour for the various tasks related to livestock but may or may not control the process of decision-making, particularly over the disposal of animals and animal products. Similarly, women may be involved in production, but may or may not own the means of production hence their contribution may never be adequate. Guaranteeing the participation of women will result in enhancing sustainable livestock development especially in resource poor communities, which in turn increase the economic return from livestock production. In most cases policies do not support gendered livestock intervention programmes, hence this gender blindness and negligence has compromised the contribution of women in livestock development.

##### **5. Finding of the right balance between modern technology and local indigenous knowledge practices in livestock production**

Indigenous knowledge is defined as the traditional and local knowledge that exists and is developed through the experiences of the local community in the process of managing the conditions or context that challenge the people's everyday life (Matsika, 2012). Warren, (1991) sees it as that knowledge that is unique to a given culture or society or particular ethnic group. It is generally localized, having been developed through traditional practices for the management and conservation of biological resources on which the society depends. Consequently, it is a complex body of knowledge, skills and technology, which belongs to a particular geographical community (Ndangwa, 2007). This discussion subscribes to the fact that indigenous knowledge is knowledge outside of the formal scientific realm held by local people in a specific geographic area (Otto, 2008). Since it is based on practical experiences, it can be preserved and harnessed for the benefit of both present and future generations, which live in these communities. The use of indigenous knowledge has been seen by many as an alternative way of promoting livestock production in poor rural communities in many parts of the developing world. Raising awareness concerning the value of indigenous knowledge related to the sustainable use and management of livestock is crucial for alleviating animal products food insecurity and enhancing rural development. It is also critical to focus on communities livestock indigenous knowledge and their contribution in enhancing livestock production can be an effective strategy for sustainable livestock production. This is on the background that it has

become increasingly clear in sub-Saharan Africa indigenous knowledge has been used by resource poor livestock farmers who do not have access to modern technology due to cost implication. An appreciation of local livestock indigenous knowledge and understanding of their use role, its importance, and this may be a prerequisite to devising policies to sustainable livestock development. Indigenous knowledge practices and experiences are the basis for livestock production in resource poor communities and further livestock development strategies has to take them into consideration. Effective use of indigenous knowledge that are economically feasible, socially accepted and at low risk for smallholder livestock farmers is crucial in sustainable livestock development. Special attention has to be oriented towards the indigenous knowledge contribution to local livestock production through documentation of such knowledge. There is need to generate and document information concerning the livestock dimension of indigenous knowledge and their implications for sustainable livestock production. This on the understanding that caution needs to be maintained regarding the fact that indigenous systems often come with their own baggage of social practices that can, and sometimes have been, interpreted differently from modern technology. It is therefore, suggested that indigenous knowledge contribution should be encouraged, while efforts should be made to blend the traditional and conventional (improved) technologies in animal agriculture with a view of increasing smallholder farmer's level of production. It is imperative to consider enhancement and exploitation of specific indigenous knowledge base by building on the knowledge itself and blending it, where required, with appropriate modern technologies in livestock production. It is sad to mention that indigenous knowledge in animal agriculture and its knowledge base - is maintained mainly through oral tradition in families, thus posing a risk of its loss. Different communities are endowed with vast, readily available indigenous knowledge in livestock production, with proven efficacies and yet most of this knowledge is not well documented. It is believed that indigenous knowledge in livestock production becomes useful due to the fact that farmers lack access to the conventional livestock management skills and financial resources to afford modern technologies. There is need for policy makers to draw some lessons from and incorporate indigenous knowledge in animal agriculture in their quest for sustainable animal agriculture.

It has been shown that indigenous knowledge was a critical building block in response to climate change mitigation and adaptation. Mitigation and adaptation efforts should systematically and effectively use indigenous knowledge to address community-specific impacts of climate change in livestock production. In the light of recent trends in the area of climate change induced livestock production challenges, through the rapid pace of change in the climatic context over the past few decades which has outpaced the ability of local coping systems based on indigenous knowledge. Harmonizing conventional scientific livestock production technologies and indigenous knowledge, where good indigenous knowledge assets that already exist in local communities, and at the same time there is need to adopt and benefit from the advances that current science offers us. However, development agent should be aware that indigenous knowledge can be difficult to define and identify, since in many cases it emerges more as a way of life rather than a set of specific initiatives or tools. Communities should developed local practices to cope with certain conditions over time, such as protection of grazing lands, incidence of new diseases and parasites for livestock and inadequate feed resources due to climatic variability. The phenomenon of indigenous knowledge, though recognized, needs to be incorporated more significantly in livestock development strategies. The viability of the existing livestock production indigenous knowledge practices depends on finding of the right balance between technology and local practices assuming greater importance in this regard. Sub Saharan Africa has already witnessed, many severe climatic induced vulnerability such as decline in rainfall amounts and intensity, reduced length of rain season and increasing warm and occasionally very hot conditions has affected greatly affected livestock production. The vulnerability to climate change impact is a function of several biophysical and socioeconomic factors influencing communities in many ways which include the changes in the primary productivity of forage and rangelands and the direct effects of weather and extreme events on animal health, growth and reproduction (Smit et al 1996). Due to these changes it is imperative that livestock production should adapt to higher ambient temperatures, lower nutritional value of feed resources and new diseases and parasites occurrence. Livestock production systems whci are mainlt grassland based where feed and water has been compromised due to high temperatures caused by climate change does not augur well for future livestock productivity. The use of local indigenous knowledge may be seen as an alternative way of promoting animal agriculture in the context of the recent trends in climate change and variability. The first step is the acceptance by the stakeholders working with local communities of its assumed inherent value as part of a shift in addressing the direct concerns of the poor on climate change and variability issues. Suggestions have been put forward for

consideration to rethink development of livestock production with local indigenous knowledge being built into the livestock production practices and programmes.

## 6. Implications

Without doubt, there is a conviction in many quarters of the need to tap into the stock of indigenous knowledge if appropriate planning and sustainable livestock production strategies are to be developed in an effective way to counteract the effects of climate change to improve livestock production. Livestock indigenous knowledge efforts establishment to characterise livestock species may result in creation of stable livestock species that can be adapted to stressful changing environment, through possession of desirable qualities needed in future to enhance livestock development. On the hand, understanding of women farmers' role in livestock production, and their constraints is a prerequisite to tapping their knowledge to improve livestock productivity and socio-economic development in Sub Saharan Africa. Therefore it is imperative that the crucial role of women is acknowledged in livestock production as a first step in formulating gender sensitive policies in response to animal products shortages. However, the effectiveness of biophysical responses of livestock production systems to specific environmental challenges that are anticipated as a result of climate change, and then at the range of adaptive measures that might be taken by local producers to ameliorate their effects will be the prerequisite for defining appropriate sustainable societal responses to livestock production. There is need for an integrated approach to assess the impact and develop adaptive measures to curb the effects of climate change on livestock production. In future the choice of adapted livestock species to enhance livestock productivity and appropriate climate change research which are location specific are crucial in sustainable livestock production. Proposed research on livestock in Sub Saharan Africa should consider testing livestock productive traits in stressful environment, hence this calls for simulation studies which will limit loss of adaptive traits in native livestock. Sustainable smallholder livestock production systems must take into account both social and environmental welfare and be targeted to sectors and areas of most probable positive social welfare returns and where natural resource conditions allow for maximum utilization. Increased attention to the issues which influence sustainability in livestock production is important if overall production are to be improved.

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