



**United Republic of Tanzania**  
Ministry of Livestock and Fisheries



## **NATIONAL COMPACT STRATEGIES AND ACTION PLAN TO IMPLEMENT GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES IN TANZANIA**



**AFRICAN UNION**  
**INTERAFRICAN BUREAU  
FOR ANIMAL RESOURCES**



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## Foreword



Tanzania is endowed with diverse livestock genetic resources including various breed-types/strains and ecotypes of cattle, sheep, goats, chicken pigs etc. that contribute to income and food security at national and household levels. Various livestock species also have many socio-cultural contribution and the animals are a significant source of employment across various value chains.

Following the development of the Global Strategy for the management of Farm Animal Genetic Resources (AnGR), FAO prepared Primary Guidelines for the development of national animal genetic resources management plans to help countries initiate the development and implementation of management programmes for their animal genetic resources for food and agriculture. Threat to biodiversity, caused by human activities and resulting in the extinction of species, destruction of ecosystem and habitat, and loss of genetic diversity within species, led to adoption of the Convention on Biological Diversity (CBD) of which Tanzania is among the signatories.

The Global Strategy established a framework for developing national, regional and global policies, strategies and action. In this regard, FAO provided support to assist countries in developing and strengthening capacity to manage their AnGR. It is for this reason that National Strategy and Action Plan (NSAP) for Animal Genetic Resources becomes vital to optimize the economic benefits attainable from these Animal Genetic Resources (AnGR) while taking care of those species and breeds that may be at risk for conservation. This document is step toward fulfilling this noble international obligation. Contained herein is a National Compact Strategies and Action Plan (NCSAP) for Tanzania that will guide the implementation of the Global Plan of Action (GPA) for Animal Genetic Resources.

I sincerely hope that this NCSAP will provide guidance and the direction in the implementation of the livestock development policy in the country at the same time giving due consideration to conservation and sustainable utilization of AnGR. I would like therefore, to thank all the stakeholders involved in the preparation of this NCSAP. My special thanks to the National Advisory Committee members for coming up with this important document. I believe that this strategic document will bring together all stakeholders to play their part towards conservation activities and development of animal genetic resources in Tanzania. Finally, I thank AU-IBAR for technical and financial support and FAO for guiding member countries in coming up with National Strategy and Action Plan (NSAP).

Hon. Luhaga Joelson Mpina (MP)  
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## **Abbreviations**

|         |   |                                                         |
|---------|---|---------------------------------------------------------|
| AI      | = | Artificial Insemination                                 |
| AnGR    | = | Animal Genetic Resources                                |
| AU-IBAR | = | African Union- Interafrican Bureau for Animal Resources |
| BHP     | = | Black Headed Persian                                    |
| CAnGR   | = | Council of Animal Genetic Resources                     |
| DAFCO   | = | Dairy Farming Company                                   |
| DPM     | = | Directorate of Livestock Production and Marketing       |
| DPP     | = | Directorate of Policy and Planning                      |
| DPs     | = | Development Partners                                    |
| DRTE    | = | Directorate of Research, Training and Extension         |
| FAO     | = | Food and Agriculture Organization                       |
| GDP     | = | Gross Domestic Products                                 |
| GOT     | = | Government of Tanzania                                  |
| MLF     | = | Ministry of Livestock and Fisheries                     |
| MOET    | = | Multiple Ovulation and Embryo Transfer                  |
| NABC    | = | National Animal Breeding Committee                      |
| NAC     | = | National Advisory Committee                             |
| NAIC    | = | National Artificial Insemination Centre                 |
| NCSAP   | = | National Compact Strategies and Action Plan             |
| NGOs    | = | Non-Governmental Organizations                          |
| ONBS    | = | Open Nucleus Breeding System                            |
| PPP     | = | Public Private Partnership                              |
| SWOC    | = | Strength, Weakness, Opportunities and Challenges        |
| TALIRI  | = | Tanzania Livestock Research Institute                   |
| TDB     | = | Tanzania Dairy Board                                    |
| TMB     | = | Tanzania Meat Board                                     |
| TSZ     | = | Tanganyika Shorthorn Zebu                               |

## **Executive summary**

Tanzanian is rich in diversity of Animal Genetic Resources (AnGR) which is crucial for economic development and enhanced livelihood of her people. The livestock sector whose growth rate is 2.8 contributes to 6.9% of the GDP of which 40% (2.76) is derived from beef, 30% (2.07) is derived from dairy and the remaining 30% (2.07) is derived from other livestock sub sectors such as small ruminants, poultry and pigs. According to the available statistics, 90% of the livestock population in the country is of indigenous type mostly kept under low input, low output production systems. However, despite their low productivity potential, indigenous livestock species have resistance and resilience traits that help them to survive well in local environments. Hence, it is imperative to put in place national strategies for characterization, inventories, conservation and sustainable utilization of the Tanzanian animal genetic resources. The Vision of this NSAP is to have progressive livestock sector founded on sustainable development and utilization of Animal Genetic Resources and the goal is to guide conservation and sustainable utilization of AnGR and its contribution to the national economy that will make improved livelihood of the people in Tanzania. Following the development of the Global Plan of Action (GPA) that is coordinated by the Food and Agriculture Organization of the United Nations (FAO), countries, were required to prepare and implement National Strategy and Action Plan (NSAP) for Animal Genetic Resources. The NSAP for Animal Genetic Resources is meant to guide the management, conservation and sustainable utilization of the Country's Animal Genetic Resources and shall be used to assess risk status of indigenous breeds and assist to address the threat of extinctions due to genetic erosion caused by indiscriminate crossbreeding and or upgrading programmes. In Preparing the Tanzanian National Strategy and Action Plan (NSAP) for Animal Genetic Resources, the Ministry of Livestock and Fisheries through the Directorate of Research, Training and Extension (DRTE) as the Focal Point, identified and facilitated the engagement of the key stakeholders to steer up the process. A Taskforce was formed to develop and share the draft NSAP document to stakeholders for their reviews. It was agreed that the implementation of the National Strategy and Plan of Action (NSAP) for Animal Genetic Resources will be overseen by the Ministry of Livestock and Fisheries while, the National Advisory Committee (NAC) will be responsible for technical, advisory and Supervisory role. In addition a National Coordinator for Animal Genetic Resources will be appointed by the Ministry and his/her roles will be among others facilitation, coordination and carry out day to

day implementation of the National Strategy and Action Plan. The proposed strategy contained herein, will address the following strategic priority areas (i) Characterization of existing breeds and monitoring of trends and associated risks (ii) Sustainable use and development of AnGR (iii) Conservation systems and (iv) Institutional framework and capacity building.



## 1.0 Background

Tanzania has diverse domestic Animal Genetic Resources (AnGR) that forms an important resource for economic development and enhanced livelihood. Out of 4.9 million agricultural households, about 36% keep livestock (35% are engaged in both crop and livestock production while 1% are purely livestock keepers) and the sector grew at the rate of 2.8 per annum (URT, 2017a). It is estimated that the livestock sector contributes about 6.9% of the GDP, of which 40% (2.76) comes from beef, 30% (2.07) from dairy and the remaining 30% (2.07) from other livestock sub sectors such as poultry, small ruminants and pig production (URT, 2018). Besides its share to the GDP, the livestock sector plays an important role in food security as most of its products are consumed in the country, acts as an important source of animal protein and also contributes raw materials for agro-industries and employments (URT, 2017b).

It is reported that Tanzania has a livestock resource base that include about 30.5 million cattle, 18.8 million goats, 5.3 million sheep, 38.2 million indigenous chickens, 36.6 exotic and crossbred chickens, 1.9 million pigs, 135,737 rabbits, 652,000 cavies and 595,160 donkeys (URT, 2018). More than 90% of the livestock population in the country is of indigenous types (Annex 1), kept under smallholder, pastoralism and agro-pastoralism production systems for ruminants. Poultry and pigs are either raised under intensive, semi-intensive and extensive production systems. Despite this large resource, per capita consumption is only 47 litters of milk, 15 kg of meat and 106 eggs (URT, 2018). These figures are lower than those recommended by FAO of 200 litres of milk, 50 kg of meat and 300 eggs per capita consumption for human growth and development (FAO, 2018). The low levels of consumption are mainly due to low purchasing power, socio-cultural beliefs, inadequate knowledge on nutritional benefits and low productivity of the livestock strains kept. However, according to market demand and increased need for high productivity, most of the indigenous livestock species are at risk of extinction due to genetic erosion caused by indiscriminate crossbreeding and or upgrading programmes. The threat to disappearance of adaptive indigenous breeds is further heightened due to disease outbreaks, disasters and other emergencies like war, famine, drought and the degradation of grazing land (FAO 2007 cited in FAO 2015).

Although, the Tanzania indigenous livestock are of low genetic potential in terms of growth rate, body size, milk production, egg production and other production attributes they merit well in terms of adapting to local environment which is characterized by seasonal and inadequate supply of quantity and quality feed and water resources. Resilience to environmental challenges and community preferences are major criteria that should be considered in animal genetic resources (AnGR) improvement that focus on breeding and conservation. Notwithstanding, conservation and utilization of animal genetic resources in Tanzania is hampered by inadequate documentation on productivity, population status, threats and inadequate recognition of the indigenous people who developed and maintained the breeds.

Recent increase in human population and urbanization in Tanzania has increased demand of animal products. This has prompted more efforts to increase livestock production efficiency which has resulted into rapid changes in production systems through intensification and industrialization. There is need to coherently address the potential challenges to the livestock sector and urgently put in place enabling environments (policies and legal frameworks) in order to improve availability of more productive livestock species that can be marketed internally and externally.

Thus, the rationale for preparation of Tanzania National Strategy and Action Plan for Animal Genetic Resources recognizes the significant role of animal genetic resources for enhanced national food security and overall economic development of the country. Furthermore, this action plan is a country commitment in meeting the Global Plan of Action (GAP) for animal genetic resources as per the Interlaken declaration for animal genetic resources. Strategic priorities and actions contained in this document are in line with FAO guidelines.

### **1.1 Situation Analysis of livestock production**

As described above, Tanzania is endowed with large and diverse animal genetic resources. However, the current status of AnGR is constrained due to inadequate documentation. The following sub-sections highlight the situation of important livestock species based on various documented literatures.

### 1.1.1 Cattle Production

The genetic potential for milk and meat production of the Tanzania Shorthorn Zebu (TSZ) that makes about 97% of the cattle population in the country is generally low. Type of cattle kept under pastoralism and agro-pastoralism are mainly indigenous of different strains namely: Maasai, Fipa, Iringa Red, Singida White and Ankole which are of medium sizes (300 - 400 kg mature body weights) while Sukuma, Gogo, and Tarime are of small size (250 - 300kg). The main breed kept in ranches is Boran whose mature weight ranges from 400 to 600 kg. Under moderate management system, the indigenous cattle produce 300-500 litres of milk per lactation whereas a steer of four years of age weighs between 250 and 300 kg. However, F<sub>1</sub> crosses between *Bos taurus* dairy breeds (Friesian Ayrshire and Jersey) to the TSZ yield between 2000-4000 litres of milk per lactation (Msanga *et al.*, 2009). Comparatively, Friesian crossbred males weigh between 350-450 kg whereas crosses of Boran to beef breeds like Angus, Charolais and Chianina weigh between 450 and 500 kg at an age of four years under Tanzanian ranching environment (Said *et al.*, 2003).

Current population of dairy cattle is 783,000 producing about 30% of total country milk production of 2.4 billion litres per year (URT, 2018). The rest (70%) of milk production comes from the national indigenous herds. To reduce the gap in milk supply there has been attempts aimed at promotion of exotic dairy cattle in area where the environment is conducive. The main breeds that were or are being utilized as pure or for production of crossbreds include: Friesian, Jersey and Ayrshire. Moreover, most of the dairy cattle are kept under smallholder production system in mixed farming, or peri-urban areas under zero grazing system. There is only a few medium to large scale farms owned by commercial farmers or by the public. Thus, to boost milk production and consequently increase per capita consumption of milk there is an urgent need to have strategies that will increase the size of the dairy herds, which should be coupled with improved management, services delivery and marketing.

With regard to meat production, the sector is also dominated by the indigenous cattle strains (TSZ and Ankole). Together they contribute about 53% of a total red meat produced in the country whereby about 80% of these cattle are kept in the agro-pastoral system, while 14% are in the pastoral system. The remaining 6% constitutes commercial beef cattle and their crosses

(URT, 2017b). According to Said *et al.* (2003), there is a possibility of achieving market weights of 350-450kg and 450-800kg from male crossbreds of Friesian and Boran at four years of age, respectively when the indigenous dams are crossed with exotic beef breeds like Angus, Charolais and Chianina under Tanzanian ranching environment.



**Plate 1:** A Farmer Ploughing his field using an ox driven plough (driven by Cattle of indigenous type) in Mpwapwa, Dodoma, Tanzania.



**Plate 2:** An Ankole bull posing for a photo during the Indigenous Livestock Show at the Nane Nane Agricultural Exhibition Ground, Nzuguni, Dodoma, Tanzania.

### **1.1.2 Goat and Sheep production**

Goats and Sheep farming is an important economic activity in the country being practiced by about 30 percent of the agricultural households. The average flock size is 9 for goats and 7 for sheep keeping households. About 99.6 percent of the goats and sheep are of indigenous subtypes such as Red Maasai, Gogo and East Africa Black Head in case of sheep while there are Gogo White, Pare White, Ujiji, Maasai, Newala and Sonjo Red populations. Among the ruminants, goats and sheep are more widely distributed and adapted than other ruminants to many agro-ecological zones in the country.

At the moment, there is inadequate supply of goat and sheep meat, to meet the demands of both local and external markets. Constraints to meat production from goats and sheep are associated with their poor genetic potential in terms of growth and poor nutrition especially in the dry season. These constraints result into lower market weights of 20-25 kg at 4-5 years of age compared to 40 -50 kg at 1.5 – 2.0 years of age for improved breeds like the Dorper sheep and Boer goats (Shirima *et al.* 2014). The poor management from birth to market age are the results of lower quantity and poor quality of meat produced from small ruminants which do not suffice the income and nutrition to the livestock keepers (Shirima *et al.* 2013). The main economic value of Goats and Sheep are Meat, Milk, Skin, Manure, Biogas and traditional socio-cultural value.

### **1.1.3 Poultry Production**

According to URT, 2018, poultry contributes about 1% of the national GDP. Out of 4.9 million agriculture households, 3.8 keep poultry. Total poultry population in Tanzania is estimated at 75.8 million out of which, 38.2 million are indigenous chickens which are kept mainly under extensive production system while 36.6 million are commercial chickens mainly kept under intensive and semi intensive production systems. Indigenous chickens contribute 100% of eggs eaten in villages and 20% of those in urban areas. To a large extent commercial poultry production is done in urban and peri-urban areas. The main limiting factor in local chicken production is their low genetic potential whereby they produce 40 – 60 eggs per year compared to 200 – 300 for improved types. The main genetic limitation to commercial poultry is low survival rate, high demand of feeds, housing, health care and lack of proper information on the

breeding systems. The main economic values of Poultry are Meat, Eggs, feathers Manure and Traditional Socio-cultural value.

#### 1.1.4 Pig Production

The majority of pigs are kept under traditional management and some few which are highly productive are kept under improved management systems. Most of the pigs are crosses of Large White, Landrace, Saddleback, Hampshire and others including non-descript types. Small-scale subsistence farmers keep the majority of pigs as a backyard activity in mixed farming systems, mainly depending on forages and supplements. The performance of pigs in this system is generally low, as exemplified by the average slaughter weight of 50 – 70 kg at the age of one year against 70 – 90 at age of 9 months for improved ones. Inbreeding and lack of proper recording have resulted to poor performance of the existing pig populations. The main economic values of Pigs are Meat, Milk, Manure and Biogas.



**Plate 3:** Some mentioned breeds of different livestock species

### **1.1.5 Other livestock species**

#### **1.1.5.1 Donkeys**

There are about 595,160 donkeys in Tanzania, which generally comprise of one breed namely Maasai donkey breed. Donkeys are more prominent in pastoral and semi-arid areas of Tanzania and used as beast of burden. In recent past there has been a surge in demand for meat and almost 280 tons of donkey meat is reported to have been exported (URT, 2018). Given the poor reproduction rate, such a demand poses a threat to the donkey population and therefore, a need to seriously regulate the donkey meat business if we have to protect the specie.

#### **1.1.5.2 Water Buffalo**

The population of water buffalo is 100 and comprising of Egyptian breed (FAO, 2006). They are kept intensive system under Government Livestock Multiplication farm (Mabuki) and some few private farms (ASAS-Iringa, Taji Mohamed-Morogoro and Milk Com dairy farm-Dar es Salaam). The main use of Water buffalo is Meat, Milk, Hides, Manure, Biogas and drought power.

#### **1.1.5.3 Camel**

In Tanzania, the population of camel is relatively small. However, camels are used in recreational areas whereby in some communities its meat is regarded as delicacy. In addition, camels have religious value especially among the Muslim communities.

#### **1.1.5.4 Rabbits**

The total population of Rabbits in the country is 135,737 (URT, 2008). They are kept under intensive production systems. Main breeds are Chinchilla, New Zealand, American and Flemish Giant and crosses. The main uses are for meat, garden manure and furs. Also, rabbit's furs are perceived to have medicinal value in healing of bunt wounds resulting from burns. Moreover, their urine has been regarded to have herbicidal effect to horticultural crops.

#### **1.1.5.5 Cavies**

The total population of cavies in the country is 652,000 (URT, 2012). They are kept under intensive production system. Apparently, characterization has not been done hence any defined breed. The main uses of cavies include meat, manure and furs.

### **1.2 Rationale/Justification**

Tanzania has been collaborating with UN Agencies (FAO and UNDP), the CGIAR institutes, African Union (AU), SADC and other international organizations in the field of animal genetic resources management and development. Up to 1992 before the UN Convention on Biodiversity the government policy was geared towards importation of live animals and semen of exotic breeds for either upgrading the indigenous breeds or keeping them as purebred in state farms. This was because improvement of indigenous breeds through selection was perceived to take too long. This resulted into large numbers of crossbred or high-grade animals in some highland areas, including Kilimanjaro, Tanga, Iringa, Mbeya and Kagera. Likewise, several Donor agencies, Non-Governmental Organizations (NGOs) and Faith Based Organizations (FBOs) also participated in direct importation of purebred cattle, goats, poultry, pigs and rabbits for small scale dairy and meat development projects for poverty reduction and improvement of nutritional status of the rural households.

#### ***Work done and available breeding and conservation institutions***

Progress and annual reports have indicated some initiatives done by the pre-colonial and post-colonial governments to develop animal genetic resource diversity in last 60 to 70 years. Some of the attempts include the establishment of two Artificial Insemination (AI) centres, in northern and the northwest, Tanzania. These are the National Artificial Insemination Centre (NAIC)) located in Arusha and the Butiama Artificial Insemination Centre in Mara region. These centres were established for production and distribution of improved semen.

Despite the reported initiatives, the conservation of animal genetic resources, whether *in-situ* or *ex-situ*, little efforts have been put in evaluation and conservation of the indigenous breeds. Breeds such as e.g. Jiddu cattle originally from Somalia were earlier imported for milk production for sisal settlers in Tanga. This breed and others such as Chagga, Mkalama dun and



Mpwapwa have been reported to be at risk. The former has disappeared completely. Currently, the government through the Tanzania Livestock Research Institute (TALIRI) has extended its supports in-situ characterisation and conservation projects for cattle, goats, sheep and chicken. It is only a handful of the local breeds that are being evaluated on station, thus efforts need to be extended for other breeds that are of economic and social importance.

It is from this background that adequate and appropriate attention to *in-situ* and *ex-situ* conservation management and improvement of AnGRs in Tanzania needs to be strategized. Available infrastructure including the National Artificial Insemination Centre (NAIC) could be used for *ex-situ* conservation of semen, ova and embryos. While, the Livestock research centres and livestock multiplication units existing in the country could be used as source of breeding stock to support initiation of *in-situ* conservation and improvement of animal genetic resources in different communities.

There is a need also to develop capacities for undertaking both *in-situ*, *ex-situ in-vitro* and *ex-situ in-vivo* conservation by establishing infrastructure and training of human resources including experts in legal issues. At this end there is a strong need for international collaborations to draw expertise and experience elsewhere.

## **2.0 The National Strategy**

### **2.1 The process of preparing the Tanzania National Strategy and Action Plans**

FAO has done substantial work in the field of AnGR management in a broad approach – addressing technical, policy and institutional issues, and taking into account interactions with other aspects of natural resource management, production system dynamics and general economic development. The State of the World's Animal Genetic Resources for Food and Agriculture identified significant gaps in capacity to manage AnGR, particularly in developing countries. In response, the international community adopted the Global Plan of Action (GPA) for Animal Genetic Resources at the International Technical Conference on Animal Genetic Resources for Food and Agriculture held in Interlaken, Switzerland from 1<sup>st</sup> to 7<sup>th</sup> September. 2007. The plan included 23 strategic priorities for action grouped into four main priority areas that are characterization and monitoring; sustainable use and development; conservation; and

policies, institutions and capacity-building. The Commission on Genetic Resources for Food and Agriculture was formed to oversee, monitor and evaluate the implementation of the GPA. It also adopted a funding strategy for the implementation of the Global Plan of Action for Animal Genetic Resources which aims to enhance the availability, transparency, efficiency and effectiveness of the provision of substantial and additional financial resources, and to strengthen international cooperation to support and complement the efforts of developing countries and countries with economies in transition in the implementation of the GPA.

FAO also developed a set of technical guidelines, and provides technical assistance and training to support capacity-building and action at country level. Through this support, Africa Union-Inter-African Bureau for Animal Resources (AU-IBAR) took initiatives to guide African National Coordinators on development of National Strategies and Action Plans (NSAPs) in a Regional training workshop that was held at Giraffe hotel, Dar es Salaam, Tanzania from 13<sup>th</sup> to 15<sup>th</sup> August 2015, within the framework of the implementation of AU-IBAR project on “Strengthening the capacity of African Countries on Conservation and Sustainable Utilization of Animal Genetic Resources in Africa”.

Historically, early attempts to characterize livestock in the country were done in the 1920's, while initiatives for coordinating AnGR started way back in the 1990's when characterization work was done at Mpwapwa Livestock Research Centre. The appointment of the first coordinator (Dr. J. Msechu) was done in 2000s followed by Dr. S. M. Das who was appointed in 2005. Dr Das brought a concept of implementation of GPA as advocated by FAO. In 2013, the coordination fell under Dr. Y. Msanga and he was instrumental in establishing the first National Advisory Committee (Annex 2) in 2014 as per Interlaken declaration. The NAC members constituted various officials from the Ministry of Livestock and Fisheries (MLF), Tanzania Livestock Research Institute (TALIRI), Sokoine University of Agriculture (SUA) and National Artificial Insemination Centre (NAIC). Currently, the national coordination is headed by Dr. H. Mruttu who took the position in 2015.

The process of preparing the NSAP for AnGR which was facilitated by AU-IBAR and involved meeting with several stakeholders at different levels. The stakeholders involved livestock

keepers, government officials, policy makers, researchers and academicians and people from non-governmental organizations and private institutions. The exercise was preceded by a baseline survey and establishment of expert and *ad hoc* group (Annex 3) for the initial preparatory stages. The Stakeholder's Meeting was convened from 26<sup>th</sup> to 28<sup>th</sup> November, 2018 with the aim of reviewing and improving the draft NSAP document.



**Plate 4:** Stakeholder meeting- 26<sup>th</sup>-28<sup>th</sup> Nov 2018

## **2.2 Vision, goal and objectives**

### **Vision:**

To have a progressive livestock sector founded on sustainable development and utilization of animal genetic resources.

### **Goal:**

To guide conservation and sustainable utilization of AnGR and its contribution to the livelihoods of the people in Tanzania and the national economy at large.

### **Objectives**

- i) To carry out a comprehensive inventory, characterization and monitoring of trends and associated risks of livestock breeds for all species existing in the country, including their production systems;
- ii) To promote sustainable use of AnGR through adoption of modern technologies and indigenous knowledge;
- iii) To develop a comprehensive framework and ensure conservation of AnGR;
- iv) To influence policy and strengthen institutions capacity in terms of technical and infrastructure.

## **2.3 SWOC Analysis for AnGRs in Tanzania**

A SWOC analysis (Strength, Weakness, Opportunities and Challenges) was done to elucidate status quo that will inform in the formulation of NSAP as summarized below.

### **2.3.1 Strengths on management and development of AnGR**

- Availability of abundant arable land, water and ample feed resources
- Large AnGR diversity which are adapted to the local environment
- , Rich local knowledge that is used in livestock management
- Availability of functional multiplication units, training and research institutions and artificial insemination center
- Availability of trained and skilled personnel

- Existing farmers association
- Conducive policy environments
- Increased involvement/collaboration of Public Private Partnership (PPP)
- Availability of financial institutions

### **2.3.2 Weaknesses**

- Insufficient information on the management and performance of different breeds/strains
- Inadequate and costly facilities for genetic materials delivery
- Weak extension services
- Lack of National Breeding Policy to provide guidance on management and utilization of AnGRs
- Weak national livestock recording system
- Uncoordinated and lack of continuity of genetic improvement programmes
- Socio-cultural limitations towards livestock improvement
- Inadequate advocacy on importance of maintaining indigenous breeds

### **2.3.3 Opportunities**

- Documented and availability of indigenous breeds and strains: cattle (Iringa Red, Maasai, Fipa, Sukuma, Mbulu, Gogo, Singida White, Pare, Chagga, Ankole, Mpwapwa and Boran); Goats (Gogo White, Sonjo Red, Pare White, Newala, Buha and Malya); Sheep (Red Maasai, Gogo and Black Head Persian), chicken (Kuchi, Singamaganzi, Ching'weke, Kawaida, Bukini and others)
- Emerging local and regional markets and improved transport and communication infrastructure in Tanzania
- Peace and political stability
- Diverse agro-ecological condition suitable for various production systems
- Government industrialization move
- Increasing demand of livestock products and by-products and inclined preference for local breed products

### **2.3.4 Challenges**

- Long term investment to realize genetic improvement
- Unreliable sources of improved genetic materials
- Shortage of funds
- Occurrence of endemic and epidemic diseases Seasonal supply of feed resources
- Low number of specialized professionals
- Weak implementation of mitigation to climate change
- Low levels of involvement in breeding programme by the private sector
- Haphazard crossbreeding

### **2.4 Strategic priority areas (SPA)**

Given the aforesaid analysis, the stakeholder agreed on the following priority areas in the course of implementing Tanzania NSAP.

#### **SPA1: Characterization of existing breeds and monitoring of trends and associated risks**

- i) Carry out a comprehensive characterization, inventory and monitoring of trends and associated risks of livestock breeds for all species existing in the country, including their production systems.

#### **Activities:**

- Establish population status of existing breeds/ stains and describe the production environments
- On station and on-farm characterization including molecular comparisons
- Establishment of monitoring system for breeds at risk
- To establish, strengthen and leverage centralized AnGR recording system

#### **SPA2: Sustainable use and development of AnGRs**

- ii) To promote sustainable use of AnGR through adoption of modern technologies and indigenous knowledge.

**Activities:**

- Encourage the establishment of breed societies
- Identification of breed niche market as incentive mechanism for farmers
- Support adoption and utilization of reproductive technologies for improvement of AnGR (AI, MOET)
- Establishing a breeding programme through open nucleus breeding systems for selected breeds
- Use of early warning system for to predict climate changes and put in place monitoring mechanism for threats that may endanger AnGR

**SPA3: Conservation systems**

- iii) Develop a comprehensive conservation framework to ensure sustainability of AnGR.

**Activities:**

- Establish and strengthen *in-situ* and *ex-situ* conservation programmes
- Establishment and/or strengthening of national gene-bank
- Create incentive mechanism for conservation of breeds that are losing popularity
- Prepare AnGRs conservation guidelines for use by both public and private famers

**SPA4 Institutional frame work and Capacity Building**

- iv) Policy, Institutions and Capacity building of key stakeholders (in terms of technical and infrastructure).

**Activity:**

- Carry out inventory of existing policy and improvement programmes
- Develop institutional framework for management of AnGR
- Develop capacity in management, advocacy and lobbying
- Spearhead the creation of a vibrant AnGRs platform that links key stakeholders involved in conservation and management
- To finalize and operationalize Animal Breeding Act

- Establish AnGR focal point at the ministry of livestock and fisheries under the department of research training and extension (DRTE)

## 2.5 Action Plan

The Action Plan gives guidance on the management of sustainable use and conservation of Animal Genetic resources (AnGR). Strategic Intervention and Activities will demand for financial resources and capacity building to reach the intended goal.

The National Strategic and Action Plan (NSAPs) as a National Compact to Implement Global Plan of action for animal genetic resources in Tanzania has a goal of guiding conservation and sustainable utilization of AnGRs. This goal will be achieved through addressing the four strategic priority areas. It is estimated that a total of Tsh **1,265,000,000 (One Billion, Two Hundred and Sixty Five Million)** will be required to accomplish the planned intervention as narrated in the log-frame and budget.

## 2.6 Monitoring and evaluation of NSAP

Monitoring of implementation of the various strategic areas will be done and reviewed from time to time as guided by the log-frame. Monitoring of activities and resource utilization will be the responsibility of the parent Ministry i.e. Ministry of Livestock and Fisheries Development. Once every year the National Coordinator will convene a meeting that will involve the National Advisory Committee. It is also proposed that a workshop drawing various stakeholders will be conducted once every three years to review the status of animal genetic resources in the country.



## 2.7 Log frame and budget

| Strategic Intervention                                                                                                                                                                                        | Activities                                                                                        | Expected output                                                                   | Target key performance Indicators                                                                                 | Means of verification                                          | Resource Requirement (in million Tshs) | Source of Finance |     |      |     | Time-Frame | Lead Implementer | Partners organization                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------|-------------------|-----|------|-----|------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                               |                                                                                                   |                                                                                   |                                                                                                                   |                                                                |                                        | GOT               | AU- | DPs& | PPP |            |                  |                                                                                                                                       |
| 1) Carry out a comprehensive characterization, inventory and monitoring of trends and associated risks of livestock breeds for all species existing in the country, including their production systems (SPA1) | i) Establish population status of existing breeds/stains and describe the production environments | Population status of breeds their distributio n and suitability maps establishe d | At least 20 breeds and strains across spps and number of maps showing the distribution and suitability documented | Progress reports and Available Booklets on productio n systems | 50                                     | √                 | √   | √    |     | June 2020  | TALIRI           | SUA, UDSM, Nelson Mandela, LGAs, Livestock Farmers, DPM, ILRI, AU-IBAR, FAO, ASARECA, RUFORUM, COSTECH, DRTE and Development partners |

|                                                                             |                                                                 |                                                                                                                                         |                  |    |  |  |  |               |  |  |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------|----|--|--|--|---------------|--|--|
| ii) On station and on-farm characterization including molecular comparisons | Undescribed breeds phenotypically and molecularly characterized | <ul style="list-style-type: none"> <li>• Number of breeds Characterized</li> <li>• Number of scientific equipments available</li> </ul> | Progress reports | 50 |  |  |  | December 2023 |  |  |
| iii) Establishment of monitoring system for breeds at risk                  | Functional national Breed monitoring system                     | Endangered, at risk and extinct spp identified and documented                                                                           | Reports          | 65 |  |  |  | December 2020 |  |  |
| iv) To establish, strengthen and leverage centralized AnGR recording system | Recording system established                                    | One national recording system established                                                                                               | Available Data   | 50 |  |  |  | December 2023 |  |  |

|                                                                                                                |                                                                             |                                          |                                         |                                                                                |    |   |  |  |               |      |                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------|----|---|--|--|---------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2) To promote sustainable use of AnGRs through adoption of modern technologies and indigenous knowledge (SPA2) | i) Encourage the establishment of breed societies                           | Breed societies established and function | At least 10 Breed societies established | Number of breed associations established                                       | 50 | √ |  |  | June 2022     | DRTE | TALIRI, SUA, UDSM, Nelson Mandela, LGAs, Livestock Farmers, DPM, ILRI, AU-IBAR, FAO, ASARECA, RUFORUM, Private sector, Farmers Associations COSTECH and Development partners |
|                                                                                                                | ii) Identification of breed niche market as incentive mechanism for farmers | Breed niche markets identified           | Breed niche markets available           | <ul style="list-style-type: none"> <li>• Reports</li> <li>• Markets</li> </ul> | 40 |   |  |  | December 2021 |      |                                                                                                                                                                              |

|                                                                                                       |                                           |                                                  |         |     |  |  |  |               |  |  |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------|---------|-----|--|--|--|---------------|--|--|
| iii) Support adoption and utilization of reproductive technologies for improvement of AnGR (AI, MOET) | Increased use of new technologies         | Number of technologies adopted                   | Reports | 80  |  |  |  | December 2024 |  |  |
| iv) Establishing a breeding programme through open nucleus breeding systems for selected breeds       | open nucleus breeding systems established | Functional ONBS                                  | Reports | 80  |  |  |  | June 2022     |  |  |
| v) Use of early warning system for predicting                                                         | Functional national climate changes       | Number of monitoring mechanisms for threats that | Reports | 400 |  |  |  | December 2023 |  |  |

|                                                                                           |                                                                                          |                                                                             |                                                                     |                            |     |   |  |   |               |     |                                                                                                                                          |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------|-----|---|--|---|---------------|-----|------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                           | climate changes and put in place monitoring mechanism for threats that may endanger AnGR | monitoring system                                                           | may endanger AnGR                                                   |                            |     |   |  |   |               |     |                                                                                                                                          |
| 3) Develop a comprehensive conservation framework to ensure sustainability of AnGR (SPA3) | i) Establish and strengthen <i>in-situ</i> and <i>ex-situ</i> conservation programmes    | <i>in-situ</i> and <i>ex-situ</i> conservation established and strengthened | Number of <i>in-situ</i> and <i>ex-situ</i> conservation programmes | Reports and AnGR conserved | 120 | √ |  | √ | December 2019 | DPM | TALIRI, DRTE, SUA, UDSM, Nelson Mandela, LGAs, Livestock Farmers, COSTECH, ILRI, AU-IBAR, FAO, ASARECA, RUFORUM, Private sector, Farmers |

|  |                                                                                                            |                                                                    |                                                     |                                    |    |  |  |  |                      |  |                                                |
|--|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------|------------------------------------|----|--|--|--|----------------------|--|------------------------------------------------|
|  |                                                                                                            |                                                                    |                                                     |                                    |    |  |  |  |                      |  | Associations<br>and<br>Development<br>partners |
|  | ii) Establishme<br>nt and/or<br>strengthening<br>of national<br>gene-bank                                  | National<br>gene-bank<br>establishe<br>d and<br>strengthen         | Number of<br>germplasms<br>conserved                | Reports<br>and<br>publicatio<br>ns | 50 |  |  |  | Decem<br>ber<br>2024 |  |                                                |
|  | iii) Create<br>incentive<br>mechanism<br>for<br>conservation<br>of breeds that<br>are losing<br>popularity | Increased<br>level of<br>awareness<br>of AnGRs<br>conservati<br>on | Number of<br>farmers<br>motivated                   | Reports                            | 40 |  |  |  | Decem<br>ber<br>2024 |  |                                                |
|  | iv) Prepare<br>AnGR<br>conservation<br>guidelines for<br>use by both<br>public and                         | AnGRs<br>guideline<br>in place                                     | Number of<br>copies<br>developed and<br>distributed | Reports<br>and copy                | 30 |  |  |  | Decem<br>ber<br>2024 |  |                                                |

|                                                                                                                     |                                                                      |                                                 |                                                             |                  |    |   |  |   |                      |      |                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------|------------------|----|---|--|---|----------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                     | private famers                                                       |                                                 |                                                             |                  |    |   |  |   |                      |      |                                                                                                                                                           |
| 4) Policy, Institutions and Capacity building of key stakeholders (in terms of technical and infrastructure) (SPA4) | i) Carry out inventory of existing policy and improvement programmes | Existing policies documented                    | Number of existing polices identified                       | Progress reports | 15 | √ |  | √ | Decem<br>ber<br>2019 | DRTE | TALIRI, DPP, SUA, UDSM, Nelson Mandela, LGAs, Livestock Farmers, DPM, ILRI, AU-IBAR, FAO, COSTECH, ASARECA, RUFORUM, Private sector, Development partners |
|                                                                                                                     | ii) Develop institutional framework for management of AnGR           | National livestock policy reviewed and existing | Number of gaps regarding AnGRs identified and institutional | Reports          | 10 |   |  |   | June<br>2019         |      |                                                                                                                                                           |

|                                                                                                                           |                                        |                                                                          |                         |    |  |  |  |               |  |  |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------|-------------------------|----|--|--|--|---------------|--|--|
|                                                                                                                           | gaps identified                        | framework for management of AnGR developed                               |                         |    |  |  |  |               |  |  |
| iii) Develop capacity in management, advocacy and lobbying                                                                | Catalog for funding agencies developed | Number of funding agencies paid interest in assisting management of AnGR | Reports and publication | 35 |  |  |  | December 2024 |  |  |
| iv) Spearhead the creation of a vibrant AnGR platform that links key stakeholders involved in conservation and management | Vibrant AnGR platform                  | Number of platform created                                               | Reports                 | 40 |  |  |  | December 2020 |  |  |



|                                                                                                                       |                                                  |                                             |                                                   |    |  |  |  |               |  |  |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------|---------------------------------------------------|----|--|--|--|---------------|--|--|
| v)Identify and create a vibrant platform of AnGRs that links key stakeholders involved in conservation and management | The platform that links stakeholders established | Number of platforms operating in every zone | Progress reports and operating platforms          | 20 |  |  |  | December 2023 |  |  |
| vi) To finalize and operationalize Animal Breeding Act                                                                | Animal breeding Act developed                    | Animal breeding Act in operation            | Number of copies produced and distributed         | 25 |  |  |  | December 2024 |  |  |
| vii) Establish AnGR focal point at the ministry of livestock and fisheries under the department of                    | Focal point at the ministry of livestock         | Focal point in place                        | Reports and physical existence of the focal point | 15 |  |  |  | December 2019 |  |  |

|                    |                                                 |                                                      |  |  |             |  |  |  |  |  |  |
|--------------------|-------------------------------------------------|------------------------------------------------------|--|--|-------------|--|--|--|--|--|--|
|                    | Research<br>Training and<br>Extension<br>(DRTE) | and<br>fisheries<br>under<br>DRTE<br>establishe<br>d |  |  |             |  |  |  |  |  |  |
| <b>GRAND TOTAL</b> |                                                 |                                                      |  |  | <b>1265</b> |  |  |  |  |  |  |

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## Annexes

### Annex 1: Livestock Breed-types/strains Population and some important parameters estimates based on Species

#### a) Population estimates

| Species | List of Breed-types/strains       | Population Estimates |
|---------|-----------------------------------|----------------------|
| Cattle  | 1. Tanzania Shorthorn Zebu (TSZ)  |                      |
|         | Breed-types/strains are:-         |                      |
|         | i. Chagga                         | 0                    |
|         | ii. Gogo                          | 929,084              |
|         | iii. Iringa red                   | 2,858,169            |
|         | iv. Maasai                        | 5,574,506            |
|         | v. Mkalama Dun                    | -                    |
|         | vi. Mbulu                         | 3,587,253            |
|         | vii. Tarime                       | 3,526,337            |
|         | viii. Singida white               | 4,645,421            |
|         | ix. Sukuma                        | 6,583,590            |
|         | <b>Total TSZ</b>                  | <b>27,704,360</b>    |
|         | 2. Tanzania Boran                 | <b>103,200</b>       |
|         | 3. Sanga                          |                      |
|         | Breed-types/strains are:          |                      |
|         | i. Ankole                         | 1,250,000            |
|         | ii. Fipa                          | 441,690              |
|         | <b>Total Sanga Cattle</b>         | <b>1,691,690</b>     |
|         | 4. Ayrshire                       | <b>61,920</b>        |
|         | 5. Friesian                       | <b>133,840</b>       |
|         | 6. Jersey                         | <b>9,536</b>         |
|         | 7. Mpwapwa                        | <b>800</b>           |
|         | 8. Sahiwal                        | <b>2,384</b>         |
|         | 9. Crosses                        | <b>811,500</b>       |
|         | <b>Total Cattle Population</b>    | <b>30,519,230</b>    |
| Sheep   | 1. Blackhead Persian (BHP)        | <b>11,239</b>        |
|         | 2. East African Blackheaded (EBh) | <b>1,500,052</b>     |
|         | 3. Red Maasai (RM)                | <b>1,000,180</b>     |
|         | 4. Tanzania Long-tailed (TLt)     |                      |
|         | Breed-types/strains are:          |                      |
|         | i. Kasulu                         | Unknown              |
|         | ii. Man'gati/Mbulu                | Unknown              |
|         | iii. Sukuma                       | Unknown              |

|                                |                                         |                   |
|--------------------------------|-----------------------------------------|-------------------|
|                                | iv. Urambo                              | Unknown           |
|                                | v. Gogo                                 | Unknown           |
|                                | <b>Total Tanzania Long-tailed (TLt)</b> | <b>2,800,627</b>  |
| <b>Total Sheep Population</b>  |                                         | <b>5,312,098</b>  |
| <b>Goats</b>                   | 1. Small East African (SEA)             | <b>18,188,987</b> |
|                                | Breed-types/strains are:                |                   |
|                                | i. Gogo                                 | 2,887,319         |
|                                | ii. Luguru                              | 0                 |
|                                | iii. Maasai                             | 3,864,783         |
|                                | iv. Newala                              | 897,464           |
|                                | v. Pare white                           | 2,732,391         |
|                                | vi. Sonjo Red                           | 954,928           |
|                                | vii. Sukuma                             | 4,042,247         |
|                                | viii. Ujiji                             | 2,809,855         |
|                                | 2. Anglo-Nubian                         | <b>672</b>        |
|                                | 3. Boers                                | <b>1680</b>       |
|                                | 4. Malya (Blended)                      | <b>1984</b>       |
|                                | 5. Norwegian                            | <b>1903</b>       |
|                                | 6. Saanen                               | <b>1680</b>       |
|                                | 7. Toggenburg                           | <b>3359</b>       |
|                                | 8. Crosses                              | <b>592,521</b>    |
| <b>Total Goat Population</b>   |                                         | <b>18,792,786</b> |
| <b>Pig</b>                     | 1. Local Tanzania Pigs (LTz Pigs)       | 483,746           |
|                                | 2. Hampshire                            | 19,000            |
|                                | 3. Landrace                             | 95,000            |
|                                | 4. Large White                          | 133,000           |
|                                | 5. Saddleback                           | 38,000            |
|                                | 6. Crosses                              | 1,140,000         |
| <b>Total Pig Population</b>    |                                         | <b>1,908,746</b>  |
| <b>Donkey</b>                  | 1. Maasai Donkey                        | 595,160           |
|                                | 2. Muscat                               | 0                 |
| <b>Total Donkey Population</b> |                                         | <b>595,160</b>    |
| <b>Camel</b>                   | Unknown breeds                          | Unknwn            |
| <b>Total Camel Population</b>  |                                         | <b>Unkwn</b>      |
| <b>Poultry</b>                 | 1. Indigenous Chicken (Ind.C)           |                   |
|                                | Breed-types/strains are:                |                   |
|                                | i. Bukin                                | Unknwn            |
|                                | ii. Ching'wekwe                         | Unknwn            |
|                                | iii. Kawaida                            | Unknwn            |
|                                | iv. Kinyavu                             | Unknwn            |
|                                | v. Kishingo                             | Unknwn            |

|                                                 |                                            |                   |
|-------------------------------------------------|--------------------------------------------|-------------------|
|                                                 | vi. Kuchi                                  | Unknwn            |
|                                                 | vii. Mbeya                                 | Unknwn            |
|                                                 | viii. Morogoro Medium                      | Unknwn            |
|                                                 | ix. Morogoron small                        | Unknwn            |
|                                                 | x. N'zenzegere                             | Unknwn            |
|                                                 | xi. Pemba                                  | Unknwn            |
|                                                 | xii. Singamagazi                           | Unknwn            |
|                                                 | xiii. Tanga                                | Unknwn            |
|                                                 | xiv. Unguja                                | Unknwn            |
|                                                 | <b>Total Indigenous Chicken Population</b> | <b>38,228,444</b> |
|                                                 | 2. Layers (Exotics and Crosses)            | <b>14000000</b>   |
|                                                 | 3. Broilers (Exotics and Crosses)          | <b>22600000</b>   |
|                                                 | <b>Total Chicken Population</b>            | <b>74,828,444</b> |
|                                                 | 1. Greyleg goose                           | Unknwn            |
|                                                 | 2. White footed Goose                      | Unknwn            |
|                                                 | <b>Total Goose Population</b>              | <b>Unknown</b>    |
|                                                 | Guinea fowl                                | Unknown           |
|                                                 | <b>Total Guinea fowl Population</b>        | <b>Unknown</b>    |
|                                                 | Guinea pig                                 | Unknown           |
|                                                 | <b>Total Guinea pig Population</b>         | <b>Unknown</b>    |
| <b>Total Known Poultry Population (Chicken)</b> |                                            | <b>74,828,444</b> |
| <b>Rabbits</b>                                  | 1. Black Satin                             | Unknwn            |
|                                                 | 2. California White                        | Unknwn            |
|                                                 | 3. Carolina White                          | Unknwn            |
|                                                 | 4. Chinchilla                              | Unknwn            |
|                                                 | 5. Flemish Giant                           | Unknwn            |
|                                                 | 6. New Zealand White                       | Unknwn            |
| <b>Total Rabbit Population</b>                  |                                            | <b>135,737</b>    |
| <b>Horse</b>                                    | Horse                                      | Unknwn            |
| <b>Total Horse Population</b>                   |                                            | <b>Unknown</b>    |
| <b>Cavies</b>                                   | Local Breed                                | 652,000           |
| <b>Total Cavies Population</b>                  |                                            | <b>652,000</b>    |
| <b>Buffalo</b>                                  | Egyptian                                   | 60                |
| <b>Total Buffalo Population</b>                 |                                            |                   |

## b) Summary of some important parameters based on Livestock Species and Breeds

| Species | Breed        | Parameters        |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|---------|--------------|-------------------|---------------------|-----------------|-------------|---------|------------|------------------|-------------------------|-------|-----|-----|--|--|--|----|
|         |              | Parturition rate* | Prolificacy rates** | Mortality rates | Weight (Kg) | Adult   | Dressing % | Milk yield (Lts) | Lactation Length (Days) |       |     |     |  |  |  |    |
| Cattle  |              |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Local   | TSZ          | 0.61              | 1                   | 2%-20%          | 260-380     | }       | 270        | }                | 250                     |       |     |     |  |  |  |    |
|         | Sanga        |                   |                     |                 |             |         |            |                  |                         | to    |     |     |  |  |  |    |
|         | Mpwapwa      |                   |                     |                 |             |         |            |                  |                         | 1,200 |     |     |  |  |  |    |
|         | Boran        |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Exotics | Ayrshire     | }                 | 0.67                | 1               | 2%-10%      | 350-400 | }          | 51-53            | }                       | 1,550 | }   | 305 |  |  |  |    |
|         | Friesian     |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  | to |
|         | Jersey       |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Sahiwal      |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Crosses      |                   |                     |                 |             |         |            |                  |                         | 2,200 |     |     |  |  |  |    |
| Sheep   |              |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Local   | EBh          | }                 | 1.5                 | 1.2             | 2 - 7%      | 38-40   | 45-47      | }                | NA                      | NA    |     |     |  |  |  |    |
|         | TLt          |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Red Maasai   |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Exotic  | BHP          | 1.6               | 1.1                 | 2 - 6%          | 47-50       | 50      |            |                  |                         |       |     |     |  |  |  |    |
| Goats   |              |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Local   | SEA          | }                 | 1.5                 | 1.3             | 2 - 20%     | 38-65   | 48         | NA               | NA                      |       |     |     |  |  |  |    |
|         | Malya        |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         |              |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Exotics | Anglo-Nubian | }                 | 1.5                 | 1.5             | 2 - 12%     | 49-70   | }          | 50               | }                       | 500   | 187 |     |  |  |  |    |
|         | Boer         |                   |                     |                 |             |         |            | 53               |                         |       |     |     |  |  |  |    |
|         | Norwegian    |                   |                     |                 |             |         |            | }                |                         |       |     | 50  |  |  |  |    |
|         | Saanen       |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Toggenburg   |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Crosses      |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Pigs    |              |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Local   | LTz Pigs     | }                 | 2                   | 6               | 2 - 30%     | 55-60   | 60         | }                | NA                      | NA    |     |     |  |  |  |    |
| Exotics | Hampshire    |                   |                     | }               | 8 - 10      | 2 - 15% | 72-90      |                  |                         |       | 70  |     |  |  |  |    |
|         | Landrace     |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Large White  |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Saddleback   |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
|         | Crosses      |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Chicken |              |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |
| Local   | Local        | Not               | Not                 | 8 - 40%         | 1.2-1.5     | 80      | NA         | NA               |                         |       |     |     |  |  |  |    |
| Exotics | Layers       | established       | established         | 2 - 5%          | 1.2-1.6     | 85.5    | NA         | NA               |                         |       |     |     |  |  |  |    |
|         | Broilers     |                   |                     |                 |             |         |            |                  |                         |       |     |     |  |  |  |    |

- i. **Parturition rate**, defined as the number of parturitions per female per year
- ii. **\*\* Prolificacy, defined** as the number of live offspring per parturition and thus **Prolificacy rate** means producing offspring in great abundance or litter size at birth.
- iii. **NA** means Not Applicable



**Annex 2:** Members of AnGR National Advisory Committee (NAC) and Ministry Working Group (MWG)

**a) National Advisory Committee (NAC)**

| <b>No.</b> | <b>Name</b>           | <b>Institution</b>                      | <b>Responsibility</b> |
|------------|-----------------------|-----------------------------------------|-----------------------|
| 1.         | Dr. Y. N. Msanga      | Ministry of Livestock and Fisheries     | Chairman              |
| 2.         | Dr. H. Mruttu         | Ministry of Livestock and Fisheries     | Secretary             |
| 3.         | Mr. Abdala Temba      | Ministry of Livestock and Fisheries     | Member                |
| 4.         | Mrs. S. Kiango        | Tanzania Meat Board                     | Member                |
| 5.         | Dr. Mayasa Simba      | Tanzania Meat Board                     | Member                |
| 6.         | Director NAIC, Arusha | National Artificial Insemination Centre | Member                |
| 7.         | Dr. S. Mbagga         | Sokoine University of Agriculture       | Member                |
| 8.         | Prof. S. Chenyambuga  | Sokoine University of Agriculture       | Member                |
| 9.         | Dr. B. Tungu          | Tanzania Livestock Research Institute   | Member                |
| 10.        | Mr. Chawala           | Tanzania Livestock Research Institute   | Member                |
| 11.        | Dr. Pius Mwambene     | Tanzania Livestock Research Institute   | Member                |

**b) Ministry Working Group (MWG)**

| <b>No.</b> | <b>Name</b>          | <b>Institution</b>                    | <b>Responsibility</b> |
|------------|----------------------|---------------------------------------|-----------------------|
| 12.        | Dr. H. Mruttu        | Ministry of Livestock and Fisheries   | Chairman              |
| 13.        | Dr. Zablon C. Nzinku | Tanzania Livestock Research Institute | Secretary             |
| 14.        | Mr. Chawala          | Tanzania Livestock Research Institute | Member                |
| 15.        | Athumani S. Nguluma  | Tanzania Livestock Research Institute | Member                |
| 16.        | Dr. B. Tungu         | Tanzania Livestock Research Institute | Member                |

**Annex 3:** List and contacts of potential AnGR Expert and *Ad hoc* Group members for Tanzania

| No. | Member                                                                                | Coverage | Institute                                       | Contact                                                                                                                                                                                                                                                                    |
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| 2.  | Prof. Mohammed A. Sheikh<br>(Environmental analytical chemistry and eco-toxicologist) | National | Commission for Science and Technology (COSTECH) | Director Research,<br>Box 4302, COSTECH,<br><a href="mailto:msheikh@costech.or.tz/">msheikh@costech.or.tz/</a><br><a href="mailto:sheikhmali2003@yahoo.com">sheikhmali2003@yahoo.com</a><br>+255778200 900/+255 782 706 668                                                |
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| 36. | Maximillian Manzi<br>(Animal Breeding and<br>Genetics) | Regional      | Rwanda Agriculture<br>Board (RAB)                                   | Senior Research Fellow,<br>P. O Box 5016,<br>Kicukiro District, Rubilizi,<br>Kigali-Rwanda,<br>Email: <a href="mailto:manzimax2002@yahoo.co.uk">manzimax2002@yahoo.co.uk</a><br>Mobile: +250788479401                                                                                                   |
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