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STRATEGIC OPTIONS FOR A CLIMATE RESILIENT AND SUSTAINABLE LIVESTOCK PRODUCTION IN AFRICA

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ABSTRACT

Africa is experiencing climate change and climate variability and this is adversely affecting livestock production. In this article, the adverse effects of climate change on livestock production are described and the strategic options available to livestock farmers, livestock researchers and policy/decision makers for raising climate-resilient and sustainable livestock animals are also highlighted. These strategic options include the provision of good animal feeds and feeding system, breeding climate resilient livestock animals, preventing and controlling animal diseases, provision of good housing facilities to livestock, adopting good animal husbandry practices, subscribing to index-based livestock insurance, deployment of effective market and financing systems, investing adequately in livestock research and extension, attracting increased investment as well as devising climate-resilient livestock policy and implementation in Africa.

Keywords: Livestock production, Africa, Climate change and variability, strategic options, breeds, animal feeds and feeding, animal diseases, husbandry, index-based insurance, investments, policy making and implementation, research and extension.

1. INTRODUCTION

The livestock subsector plays an important role in the economies of many livestock-dependent countries in Africa. Livestock is also a source of livelihoods and employment to many people as well as the provision of food security on the African continent. However, it is now known that climate change is adversely affecting us, including livestock production in Africa (Assan, 2014). It is estimated that livestock production is responsible for up to 18 percent of greenhouse gases emitted in the world (Geber, Steinfeld, Henderson, Mottel, Opio, Dijkman, Falcucci, and Tempio, 2013; Tekletsadik, 2017). These greenhouse gases include methane, nitrous oxide and carbon dioxide and they originate from rumen fermentation, manure management, feed production and energy consumption (FAO, 2020). The livestock sector is therefore an important contributor to climate change and is also affected by the negative effects of this phenomenon, manifested in droughts, floods and other inclement weather conditions experienced in the world (Rojas-Downing, Nejadhashemi, Harrigan and Woznicki, 2017). It has been noted that whilst in the past, droughts occur every twelve and half years in Africa, this phenomenon now takes place every two and half years (Ehui, Kray and Mghenyi, 2020). This calls for the raising of livestock animals, which are not only high-yielding but also climate resilient. In this article, an attempt is

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made to highlight some of the strategic options available to us in raising a climate-resilient and sustainable livestock animals in Africa.

2. WHAT ARE THE EFFECTS OF CLIMATE CHANGE AND VARIABILITY ON LIVESTOCK PRODUCTION

Climate change results in variability in rainfall, temperature, humidity and other climate stressors. Low rainfall and high temperatures lead to excessive lignification of plant resources, which lower their quality as feed resources to livestock. Such situations also lead to lack of water for the animals, which in extreme situations, could lead to death. Furthermore, high temperature and humidity result in heat stress to livestock and reduce their metabolic rate and lessen their productivity. Both excessive and low rainfall and temperature expose livestock animals to various pathogenic and parasitic organisms; with an outcome of increased disease outbreaks (Rojas-Downing, Nejadhashemi,Harrigan and Woznicki, 2017). High rainfall can also lead to floods which can drown livestock animals, if they are not properly housed or moved to safer grounds in time. Both low and extremely high temperatures can adversely affect the reproductive capacityof livestock animals.

3. OPTIONS FOR DEVELOPING A CLIMATE-RESILIENT AND SUSTAINABLE LIVESTOCK PRODUCTION IN AFRICA

i. Animal Feed and Feeding

Climate change can lower both the quality and quantity of feed resources available to livestock animals. This in turn reduces the carrying capacity of available pastures and rangelands for livestock animals. As such, livestock animals need to be matched to available feed resources during such periods. Where it is not possible to practice strategic supplementation of the animals, it may require selling excess livestock animals that cannot be supported by available feed resources. Feed availability for grazing livestock animals in Africa is often seasonal. There is plenty of feed during the raining seasonsand lack of or poor quality feed in the dry seasons. As such, the excess feed in the raining seasons should be conserved and given as supplementary feed to the animals in the dry season. Livestock farmers should also take advantage ofcompensatory growth rate during the early part of the raining season to fatten their livestock animals for the market. There is also the need to breed high-yielding and climate resilient grass and leguminous crops for use as pasture in the rangelands. Cheaper and high quality feed resources from by-products of agro-industry and crop residuesshould also be identified and used as supplements to the animals during dry seasons or periods of droughts or floods. To enhance digestibility, some of the agro-industrial by products and crop residues should be treated either by chopping them into smaller pieces or treated with ammonia and molasses and fed to animals. Feed resources that result in lower emission of greenhouse gases should be bred and or adapted to Africanconditions. In addition, methane blockers can be added to feeds of ruminants to drastically reduce methane emission from them and help reduce climate change. For monogastrics such as pigs and poultry, emphasis should be placed on precision feeding to reduce feed waste on the farm and also prevent nutrient offload to the environment (Deloitte, 2020). Feed grains should also be processed in a manner that enhances their digestibility.

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ii. Breed Climate Resilient Livestock Animals.

African Livestock breeds are low-yielding but well acclimatized to the harsh environmental conditions. Attempts should therefore be made to select from among these breeds, those which can withstand droughts and flood conditions and at the same time are relatively high-yielding. Where this is not possible, efforts should be made to infuse African livestock breeds with breeds from other parts of the world, which are high-yielding and select from among the cross-breeds those that are climate resilient and emit less greenhouse gases.Concerted efforts should be made to breed for livestock animals that are resistant to droughts and floods. Improving the genetic make-up of African breeds with respect to their adaptability to climate stressors and their emission of lower levels of greenhouse gases holds the key in raising climate-resilient livestock animals in Africa. This is because changes effected in livestock animals through breeding and selection tend to be more permanent.

iii. Disease Control and Animal Health

African livestock animals suffer from a heavy burden of disease and parasitic infestations. Climate change can worsen this situation as it predisposes livestock animals to various kinds of diseases and parasites. As such, to raise climate-resilient livestock, there is the need to practice zero-tolerance for diseases. Where it is not possible to take advantage of early warning systems of droughts and floods, this should be prioritized and the needed preparations made to forestall disease outbreak among the herd or flock. There should be a routine monitoring of livestock animals to ascertain their health. Sick animals identified from this exercise, should be quarantined and promptly treated to prevent the spread of the disease among the herd or flock.Veterinary delivery services should be well funded so that emerging and existing diseases and parasites can be effectively dealt with. Veterinary services should also be made affordable to livestock farmers in Africa, so that they can send their sick animals for treatment.

iv. Husbandry and Management Practices

Ruminants emit greenhouse gases such as methane, carbon dioxide and nitrous oxide from their enteric fermentation and manure. As such, enzymes and digesters that limit exudation of such gases should be incorporated in the feed. Also, manure from such animals should be treated and properly disposed of. Efficient water utilization systems should be instituted on the farm. Where possible, boreholes should be sunk on the farm, especially before drought conditions hit the farm. The farm should also be interspaced with edible shrubs and tree crops, which can provide shade during period of heat stress and at the same time serve as browsers to the animals (Ocran, 1987). Grassland management softwaresthat enable Livestock farmers to turn in the optimal number of livestock animals for grazing based on the available grassresources should be deployed(Pasturemap, 2020; Maiagrazing, 2020). Where this is not available, grazing intensity should be optimized through rotational grazing. This approach also reduces the burden of endo-parasites on the pasture or rangeland.

v. Housing Facilities

Livestock animals should be housed in a well aerated housing facility and that adequately protects them from inclement weather conditions. The house should be on a flat plane that does

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not easily become flooded. Under no circumstances should livestock animals be left in the open field during the night. They should be housed after each grazing period in the evening. The house should be sited perpendicular to wind so that they are not unduly exposed to the wind. Above all, the house should be made comfortable for the animals by spreading adequate bedding in it.

vi. Subscribe toIndex-Based Livestock Insurance

Index-based livestock insurance was first introduced in Africa by the International Livestock Research Institute (ILRI) in Kenya. Under this insurance scheme, livestock farmers are compensated for loss of livestock animals based on weather data that show that the prevailing conditions were caused by the weather and it was beyond the control of livestock farmers (International Livestock Research Institute (ILRI), 2020). In the past, livestock farmers used to lose their entire herd or flock of animals to drought and floods but with the introduction of this insurance scheme, their animals can be safe-guarded (Gebrekidan, Guo, Bi, Wang, Zhangand Lyu, 2019). Livestock farmersin flood and drought–prunedcommunities and countries in Africa areencouraged to purchaseindex-based livestock insurance for their livestock animals, if it is available. This way, they would be compensated with some money, when they faced drought, flood or inclement weather conditions that predisposes them to diseases or lack of feed for their livestock animals. There should also be an early warning system that alerts livestock farmers of an inpending inclement weather conditions so that they can move their livestock animals to safer areas.

vii. Attract the needed investments and Credit for a climate-resilient livestock production

One of the key challenges facing the livestock sub-sector in Africa is the lack of investmentsin the sector. Given this challenge, it will be difficult to achieve a climate-resilient and sustainable livestock production, if the needed investments are not forthcoming. Livestock farmers and other stakeholders should be brought together to advocate for increased investments for the livestock sub-sector in Africa. Government agencies responsible for livestock development in Africa should develop livestock investment maps, with which potential investors can be wooed with, to invest in the livestock sub-sector (The World Bank Group, 2014). Incentives such as tax rebates should be provided to investors who invest in the livestock subsector. Success stories in the livestock sector in Africa should be packaged and used to advocate for increased financial and material resources for the sector. Investments are currently needed for the development of new feed resources and technologies, climate-resilient breed improvement, disease control and animal health as well as the provision of marketing and trade infrastructure. Cheaper financing mechanisms and affordable credits should also be made available to livestock farmers to enable them purchase supplementary feed and drugs for their animals during drought and flood periods.

viii. Deploy effective market systems and a Marketplace

An effective market system should be established to enable livestock farmers dispose of or sell their livestock animals where the various strategic options described above cannot be applied. If possible,a market information system and an electronic livestock marketplace should be established, so that, livestock farmers can be informed of the prices of livestock animals, feed

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and medication in real time. Such an electronic marketplace can best work, if there are efficient livestock grading and weighing system, online payment system and logistics system to transport the animals to buyers for a fee.

(ix) Livestock Research and Extension

There is a paucity of information on livestock-climate change interactions in several locations and communities in Africa, where livestock animals are raised (Assan, 2014). Location-specific information is therefore urgently needed to develop effective mitigation and adaptation measures against climate change in Africa. Currently, the National Agricultural Research System (NARS) in many African countries receive less than the minimum of 1 percent of Agricultural Gross Domestic Product (AgGDP) advocated for by the African Union Development Agency (AUDA-NEPAD) for Africa's NARS. Livestock Research and Development Institutions in Africa should therefore be adequately funded to enable them undertake studies on the local effects of climate change on livestock development in Africa and the development of climate-resilient feed resources as well as climate-resilient breed improvement programmes. Unlike, crops, livestock extension services are given less priority in Africa. The linkages among livestock researchers, livestock extension workers and livestock farmers are also weak. As a result of this weakness, improved livestock technologies do not flow seamlessly from livestock researchers through livestock extension workers to livestock framers. This situationcalls for a change and the provision of adequate funding for extension and advisory services for livestock production in Africa. Furthermore, an additional call is also being made for the strengthening of linkages among livestock researchers, extension workers and farmers in Africa.

(x) Climate-Resilient Livestock Policy Making and Implementation

Effective Policy making and implementation play an important role in developing climate-resilient and sustainable livestock production in Africa. This requires that policy instruments are formulated, effectively implemented and monitored to establish climate-resilient livestock production in Africa. Livestock policies should be developed based on evidence or data for them to be effective when implemented. This calls for regular collection of livestock data through livestock census in Africa.

Policies should be developed not only at the country-level but also at the community levels in Africa.If this is done, the adverse effects of climate change on livestock production in Africa can be isolated and adequately addressed to boost livestock production in Africa. Africans should also be driving the policy making agenda in Africa, so that, impactful projects can be developed and funded.

4. CONCLUSION

With the frequency, intensity and duration of droughts in Africa having increased in recent years, there is the urgent need to develop climate resilient and sustainable strategies to protect and enhance livestock production in Africa. This article has highlighted the strategic options, which when implemented would enable us to boost livestock production, even under inclement weather conditions.

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