



# **THE ROLE OF ANIMAL BREEDING AND GENETIC TECHNOLOGIES IN IMPROVING LIVESTOCK PRODUCTIVITY IN SOUTH AFRICA**

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# PRESENTATION OUTLINE

- **BACKGROUND**
- **SIGNIFICANT CHALLENGES**
- **GOLDEN OPPORTUNITIES**
- **RESEARCH THEMES**
- **CONCLUSIONS**

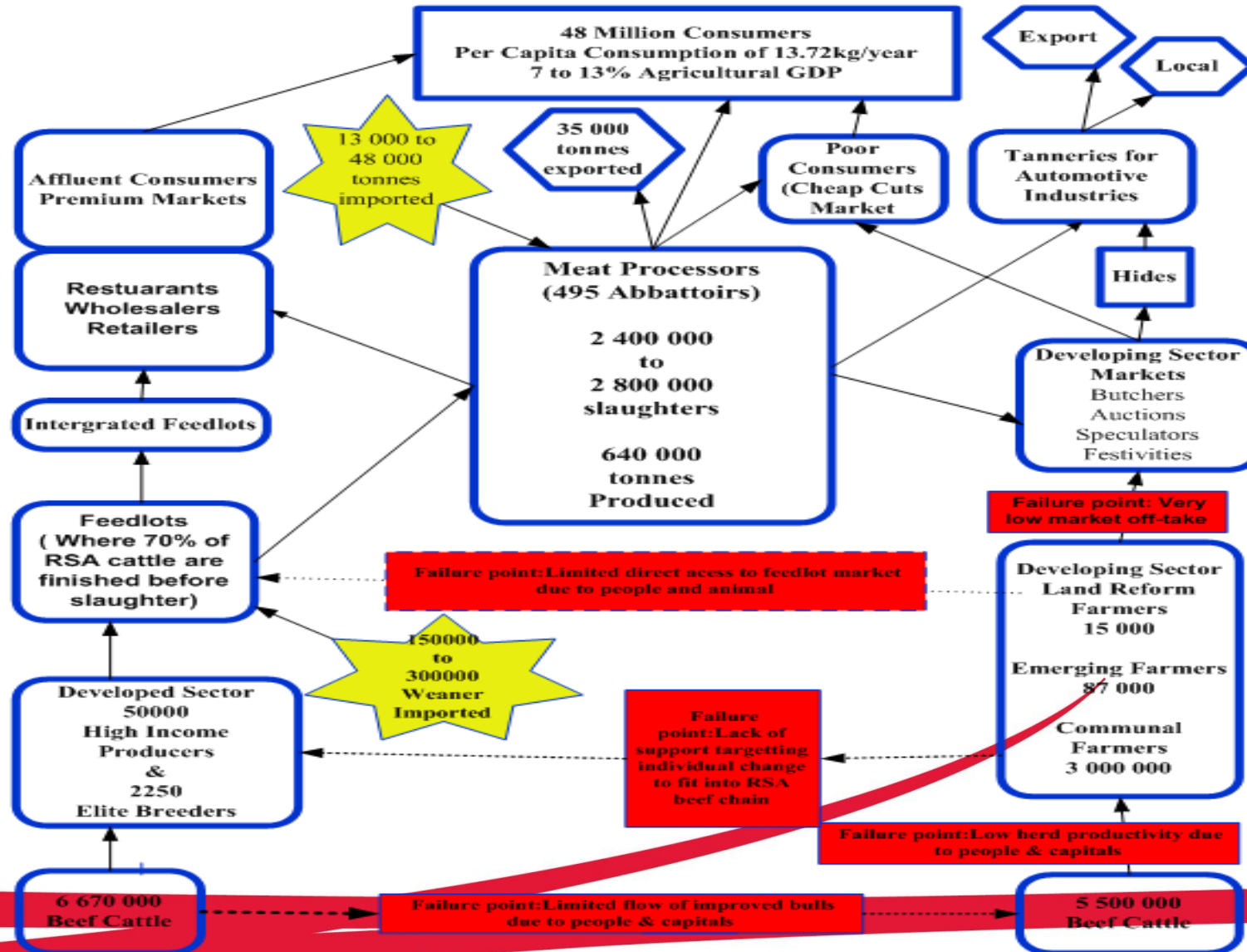
# BACKGROUND

- The National Development Plan (NDP) of South Africa vision 2030 indicates that Agriculture has a central role to play in building a strong economy.
- Agriculture is central to an inclusive and integrated rural economy by creating jobs in agriculture, agro-processing and related sectors.
- The NDP strives for the increased investment in new agricultural technologies, research and the development of adaptation strategies for the protection of rural livelihoods and expansion of commercial agriculture.

# BACKGROUND

- The importance of the livestock industry is evident from various perspective (Livestock Development Strategy for South Africa, 2007).
  - Livestock accounts for more than 40% of the total value of agricultural output.
  - Livestock farming occupies nearly 80% of the agricultural land.
  - From a food and income security point of view, animal agriculture is the primary income generator in the majority of rural areas.

# SIGNIFICANT CHALLENGES





# SIGNIFICANT CHALLENGES

Production Traits	Smallholder/ Emerging Sector (%)	Commercial (%)	Stud or elite (%)
Calving rate	40	65	85
Pre weaning mortality	50	2	2
Post weaning mortality	15	2	2
Market price	50	100	>130
Beef Market off-take	5	85	100
Weaning weight (kg)	150kg	200kg	223kg

# GOLDEN OPPORTUNITIES

- Majority of livestock in SA are still being reared under traditional systems.
- Majority of these livestock are under threat of extinction.
- Livestock kept under the prevailing smallholder conditions and traditional systems of production has a low level of productivity.
- Therefore, traditional systems of production alone cannot be the best solution.

# GOLDEN OPPORTUNITIES

- The most important and reliable alternatives is the use of animal breeding technologies such as:
  - Artificial insemination (AI),
  - Embryo transfer (ET),
  - Breeding Schemes,
  - Gene-Based Technologies.



# GOLDEN OPPORTUNITIES

- There is an enormous potential for the utilization of gene-based techniques in communal and emerging livestock sectors.
  - marker-assisted selection (MAS), gene-assisted selection (GAS) and genomic selection (GS).
- However, owing to factors related to cost, infrastructure, institutional and human capacity, its large scale practical implementation in SA will take some time.
- Necessary to build a strong local capacity in biotechnology, infrastructure and investment in institutional developments to lay the foundation for future practical application.

# GOLDEN OPPORTUNITIES

- Much interest towards community or village-based breeding programs.
- So far, several such breeding programs have been launched in SA (FAnGR, ART & IDC) and the experiences are encouraging.
- Active involvement of communities from the definition of breeding goals and selection criteria to identification and implementation of most appropriate and acceptable strategy.
- Thus, it is a more potential breeding strategy, suitable to improve the genetic potential of indigenous livestock in low-input small-scale farmer's herds.

# RESEARCH THEMES

SPECIALISATION	AREA OF RESEARCH	STAKEHOLDERS / COLLABORATIONS
Animal Breeding & Genetics	Beef Cattle Breeding (Production Efficiency, Indigenous genetic resources, Genetic markers)	ARC Provincial DAFF & National DAFF
	Dairy Cattle breeding (Milk Production Traits)	ARC
	Sheep, Goats and Chicken Breeding (Molecular Characterisations, Conservation & Sustainable Utilisation)	ARC Provincial DAFF & National DAFF NRC (Egypt)
	Game (Hybridization)	National Zoological Gardens (NZG)
Animal Reproduction and Physiology	Reproductive technologies (Semen, Oocytes and embryo characterisation and quality studies from indigenous breeds)	ARC
	In-vitro embryo production and cryopreservation	ARC
	Cryo-conservation, embryo transfer, artificial insemination	ARC
Animal Nutrition	Feed processing (Silage making; natural products)	ARC
	Probiotics	ARC



# RESEARCH THEMES

SPECIALISATION	AREA OF RESEARCH	STAKEHOLDERS / COLLABORATORS
Animal Health & Indigenous knowledge Systems	Indigenous fodders – nutritive and anti-nutritive properties	ARC
	Probiotics/Anthelmintics	ARC
	Medicinal Plants	ARC Provincial DAFF & National DAFF
Multidisciplinary Research	Poultry production	Industry ARC
	Pig Production	ARC & Industry
	Feed safety / Mycotoxins and Bacterial contamination	University of North-West
	Small scale farming -management	ARC
	Climate intelligence agriculture (Mitigation of ghg emissions from extensive livestock production systems)	University of Pretoria ARC
	Climate smart forage nutritional modelling	ARC
	Biogas production	ARC

# CONCLUSIONS

- Proper adoption of modern animal breeding biotechnology will have great potential to improve livestock productivity and food security in SA.
- In view of the impressive results achieved in developed countries, there are good prospects for adoption of similar technologies to improve the productive potential and efficiency of livestock in SA.
- The adoption of new technologies should be gradual and tailor-made.
- A multidisciplinary approach may be necessary.



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