Animal resources research In RWANDA

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Introduction

- In Rwanda, agricultural sector contributes over 32% of the national Gross Domestic Product;
- Livestock on their part contribute 11% of the Agricultural GDP and about 3% of the national GDP.
- Since 2006, livestock sub-sector has consistently received strong policy support through the “One cow per poor family programme”
- Major limitations :
  - Shortage of grazing land
  - The scarcity of forage year round, especially during the dry season
  - Critical in the areas constrained by the low rainfall and acidic soils
  - Pest and diseases for major feed resource

Animal resources research

Is carried out in the following **Sub-programs**:

i) Ruminant
ii) Monogastrics
iii)Fish and fisheries
iv) Commercial insects

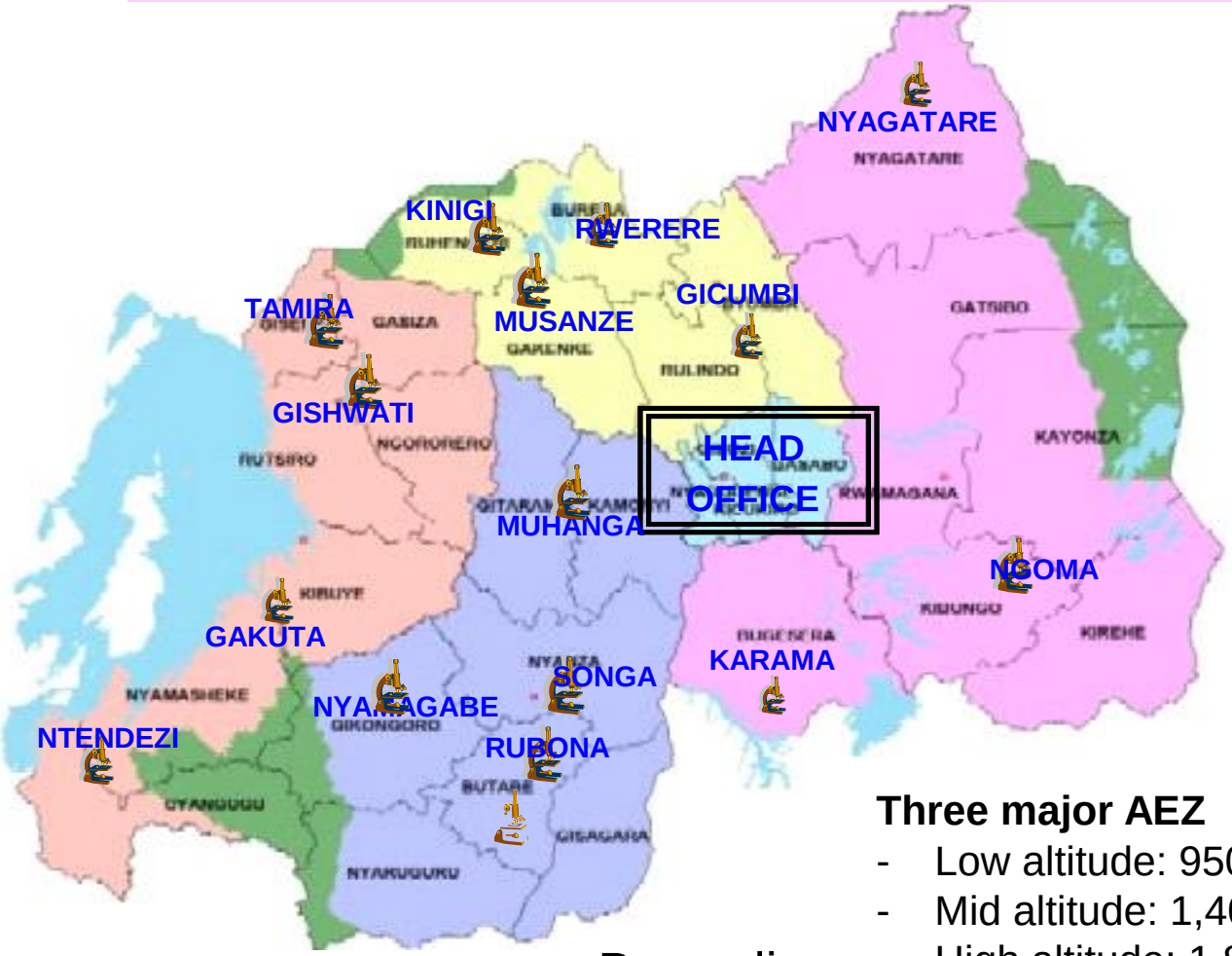
Animal resources research

Address the constraints through the **development of technologies** which will:

- Increase farmers access to high yielding animal breeds.
- Establish and conserved a critical mass of indigenous livestock genetic resources as reservoir for adaptive traits and emerging needs for future generations.
- Improve **feed availability** throughout the year especially dry season feeding.
- Come up with well suited **forages** and **fodder**.
- Develop **disease control** technologies.
- **Integrate** crop and livestock.
- Give Solution on livestock climate change

Introduction

Research stations of RAB



Burundi

Three major AEZ

- Low altitude: 950 – 1,400 m a.s.l
- Mid altitude: 1,400-1,800 m a.s.l
- High altitude: 1,800 – 2,600 m a.s.l

Longitude: 29^0 00’ – $30^{'}$ $30^{'}$ East
Latitude: 1^0 $30^{'}$ – 2^0 $30^{'}$ South

Feed resources development and utilisation

❑ General objective

- To promote the productivity of cattle through improved nutrition with the view to increasing food and income of the farming families

❑ Specific objectives

- To introduce and maintain improved pasture germplasm and produce basic seeds
- To select the most promising forage germplasm according to existing agro-ecological zones of the country
- To characterise, evaluate and integrate the best-bet pasture varieties into existing feeding systems
- Characterise existing feed resources including crop-residues and integrate them into feeding systems

Feeding calendar development with farmer participation

Adapted forages in different AE zones

- **Low altitude zone (Eastern Province)**
  - Legumes: *Clitoria tenatea*, *Stylosanthes scabra*, *Macrotyloma axillare*, *Lablab purpureus*, Siratro, *Stylosanthes guinensis, D. distortum*
  - Grasses: *Chloris gayana*, *Cenchrus ciliaris*, *Panicum maximum*, *Brachiaria* sp.
- **Mid-altitude zone (Southern Province)**
- Legumes: *Pueraria phaseoloides D. intortum*, *D. uncinatum*, *Lablab purpureus*, *Neonotonia wightii, D. distortum*
- Grasses: Chloris gayana, *Cenchrus ciliaris*, *Brachiaria* sp.
- **High altitude zone (Northern and Western Provinces)**
  - Legumes: *D. intortum, D. uncinutum*
  - Grasses: *Pennisetum clandestinum* (Kikuyu grass)

Improvement of grazing pasture

Major feed resource: Napier grass – Napier Stunt Disease in Rwanda

Fodder conservation at small scale farmers

Fodder conservation at large scale farmers

Forage characterisation

Forage Species	Fermentation kinetic parameters				
	a	b	c	ME	RDP
Flemingia macrophylla	20.7	29.1	0.0276	5.6	51.2
Stylosanthes scabra	20.2	202	0.00285	6.8	
Canavalia brasiliensis	21.8	63	0.0565	7.6	
Desmodium tortuosum	24.0	68.6	0.0105	11.0	
Chamaecrista rotundifolia	22.0	37.6	0.0573	7.5	
Desmodium intortum	21.9	32.5	0.0515	7.2	
Desmodium uncinatum	23.4	37	0.039	7.5	58.2
Gliricidia sepium	23.4	33.7	0.0694	8.3	
Lablab purpureus	23.1	34.9	0.0629	7.8	
Leucaena diversifolia	24.1	31.1	0.0412	7.2	49.3
Leucaena pallida	20.6	46.9	0.0134	6.0	
Macrotyloma axillare	22.6	39.8	0.0477	7.8	
Macroptilium atropurpureum					72.9
Mucuna pruriens					55.6
Desmodium distortum					35.4
Stylosanthes guianensis					33.1
Clitoria ternatea					75.8

Climate smart Brachiaria grass

- Tolerate drought and acidic soils
- Increase milk yield due to its nutritive values
- Brachiaria grass offers an advantage of sequestering large amounts of carbon
- Possibility of reducing greenhouse gas emissions (e.g. N2O, CH4)

On-farm Brachiaria varieties evaluation

- Define niches for the introduction of forages into smallholder crop livestock systems
- Brachiaria options
- Impact on milk and meat yields
- Overcoming animal nutritional limitation

Straw-based rations

- Digestibility were 532, 588, 564, 572 g/Kg DM.
- Nitrogen (N) digestibility were 435, 494, 454, and 497 g/DM.
- N retentions were 10, 26, 23, 33 g/day.
- At the prevailing abattoir price of beef (FRW 1800/kg) the gross margins were FRW -15,484; 5,101; 4,453; -20,310 per animal fed on rice straw with 0; 0.5; 1 and 2 kg concentrates/day, respectively.
- Feedlot beef production using rice straw is economically feasible at level of 0.5 to 1 kg of

Forage seed production

Challenges

- Funding
- Forage seed systems
- Infrastructure and Capacity in animal nutrition and forage science

Animal resources research

The strategic objective of the animal resources research:

- to increase the Animal Genetic Resources (AnGR) contribution to the Crop Intensification programs and sustainable natural resources management while responding to national food and income security concerns

Animal resources research

Constraints :

- Breeds and breeding methods (low productivity)
- Replacement stock (unavailability)
- Feeds and feeding (inadequate quantity and quality)
- Genotypes and environment (matching the two)

Animal resources research

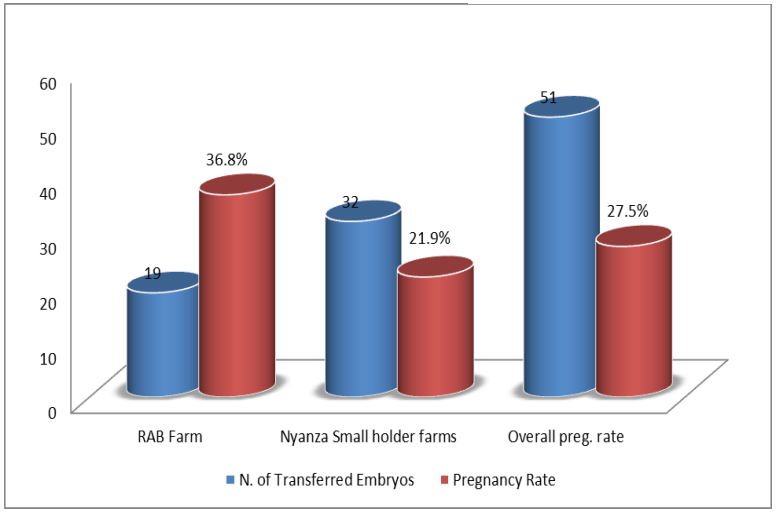
I. Animal genetic improvement technology

- **A. Multiple ovulation and Embryo transfer technology (MOET)** is an effective method of increasing the reproduction rate of individuals or groups of animals.
- The Rwandan farmers are currently importing high performing dairy cows to enhance the dairy sector productivity. The most important challenge in this dairy cow importation is predominantly the low adaptation in tropical environment accompanied mostly by low milk yield and death.
- To avoid continuous importation of these expensive grade animals, there is a need to use efficiently Assisted Reproductive Technologies (ARTs) such MOET.

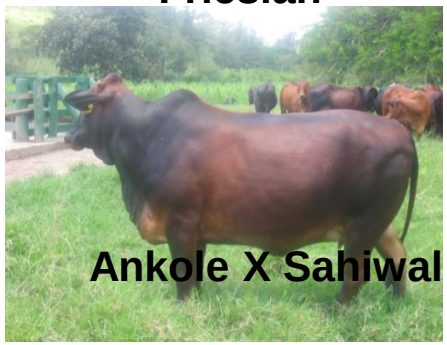
Achievements:

✓ The pregnancy rate was at 27.5 %. The success rate is above 24% on station and farm level (14 calves were born)

✓ This technology will be used for developing new lines of dairy genetics



Animal resources research



I. Animal genetic improvement technology

- **B. Selective breeding**

✓ **Effect of genotypes and season on growth performance**

The study were carried out at Songa station, the results shown that the mean live weights of the six cattle breed groups at birth, 3 months , 6 months and weaning and their standard deviations are presented in Table 1. Birth weight was not affected for any of the sources of variation studied, although sex of the calf tended to significance (P=0.0358). However the calves of AF, ASS, ASJF, AFJ and ASF were heavier than calves of AA, AJ, and AJJ.

The heaviest weights were registered by breed groups AF and ASJ, but breed group ASJ was not significantly different in mature weights than breed group AJS and AJ.

✓ **Effect of breed and season on milk production**

.On average, the best performing genotype across the entire year was pure Frisian reared at Kinigi station, followed by AF , followed by AFF (Upgrades of AF when sired by Friesian), AFJ(upgraded when sired by friesian and Jersey); followed by Fleckvieh ; and then by AF and ASJJ (crossbred of Ankole and Sahiwal)

Animal resources research

MONOGASTRICS PROGRAM

Poultry

Topic: Enhancing productivity through characterisation and selection of local chicken ecotypes in Rwanda

Output s

1. Diversity of various ecotypes available locally and their attributed established and documented to inform conservation efforts
2. The Innovation platform of different actors involved in the poultry value chain established
3. The project is efficiently monitored and evaluated.

Innovations

- Signatures of selection identified in local chicken of Rwanda
- Development of highly yielding chicken breed within locally available chicken
- Innovation platform for chicken breeders

Researches done in Animal Health

- RVF, Vector-borne & seasonal surveillance , potential risk factors associated with Rift Valley fever seroprevalence based on univariate logistic regression. Arbo-viruses Incidence and Diversity (RVF): 2016
- Cysticercosis incidence and diversity in human and pig population in Southern Province . 2015
- Planning for rational use of antibiotics in treatment and control of bovine mastitis in Rwanda: Jan 2018
- Study of the efficacy of the muguga cocktail vaccine associated to the satisnki strain in the control of the ECF in Rwanda; November 2017
- Brucellosis Prevalence Study and Strategic Plan Development for its Eradication in Rwanda; May 2018

Ongoing researches in Animal Health:

- Zoonoses and Emerging Livestock Systems (ZELS): *"Multi-sectoral strategy and longitudinal study for brucellosis control in peri-urban dairy production zones in Western and Central Africa; Gasabo and Nyagatare Districts, Rwanda case studies"*
- Application of socio-economic methods to optimise the implementation of infectious diseases control strategies in cattle in West and Central Africa: Transaction Cost Economics to assess governance of livestock health prophylactic and clinical services"

- Research project on epidemiology of trypanosomiasis in cattle at the wildlife-livestock interface of Akagera National Park

THANK YOU