



REPUBLIC OF KENYA



GOOD ANIMAL WELFARE PRACTICES THAT IMPROVE PRODUCTION



What is climate change using the lens of livestock farming?

Climate change (CC) refers to a broad range of alterations in climatic and weather conditions. It is characterized by the rise in global temperatures (Global warming) that leads to changes in known climatic conditions of various regions. Further, it leads to climate extremes that affect feed and water resources as well as animal health and production.

How does climate change affect livestock production?

Climate change affects livestock production in several ways, including the following:

- Climate change affects dairy, meat, and wool production by altering feed availability, particularly in rangelands.
- Animals under heat distress eat less, leading to reduced growth performance.
- Climate change causes water scarcity and more frequent droughts, resulting in resource losses for livestock.
- Competition for grazing land and watering points intensifies due to scarce resources, leading to conflicts.
- Higher temperatures and changing rainfall patterns increase the prevalence of existing vector-borne diseases and parasites.
- Climate changes can introduce and lead to the spread of new diseases through altered transmission models.



Cattle driven into the Kenyan capital Nairobi for new pasture amid a severe drought navigate through city traffic. Simon Maina/AFP via Getty Images

How can livestock farmers be supported to adapt to climate change?

Livestock farmers can be supported to adapt to climate change through the following way:

1) Production adjustments involve changes in livestock practices, such as:

- Diversifying the types of livestock kept and adopting intensive production and mixed livestock enterprises.
- Altering land use and implementing fodder irrigation.



- Changing the timing of farm operations in line with the weather
- Adopting feed conservation strategies



Cattle killed by severe drought in Kenya in 2009 –. Lack of proper offtake programs leads to significant losses

Source: Thomas Mukoya/Reuters

2) Adaptive Breeding Strategies: Many local breeds have developed tolerance to heat and can thrive in conditions of poor nutrition, parasites infestation, and diseases. Adaptive measures include:

- Identifying and fortifying local breeds that have adapted to local climatic stress and feed sources.
- Enhancing local genetics through crossbreeding with breeds known for tolerance to heat and diseases.

3) Market responses: Improved market access interregional or extra continental markets and availability of credit schemes can improve livelihoods.

4) **Institutional and policy changes:** Removing or introducing subsidies, insurance systems, income diversification practices and establishing livestock early warning systems to reduce losses to extreme weather conditions.



Source: *Sara Jerving*

5) **Research and technology development:** Working towards a better understanding of the impacts of climate change on livestock, developing new breeds and genetic types, improving animal health and enhancing water and soil management would support adaptation measures in the long term.

6) **Capacity building for livestock keepers:** Creation of awareness about climate change to understand and adapt to the changes.

7) **Livestock management systems:** Adopting Efficient and affordable practices in livestock management

- Provision of shade and water to reduce heat stress from increased temperature.

- Reduction of livestock numbers – a lower number of more productive animals leads to more efficient production and lower GHG emissions.
- Improved management of water resources through water saving irrigation, water harvesting and storage

Livestock and Green House Gases (GHG) emission

Greenhouse gases (GHGs) are gases in the Earth’s atmosphere that trap heat, acting like the glass walls of a greenhouse—hence the name ‘greenhouse gases.’ They play a crucial role in regulating the Earth’s temperature. These gases can be released by animals, specifically ruminants, during the digestive process, as well as from manure and the production of feed and fodder.

GHG can be reduced by:

- Ensuring proper animal health: Healthy animals produce fewer gases.
- Managing manure (collection, storage, spreading): Production of biogas is environmentally friendly.
- Supervising feed crop production: Deforestation for fodder farming land accumulates GHGs.
- Selecting faster-growing breeds: They use less feed with better feed conversion efficiency.
- Implementing improved feeding management: Better quality diets with concentrates can lower GHG emissions.
- Managing grazing: Proper rotational grazing improves feed utilization.
- Reducing livestock production and consumption: Lowering the demand for meat and milk subsequently reduces production.

Linkage between climate change, environmental health and public health

<p>Dust storm impacts</p> <ul style="list-style-type: none"> • Vehicular accidents (visibility) • Eye irritation • Respiratory effects (e.g., COPD) <p>Snowstorm impacts</p> <ul style="list-style-type: none"> • Injuries • Cardiac conditions • Respiratory effects (due to power outages and burning of dirty fuels) • Post-traumatic stress disorder 	<p>Flood impacts</p> <ul style="list-style-type: none"> • Drowning • Injuries • Spread waterborne diseases • Loss of infrastructure <p>Drought impacts</p> <ul style="list-style-type: none"> • Food insecurity • Malnutrition • Stunting • Respiratory effects 	<p>Maternal and child health</p> <ul style="list-style-type: none"> • Pre-term birth • Stillbirth • Low birth weight • Stunting • Malnutrition • Asthma • Allergies • Learning disabilities • Epigenetic effects 	<p>Non-communicable diseases (increased frequency / severity)</p> <ul style="list-style-type: none"> • Acute and chronic respiratory diseases • Type-2 diabetes • Cardiovascular disease • Cancers • Mental disorders • Injuries • Malnutrition 	<p>Infectious diseases</p> <ul style="list-style-type: none"> • Vector-borne • Water-borne • Food-borne • Rodent-borne • Air-borne • Zoonoses
Climate-change related health impacts in Africa (non-exhaustive)				
<p>Storm impacts</p> <ul style="list-style-type: none"> • Injury • Loss of life • Stress • Anxiety • Destruction/ Loss of healthcare facilities • Disruption to healthcare access/services • Contamination of drinking water sources • Increased risk of waterborne diseases 	<p>Wildfire impacts</p> <ul style="list-style-type: none"> • Smoke inhalation • Eye irritation • Respiratory effects • Drought impacts • Food and personal hygiene • Food and water security • Undernutrition (due to reduced food yield and quality) 	<p>Mental health</p> <p>Health, environmental and economic impacts and consequences of climate change related disasters contributes towards feelings of:</p> <ul style="list-style-type: none"> • Sadness, fear, despair, grief, anxiety • Mood disorders • Increased risk of suicide • Violence/aggression • Sleep disorders • Substance abuse • Mental disorders 	<p>Heat-related impacts</p> <ul style="list-style-type: none"> • Heat stress • Heat exhaustion • Heat stroke • Increased risk of mortality associated with pre-existing chronic health conditions • Dehydration • Heat exhaustion and stress can lead to damage to brain, kidneys and liver. 	<p>Socio-health impacts</p> <ul style="list-style-type: none"> • Conflict over resources (water, arable land) • Forced migration due to weather-related disasters • Reinforced gender inequities • War • Displacement • Loss of jobs and income

Adapted from: Wright *et al.*, (2024)

Further reading:

Hoffmann, I. 2008. *Livestock Genetic Diversity and Climate Change Adaptation*. Livestock and Global Change conference Global Change conference proceeding. May 2008, Tunisia.

Wright CY, Kapwata T, Naidoo N, Asante KP, Arku RE, Cissé G, Simane B, Atuyambe L, Berhane K. Climate Change and Human Health in Africa in Relation to Opportunities to Strengthen Mitigating Potential and Adaptive Capacity: Strategies to Inform an African “Brains Trust”. *Annals of Global Health*. 2024; 90(1): 7, 1–21. DOI: <https://doi.org/10.5334/aogh.4260>

Rowlinson, P., 2008. *Adapting Livestock Production Systems to Climate Change – Temperate Zones*. Livestock and Global Change conference proceeding. May 2008, Tunisia.

Compiled by: Olum M. O, Maichomo M. W., Ogali I. N, Kiprono A, and Mungube E.O.

Contacts

The Institute Director,
Veterinary Research Institute,
P.O. Box 32-00902 Kikuyu, Kenya
Tel. +254-20-2524616/2519769, Tel/fax +254-20-2020512
email: director.vsri@kalro.org

Editors: Nyabundi K.W., Mukundi K.T., Omondi, S.P., Maina P., Wanyama, H.N,

KALRO/NAVCDP VRI Pamphlet No...../2024