ZIMBABWE

Grasslands Research Institute

An Abridged Profile

Division of Livestock and Pastures Research
Department of Research and Specialist Services
Ministry of Agriculture, Mechanization and Irrigation Development

June 2014

Content

Introduction

Grasslands Research Institute (GRI) is one of the four Livestock Research Institutes in the Ministry of Agriculture, Mechanization and Irrigation Development. The four institutes, under the Division of Livestock and Pastures Research, in the Department of Research and Specialist Services (DR&SS), have research programmes and projects on livestock conservation; livestock breeding and productivity enhancement; pasture and forage productivity for improved livestock nutrition. This is coupled with support services using information and technologies generated by research programmes. The institute also sells excess livestock bred, as well as forage and pasture seed to farmers.

The Grasslands Research Institute farm is located 67 km South East of Harare near Marondera town, along the Harare-Mutare Road. The farm land cuts across an elevation gradient of between 1 577 and 1 666 m.a.s.l. The farm is **2 700 ha** (Table 1) in extent, subdivided into approximately **330 ha** arable, **240** infrastructure, **1 550 ha** grazing land and **580 ha** of woodland, timber plantations, water bodies and wasteland. Mean annual rainfall is in the range of 600 to 900 mm p.a. with about 80% falling between November and March. The rainfall is usually reliable enough to support intensive mixed crop-livestock production. Soils are predominantly acidic, with an average pH of 4.5, deep brown, fine, loamy kaolinitic thermic derived from granite. The vegetation is wooded shrub land with *Terminalia serica* and *Burkea Africana*, in association with various *Combretum* and Acacia species. *Brachystegia boehmii* may occur in places. The grasslands are dominated by *Hyparrhenia* species of grass.

2. History and development

Grasslands Research Farm/Station was established in 1929 when Government bought three farms, which were consolidated into one farm in order to satisfy the growing demand for agricultural research in the high rainfall sandveld region. The main research focus was on dairy, beef, sheep and pasture research and production. The remaining part was farmed commercially for demonstrations. The station's main dam was built across the headwaters of the Hunyani River in 1954 and this made work with irrigated pastures possible.

Studies on lamb production started in 1956 and on dairy in 1966. Success in livestock production was largely dependent on the outcome of work with pasture legumes and their combinations with grass pastures.

In 2007, the Grasslands Research Station was re-named Grasslands Research Institute to reflect its national focus and contribution. In that regard, the thrust of the institute's research programmes has since been re-oriented from focusing on the minority large scale commercial farmers' needs to include the needs of the majority and previously neglected communal, smallholder and the later models of A1 and A2 resettlement scheme needs for improving both livestock and pasture production. In Zimbabwe, beef and dairy cattle play a significant role in the livelihoods of communities through provision of meat, milk, draught power and general financial security. According to a nation-wide survey conducted by the Agricultural Research Council (ARC) in 1999, the major constraint to livestock production has been singled out as shortage of feed, especially during the dry season.

Table1: Current Land Use Apportionment and Related Stock Carrying Capacity

Apportionment	Area (ha)	Carrying capacity (LU)
Total farm size	**2 700**	
1. Lendy Section	**700**	
Rocky outcrops and hills	50	5
woodland area	40	8
Grass (upland)	510	120
Vleis (wetland)	100	30
Total carrying capacity		**163**
2. Driffield section	**635**	
Dams	5	NIL
Woodland area	195	25
Rocky outcrops and hills	45	5
Grass fields	330	95
Vleis	60	20
Total carrying capacity		**145**
3. Mkute section	**369**	
Dam	4	nil
Woodland area	20	3
Grass fields	195	44
Vleis	150	36
Total carrying capacity		**83**
4. Sheep paddocks	**317**	
Grass fields	120	30
Gum plantations (forestry)	150	15
Vleis	25	6
Woodland area	10	1
Infrastructure	12	nil
Total carrying capacity		**52**
5. Experimental fields	**355**	
Pasture research trials	140	n/a
Pasture seed plots	30	n/a
Forage production (live banks)	55	n/a (for hay production)
Other cropping fields	65	10
Woodland (**windbreaks**)	65	6
Total carrying capacity		**16**
6. Other Institutes	**74**	
Horticulture Research institute	50	n/a
Soil Productivity Research Lab	10	n/a
Met Department	7	n/a
AGRITEX	2	n/a
Grasslands Primary School	5	n/a
7. Other Infrastructure	**200**	
Roads	45	n/a
Infrastructure (farm Buildings/offices)	35	n/a
Cattle handling facilities	5	
Staff houses	55	n/a
Airstrip	60	n/a
8. Other Timber Plantations	**50**	n/a
Grand Total	**2700**	

Total LU = 459 (based on available grazing land). One (1) LU = a beast (cattle) of 500 kg.

For intensive production systems, such as dairy and beef fattening, the cost of bought-in concentrates can be prohibitive and beyond the reach of most farmers. In addition, the advent of A1 and A2 settlement schemes has seen an overall reduction in farm sizes. As a result, available grazing for cattle on most farms has become limited in both quantity and quality. Therefore, there is need to promote research that continuously evaluates and develops cheaper alternative sources of feed such as use and beneficiation of farm grown feeds, in addition to use of crop residues and industrial by products. There is also a need to improve pasture and rangeland productivity, which is the cheapest form of livestock feed, especially in areas where beef in solely produced off the *veldt* (rangeland).

3. Mission

The institute's mission is to facilitate increased livestock productivity through provision of research-based technologies, as well as information dissemination strategies that inculcate production sustainability on farms.

4. Core Functions for Grasslands Research Institute

- **Research**, develop and **conserve** livestock breeds, pastures and forages adaptable to Zimbabwe's agro-ecological zones.
- Conduct **research** for developing appropriate and sustainable livestock production information and technologies for farmer support.
- **Package** and **disseminate** new and relevant information on livestock productivity and production.
- Conduct **training** of extension agents and lead farmers to share information developed on livestock productivity, production and best practices.
- **Characterize** and conserve plant and livestock genetic resources for future breeding, food and agriculture.
- Provide **testing** and **advisory** services on animal feeds and animal management.

In fulfilling its core functions, GRI creates **linkages** and smart partnerships with stakeholders in the livestock industry.

5. Research Focus and Partnerships

Grasslands Research Institute conducts its research in collaboration with other organizations through partnerships and joint planning and execution of programmes and information exchange. The institute's research partners include farmers, farmer organizations, extension agents and livestock development organizations, other local research institutes and international research centres. The main areas of research include, but not limited to:

5.1 Livestock Productivity Research:

- Develop dairy, beef cattle, goat and sheep feeding and **husbandry systems** through evaluation of locally available feed resources and their management systems.
- Improve and beneficiate **crop residues** and poor quality roughages for ruminant livestock feed, as an ongoing exercise.

- Develop **cost effective** maintenance and pen/*veldt* (rangeland) finishing diets for dairy and beef cattle production.
- Carry out livestock **feed efficacy** evaluations through metabolism experiments, for the benefit of giving guidelines to farmers on best practices and feed selection.
- Training and advisory to farmers, extension agents and students of agriculture on specific sustainable livestock and pasture production systems.
- Enhance cooperation with other institutions in animal nutrition research for the benefit of Zimbabwean livestock production.

5.2 Pasture and rangelands research for high to medium rainfall areas:

- **Select** and **develop** high yielding and protein–rich forages to supplement poor quality native pastures and crop residues.
- Develop **forage production techniques** that integrate forages for balance with food crops to avoid displacement of food and cash crops by forages or *vice versa*.
- Develop simple and **low-cost conventional pastures** for use by specialised ruminant animal farms.
- Develop appropriate fodder conservation techniques that help reduce the growing **pressure** on **native pasture** and **forest** resources during the dry season.
- Produce and avail legume and grass **seed** for both dry land and irrigated pastures.
- Conserve and utilize forage genetic resources such as **improved** grasses and legumes.

Below is a sample of some of the conserved grass and legume forages for seed and vegetative material production.

Forage grass under conservation and seed production

Bana Grass Seed Stock

Katambora Rhodes Grass

Brachiaria Grass spp.

Forage and pasture legume evaluation and seed production

Sunnhemp (*Crotalaria juncea*)

Velvet Bean (*Mucuna pririens*)

Silver Leaf (*Desmodium triflorum*)

- The institute is a source of seed of pasture grasses and forage and pasture legumes for farmers wanting to improve their livestock production in Zimbabwe.
- The institute has set side at least **200 ha** for its seed production programmes. The yield of pasture seed is very low, hence the requirement for a large land area.
- The institute has been identified by the International Livestock Research Institute (ILRI) as having potential to supply pasture and forage legume seed to the SADC region, if additional investment is made. This was against the backdrop that:
    - ✓ Pasture seed is very expensive when imported from countries outside the African continent.
    - ✓ The sub-region has good sources of natural pasture grasses and legumes, whose productivity could be further enhanced through selection.
    - ✓ Regional supply of seed would be an additional source of revenue to complement the institute's funding.
    - ✓ Currently, Australia is the only **reliable** source of pasture seed and it exports to many countries around the globe. However, their prices are beyond the reach of most, especially African farmers.
- The demand for seed of pastures and forages by livestock producers has been increasing in recent years. The institute has made great effort to supply the seed within its current capability. However, optimum and increased seed production is hindered by lack of capital investment for purchase of appropriate machinery and equipment for planting, harvesting, cleaning and packing pasture seeds. This is an area that requires strategic investment, including installation of additional irrigation infrastructure for irrigating the pasture and forage seed crops.

6. Cattle and small ruminant breeds under conservation with utilization programmes

6.1 Goats and sheep under conservation for utilization

Boer Goats

Dorper Sheep

Boer Goat breeding stock:

- Ideally, the station can carry between 200 and 250 breeding females at any given time. This would result in about 100 gimmers and 100 bucks being sold to farmers each year.
- For the stocking mentioned above, at least 100 ha would be required for grazing; 20 ha would be under browse species and 20 ha would be required to grow maize for energy source for the stock.
- Currently, the Institute is not meeting demand for breeding stock from clients. Additional investment to upscale stock production would improve supply.
- The Institute is in the process of meeting due deligence for registration to be in the Boer Goat Breeders Society.

Dorper Sheep breeding stock:

- The Institute targets to maintain a flock of 200 ewes (breeding females) or more. This would allow for sale of at least 100 gimmers and 50 rams per year.
- There is very high demand for breeding stock by livestock farmers already rearing sheep and those wanting to embark on sheep farming.
- The current target is to retain as many females as possible for rebuilding the flock.
- 100 ha would need to be set aside, under improved pastures and hay production for the purpose. Another 25 ha for silage maize and grain is necessary to carry a breeding stock of at least 200 females.
- Further investments in feed resources in the future can increase breeding stock.

6.2 Dairy and beef cattle under conservation for utilization

Jersey Cattle Breed

Tuli Cattle Breed

Mashona Cattle Breed

Jersey breeding stock:

- The Institute maintains some Jersey dairy stock.
- It has cross bred some of them with indigenous breeds for supply to farmers who prefer crossbreds for environmental tolerance.
- Maintenance of about 50 purebred Jersey females would require at least 100 ha of grazing land, 20 ha for silage maize and 25 ha for maize grain production.

Tuli breeding stock:

- The institute maintains between 150 and 200 Tuli breeding females and some bulls.
- It is currently in the process of preparing the herd for registration with the ***Tuli Breeders' Society***.
- The target is to increases the number of purebred Tuli females to 300. This would in turn increase the off take of both heifers and weaner bulls.
- For this purpose, 1250 ha under natural rangeland and for improved pastures would be set aside.

Mashona breeding stock:

- A small number of Mashona breeding females is maintained at the farm.
- The Mashona breeding herd is already registered with the ***Mashona Breeders' Society***.
- The plan is to increase the Mashona breeding females to at least 100, on some 400 ha of land (natural and improved pastures).

7. Revenue Generation

Challenges of financing research would always be there. In real terms, the institute has experienced extreme reductions in funds allocated for both capital and recurrent expenditure. To mitigate against the latter, the institute has had to embark on income generating projects and some of the income-generating activities include:

.

a) Livestock production

- Weaner cattle production - 100 heifers and steers/year
- Milk production using crossbred and purebred Jersey animals
- Beef production - feedlot and cull animals from conservation herds

b) Pasture seed and hay production

- Forage legume and grass seed production and sale
- Improved pasture and rangeland legume and grass seed
- Tree seedlings
- Star grass and Katambora grass hay

c) Crop production

- Crop production includes maize and potato, the latter on having 3 production cycles per year, as well as green mealies under irrigation.

8. Institute's Strategic Support Services

- *Estate (farm) Section*: The section is responsible for the institute's infrastructure and asset maintenance and repair, provision of traction and transport services for research programmes and crop production activities under revenue generation programs.
- *Administration Unit*: The unit is responsible for institute asset management and procurement of goods and services, approved by Head after adjudication.
- *Accounts Unit*: The unit is responsible for accounting for the institute's finances, advisory to the Head of Institute on financial matters and payments for procured goods and services.
- *Human Resources Unit*: The unit is responsible for the human resources HR databases and tracking of the dynamics in same within the institute, as well as advisory to the Head.
- *Chemistry Section*: The unit is responsible for analysis of feed and plant samples from research experiments. Their strategic function is internal quality control and evaluation of research materials.

In addition to the support sections mentioned above, other key staff include research officers (degree holders), research technicians (degree and diploma holders), Agricultural Assistants (agricultural certificate holders) and Research and General Hands.

9. Conceptual note on up-scaling livestock breeding

Given the high demand for breeding stock and the institute as a centre of research and learning, there is need for robust and vigorous support to preserve the Grasslands Research Institute estate for the good of the nation.

- The institute has been contributing livestock genetics to farmers mainly in the "green zones" of Mashonaland Provinces, Manicaland Province and parts of the Midlands Province. Therefore, it is strategically positioned to service the needs of these Provinces.

- The institute is a potential source of increased livestock breeding stock at affordabale prices to farmers. Some of the land could, therefore, be deliberately set aside specifically for use in upscaling breeding and multiplication of livestock to support a **greater number** of livestock farmers with good genetics. This would initially require strategic Government investment, especially in the area of fencing, irrigation for pastures and other related livestock handling infrastructure.
- With additional investment, the institute is also strategically positioned for semen collection from elite bulls to support artificial insemination (AI) programmes for accelerated breeding.
- It is important to note that Grasslands is the only Government institute with purebred boer goat genetics at the moment. Therefore, it has the potential to become the centre of small ruminant research, with particular emphasis on **Boer** Goat and **Dorper** Sheep.

10. Concluding Remarks

- The size of the institute gives room for diverse livestock research programs to cater for a large client-base needs.
- The institute does have appropriate facilities for capacity building of farmers in collaboration with livestock extension agents (some of whose officers are located on Grasslands) and with farmer training organizations. However, financial support for re-capitalization and refurbishment of existing infrastructure is necessary for its continued function.

It is important to note that the success of the institute's programmes and indeed that of the other institutes largely depends on:

- The level of strategic financial investment:
  - ✓ For maintenance of infrastructure and for its regular replacement and
  - ✓ For sustained support for research
- Human resource in the correct numbers, experience and developed capacity to conduct research and to deliver appropriate advisory services.

(Attachment: Map of Grasslands Research Farm)