

# NATIONAL LIVESTOCK RESEARCH INSTITUTE

## 1. HISTORICAL BACKGROUND

For nearly eight decades, the present National Livestock Research Institute, under various names, has been well known as a centre for livestock research in Tanzania.

Founded by the Germans at the beginning of the 20th century .around 1905, it was used as a veterinary research centre up to the First World War. Unfortunately, not much was left behind to indicate the activities of the Germans, except for a Cattle Dip which was built in 1905. The dip is still in use and is believed to be the oldest in East Africa. In 1922 the British took over the station and set up a Veterinary Pathology Laboratory.



Nunge dip, the first in East and Central Africa

From 1924 to 1929 the main activities of the station included research into Rinderpest and Trypanosomiasis. Over 50,000 doses of anti-rinderpest serum was produced each year. The headquarters of the Department of Veterinary Science and Animal Husbandry moved from Dar es Salaam to Mpwapwa in 1929. It is also indicated that improvement of the indigenous cattle which originated from Iringa, Rungwe, Singida and Masailand through crossbreeding started in 1923.

From 1930 to 1938, animal husbandry research gained high status with the appointment of a biochemist and a research officer in pasture. A number of experiments in animal nutrition and pasture management at the station and in demonstration farms are documented in Annual Reports and in the East African Agricultural Journal. Animal breeding activities were expanded with the appointment of a geneticist in 1944. A Central Livestock Registry was inaugurated in 1951. At the same time the station took more interest in the overall development of the livestock sector and established a veterinary and animal husbandry training center. The Headquarters of the Veterinary Science and Animal Husbandry Division returned to Dar es Salaam in 1954, leaving a Chief Veterinary Officer at Mpwapwa in charge of the Research Laboratory, Central Breeding Station, Livestock and Pasture Research.



In the early years of the 20th Century the station built up an international reputation for research work into animal breeding, nutrition, pasture management and utilization. Domestic species kept at the farm included cattle, buffaloes, sheep, goats, pigs, poultry and horses

In 1962 there was a ministerial re-organization which grouped all experimental and research station covering agronomy, animal husbandry and fisheries under the Research Division. This station was re-designated Livestock Experimental Station.

In 1966 the livestock development policy emphasized introduction of up-graded cattle into the villages and the station concentrated on cattle breeding, The station was again re-designated Livestock Breeding Station. In the late 1960's the station was renamed a Research and Training Institute with a bias towards livestock development. From 1977 research and training were administered as separate institutes under a Director and Principal, respectively. The research institute was designated Livestock Production Research Institute and the same name was adopted by the newly formed Tanzania Livestock Research Organization (TALIRO) in July, 1981. In 1989, the organisation was dissolved and transferred again to the Ministry of Agriculture and Livestock Development.

## **2. Location:**

Latitude	:	60° 20'S
Longitude	:	36° 30' 30'E
Region	:	Dodoma
District	:	Mpwapwa
Sea Port	:	Dar es Salaam (430 km)
Bus stand	:	Mpwapwa (2km)
Railway Station	:	Gulwe (17 km)
Airport	:	Dodoma (112 km)
Airstrip	:	Iloilo (5 km)

## **3. CLIMATE AND VEGETATION:**

Though the station is situated in the semi-arid zone, hills which surround greater portion of the farm make the weather milder than in neighbouring areas. The Main Farm lies at an altitude of about 1, 100 m while Kiboriani Farm is about 1,750m above sea level. The Lower Farm at Iloilo lies at 900m above sea level.

The average annual rainfall is 660 mm and varies greatly in distribution and amount from year to year. Drought years with low erratic rainfall are frequently experienced. About 90 % of the rain falls between December and April, and there is usually a dry spell in February.

The average minimum temperature is 15.5°C, the coolest month being August (13.8°C). The average maximum temperature is 27.5°C, the warmest month being November (30.2°C).

The soils are sandy loams on the slopes and clay loams along valley bottoms. Soils are low in nitrogen and phosphorus but adequate in potassium. The pH of the top soil, ranges between 5.6 and 7.7 while that of the subsoil lies between 5.3 and 8.6. The natural vegetation consists of deciduous thicket of *Acacia*, *Cassia*, *Grewia*, *Commiphora* and *Lannea*. At altitudes above 1,200m there is fairly open *Brachystegia* woodland with inter-spersed grass.

#### **4.0 FARM AREA**

The institute has three farms for research purposes with a total area of 7,000 ha.

The size of the farms is as follows:-

Main farm	-	5,080 ha.
Kiboriani	-	1,800 ha
Ilolo	-	120 ha

#### **5. RESEARCH ACTIVITIES**

The Institute carries out both basic and adaptive research. The adaptive research activities are undertaken using participatory methods. Some of the research activities carried out under various disciplines are summarised below:

##### **5.1. Dairy Cattle Research**

- i) Development of improved breeds to meet quality requirement of various livestock enterprise systems
- ii) Improvement of gaps identified by clients through selective breeding
- iii) Characterisation of animal genetic resources
- iv) Formulate a series of cost effective and complementary technical packages to maximise farm profits from milk
- v) Promote the integration of dairy production into mixed farming systems
- vi) Progressively improve the local cattle in respect of the traits most relevant for small holder profitability in the target environment
- vii) Multiplication of Mpwapwa breed cattle to meet the demands of farmers
- viii) Improved dissemination and communication of research results to livestock keepers in collaboration with community level NGOs and rural organizations



*Mature Mpwapwa Cow and Bull*

## **5.2. Beef Cattle Research**

- i) Improving livestock nutrition to meet acceptable growth rates and meet quality
- ii) Promotion of commercial beef cattle production systems (feedlots, fattening units)
- iii) Evaluation of production potential of indigenous cattle for beef production under improved husbandry
- iv) Evaluation of causes of reproductive wastages, low performance and mortalities in beef cattle
- v) Development of appropriate beef cattle breeding methods for agro-pastoralists
- vi) Development of low cost packages to improve animal health, hygiene and sanitation
- vii) Development of appropriate drought power technologies

## **5.3. Pastures and Forages Research**

- i) Introduction and evaluation of new forage species
- ii) Forage genetic material collection, development evaluation and conservation
- iii) Integration of feed and forage production into existing farming systems
- iv) Agronomic and Evaluation of grass/legumes mixtures
- v) Production and multiplication of pastures and fodder crop seeds for research and development
- vi) Development of tree and shrubs for multiple use in communal grazing land
- vii) Development and promotion of forage conservation and utilization technologies
- viii) Documentation and dissemination of research findings
- ix) Development and promotion of Soil and water conservation technologies
- x) Studies on weed control in pastures



#### **5.4. Range and Environmental Management**

- i) Communal grazing lands management and utilization (grazing systems, stocking rates, carrying capacity)
- ii) Ecological studies (forage value, species)
- iii) Developing and promoting livestock early warning systems for disaster preparedness
- iv) Soil and water conservation (water harvesting, water spreading and pitting)
- v) Range condition and trend monitoring and evaluation
- vi) Carrying out studies into pastoral systems and integrity
- vii) Studies into Indigenous knowledge in rangeland management
- viii) Control of noxious plants in rangelands

#### **5.5. Small Ruminants Research**

- (i) Development of low cost strategic dry season supplementation of small ruminants with locally available feed resources
- (ii) Development of proper technologies for use of communal pastures by small holders and agro-pastoralists.
- (iii) Consolidation of present breeding activities for dual-purpose goats and establishment of open nucleus breeding system.
- (iv) Evaluation of nutrient requirements of different small ruminants breeds and breed types
- (v) Evaluation of effects of seasonal changes on feed availability and quality on productivity of small ruminants.
- (vi) Improvement of husbandry and management systems of small ruminants for different farming systems
- (vii) Small ruminants research in range management and utilization
- (viii) Development of appropriate breeding methods for small holder systems
- (ix) Development of low costs packages to improve animal health, hygiene and sanitation.
- (x) Identification, Characterization and conservation of different strains of small ruminants from various agro-ecological zones
- (xi) Multiplication of Malya goats and other breeds



*A Malya type (Blended) Doe with her twin kids*

## **5.6. Non and Pseudo Ruminants Research**

- (i) Collection of important qualitative information on deferent indigenous poultry, pigs, rabbits and guinea pigs found in the country
- (ii) Identifying production ability and physical characteristics of each breed/type under different management systems
- (iii) Improvement of feeding and housing system of non and pseudo ruminants
- (iv) Improve and promote disease control methods to non ruminants
- (v) Develop cost effective feed packages using locally available feed materials
- (vi) Studying the performance traits of crossbreeds including fertility and carcass quality for commercial marketing.
- (vii) Promotion Artificial Insemination (AI) technique for poultry improvement.
- (viii) Development and Promote of Dual purpose Tanzania chicken.

## **5.7 Socio-Economics and Innovation systems Research**

- ii) Carrying out adoption and uptake studies on livestock technologies
- iii) Undertake livelihood studies on various livestock production systems
- iv) Development and Promotion of participatory livestock research approaches
- v) Carrying out studies on livestock and livestock products marketing including value addition and market information
- vi) Developing and promoting participatory M&E approaches
- vii) Gender assessment on livestock technologies
- viii) Promotion of farmers, dynamics and local knowledge systems
- ix) Case studies on impact of HIV Aids on livestock systems
- x) Develop and fine-tune livestock production systems
- xi) Carry out knowledge management studies

### **5.7.1 Information, Documentation and liaison**

- (i) Determining technological gaps in technology packages
- (ii) Drawing implications for various stake holders
- (iii) Documentation and dissemination of research packages
- (iv) Establishing and fostering donor relations
- (v) Publication of available research findings
- (vi) Establish and maintain linkages with other stake holders
- (vii) Identify and ensure access to scientific information for livestock

- research
- (viii) Organise exhibitions on livestock technologies
- (ix) Maintain, update and manage information technology facilities
- (x) Maintain and update staff and technology data bases

## 5.6 Animal Health

This is mostly a service department which also complements animal based research activities

- (i) Control and treatment of animal diseases such as
  - Tick borne diseases
  - Newcastle disease and respiratory diseases of poultry
  - Ecto and endo parasites
- (ii) Accessing and enforcing various veterinary rules and regulations
- (iii) Collection and documentation of indigenous knowledge on ethno-veterinary including ethno-botany
- (iv) Liaison with relevant animal disease research institutes with respect to animal disease research.
- (v) Document and disseminate research findings
- (vi) Advising the director on matters related to animal diseases control



*Tephrosia vogelii* shoot used for treatment and prevention and treatment

### 6.0 ON GOING RESEARCH PROJECTS AT NLRI MPWAPWA IN 2006/2007

Title: 1	Breeding and selection of Mpwapwa cattle by using Open Nucleus Breeding System (ONBS)
Contact	DR. J.M.N. BWIRE and MKONYI, J.I. <a href="mailto:imbwire@hotmail.com">imbwire@hotmail.com</a>
Title: 2	Mpwapwa Breed Cattle Multiplication
Contact	DR. J.M.N. BWIRE and MKONYI, J.I. <a href="mailto:imbwire@hotmail.com">imbwire@hotmail.com</a>
Title: 3	Breeding and use of improved management practices for optimum utilization of Tanzania Shorthorn Zebu (TSZ) cattle in Central Tanzania
Contact	J.I. MKONYI <a href="mailto:mkonyiji@yahoo.co.uk">mkonyiji@yahoo.co.uk</a>
Title: 4	The potential of watermelon ( <i>Citrus vulgaris</i> ) as a source of water and protein supplements for dairy cows in the farming system of Central Tanzania

Contact	DR. J.M.N. BWIRE <a href="mailto:imbwire@hotmail.com">imbwire@hotmail.com</a>
Title: 5	Breeding and Selection of Mpwapwa Cattle On-station
Contact	D.F. MASAO and MKONYI J.I. <a href="mailto:dfmasao@yahoo.co.uk">dfmasao@yahoo.co.uk</a> Or <a href="mailto:mkonyiji@yahoo.co.uk">mkonyiji@yahoo.co.uk</a>
Title: 6	Establishment of a Feed Resources database for East and Central African Countries
Contact	Prof. MTENGA, L.A. and Dr BWIRE, J.M.N. <a href="mailto:imbwire@hotmail.com">imbwire@hotmail.com</a>
Title: 7	Characterization and performance evaluation of local chicken in semi arid Central Tanzania for improvement of village chicken.
Contact	WILFRED G. MUNISI <a href="mailto:wilfredmunisi@yahoo.com">wilfredmunisi@yahoo.com</a>
Title: 8	Introduction of improved pig breeds and their management in Kongwa and Mpwapwa districts
Contact	WILFRED G. MUNISI <a href="mailto:wilfredmunisi@yahoo.com">wilfredmunisi@yahoo.com</a>
Title: 9	On station breeding and selection of blended goats
Contact	WILFRED G. MUNISI <a href="mailto:wilfredmunisi@yahoo.com">wilfredmunisi@yahoo.com</a>
Title: 10	Feeding and Management Strategies for Rural Poultry Production in Central Tanzania
Principal Investigator	EZEKIEL H. GOROMELA <a href="mailto:egoromela@yahoo.com">egoromela@yahoo.com</a>
Title: 11	Pastures and Fodder crops introduction, evaluation and forage seed studies
Contact	MWILAWA, A.J. <a href="mailto:mwilawaa@yahoo.com">mwilawaa@yahoo.com</a>
Title: 12	Rangelands Resource Utilisation among the agro-pastoralists in Central Tanzania
Contact	MWILAWA, A.J. <a href="mailto:mwilawaa@yahoo.com">mwilawaa@yahoo.com</a>
Title: 13	Forage Diversity and their potential in the drylands of Sukuma traditional Reserve grazing lands in Meatu district Shinyanga region, Tanzania
Contact	MWILAWA, A.J. <a href="mailto:mwilawaa@yahoo.com">mwilawaa@yahoo.com</a>
Title: 14	Strategies for Controlling the weed <i>Astripomoea hyoscyamoides</i> to Improve Pastures Productivity in semi-arid rangelands of central Tanzania.
Contact	TEMU, V.W.K. <a href="mailto:kisingov@hotmail.com">kisingov@hotmail.com</a>
Title: 15	Strategies to sustain the diversity of forage trees and shrubs in communal grazing lands of central Tanzania
Contact	TEMU, V.W.K. <a href="mailto:kisingov@hotmail.com">kisingov@hotmail.com</a>

Title: 16	Integrated Nutrient Management Strategies for Sustainable Crop-Livestock Production Systems in the Eastern and Central Africa Region
Contact	JOLLY KABIRIZI (REPRESENTED BY TEMU V.W.K. IN TANZANIA) <a href="mailto:kisingov@hotmail.com">kisingov@hotmail.com</a>
Title: 17	Feeding Strategies for Improving the Use and Management of Draught Animals by Small-scale Farmers in Central Tanzania
Contact	MLAY J.A. <a href="mailto:mlayjohn2@yahoo.com">mlayjohn2@yahoo.com</a>
Title: 18	Ensuring rural water supply and sanitation through sand dams construction at Kisokwe village (Mpwapa district-Dodoma region)
Contact	LEO JOSEPH MZERU AND MLAY J. <a href="mailto:mlayjohn2@yahoo.com">mlayjohn2@yahoo.com</a>
Title 19	Characterization of undesirable substances in the ruminant food chain in the Lake Victoria Basin on the basis of biophysical and anthropogenic factors
Contact	D.M. Komwihangilo <a href="mailto:dkomwihangilo2001@yahoo.com">dkomwihangilo2001@yahoo.com</a>
Title 20	Strengthening goat keeping associations in mixed production systems
Contact	D.M. Komwihangilo <a href="mailto:dkomwihangilo2001@yahoo.com">dkomwihangilo2001@yahoo.com</a>