

# Research and development needs to support best practices in livestock production in the era of climate change: *Research and Educational Organizations*

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# INTRODUCTION (1)

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**Climate change - immediate and long-term threats to the life-support systems upon which all people depend (food, water, habitat, health and ecosystem) as climate change is taking place faster than originally thought. Developing countries are more vulnerable as they are least able to recover from climate stresses and their economic growth is often highly reliant on climate-sensitive sectors.**

**Furthermore, 70% of world food is produced by several billion small-scale / subsistence / communal farming families, livestock keepers and pastoralists in Africa, Asia and Latin America.**

# INTRODUCTION (2)

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Human food from animal origin and rice are the two most important single food sources for the developing world. However, these two food sources are also responsible for the production of large quantities of anthropogenic methane.

Climate change represents a feedback-loop within which livestock production (and rice) contributes to the problem and suffers from the consequences - twofold implications for livestock production.

Research and development to support best practices in livestock production in the era of climate change is therefore essential. The most important issues are discussed in this paper.

# **Information in this paper is largely influenced by:**

- 1. National Conf. on Global Change (Boksburg, 26 to 28 Nov. 2012)**
- 2. R&D Plan for the Focus Area: Climate change and sustainable livestock production, as updated by Red Meat Research and Development South Africa (2013)**
- 3. 3rd Multi-stakeholder Platform Meeting (Global Agenda of Action in support of sustainable livestock sector) (Kenya, 22 to 24 Jan. 2013)**
- 4. Climate Change Workshop between the livestock industries, researchers and academics (Pretoria, 30 Jan. 2013)**
- 5. 11th World Conference on Animal Production (China, 15 to 20 Oct. 2013)**
- 6. BRICS seminar on Agriculture and Climate Change (Muldersdrift, 23 to 25 Oct. 2013)**
- 7. The valuable inputs from my co-authors**

# **Best practices in livestock production that should be researched and put in place are:**

- 1. The effect of global warming on sustainable livestock production**
- 2. Mitigation of climate change**
- 3. Improved production efficiency**
- 4. Disconnection between food and nutrition needs**
- 5. Water and waste management**
- 6. Restoring the value of grasslands/rangelands**
- 7. Conservation of genetic resources**
- 8. Pastoral risk management / decision support systems**

# **1. The effect of global warming on sustainable livestock production**

**We need research to understand the effect of global warming:**

- **Ambient temperature (heat stress, nutritional stress, lowered production/reproduction)**
- **Climate (rainfall, humidity, solar radiation)**
- **Altered patterns of animal and plant diseases (threat of new disease, frequency of existing diseases)**
- **Nutritional value of pastures and change in pasture composition (growth, yield & stocking rate)**
- **Adaptation of animals to production environments.**

## 2. Mitigation of climate change

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**Livestock in especially developing countries will need to adapt to higher ambient temperatures, lower nutritional value of grass, expansion of diseases (especially ticks and tick borne diseases).**

**With such challenges, matching genotypes with production environments will become crucial.**

**The development of mitigation strategies and a livestock discomfort index are therefore recommended.**

# **3. Improved production efficiency**

**Reducing livestock numbers and increasing the production per animal unit (improved productivity) is an effective way to reduce the carbon and water footprint from livestock.**

**Increased productivity generates less GHG emission per unit of livestock product. Improved production efficiency → breeding, feeding management, alternative production systems (also crossbreeding), the use of alternative breeds, breeding for adaptation/ resilience, etc.**

**Other strategies: systems and management strategies, manipulation of nutrition, breeding of new forage and pasture cultivars.**

**3 Posters**

# 4. Disconnection between food and nutrition needs

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**Choosing nutrient-rich foods and reducing intake of nutrient-poor energy dense foods is one way of reducing the amount of food (and resources) required to meet human nutritional needs.**

**In addition to the formulation of strategies aimed at greener food environments, health issues (such as nutrient-density) should be considered.**

**The consumption of more food than the daily human requirements and the waste of food from production to consumption, need to be part of a holistic approach in considering sustainable diets.**

# 5. Water and waste management

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**Positive approach → utilize emissions and waste to the benefit of the environment.**

**Downstream aspects that need attention → methane capturing and energy generating units/plants; treatment of manure and waste that limits methane release and water use; management of agricultural wastes and effluents to limit water pollution; and application of techniques and methods to earn carbon credits from the livestock value chain.**

## 6. Restoring the value of grasslands/ rangelands

**Widespread neglect and degradation of grazing land  
→ high incidences of poverty & environmental  
losses (erosion, carbon dioxide emissions, water  
loss and biodiversity loss.)**

**If rangeland/grassland vegetation recovers it will  
increase carbon sequestration in biomass, improve  
climate change resilience and improve production  
efficiency. It will also ensure a dense basal  
vegetation cover to avoid excessive runoff that  
would lead to damaging floods, erosion, silting up  
of dams, etc.**

# 7. Conservation of genetic resources

**The use of alternative / adapted genotypes and varieties may become important.**

**The screening of traditional / indigenous breeds / varieties for resilience to climate change is therefore essential.**

**The conservation of genetic resources (both plants and animals) must therefore be a priority, since they may be useful in future.**

## **8. Pastoral risk management and decision support systems**

**Management and decision-making → greatly enhanced by the availability of risk identification and decision support systems.**

**Proper databases are needed to development risk management and decision support tools → inform stock farmers in time of environmental risks (e. g. drought and/or floods) and extreme events, e.g. temperature (both high and low) so that they can employ strategies to minimize the negative effects.**

# CONCLUSION (1)

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- **It is important that methods or innovative ways are developed through research and put in place to ensure best practices in livestock production in the era of climate change.**
- **All major livestock producing countries and the different livestock industries and related stakeholders should recognize the threatening effects of climate change and actively support strategies to mitigate it.**
- **No single country, organization or industry can do this research and the implementation thereof on its own.**

# CONCLUSION (2)

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- **Academics, researchers and industries from around the world should combine their efforts.**
- **The establishment of some form of “Climate – Smart Agriculture Alliance”, with the objective to share research expertise and information, build capacity and conduct research and development studies, should be a priority.**

# THANK YOU

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