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IS THE LIVESTOCK SECTOR IN SOUTHERN AFRICA PREPARED FOR CLIMATE CHANGE?

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EXECUTIVE SUMMARY

The climate of the Southern African region is moving towards drier and hotter regimes. Livestock production will be significantly affected by the change and variability of climate, yet the response to climate change in the region has been unco-ordinated and sporadic. The drought of 2015/2016, which has been the most severe in 35 years, has forced policymakers to rethink this issue. As a result, SADC has recently drawn up a Regional Climate Change Strategy and Action Plan to co-ordinate adaptation and mitigation efforts in the region. Many countries in Southern Africa have limited climate change frameworks for the agricultural sector, and still less for the livestock sector. The region is endowed with a rich diversity of livestock, contributing significantly to the agricultural gross domestic product (GDP). Livestock will be adversely affected by increases in temperature, reduced rainfall and other aspects of climate change. Livestock production itself contributes to climate change but smart adaptation initiatives can result in fewer and more efficient animals. Opportunities exist to use indigenous animal genetic resources and green technologies, which can form part of carbon-neutral, climate-smart production systems. It is important to create regional networks where experiences are shared and lessons learnt to enhance effective adaptation of the livestock sector in the region.

RECOMMENDATIONS

1. Small-scale livestock farmers face significant climate risks. Climate adaptation policies and strategies should include appropriate and dedicated interventions to support this sector.
2. More effective strategies are required for timely support to livestock-dependent small-scale farmers during times of climate stress.
3. Greater support from national authorities is required for research in appropriate livestock breeding, nutrition, rangeland management and livestock health programmes to support climate-smart agriculture. In this respect, enhanced co-operation between governments, the research community and the agricultural industry is also required.
4. Collaborative platforms are required to promote peer learning in the area of climate smart agriculture.

INTRODUCTION

It is now widely accepted that the global climate is changing. The impact of climate change will differ across and within regions. It is anticipated that Southern Africa will experience higher temperatures, with increases expected to range from 1.5°C to 3°C; the region will also experience more hot days and fewer cold and frost days, reduced annual rainfall, as well as the possibility of increased rainfall in certain regions, particularly along the south coast.[2] In addition, one of the key features of climate change is thought to be more severe fluctuations in weather patterns and increased intensity of severe weather events such as droughts and floods. Because agriculture is highly dependent on climate, the sector is expected to be seriously affected by climate change. In Southern Africa this is further exacerbated by the fact that many of the region's economies are dependent on agriculture, which contributes to about 38% of its GDP. The livestock sector is an important component of the agricultural economies of the region, as over 60% of the region's total land area is non-arable. The countries that form part of SADC are endowed with a diversity of livestock species with estimated populations of 64 million cattle, 39 million sheep, 38 million goats, 7 million pigs, 1 million horses and 380 million poultry.[3]

Three-quarters of the livestock population are kept under smallholder traditional farming systems. In these systems women and children are the major caretakers of livestock resources. Over 60% of people in Southern Africa live in smallholder farming communities, which are largely rural. Moreover, national accounts generally underestimate the contribution of smallholder farming communities to national economies, since many important non-food outputs, which are difficult to quantify in monetary terms, are excluded from calculations. These include the provision of draught power, household consumption, sources of cash income and various socio-cultural functions.[4] Improving the resilience and efficiency of livestock agriculture is therefore critical to achieving sustainable agricultural development and food security in the region.

The 2015/2016 drought has helped put climate change back on top of the food and agriculture agenda of key players at local, regional and even global levels. The drought is attributed to the El Niño phenomenon, which occurs periodically. Climate change is thought to lead to more frequent and intense El Niño events. The 2015 Southern African agricultural season was the driest in 35 years. In the SADC region five countries (Swaziland, Lesotho, Malawi, Namibia and Zimbabwe) have declared national drought disasters and another two have declared partial drought emergencies – South Africa (eight of nine provinces) and Mozambique (southern and central areas). SADC declared a regional drought disaster in July 2016. This was due to massive crop failures, leading to a cereal deficit of 9.3 million tonnes, combined with severe impacts on the livestock sector. It is estimated that 643 000 cattle in the region have died during the drought.[5]

At the regional level, SADC, through its Climate Services Centre, provides operational services for monitoring and predicting extremes in climatic conditions. One such service is the Annual Southern Africa Regional Climate Outlook Forum, which is held annually in August just prior to the major rainfall season. The Forum's statement issued on 1 September 2015[6] accurately predicted normal and below-normal rainfall for most of the SADC region. A further important element of the regional response to climate change is the 2015 SADC Climate Change Strategy and Action Plan, which establishes regional mitigation and adaptation strategies and evaluates the costs associated with climate responses in the key economic sectors of the region.

Despite the existence of climate change policies and plans at the national and regional level, the response to climate change in the region has tended to be donor driven, rather unco-ordinated and sporadic. The implementation of policy has generally been poor.

ADAPTATION READINESS TO CLIMATE CHANGE IN LIVESTOCK AGRICULTURE IN THE REGION

Adaptation strategies are best formulated when the impact of climate change on different livestock sectors is well understood. These impacts can be direct, such as heat stress, or indirect, for example through low crop yields leading to less feed availability or higher feed prices for livestock.

Overall, the warmer temperatures and concurrent changes in heat exchanges expected in the region are likely to cause heat stress in cattle raised on natural pastures and in feedlots. Heat stress suffered by beef cattle will possibly reduce foraging time, feed intake, growth performance and carcass quality. Reproduction performance will also be compromised. For example, conception rates will decrease, calving intervals will increase, and spermatogenesis and semen quality will be impaired. For

dairy cattle, heat-induced reduction in feed intake will result in a decline in milk yields. A combination of high temperatures and moisture in some parts of the region will result in an increase in livestock pests and parasites such as ticks, flies and internal worms. The geographical distribution of parasites is also likely to change from current distribution patterns.

The effect of climate change is not likely to be as adverse in small ruminants, due to the small body weight, well-developed water retention in the kidney and lower metabolic rates of smaller ruminant species.[7] Goats are more likely to cope with, and adapt to, the increasingly hot and dry conditions expected in the region compared to sheep and cattle, because of their low feed and water requirements, ability to exploit low quality forage, and disease resistance. Goats can survive harsher climates than cattle and require less space. This makes them a popular substitute for cattle. Small ruminants are very important in the context of climate change, particularly for rural livelihoods, as they are kept mostly by women and sometimes young adults in small-scale farming areas.

There are significant prospects for the expansion of pork and chicken industries, as Southern Africa is currently experiencing a huge growth of its urban population and has a deficit of both pork and poultry meat production, which is met by imports from Europe, the US and South America. The production of pork and poultry is characterised by intensive production systems where animals are generally housed and provided with feed. A significant amount of pork and chicken is produced by small-scale farmers. These are largely free-ranging animals that also receive some supplementary feeding from the household, like kitchen waste. These animals make an important contribution to the livelihoods and food security of the keepers. Chickens are largely of indigenous stock and have undergone some natural selection to reproduce and survive under harsh conditions. Such breeds could be an important source of genetic diversity for breeding future genotypes that are better able to withstand climate change.

Increased ambient temperatures, downward trends in rainfall and increased frequency of extreme weather will have impact indirectly on cattle production by reducing the quantity and quality of pastures, fodder crops, grains and water. Thus, both intensive and extensive beef production systems are extremely vulnerable, as natural pastures and feed crops will be affected by climate change. Subsistence, emerging and small-scale commercial farming systems are expected to be at high risk due to their dependency on rain-fed natural pastures and limited access to capital resources and management technologies. There is a need for policies with adaptation packages for this high-risk group of farmers. Livestock agriculture policies and strategies must include efforts to develop and promote the adoption of sustainable breed-species mixes, as well as animal health support systems.

In response to climate change farmers prefer livestock species and/or breeds that are heat and drought tolerant, as well as disease and parasite resistant. Drought-tolerant breeds have low feed requirements and are able to utilise poor quality forages and crop residues. For example, some farmers in both commercial and smallholder sectors are shifting towards indigenous Sanga breeds of cattle such as Nguni, Tuli and Tswana cattle, owing to their good mothering ability, longevity, high fertility, disease and parasite resistance, and ability to use low-quality feeds. In the commercial sector, indigenous livestock breeds are being used in crossbreeding programmes because of their fertility and adaptability. Crossbreeding is used to improve the efficiency of meat production in indigenous breeds or to increase the adaptability of exotic breeds.

In South Africa the Nguni is one of the fastest-growing breeds in the beef industry.[8] This is driven by the government, private sector and non-governmental stakeholders in the livestock industry. A national restocking programme of Nguni cattle in smallholder farming areas supported by the government, parastatals and universities has been established.[9] The rationale behind this programme is that Nguni cattle are one of the few breeds that can survive the harsh environments prevalent in communal areas; conditions that will only be exacerbated by climate change. To further increase the use of local breeds, deliberate policies need to be developed that provide incentives for using these genotypes. Most policies in the region are currently anchored by conservation of indigenous genetic resources and are less focused on utilisation. Governments could provide subsidies or tax incentives to breeders of indigenous animals to promote their use.

Adapted breeds can also be central to an animal health adaption readiness programme. In addition to using local breeds, governments will need to invest more in disease control and early warning systems. Animal health policies will need to be revisited in light of new disease threats and this too will require more public funding. Small-scale farmers in particular will need to be supported in the implementation of disease-control strategies.

More resilient livestock farming can be enhanced by reducing livestock numbers through innovative marketing policies, changing livestock composition, diversifying breed and species mixes and designing innovative rotation-based rangeland grazing systems to improve carbon sequestration. Furthermore, genetic gains through selection mean that fewer animals can be bred to provide the same amount of product, resulting in reduced greenhouse gas emissions. By reducing the carbon footprint of livestock, farmers will be better able to withstand the effects of climate change.

CONCLUSION

There has been a significant shift in thinking around the way livestock is produced under conditions of changing climate. By using more appropriate genotypes, adapted and efficient indigenous animals, managing feed resources better, conserving rangelands and improving water resource efficiency, significant gains can be made in securing more climate-resilient livestock agriculture. These ideas need to feed into broader climate adaptation strategies, and gain greater support through collaboration between governments, research institutions and farmers. A particular focus, in this regard, should be practical and meaningful interventions to support small-scale livestock farmers, who play a vital role in supporting livelihoods and food security in the Southern African region.

ENDNOTES

1 Kennedy Dzama is a Distinguished Professor of Animal Genetics and Team Leader of the Sustainable Agriculture and Food Security Group at the University of Stellenbosch.

2 SmartAgri, 'Status quo review of climate change and the agriculture sector of the Western Cape Province', 2016, http://www.greenagri.org.za/assets/documents-/SmartAgri/Briefs-/Smart-Agri-Status-Quo-Review-2016.pdf, accessed 2 September 2016.

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4 Marandure T, 'Sustainability of smallholder cattle production and its vertical integration into the formal beef market value chain in South Africa', unpublished MSc thesis, University of Stellenbosch, Stellenbosch, 2015, p. 164.

5 CCARDESA (Centre for Coordination of Agricultural Research & Development for Southern Africa), 'Southern Africa Regional Conference on Climate Change Adaptation in Agriculture and Climate Smart Agriculture', 11 August 2016, http://www.ccardesa.org/climatesmartagric, accessed 23 August 2016.

6 Humanitarian Response, 'Statement from the 19th Southern Africa Regional Climate Outlook Forum', 2015, https://www.humanitarianresponse.info/en/operations/southern-africa/document/statement-19th-southern-africa-regional-climate-outlook-forum, accessed 18 October 2015.

7 Rust JM & T Rust, 'Climate change and livestock production: A review with emphasis on Africa', *South African Journal of Animal Science*, 43, pp. 255–67.

8 BREEDPLAN, 'The South African beef cattle stud industry in 2011', *LRF/BREEDPLAN eNEWS*, 1, 3, 2011, http://www.lrf.co.za/Newsletter/October/Articles/Article09.htm, accessed 12 August 2016.

9 Tada O *et al*., 'Determination of economic weights for breeding traits in indigenous Nguni cattle under in-situ conservation', Livestock Science, 155, 2013, pp. 8–16.

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