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MANAGEMENT OF FARM ANIMAL
GENETIC RESOURCES
IN THE SADC REGION

MALAWI

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A FINAL REPORT ON
THE STATE OF THE WORLD'S
ANIMAL GENETIC RESOURCES

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LIST OF ABBREVIATIONS AND ACRONYMS

ADD	-	Agricultural Development Division
ADMARC	-	Agricultural Development and Marketing Cooperation
AGD	-	Animal Genetic Diversity
AI	-	Artificial Insemination
ALDSAP	-	Agricultural and Livestock Strategy and Action Plan
AnGR	-	Animal Genetic Resources
BA	-	Black Australop
BCA	-	Bunda College of Agriculture
BLADD	-	Blantyre Agriculture Development Division
DAHLD	-	Department of Animal Health and Livestock Development
DANIDA	-	Danish International Development Agency
DARS	-	Department of Agricultural Research
DNA	-	Deoxynueleic Acid
EPA	-	Extension Planning Area
FAnGR	-	Farm Animal Genetic Resources
FAO	-	Food and Agriculture Organization of the United Nations
FIAH	-	Foundation for the Improvement of Animal Health
GDP	-	Gross Domestic Product
GNP	-	Gross National Product
GTZ	-	Deutsche Gessellschaft fur Technische Zusammenarbeit
HH	-	Household
ILRI	-	International Livestock research Institute
KADD	-	Kasungu Agriculture Development Division
KRADD	-	Karonga Agriculture Development Division
LADD	-	Lilongwe Agriculture Development Division
LC	-	Local
MAPHIS	-	Malawi Animal production and Health Information System
MBG	-	Milk Bulking Group
MoAIFS	-	Ministry of Agriculture, Irrigation and Food Security
MRSA	-	Malawi Rural Sector Assessment
MZADD	-	Mzuzu Agriculture Development Division
NASSA	-	National Survey Sample of Agriculture
NCD	-	New Castle Disease
NCL	-	Non-conventional Livestock
NGO	-	Non-Government Organization
NLDMP	-	National Livestock Development Master Plan
NORAD	-	Norwegian Development Agency
NSO	-	National Statistical Office
RDP	-	Rural Development Project
SADC	-	Southern African Development Committee

SLADD	-	Salima Agriculture Development Division
SoW-AnGR	-	State of the World's Animal Genetic
SSLPP	-	Small Scale Livestock Promotion Program
SVADD	-	Shire Valley Agriculture Development Division
UNDP	-	United Nations Development Program
VLG	-	Village Livestock Groups

EXECUTIVE SUMMARY

The ultimate objective of this document is to provide information on the strengths, threats and opportunities in the country's animal genetic resources. Indigenous animal resources are valuable and strategically important assets a country holds.

The Malawi Government is aware of the impact and contribution of the indigenous animals to the GDP, services to small-scale and large-scale farm sub-sectors and the general crop and livestock production. Through the knowledge of the status of animal genetic resources, it is hoped that development programs and research technologies can be designed and implemented to promote sustainable, efficient utilization and conservation of the AnGR.

It must be mentioned that this information can help to prioritize settings resulting to coordinated interventions by the public sector, development agencies and livestock owners.

Some of the contents require institutional reform which may result in drastic changes in human and physical resource allocation. Implementation of strategies will depend on the understanding of the rationale to change, willingness and cooperation of all concerned stakeholders. Other factors likely to influence the successful implementation will include macro-economic, political will and commitment.

We would like to take this opportunity to express our sincere gratitude to the FAO of the United Nations for funding and initiating this valuable program in animal genetic resources. The continued support in capacity building in AnGR for the country is very much appreciated. The Malawi government through the Ministry of Agriculture, Irrigation and Food Security is thanked for supporting this initiative.

Chapter 1.

STATE OF THE WORLD'S ANIMAL GENETIC RESOURCES (AnGR) – MALAWI

INTRODUCTION

Malawi is basically an agricultural country located in South East Africa. It has a total area of 12.3 million hectares of which 2.7 million hectares are under water. The population is estimated at 12 million people with an average growth rate of 1.98%, and population density of 83 persons per square kilometer, making Malawi one of the most densely populated countries in Sub-Saharan Africa (Table 1 and 3). **An estimated 52% of the total human population is female.** An estimated 46% of the population is under 15 years of age and about 90% of the total population lives in rural areas. The agricultural sector including livestock production has two distinct separate sectors; estate and smallholder. Within the estate sector there are very large corporate estates, medium sized privately held estates and small family owned and operated establishments (Table 4). Seventy percent of the smallholdings grow maize, tobacco, groundnut, while as the estate sector, which is commercial and grows sugarcane, coffee, tea and also tobacco.

Livestock constitutes a relatively small sub-sector within Malawi agriculture. The ratio of cattle to human population is around 1 to 17, and cattle ownership in the smallholder sector is confined to fewer than 10% of farming families. Among this minority, an average of around 7 Malawi Zebu animals are kept in each herd. Typically, smallholder dairy farmers in the three milk shed areas of Lilongwe, Mzuzu and Blantyre keep 2-4 crossbred cows, which are stall fed. Cattle populations have been declining, in the past decade from 750,000 in 1994 to an estimated population of about 700,000 in 2003. The pig population has been increasing from 250,000 in 1994 to 420,000 in 1997. Sheep population has been increasing slowly and is estimated at 200,000, whereas the goat population is at 1.7 million. There is an estimated 12 million chicken and substantial numbers of other species of turkeys, ducks, pigeons and guinea fowl which are found in both agricultural sectors.

Most livestock are kept on 6.1 million hectares of customary land within family operated smallholdings (Table 1). These smallholdings operate mixed crop and livestock activities under conditions of extensive management in different agro-ecological zones.

Zone one (1) covers low lands of semi-arid areas found mainly on the shores of Lake Malawi and in the Rift valley areas of the Lower Shire. It lies between 500 – 1,000m above sea level and receives less than 1000 mm annual rainfall. Zone two (2) covers highland plains of the Shire Highlands, Lilongwe, Kasungu and Mzimba lying at 1,000 – 1,500 m above sea level. This zone receives 1,000 – 1,500 mm annual rainfall. Zone three (3) covers high altitude areas of the Vipya Plateau, Nyika plateau, Dowa and Dedza hills lying over 1,500m above sea level. It has a total annual rainfall of over 1,500 mm. A high proportion of this zone encompasses forest reserves and national parks. There are approximately two million smallholder families and 30,000 estates in Malawi. Most family-operated smallholdings depend upon subsistence farming based on mixed crop and livestock farming (Table 6 and 7)

Malawi has a wide range of farm animal genetic resources (FAnGR). Approximately 95% of these FAnGR are of the indigenous type. The remaining 5% are of the exotic blood, and their crosses, with the former in varying genetic proportions. These FAnGR constitute an important sub-sector within Malawi's agriculture, contributing about 7% of the total Gross Domestic Production (GDP), and about 20% of the value of total agricultural product. Within the smallholder sector, they constitute an integral part of the food security and sustainable livelihood. Most non-market services of livestock have not been included in the GDP. These are transport, draught power, gifts and socio-cultural aspects. Given the current high prices of inorganic fertilizers, manure from FAnGR offers a cheap source of organic fertilizer for crop production.. In some cases cattle and donkeys are used as a source of draught power and transport (Table 8)

The government's overall livestock development policy is to become self-sufficient in all livestock products and to export any surplus. This is to be realized through sustainable management and use of all FAnGR. However, this has never been achieved due to the so many constraints that prevail in the livestock industry, some of which include:

- Human population pressures, particularly in the Southern Region, leading to increased pressure on land and reduced communal grazing areas, mainly in the cropping season. (Table 6)
- The high demand for animal products, coupled with economic hardships of stock owners, has forced farmers to sell and slaughter animals at a number far beyond the reproductive rate of the stock. In addition, farmers dispose of any animal regardless of age. Stock owners in Malawi as elsewhere in the world have sovereign rights over their FAnGR so that they decide what to do with their resources in whatever way they perceive in order to alleviate their poverty and satisfy their food need.
- The short term benefits that cross-breeding offers, exotic genotypes have tended to be favored and preserved to the complete neglect of their indigenous counterparts.
- The introduction of exotic breeds, coupled with lack of proper cross-breeding policies and strategies, has definitely made the indigenous FAnGR vulnerable to genetic erosion (Table 11).
- Furthermore, no planned breeding programs are followed under communal extensive grazing and management systems, resulting to inbreeding of the indigenous stock and use of inferior males in next generation.
- FAnGR are also being challenged by various types of diseases, parasites and pests; for example, foot and mouth disease in cloven animals, tick borne disease in ruminants, Newcastle disease in poultry, African Swine Fever in pigs. Although natural selection has probably produced animals that are to some extent resistant or tolerant to these diseases and pests, the conditions have disturbed the livestock population over years. However, no deliberate attempt has been made to characterize the indigenous FAnGR for their resistance to such diseases and pests.

- Despite the enormous FAnGR contribution to the livelihoods of the population, there has not been meaningful investment in understanding their value through development programs.

The rapid increase in human population growth currently estimated at 12 million people, and growing at the rate of 1.98% per year has made the demand for meat and other products outstripping the supply (Table 10).

In view of the above constraints, it is important to conserve and utilise FAnGR so as to have maximum benefit since these form the largest source of animal products and services of up to 95% of the total animal population.

2. THE STATE OF FOOD SECURITY AND RURAL DEVELOPMENT

Malawi is one of the poorest countries in the world, with a GNP per capita of US\$ 190 and Human Development Index of 0.392 in 1999, Malawi ranked eighth and twelfth from the bottom respectively. Underlining the high food insecurity there are also problems such as adult illiteracy, infant mortality, malnourished children and expectant mothers and adult HIV/AIDS prevalence. Two-thirds of the population is estimated to live in poverty.

Malawi agricultural system is largely rain-fed dependent, therefore, any disruption in the weather pattern like; droughts, rainfall irregularities and floods, lead to food insecurity. Small fragmented land holdings, high cost of agricultural inputs, HIV/AIDS impacts, limited crop diversification are some factors that contribute to food insecurity.

The national initiative on food security in the past emphasized crop production development to the neglect of the contribution of FAnGR to food security; direct or indirect contribution including the crop and livestock system; a characteristic of rural communities.

Lowlands or semi-arid areas found mainly along the shores of Lake Malawi and in the rift valley areas of the lower shire are prone to food insecurity due to flooding and drought. With the population growth rate of 1.98%, the demand for food is high. Similarly, the migration of active age group moving from rural to urban centers creates food imbalances. This makes food insecurity to increase and the development to dwindle or lag behind in the rural areas leading to an increasing rural poverty. The agricultural land holding size is declining leading to land encroachment in protected areas, river banks, parks, game reserves and other marginal areas. (Table 3).

FAnGR have played a big role during drought, crop failure and other calamities. They provide emergency source of cash or food needs to the families especially small stock and avian species

Generally, there is increased demand for livestock products in all sub sectors. There is growing demand for liquid as well as processed milk and meat products, including poultry. The national deficiency has necessitated importation of meat, milk and dairy products.

The major changes in the agricultural production systems include increased estate land allocation to maize, shift to irrigation, intensification of other cereal crops (like sorghum and millet), integration of small livestock (poultry, rabbits, pigs, small ruminants and aquaculture) into the farming system and emphasis on estate sector for commercial crops. This scenario has resulted into more crop, livestock interdependency.

2.1 Roles of FAnGR in Meeting Future Demands for Food and Agriculture in the Country.

Domestic animal provide wide range of uses such as:

- source of fuel and fertilizer
- source of draught power
- source of transport
- source of social and cultural assets
- source of income
- risk management
- food
- biopropagation (seed scarification, dispersal)
- raw material

3. THE STATE OF PRODUCTION SYSTEMS

Small-scale farmers on 6.1 million hectares keep an estimated 80% of livestock population under extensive production system. The most frequently kept livestock under smallholder farmers are poultry, small ruminants and pigs with a small number of cattle. (Table 12) Large-scale farmers on 1.2 million hectares raising various livestock species under semi or intensive production systems keep the remaining 20% of the livestock population (Table 4).

Current Production Estimates and Production System Sources

3.1 High input production system

3.1.1 Beef production

Animals are fattened in large scale feed-lots – the majority of which are found in the Shire Valley. These are intensively fed using crop residues, agricultural by-products and concentrates for up to the time they are ready for slaughter. The target animals are non-breeding stock that is sourced from the open market and own animals. Males from the dairy scheme, which usually range from 2-4 herds per unit, are also stall fed for beef production. Currently there are limited smallholder stall-feeding schemes and this activity is dominant in central and southern region where crop residues are utilized.

3.1.2 Dairy Production

Of the 31 large-scale dairy farms in Malawi, 22 are privately and government owned with a total of 4,000 milking cows mainly Friesian or Holstein, with a few Ayrshire and Jersey, and these farms are concentrated in southern Malawi. They generally use imported semen, sourced from Africa, Europe and America.

Most of these farms grow maize and napier grass for ensiling. Rhodes grass and other forage legumes are established for grazing and hay production. Supplement feeds are generally based on groundnut, cotton seed and sunflower cakes, maize and its by-products, and soybean all of which are fed with mineral supplements. However, the

supply of concentrate feed is often interrupted, and generally expensive, since they are sourced from production areas away from intended utilization locations.

Management levels vary considerably. Some farmers report high yields, whereas many achieve lactation yields of 2,000-3,000kg, which is low for the region. They all dip or spray weekly for tick control, as well as routine deworming. Despite the health measures used, farmers report problems with tick borne diseases, mastitis, reproductive efficiency, pneumonia especially in calves, foot rot and abscesses.

The smallholder dairying system is based on Malawi Zebu crosses with Friesian cattle which started in 1969. There are presently around 11,600 crossbred animals of which 5,600 are cows owned by 3,600 smallholder farmers including 600 female farmers operating in the 43 Milk Bulking Groups (MBGs) situated in the three milk shed areas, the largest of which is Blantyre (Table 13). Typically, a smallholder keeps 2 – 4 animals, but groups of smallholders keep much larger numbers of up to 20 – 30 cows, which is becoming increasingly common in Blantyre. Farmers used to obtain their cattle from government farms, but from 1990, the main source has been from fellow farmers or estates. Starting in the late 1980s, but particularly since 1993, stock theft has become a major issue. In the northern region, and specifically Karonga, cattle are tethered. It is a production system adapted to take advantage of the manure droppings.

3.1.3 Sheep Production

There is limited sheep intensive production within the estate sector including urban backyards. The production units do not exceed 30 herds per intake and are usually infrequent. The common exotic breed kept is Dorper and its crosses with the local species.

3.1.4 Pig Production

Pig intensive production systems are mainly done in areas surrounding the urban centers in all the three regions of the country. Intensive production accounts for around 12% of the pig production and a higher percentage of total output. This types of producer is

entirely commercial and the most receptive to advice and amenable to investment. The common exotic breeds kept are Large White and Land Race. They are bred and fattened on the farm. These are basically fed on concentrates; mainly cereal by-products, which constitutes 70% of the production costs. All necessary health management practices are followed and disposal is normally at economic weight.

3.1.5 Poultry Production

The commercial poultry sector is concentrated around cities, trading centres and urban backyards. This sector comprises less than 10% of the total chicken population of 12 million.

Both smallholder and large-scale producers are involved in egg and broiler production. For egg production, the Hyline breed is used, while for broiler, the Cobb and Ross breeds are used. Tokai breed has been imported from South Africa to small-scale farmers at 6 weeks. The minimum stock for both systems is normally 50 per herd. Broilers are raised under deep litter production systems, while layers are raised under both deep litter and cage management systems. These birds are intensively fed commercial rations, and disease control measures are strictly followed.

3.2 Medium Input Production Systems

3.2.1 Dairy Production

Most smallholder dairy farmers practice mixed farming. The animals are on cut and carry feeding regimes and sometimes are supplemented with commercial rations, crop residues and minerals. Disease control is intensively practiced and animals are housed in shaded standard pens. The average smallholder size is 2 – 4 animals per unit. The dairy breeds comprise Holstien, Friesian, Jersey and their crosses with Malawi Zebu. Normally artificial insemination is used. Their calves are allowed to suckle after milking in the morning and afternoon. The local breeds are used for the introduction of local adaptability traits (disease tolerance, low quality feed utilization), while the exotics are basically utilized for milk yield potential traits.

3.2.2 Pig production

Pig breeds are basically landraces, large white and their crosses with the indigenous species. These are housed and are sparingly fed commercial rations, but subsist on farm produced feeds, house refuse and industrial wastes.

3.2.3 Poultry production

Poultry breeds used are basically Black Australop and their crosses with local breeds for both meat and egg production. In addition, they also keep Hyline and their crosses with local stock for egg production. These are normally on free range and occasionally supplemented with concentrates and they are also housed.

3.3 Low Input Production Systems

3.3.1 Beef Production

Multiple ownership within one herd is common and is kept on customary land (Table 14). The 1992/93 NASSA Survey showed that 9% of the farming families own cattle. Cattle are confined at night in pens or open space tethered to a stake or tree. They graze in communal areas for variable periods during the day, generally herded by small boys. During the dry season, after the main crops have been harvested, cattle graze on crop residues and in the wetlands areas (dambos) that flood during the wet season. Cattle are moved from one grazing area to another depending on the availability of forage. During this period (after the rains), the condition of stock is generally good. However, towards the end of the dry season, cattle start losing weight as crop residues become less available and burning commences as part of land preparation for the coming crop season. Cattle travel long distances for watering and grazing before the rains since most sources are inadequate or not available.

Due to the high labor requirements for crop cultivation at the beginning of the rainy season, cattle are frequently left in open muddy kholas until late in the morning and returned early in the evening resulting in reduced grazing hours. With grazing concentrated within small areas between crops and on dambo fringes, tick-borne diseases and *helminthiasis* increase and this results in high mortality rates, particularly in calves.

Breeding is not controlled in the majority of the herds as no structured selection procedures are followed. Inferior bulls are used communally and inbreeding is common, the degree of which has not been determined. Studies in the Lilongwe area indicate that, in a normal year, a distinct breeding season occurs from July through December with around 85% of the calves born from April through September. A period of maximum fertility occurs during September, October and November, towards the end of the dry season, producing a peak calving period in June, July and August when some 60% of the calves are born. This seasonality produces a cyclical effect, in that heifers that miss the breeding season in one year will tend not to breed until the following year.

There are considerable variations in overall calving percentage between years, and between herds within one year, but the national herd average appears to be around 60%. There is no economic justification for livestock ownership other than cultural-social aspects including services. In general there is low productivity whose technologies for improvement are specific (Table 14 and 15).

3.3.2 Small ruminants:

Goats are mostly raised than sheep and outnumber them by 16:1 in 1993 and 4:1 in 2003. These are held in small flocks by some 15% of all family households compared with sheep which are only kept by 1% of all farming households. There is high off take of goats of 24%. In Malawi two major small ruminants production systems are practiced during the wet season, namely tethering or herding. Tethering is widely practiced in densely cropped areas and is employed primarily to prevent crop damage. Up to 90% of small ruminant farmers in the Central and Southern regions of Malawi tether their animals during the wet season. Herding is practiced widely in the northern region where some land is left fallow under natural vegetation (Table 6).

3.3.3 Poultry production

Local chickens are on free range with little or no supplementations. They are occasionally housed, hence go out early in the morning and come back very late in the evening.

Indigenous birds depend on fetching own feed with little supplementation. Housing is not specialised including dwelling houses beings pens and brooders. Turkeys, ducks, pigeon and geese are some other poultry species kept in all agricultural sub sectors under low-input and out-put management system. These do not have planned market-oriented objectives for their keeping.

3.3.4 Pig production

Pigs are basically indigenous breeds and are occasionally housed. The animals are generally on free-range scavenging system and there are prescribed disease control measures, which are followed. These however contribute over 50% of all pork consumed at national level.

3.3.5 Non – Conventional Livestock (NCL)

Rabbits are kept by some rural and urban households and are becoming increasingly popular in the rural areas as part of the promotion of agricultural diversification.. They are mostly raised in ground level houses. Rabbits are fed on crop and vegetable by-products and weeds. Live weights of around 1.5kgs are achieved in 5-6 months. Reliable production parameters for rabbits kept under village conditions are yet to be established. However, the main problems are losses through escape and predation, *coccidiosis*, mange and mites.

Other non-conventional livestock, such as guinea fowls, guinea pigs and cane rat are also popular and are raised under subsistence production system.

4. ORGANIZATIONAL STRUCTURE

There are some associations that are responsible for the promotion of livestock production. In the dairy sector, smallholder farmers are organized at area level forming Milk Bulking Groups that form regional associations. These are Shire Highland Milk Production Association (SHMPA), in the South, Mpoto Dairy Farmers Association (MDFA) in the North and Milk Producers Association (CREMPA) in the Central. There are also Village Livestock Groups (VLG), which mainly look at health of animals and attempts on stock theft reduction. The dairy commercial producers operate independently but they are part of the National Association that oversees dairy farmers and other stakeholders.

Not all poultry producers belong to the Poultry Industry Association of Malawi (PIAM). However, both commercial and some smallholder producers belong to this body. The association is mandated to promote poultry production and there are no regional poultry associations.

There have been breeding and communal grazing committees in the country in early 60s to mid 70s which were in areas of Mzimba (Njinge). T.A. Symon, Lilongwe, Neno, Phalombe. These were government initiated and had varying success and failures. It would appear there are no records on project outcome on the above improvement initiative.

There is a Livestock Association for all livestock classes for livestock owners in Chikwawa and Nsanje districts.

There also exist farmers clubs on such species as guinea fowls, rabbits, medium pig production systems.

The important animal products in the country are milk, meat, eggs, hides, draught power, manure and prestige. The prestige aspect is important in the social circles.

The Northern Region considers meat as the source of protein in addition to income. In the Southern Regional (especially lower shire) they consider livestock as storage of capital while the Central Region use quite often the drought animals. The rural Northerners have the habit of taking milk than the Central and Southern. Use of manure is mostly practiced in the Central where as the Southern Region use the manure as fuel in addition to fertilizer.

5. MAJOR TRENDS OR SIGNIFICANT CHANGES IN THE MANAGEMENT OF ANIMALS IN MALAWI

Liberalization on Malawi markets has led to the flooding of unregulated imported poultry and dairy products thereby neglecting our own local products. Privatization of government farms led to the in-availability of breeding stock of dairy. These imports are normally at lower prices than locally produced products due to subsidies, comparative lower production costs and poor bilateral trade agreements on beef and small stock. This has led to unregulated importations of the above for breeding as well as uncontrolled cross breeding program. NGO have implemented cross-breeding programs in FAnGR without consultation, long-term objectives or mere reason about the impact on the local species and future of FAnGR biodiversity. Animal health programs like dipping are now in the hands of the local owners not as previously done by government, leading to inadequate services resulting to high mortality rate. The suspension of auxiliary livestock training at the Natural Resources College (for four years) has affected the advisory capacity in livestock extension at grass root level. The regular information exchange between raisers and government has therefore been affected. In addition, there are such situations as un-controlled slaughter of breeding animals, unorganized beef marketing system. Stock theft has increased taking advantage of uncontrolled markets, thereby depleting the availability of stock; consequently a deterrent to investment

The significant change in poultry is the broiler production in urban areas due to urbanization changes and demands (Table 16). The changes are related to income shifts due to changes in the types and diversity of products produced caused by urbanization. This shift is due to productivity and availability of both locally adapted and recently

introduced animal genetic resources. The other change has been the subsequent organization of farmers' groupings leading to increased production in quantity but not necessarily per unit input.

Interest in non-conventional livestock such as guinea fowl and rabbits has increased due to the promotion of diversification and low input cost that can be afforded by the poor populations.

The old generation of livestock owners is getting smaller and there is less interest in the new generation in livestock husbandry including migration of young people from rural settings into urban areas to seek employment.

6. THE STATE OF ANIMAL GENETIC DIVERSITY (AGD) IN MALAWI

Generally, specific studies geared towards looking at domestic animal diversity have remained limited in some species and non-existent in others. On the other hand, the available genetic species have been studied indirectly using breeds or species for other studies, be it nutritional, breeding, reproduction and physiology. This report will therefore discuss the state along these lines for some species.

6.1 STATE OF KNOWLEDGE OF AnGR IN MALAWI

There is some information on cattle, goats, pigs and chickens collected through small surveys and studies that have mostly been localised in nature. Graduate and undergraduate students have collected AGD information through studies from BAC, country's AGD database Researchers from DARS and DAHLD information from livestock farms form the countries ADG database. Goat and sheep breeds were also described through the German supported project in Salima (Malawi – German Livestock Development Project-GTZ) in the early 1990s. Chancellor College with the support of FAO, in collaboration with Department of Animal Science at BCA, conducted molecular characterization of Malawi Zebu cattle. This complements regional studies conducted by

the International Livestock Research Institute (ILRI) on genetic characterization of cattle in Africa.

At village level, livestock keepers and breeders possess knowledge about their livestock diversity, their farming environment and their socio-economic conditions. This indigenous knowledge on AGD of local species is accepted but not well documented. Further, the knowledge can be particular to an individual; and bear little or no relation to the perceptions of the other community members of society.

Due to the nature of the closed information from keepers and scope of such studies; not necessarily looking at genetic diversity; the information on the species and their breeds is not available at global level; be it at DAD – IS or at ILRI DAGRIS. Instead, there are only reports of numbers of livestock by species, limited characterization and performance reports and acceptance of useful practical practices by keepers and breeders.

Surveys on AnGR are generally non-existent, except for individual species. This excludes the breed survey conducted under the FAO SADC AnGR Project. For individual species, notable ones include biodiversity of rural poultry done in Mzuzu and Lilongwe ADD once in 1998, and thereafter on rural poultry in Lilongwe ADD from 1999 to 2002. In this survey, avian species (chickens, turkeys, pigeons and ducks) were included in the surveys and censuses. Currently, all turkeys, ducks and pigeons are described as local breeds. Chicken breeds included Local (LC), Black Australorp (BA) and exotic strains for broilers and layers. Surveys and phenotypic evaluation of Malawi Zebu were proposed but have not been effective to date. Molecular characterization on small ruminants, pigs and poultry are yet to be done.

The physical characteristic of the present Malawi Zebu is, however, not clear as there is a mixture of three distinct populations. First, is the bigger, longer – horned Angoni Zebu type that is a characteristic of cattle from northern Malawi. second is the smaller, short horned Malawi Zebu type, typical of cattle from the central and southern Malawi. third is the Nkole – like cattle of Zimbabwe that has been observed among Ngoni settlements of

Mzimba, Dedza and Ntcheu. This mixture implies that the Malawi Zebu does not breed true to type. However, no attempts have been made to fully characterize these types of Malawi Zebu in different management systems and agro-ecological zones.

The impurity of the Malawi Zebu has further been compounded by previous indiscriminate cross breeding work to improve productivity of the breed. The breed is characterized by long calving intervals of up to 540 days, small body size and slow growth rates. Therefore, in order to improve the meat production potential, previous attempts were aimed at crossing the Malawi Zebu cow with improved exotic breeds of Brahman, Sussex, Africander and Charolais. The programs had an immediate positive impact on the productivity of the Malawi Zebu. However, due to the multiplicity of the exotic breeds used and the eventual stoppage of the importation of such breeds, there has been a lot of interbreeding and inbreeding within the population and also breeding back. Hence, some Malawi Zebu cattle do still have exotic blood in them in various proportions both on station and on farm. Information on the pure genetic constitution of cattle indigenous to Malawi is therefore required.

The Malawi zebu as regards dairy production was recommended to be inferior (NEC. 1970). After selection within Malawi Zebu for dairy characteristics, the overall production level was estimated at only 1 liter per day. In spite of high levels of butter fat (BF) and solids not fat (SNF), the Zebu was recommended not be fit for dairying as a pure breed but should be crossed with exotic dairy breeds. As such, cross breeding of Malawi Zebu with exotic dairy breed was started during the late 1950s. This led to establishment of the smallholder dairy industry. There are presently around 11,600 crossbred animals owned by 3,000 smallholder farmers in Malawi while impressive rates of improvement are realized, if allowed to continue unchecked, chances of losing the indigenous cattle are very high; especially in areas near urban centers.

Small stock namely goats, sheep and pigs have limited information on their breeds or genotypes. Currently there are serious attempts to evaluate these genotypes and possibly have different nomenclature if unique isolated pools can be identified. The small stock

must have priority because of their contribution to the livelihoods of the sub sectors. Further, some observations on genotype differences within possible similar animals have been unscientifically isolated.

The National Focal Point does not have an update of information on almost all animal species in Malawi. Where such information was generated, it can mostly be found in published articles and gray literature. In this situation, there exists no information on breeding structure and organization of breeds.

Priority on FAnGR characterisation and evaluation including studies on indigenous knowledge are being proposed. The species in question are cattle, goats and sheep, pigs, ducks and possibly different game animals.

6.1.1 Poultry

Poultry in Malawi is predominantly composed of the smallholder sector that constitutes 90% of the total poultry population. There is a small component (10%) owned by the commercial sector. While the rural poultry sector encompasses chickens, ducks, pigeons, turkeys, guinea fowls and geese; indigenous chickens form the largest proportion of poultry raised in Malawi. It is estimated that about 8 million indigenous chickens exist in country.

Indigenous chickens are of non-descript type but, three major categories are visibly present: (i) the naked neck, (ii) the frizzed and (iii) the dwarf. Common feather colors are waxy black, white reddish brown, gray, spotted or mixture of these.

Apart from natural mating, no planned breeding programs are followed under free management systems and this definitely results into inbreeding. The prevalent indigenous chicken types have probably resulted from such breeding systems. Although adapted to local conditions, the productivity of local chickens is generally low. Thus, the Malawi government instituted the Smallholder Village Poultry Improvement Program (SVPIP) in the 1950's. The SVPIP was aimed at improving production of indigenous chickens in

terms of meat and egg production through cross-breeding with the Black Australorp (BA). The BA breed was chosen for its dual-purpose nature and its ability to survive harsh tropical conditions. However, breeding policies and strategies of this program are still not clear. As such, there is wide spread use of BA which if not checked will put local chickens at risk of extinction. For example, the frizzle strain of chickens had up to 90% mortality of flocks in some areas mainly during hot dry months of August through November due to NCD.

In Malawi, poultry means chickens; denoting little recognition of other species such as ducks, doves, guinea fowls and turkeys. Population estimates, as indicated in Table 4, are quite significant for other species other than chicken. Most of these poultry species have been neglected by almost all stakeholders in terms of care, management and research; leading to suspects of the species being vulnerable and endangered. This is further evidenced by lack of programs and a clear policy by government on such poultry species.

The Department of Animal Science, through NORAD and FAO Projects, initiated a monitoring system for rural poultry through regular censuses since 1999. This is, however, very localized in areas of two EPAs around Bunda College of Agriculture. This included detailed description of species and breeds or phenotypes within species for chickens, pigeons and ducks. Through numbers, their status is known and those phenotypes that are relatively few in number are determined. Other than that, and at national level, no system exists for such important documentation. With this situation, there is currently livestock information system in place called Malawi Animal Production and Health Information system (MAPHIS), which is still going into perfection. Performance recording and record keeping is also a major problem in most farms, including commercial units.

Table 11 presents introduced exotic breeds and strains of livestock that are either used in pure production or crossbreeding with local breeds. In all species there are local breeds

available. Due to limited characterization, these breeds are still considered local despite having different phenotypes and other distinguishing Mendelian characteristics.

All the breeds shown in Table II are contributing to food security of many Malawians and some are actively being promoted in community development projects run by several NGOs (notably Concern Universal, FIAH in Mzuzu, OXFARM, SSLP, Action AID among others).

Guinea fowl production is a recent introduction into domestication and is gaining favor in most rural and urban households. Three breeds are noted among different flocks. Chitedze Research Station embarked on characterizing and evaluating guinea fowl in collaboration with Bunda College of Agriculture. There is at the moment no conservation effort in place for all exotic species.

6.1.2 Types of Breeds

6.1.2.1 Cattle: Breeds of each Species

Dairy

Malawi Zebu, Friesian, Holstein, Jersey, Ayrshire and their crosses between the exotic and the Malawi

Beef

Malawi Zebu, Brahman, traces of Sussex, Simmental, East African Zebu, Charolais and Boran

6.1.2.2. Small Stock

Ovine (sheep) - Merinos, Dorper, and the Malawi local sheep

Caprine (goats) – Boer goat, Saanen, Cyprus goat and the Malawi local goat

Swine (pigs) – large white, landrace, and the Malawi local pig

Rabbits – Newzealand white and local rabbits.

6.1.2.3 Avian:

Poultry – local (various strains), Black Australop, Hyline, Cobb, White Leghorn and Indian River

Guinea fowls – Ash, Pearl, Lavender

Pigeons

Ducks

Turkeys

6.1.2.4 Equine:

Donkeys

Mules

Horses

Actively developed breeds (i.e., cutting across all species) is the local breeds through cattle selection. There are no breeds that are not being used.

7. DISTRIBUTION OF LIVESTOCK IN MALAWI

No categorically breed distribution has been done in the country and that the exotic breeds are basically crosses with local species and have varying breed composition. Indigenous livestock are widely distributed by class, species and use as shown on Tables 14, 17, 18 and 19

Dairy – Friesians and Holstein are present in all the three regions under high input production systems. Jersey and Ayrshire are present only in the southern region of Malawi, particularly in the estate or commercial sector. The Malawi Zebu is present in all the three regions under medium and low input production systems.

Beef – The Brahman are found in the north, central and southern parts of Malawi under all production systems. Boran are present in the central region, mostly Kasungu. The Sussex breed is found in the mid and Lower Shire Valley and traces in the central and northern regions around former ADMARC farms that kept animals. The local Malawi Zebu are present through out the country under medium and low input production systems.

Sheep – Merino, Dorper and the local sheep are widely adapted in the country under low and medium input production systems.

Goat – the local goat is widely distributed along the lake shore areas, Lilongwe plain or Lower Shire Valley. The Saanen are found in Salima and Lilongwe, whereas the Boer goats are widely distributed across all the regions.

Pigs – all the breeds Landraces, Large White and Malawi local pigs are present in all the three regions

Rabbits – widely distributed in the country

Poultry - present everywhere in the country i.e., all breeds, whereas exotic are mostly found in the urban areas.

Guinea fowls – found everywhere but with concentrations in Karonga and Mchinji

Pigeons - everywhere in the country

Ducks – everywhere in the country

Turkeys – present everywhere but mostly around cities.

Donkeys –present mostly in Dedza, Ntcheu, Mchinji and Lilongwe.

Mules – same distribution as donkeys

Horses – Central and Southern regions

8. WILD RELATIVES.

There are also wild species in the country. We have buffalo for cattle, warthogs and hogs for swine, hare for rabbits, antelopes for goats. These wild species are conserved in protected areas (i.e. wild life game parks, sanctuaries, etc). Domestication efforts are only on guinea fowls, and to some extent antelopes for animal protein source, diversification or income. Presently, insignificant contribution of these wild relatives to food and agriculture however records are not readily available.

(i) Guinea fowls are the potential resources for integrations into animal crop production systems and are being investigated management, production systems and performance traits

The wild species are conserved for tourisms. Most of these animals act as reservoirs for disease transmission. They also damage crops where farming is close to protected areas and when there is limited food supply in the reserves. Efforts are being made to build capacity in an attempt to improve the understanding of the state of these AnGR, but sustainability of personnel has been hampered by attrition.

(ii) Small Ruminants

The current goat population is estimated at 1597500 while that of sheep is estimated at 102,700. More than 90% of the indigenous small ruminants are kept by smallholder farmers in flocks of up to 20, the average being six animals. There are collections of local goats and sheep at government farms. About 42% of the goats in Malawi are found in the semi-arid low lying areas of the Lower Shire Valley and the Lake Shore, followed by Plateau Areas (39%) and then High Altitude Areas (19%). Similarly, a significant concentration of sheep is in Machinga ADD (Lake shore) where nearly 40% of the national flock are recorded (Table 17). Little work has been done so far to characterize the goats and sheep and the inherent production systems found in these different ecological zones. It is also a known fact, that while the goat population has increased

over years, that of sheep has remained constant. However, factors leading to this type of trend in small ruminant population have not been fully established (Table 5).

The ratio of goats to sheep is about 16.1, indicating that goats are far more important than sheep. Goats are kept in flocks by some 15% of all farming householders; compared with sheep that are only kept by some 1% householders. The main value of the local Malawi goat lies in their meat, which is preferred to sheep meat and is second to beef in popularity. Both goats and sheep are rarely milked. Milk production of the Malawi goat is quite low and hence kids are left to suckle all the milk. These very low yields probably show that the local goats have never been selected for milk production, perhaps because of the importance of cattle as the only source of milk. In addition, there is no deliberate policy to promote goat milk production and marketing. There is need to study the milk production capabilities of local goats throughout the country. This will form a base for the improvement from milk production of small ruminants and the diversification of species used for milk production.

Crossbreeding programs in sheep and goats are not as strong as those for cattle and poultry. However, some small flocks of pure exotic breeds and crosses of both goats and sheep are found on government farms. These are crossed with local Malawi goats in order to improve meat production in the country. Pure Boer goats are extremely less abundant. However, because of the Malawi – Germany Livestock Development Program, Boer x local crosses are highly abundant in Salima and Kasungu districts. Some stud flocks of these genotypes have also been established in Salima. They are now beginning to spread beyond Salima: putting the local breed at risk of genetic erosion. Dorper x local crosses are also less abundant and are mainly found on Government farms while pure Dorper are extremely less abundant and are found mainly in large estates.

Recent development is that NGO's are embarking on large scale unsupervised crossbreeding of goats in an attempt to increase meat production for food and income. Due to the shortage of pure Boer bucks, any Boer cross with obviously untested performance is put into breeding. The local does unfortunately are not selected either

(iii) Pigs and Rabbits

Pig population in Malawi is estimated at 468,000, most of which, are owned by smallholder farmers (366,800). The majority of pigs in rural areas are the indigenous black variety. Productivity levels of pigs in rural areas are low and half the piglets die before weaning. This scenario reduces the total population over years.

There are few exotic breeds (large white and landraces), which were originally kept in estates and Government Institutions, but now a few have infiltrated into the rural areas. The numbers of pigs fluctuate mostly because of the African Swine Fever (ASF), which is prevalent in the country. Very little work has been done to evaluate the performance of local pigs in different agro-ecological zones of Malawi in terms of growth performance and disease resistance. There is need to phenotypically and genetically evaluate this local species.

Rabbits are reportedly kept by some 26,000 households in Malawi and are becoming increasingly popular in the rural households with an estimated total rabbit population of 140,900. There are at present five genotypes of rabbits. The local genotype has a great diversity of fur color, the most common being black. The New Zealand type, which is a meat variety, grows very rapidly and is ideal for meat production. Other meat types available in Malawi are the Flemish Giant, dominantly gray-brown in color; and the California type that is mostly gray in color. Crosses of exotic and locals are also available and are used for meat production.

All breeds of rabbits are sparsely distributed in Malawi, and are therefore, greatly endangered. Very little research work has been done, and this is at Bunda College of Agriculture. Extension efforts are also negligible, however, owing to its small body size, and prolificacy, there is scope for further exploitation for it to enter formal marketing structures and nutritional improvement of rural households populations.

9. AN ASSESSMENT OF ANIMAL GENETIC DIVERSITY

A number of breeds and strains have not changed much over the past 10 years, except for those introduced recently (Table 11). However, from surveys, farmers expressed views of declining numbers of livestock in herds / flocks and indicated continued drop in the near future. This is also evidenced from livestock statistics, with the exception of goats; other species are continuously declining or insignificant increases. Diseases and parasites leading to high mortality rates, low reproductive rates in some species, theft and lack of clear production and breeding goals, are cited as major problems.

The exact impact of exotic species on indigenous resources has not been evaluated in detail. However, it is hypothesized that declining herd / flock sizes might also be due to exotic blood diluting adaptive ability of local species to the existing environment, making them vulnerable. Where exotic breeds specialised products have replaced indigenous breeds (such as in commercial pigs, dairy and poultry production), indigenous breeds have been neglected as marginal producers.

All exotic breeds intended for crossbreeding with local breeds are found in the smallholder crop / livestock production system that is mainly rural based. This is because all indigenous breeds are found in this production system that is primarily extensive. All other exotic breeds are in the commercial intensive oriented system of production. In most commercial production, recommended sex ratio is practiced while in extensive system, it is haphazard. Adequate information is lacking in most species. However, there are many flocks that do not have males and take advantage of males from other flocks / herds to mate their females. This is facilitated by the extensive system in which herds / flocks mix freely during feeding. This implies the need to determine sex ration in terms of group of herds / flocks that mix and not for an individual herd / flock. This has not been done for most species. In chickens, a group of flocks is composed of 4 cocks and 31 hens. This gives an effective population size number of 1:4. Table 11, provides details of the production systems and livestock breeds available.

10. THE STATE OF UTILIZATION OF ANIMAL GENETIC RESOURCES

There has been no reliable and comprehensive inventory of the countries' domestic animal genetic resources' diversity, including wild species. Reliable information will be available from breed survey data when analysed and reported. Information on productivity, reproduction, health, breeding structure and organization of each breed, or group of breeds, is recorded and maintained at public institutions and large commercial farms. Most of the animal breeds that have been introduced in the country lack initial documentation on origin, performance, date of introduction and heredity of traits among other necessary information.

The major factors preventing the collection of necessary information are illiteracy, insufficient funding and lack of centralized livestock data recording system. The interest is to promote capacity. The Government has supported capacity building in the development of stalls in animal genetic resources, and awareness campaigns on the availability of breeds, agriculture shows, newsletters, and posters. All this is an attempt to bring the awareness and capacity building on Animal Genetic Resources.

There have been attempts to conduct livestock population census but these have been at irregular intervals. Currently the department animal healthy and Livestock development, (DAHLD) in conjunction with NASO are developing a livestock censuses system. In Malawi there is limited basic local breeds characterisation. Available information is based on few numbers of cattle, goats pigs and poultry. Molecular characterization has been done in Malawi Zebu, insufficient comparative phenotypic characterization information has been done on the Malawi zebu (i.e. product yield, product quality traits, male/female reproduction performance, drought power, diseases resistance, feed efficiency, lifetime productivity, etc) and comprehensive information on a wider scale and including all genotypes within the Malawi Zebu is needed. The characterization has been done on on-farm and on-station, and documentation is available at the university, public library and responsible institution. The MoAIFS charged with animal genetic

resources investigation has no tertiary specialized training in this discipline but short-term training programs have been offered through FAO AnGR global strategy.

11. THE STATE OF CONSERVATION OF ANIMAL GENETIC RESOURCES

In Malawi, there are no effective policies and legal to guide the use of animal genetic resources of all the livestock species. These animal genetic resources are used as a source of animal protein in the form of meat, milk and eggs. They are also used for draught power, integrated into crop-livestock production systems, has cultural and social values, for risk management and as a source of income.

The government overall policy in livestock production is to become self sufficient in all livestock products and to export the surplus. But this has not been achieved despite major project efforts. As part of an effort to develop resources further, there have been cross-breeding programs in all the species. There are also efforts to increase the numbers of farm animal genetic resources on sustainable manner. However, the available breeding policies and strategies of farm animal genetic resources are not clear and hence, very difficult to re enforce. The choice of utilization of animal genetic resources is dependent on the market demand and some species do not have institutional market structure i.e. goats, guinea fowl and rabbits.

The government established farms at Mbawa, Chitala and Dzalanyama where indigenous cattle were selected for the performance and conserved the superior animals were used for improving herds in rural communities. The program was successful until the population size started getting smaller eventually leading to no progress in most traits and inbreeding.

The program objectives charged over the 30 years or so to the extent that there is need to restart with use of large pool of very diverse herds from across the country.

The majority of the animal populations are kept by rural communities but unfortunately there are no attempts to incorporate this sector in conservation programs.

Effort should be made to include or involve the keepers and breeders in AnGR utilisation and conservation. Their knowledge if known and embedded with other technologies could form a strong and sustainable resource conservation program.

12. THE STATE OF CAPACITY TO USE ANIMAL GENETIC RESOURCES BY SPECIES

In the dairy industry, breeding programs are basically on artificial insemination. In general, Malawi has no capacity in the livestock industry including farm animal genetic resources. This therefore indicates that there are so many technical areas in the livestock improvement initiatives, which have not been carried out. This situation is affecting research, extension and all other sectors in the livestock industry. It is supposed that the limited knowledge in the understanding of the potential of AnGR limits the extent of the use of these AnGR despite their recognized impact.

There have not been planned studies to document and utilise local knowledge on AnGR from the keepers and breeders. This may mean there cannot be knowledge of what is happening in this sector and how the potential benefits can be utilised. Similarly, there could be more the keepers can adapt from modern technologies if alternative innovations are appropriate for them.

13. TRENDS AND FUTURE USE OF ANIMAL GENETIC RESOURCES BY SPECIES

Taking into consideration the high population growth of the people, there is a high demand for livestock products. Increased demand is forcing changes in the type of breeds of animal genetic resources that can be used to meet the demand. This has a bearing on the composition of animal genetic resources in that there will likely be more introductions of high performing exotic breeds at the expense of self-sustaining indigenous breeds. The advancements in technologies will affect the way animal genetic resources are used. Also, the changes in international policies (trade sanitary, environmental, food quality and property right) will equally affect the production systems of animal genetic resources.

14. OBSTACLES, OPPORTUNITIES AND NEEDS FOR USE AND DEVELOPMENT OF ANIMAL GENETIC RESOURCES BY SPECIES

For all livestock breeds, there is an increased demand for their products as a result of increased human population and income changes. This also applies to draught power and manure required for in the farming systems. Since there is low productivity of the indigenous animals, there is potential to genetically develop the local breeds, thus selection to increase productivity. The majority of all animal species are under the low input production system. The strategy is to characterize and evaluate. Since characterization of which breeds to develop has not been done comprehensively, there is no proper base of major development activities under way.

For additional characterization work the country intends to undertake evaluation of pure breeds and crosses in all production systems countrywide the emphasis will be laid on locally adapted breeds.

14.1 Constraints

The primary constraints that impede improved genetic resources are lack of knowledge, insufficient specialized training, inadequate animal resources, capital, land and infrastructure. The priority capacity building needs in the country for animal genetic resource development included characterization, evaluation, nomenclature, indigenous knowledge and systematic data capture and storage capacity.

Animal health related laws and regulations nationally and regionally do limit importation of animal genetic resources material, however semen and fertilized egg importation are not restricted. In the high input production system importation is limited due to shortage of capital, however, the country would greatly benefit from further improvements despite such constraints. There are available breeds that are quite unique around the region (goats, cattle, chicken). However, these have not been evaluated.

15. THE STATE OF THE CONSERVATION OF ANIMAL GENETIC RESOURCES

The concept of conservation of animal genetic resources is well previewed and there is general understanding of its roles and values. However, the understanding of the roles and values of animal genetic resources by smallholder farmers is not well recognized. Consequently, the understanding of the role of conservation in term of future sustainable development in light of changes in environmental conditions and market preferences is quite vague.

The country is currently developing conservation strategies and action plans for animal genetic resources. It has taken long for Malawi to develop these strategies due to lack of awareness, lack of financial resources, lack of technology and technical capacity, lack of trained human resources, and has in the past been perceived as a private sector responsibility.

Despite its high priority in the agricultural and livestock sectors, there have not been deliberate programs to promote awareness and understanding of the roles and values of animal genetic resources and need to conserve them for future use and development.

Currently, the responsibility for running conservation strategies and programs is in hands of DARS, DAHLD, however there is need to formalize and institutionalize the activities to gain recognition at all stakeholder levels.

The main factors affecting breed security for each species include replacement of indigenous breeds with exotic breeds, cross breeding without maintaining pure breeds, social and economic disruption, market forces, environmental stresses, animal health issues and lack of access to new technologies.

All indigenous breeds of animal species are at risk and there are no action plans for monitoring breed risk. Currently, there are attempts to improve conservation programs on farms through proposed studies, i.e., Malawi indigenous Zebu cattle and local goat.

There has been no significant shift in conservation efforts because there are no deliberate programs in place and also due to lack of funding.

16. THE STATE OF POLICY DEVELOPMENT AND INSTITUTIONAL ARRANGEMENTS FOR AnGR IN MALAWI

16.1 Institutional Arrangements

Animal Genetic Resources activities fall under the institutions which are in one way or the other involved in livestock research. In general, all research within Malawi is under the umbrella of the Natural Research Council of Malawi (NRCM), a corporate body established in 1991. The NRCM has “Conservation of Natural Resources” as one of its policy objectives. The other institutions involved in Animal Genetic Resources activities include the Department of Animal Health and Livestock Development (DAHLD), which maintain a number of government farms for this purpose and others, the Department of Agricultural Research Services (DARS) and the University of Malawi at Bunda College of Agriculture. It must be noted that all of the above institutions, except the University of Malawi, are government institutions. This is a reflection of inadequate private sector involvement in Animal Genetic Resources (AnGR).

16.2 Organizations and Programs for AnGR

Despite the existence of the above institutions, which are involved in Animal Genetic Resources activities, there is no formal collaboration among them. Each institution has its own mandate regarding Animal Genetic Resources activities. The establishment of NRCM is viewed as a positive step towards streamlining Animal Genetic Resource activities in line with its policy objectives. Virtually all Animal Genetic Resources activities are funded on the recurrent budget with the exception of a few donor funded programs executed by Bunda College of Agriculture

The Farm Animal Genetic Resources project currently operational in Malawi is funded by United Nations Development Program (UNDP) and implemented through the Food and Agriculture Organization (FAO). This project is perhaps the first initiative in Malawi to consolidate Animal Genetic Resources activities in terms of policy analysis, farm animal breed identification, characterization, evaluation, conservation, sustainable use, and coordinating the interactions between various public and private stakeholders. It can thus be concluded that from the Animal Genetic Resources activities point of view, there

these initiatives are in their infant stages such that the question of incentives/disincentives to the use of, and development of AnGR does not arise but is being promoted.

In the past, animal-breeding policy focused on the use of exotic breeds to cross with locally available genetic resources in an attempt to increase the size and productivity, at the same time preserving the potential for hardness in the local breeds. The success of this strategy remains questionable because no evaluation has been done to assess the impact. However, it is generally accepted that locally adapted breeds are often able to survive and produce valuable products under low input systems and variable environments. A strategy to develop them is likely to be more sustainable over the long-term than reliance on external genetic resources. The gender aspect in the areas of utilization and conservation of AnGR in Malawi is silent but limited recent information is reported on Table 20

16.3 Policy and Legal Frameworks for AnGR

Currently, there are no clear written policies and legal frameworks explicitly governing Animal Genetic Resources in Malawi. The existing legislation on the movement of indigenous and exotic genetic resources is primarily aimed at preventing introduction of infectious diseases into the country. The existing legislation on food products (of animal origin) standards does not affect the use and conservation of AnGR. As it is, primarily designed to protect the general public against Zoonotic diseases. Policy guidelines do exist regarding access to local genetic resources. The extent to which these policies are enforced, and let alone how they affect the use, development and conservation of AnGR, is yet to be assessed.

Malawi has in place the Animals Act. The provisions of this act have remained largely un-enforced due to inadequate civic education on animal welfare issues. This being the case, it is difficult to establish the impact of this legislation on the use, development and conservation of AnGR.

A bio safety bill, which has provisions relating to the use and release of Genetically Modified Organisms (GMO) has now been enacted by parliament. It is also equally true that legislation and policies governing intellectual property rights do exist, but considering the infant stage at which the AnGR activities are in the country, the extent to which these policies and legislations specifically affect the use, development and conservation of AnGR is difficult to determine.

As stated earlier, there's no formal collaborative work pertaining to AnGR activities amongst different institutions. What is evident is that the various institutions are involved in AnGR activities at different levels and for different purposes. The University of Malawi's interest in AnGR is purely academic, while as government institutions, conduct activities pertaining to AnGR for policy formulation relating to conservation of AnGR and increased production levels of animal products to satisfy the ever-growing demand. In the absence of formal collaboration, the most effective medium of communication for information exchange remains the publication through journals, newsletters, leaflets etc. occasionally seminars and conferences are used for information and material exchange.

The primary institutions and organizations that are involved in some form of research, education, training and policy development have been mentioned above under institutional arrangements. Within the premises of the few past AnGR activities, priority has been given to training and data collection in phenotypic characterization, utilization and conservation of AnGR in order to create baseline data for the future AnGR activities. Educational programs in characterization, utilization and conservation of AnGR will only be available once the baseline data have been collected, collated and analysed (breed survey). The strategy for enhancing information and communication system's capacity to support and promote the better management of AnGR, including preserving and using indigenous knowledge, monitoring and reporting on the state of these resources, trends and threats are yet to be developed but will certainly be formulated upon completion of the currently FAO funded project on Farm AnGR in the country.

LITERATURE CITED.

Ambali, A.J.D., J.C., Nyirenda and M.M. Chagunda, 2003, Genetic Characterization of the Malawi Zebu, SADC/FAO/UNDP FAnGR Report.

Butterworth, M.H. and , J.I Mcnitt. 1994: The Malawi Zebu. World Animal Review 49:6-12.

Community – Based Management of Animal Genetic resources 2001 Proceedings of workshops, Mbabane, Swaziland, 2001.-FAO

Dairy/beef production systems (Malawi) 1993 – IDRC-Animal production Systems center file: 3-P-86-0186- 1 and 2.

Gondwe, T. N, 2003, Exotic species introduced to Malawi for crossbreeding with local species or used for pure line production SoW-AnDR – Malawi – Draft report.

Jere J.A., E.M. Khonje and M.B. Kasowanjete, 1997, Evaluation of local chickens and their crosses with Black Australop and Hyline chickens for egg production technical report – Annual Livestock/Pasture Commodity Group meeting, Mzuzu.

Jere, J. and Msiska, H.D., 2002: Current Status on the Management and utilization of Farm Animal Genetic Resources in Malawi: Paper presented at Farm Animal Genetic Resources Workshop, Natural Resources College, Lilongwe, Malawi.

Johnson J.S.,1996, An analysis of the extent, causes and effects of food insecurity in Malawi with an approach towards improving food security. Smallholder Agricultural Productivity Program - GoM/UNDP/FAO. Occasional Paper No. 1

Karua, S.K., Makhambera and M.W. Mfitlodze, 1992, Some characteristics and reproductive performance of the indigenous goats in Malawi, Malawi Journal of Science and Technology.

Khonje, E.M.H., L.A. Kamwanja and T.P.E. Makhambera, 1992, Effects of season of calving and supplementary feeding on the reproductive performance of Malawi Zebu cows on smallholder farm. Malawi Journal of science and Technology Vol. No.1 49-57.

Makhambera T.P. 1988, Breed evaluation and breeding systems, animal production extension and planning workshop, Malawi

Maxton G, N..Tsoka, N., Nyirenda, E., Hayes and O. Chulu 2002: Millennium Development Goals, Malawi.

MoIFS, 1993, Agricultural Land/Food Potential and Population/Nutritional Survey, final report.

MoIFS, 1995, Agricultural Research Master Plan.

MoIFS, 1996, Anonymous, Improved and Sustainable meat and milk production from small ruminants in smallholder mixed crop/livestock system in Malawi.

MoIFS, 1996, Improvement of Malawi Zebu for beef production.

MoIFS, 1996, Livestock and Pasture Research Commodity groups-Research Bulletin DARS.

MoIFS, 1998, Annual Livestock/Pasture Commodity Group Meeting Range performance testing of the Malawi Zebu cattle.

MoIFS, 1998, Agricultural and Livestock Master Plan.

MoIFS, 1999, Malawi National Livestock Development Master Plan, Final report. NLDMP Task Force.

MoIFS, 1999, Department of Animal Health and Industry. Current and future strategies.

MoIFS, 1999, Review of Malawi Agricultural Policies and Strategies.

MoIFS, 1999., Review of Malawi Agricultural Policies and Strategies.

MoIFS, 2001: Malawi Poverty Strategic Reduction Plan.

MoIFS,..... Guinea Fowl Production in Malawi. Preliminary lessons learnt from an exploratory survey.

National AIDS Control Programme (NACP) 2000. the national Strategic Framework of HIV/AIDS: 2000 – 2004, MOHP, National AIDS Control Programme (NACP), Lilongwe.

NSO 1993, National Agricultural Survey.

NSO 1993, Population Density 1977, 1987 and 1998

NSO 1993, Population Distribution in Malawi

Revesai T., 2003, Results of the evaluation of the performance of improved smallholder dairy cattle in central Malawi: implication for policy and practice – Malawi Dairy Stakeholders, land O' Lakes/USAID.

Roger P., G. Jonathan, J. S. Tabor, A. Simons, N. Ngwira, K. Sichinga, M. Mwabumba
1999, Malawi Rural Sector Assessment.

Safalaoh A.C. 1997., Characteristics of indigenous chickens of Malawi. FAO-AGRIC
Number 22.

Schlerss K. 2002. Livestock as a tool for poverty alleviation (The Malawi Smallholder
Poultry Production Model).

Zimba, A.Z.C., 1988, Rural Cattle Improvement, Animal Production Extension Planning
Meeting, Malawi.

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Table 1. Land Area of Malawi by Category of Land

Classification	Area in '000 ha	Percent of Total Land
Customary land	6 100	65
Estate land	1 200	13
Public land	1 800	19
Urban area		3
Total	9 400	100

Source: Estate Land Utilisation Study, June 1997

Table 2. Population Density 1977, 1987 and 1998

Region/District	Land Area Sq. km	Population Density		
		1977	1987	1998
Malawi	94276	59	85	104
Northern Region	26931	24	34	46
	4288	17	23	29
Chitipa	3355	32	44	58
Karonga	4769	13	20	27
Rumphi	4089	26	34	42
Nkhata Bay	10430	30	29	58
Mzimba				
Central Region	35592	60	87	114
Kasungu	7878	25	41	60
Nkhotakota	4259	22	37	54
Ntchisi	1655	53	73	101
Dowa	3041	81	106	135
Salima	2196	60	86	113
Lilongwe	6159	109	108	217
Mchinji	3356	47	74	95
Dedza	3624	82	114	133
Ntcheu	3424	66	105	108
Southern Region	31753	87	125	144
	6273	48	79	96
Mangochi	3771	52	80	97
Machinga	2193	67	97	115
Balaka	2580	108	102	209
Zomba	767	230	275	307
Chiradzulu	2012	191	198	389
Blantyre	2295	31	53	60
Mwanza	1715	188	251	267
Thyolo	2056	150	204	208
Mulanje	1394	122	156	166
Phalombe	4755	41	67	72
Chikwawa	1942	56	105	100
Nsanje				

Source : NSO, 1998

Table 3. Milk Bulking Groups 1996/97

Milk Shed	Number of MBGs	MBGs out of Function	Total Members	% Women	Total Dairy Cows	Average Daily Milk	Average Daily Milk per Active MBG
Blantyre	20	3	2640	12	3900	10930	643
Lilongwe	18	7	475	14	600	1150	104
Mzuzu	5	1	275	20	550	1440	360
Total	43	11	3390	12	5050	13510	422

Source: Dairy Mission Report (1998)

Table 4. Estimates of Estate and Smallholder Livestock Population – (1997/98)

Type of Livestock	Smallholder Households Holding Livestock ('000)	Total Smallholder Livestock Numbers ('000)	Average Number per Household Holding stock	Estate Population ('000)	Urban Population ('000)	Total Livestock Population ('000)
Cattle	82.0	589.2	7.2	27.5	2.1	618.8
Goats	311.8	1 566.5	5.0	14.1	16.9	1 597.5
Sheep	19.5	98.6	5.0	4.7	0.1	102.7
Free Range Pigs	91.7	365.6	4.0	1.2	4.0	366.8
Intensive Pigs	15.2	55.2	3.6	6.0	0	61.2
Free Range Chickens	1 116.0	8 362.5	7.5	71.7	162.0	8 595.5
Broiler Chickens	1.0	81.1	80.3	1 426.8	75.3	1 583.2
Intensive Layers	4.1	90.5	21.9	57.2	40.0	187.8
Ducks	73.3	331.4	4.5	7.2	20.2	358.8
Turkeys	3.3	14.9	4.5	0.1	2.4	17.4
Guinea Fowl	3.4	13.1	3.8	0.2	2.3	15.6
Doves	84.1	953.3	11.3	2.3	69.0	1 024.7
Rabbits	26.3	137.7	5.2	1.1	2.1	140.9
Donkeys	n.a	2.4	n.a	0	0.1	2.5

Source: NLDMP Census and Surveys

Table 5. Trends in Livestock Population (1994 – 1997)

Species	Population			
	1997	1996	1995	1994
Cattle	589 175	780 069	745 830	748 891
Pig	420 772	312 925	340 129	252 112
Sheep	97 916	93 018	86 827	91 915
Goat	1 566 514	974 028	843 362	850 313

Source: DAHI 1999

Table 6. Holding Size for Smallholder Households, 1980/81, 1992/93 and 1998/99 (%)

ADD/Year	1980/81			1992/93			1998/99		
Holding Size (ha)	<1	1-2	>2	<1	1-2	>2	<1	1-2	>2
National	55	30	15	78	17	5	78	17	5
Karonga	65	27	8	82	16	3	83	14.5	2.5
Mzuzu	45	36	19	69	23	8	70	22	8
Kasungu	18	39	19	46	37	17	48	35	17
Lilongwe	41	38	22	76	20	4	78	19	3
Salima	62	27	11	80	17	3	81	16	3
Machinga	69	25	21	81	16	3	82	15	3
Blantyre	74	21	4	92	7	1	92	7	1
Shire Valley	46	33	22	76	16	8	77	17	6

Source: NSO, 1980/81, 1992/93 and 1998/99

Table 7. Classification of Smallholder Farmers In Malawi, 1994

Group	Rural Development Project (RDP)	Households	Average Holding (Hectares)
Group 1 : Very Small Land Holders		346 804 (23%)	0.44
	Blantyre Shire	190 082	0.42
	Nkhata bay	15 642	0.45
	Mulanje	82 527	0.47
	Phalombe	58 553	0.47
Group 2: Small Land Holders		349 389 (24%)	0.62
	Ntcheu	50 441	0.59
	Mangochi	82 616	0.60
	Karonga	32 930	0.60
	Nkhota Kota	23 790	0.61
	Zomba	109 550	0.65
	Salima	26 993	0.65
	Mwanza	23 069	0.66
Group 3: Medium Land Holders		547 812 (38%)	0.80
	Chitipa	17 797	0.68
	Nsanje	14 140	0.70
	Rumphi N/Mzimba	28 105	0.70
	Lilingwe east	61 122	0.71
	Kawinga	35 866	0.72
	Bwanje Valley	37 087	0.78
	Balaka	49 332	0.79
	Dedza Hills	35 623	0.80
	Thiwi-Lifidzi	44 730	0.80
	Chikwawa	82 230	0.85
	Lilongwe West	102 590	0.92
	Namwera	39 190	0.93
Group 4: Large Land Holders		213 270 (15%)	1.32
	Central Mzimba	34 902	1.17
	Mchinji	18 122	1.26
	South Mzimba	22 875	1.27
	Dowa East	21 247	1.27
	Ntchisi	40 194	1.31
	Kasungu	38 117	1.42
	Dowa West	37 813	1.47
All Groups		1 457 275	0.75

(Classification based on land Holding Size. Geographic Location, and Household Size) Source: NSO, 1999

Table 8. Distribution of Draught Animals – 1997/98

ADD	Pairs of Work Oxen	% of ADD Cattle Herd	Number of Donkeys
SVADD	927	2.3	20
BLADD	426	2.0	98
MADD	990	5.1	2
LADD	4 667	12.8	1 962
SLADD	1 069	4.8	98
KADD	8 573	18.8	192
MZADD	14 740	22.6	18
KRADD	6 109	14.1	3
Total	37 501	13.0	2 393

Source: NLDMP Census and Survey, 1998

Table 9. Population Distribution in Malawi

	Urban		Rural		Total	
	(‘000)	%	(‘000)	%	(‘000)	%
Regions	Total	Total	Total			
Northern	135.5	1.38	1 009.6	10.27	1145.1	11.65
Central	313.8	3.19	3 393.2	34.51	3707.0	37.70
Southern	644.5	6.55	4 336.0	44.10	4980.5	50.65
National	1 093.8	11.12	8 738.8	88.88	9 832.6	100

Source: National Statistical Office, 1994.

Table 10. Demand and Supply Situation of Livestock Products (tons 1997)

Product Type	Domestic Supply	Requirement	Production Gap	Imports
Red Meat	45 000	50 000	5 000	500
Eggs	8 000	20 000	12 000	1 400
Milk	21 000	35 000	14 000	13 000
Poultry	11 000	15 000	4 000	900

Source : DAHI 1999

Table 11. Exotic species introduced to Malawi for crossbreeding with local species or used for pure line production

Species	Introduction	Status	Purpose
Chickens	Black Australorps (BA)	Partially adapted but continuously introduced	Meat and egg production
	Hylines, Cobb, Ross	Raised under intensive management	Egg and meat production
Cattle	Brahman	Locally adapted	Meat production
	Friesian, Holstein, Jersey	Continuously imported, partially adapted	Milk production
Goats	Boer goats	Locally adapted	Meat production
	Saanen, Damascus, Anglo Nubian	Recently introduced breed	Milk production
Sheep	Dorper		Meat production
Pigs	Large white, Landrace	Adapted under intensive management	Meat production
Rabbits	Flemish Giant, New Zealand, Californian	Adapted under intensive management	Meat production

Source, T.N. Gondwe

Table 12. Farmer's preference as the first option for investment

	% of farmers keeping type of livestock	Average No. of each type of livestock per household	Relative importance of the different types of livestock
Chicken	64.5	7.05	1
Goats	27.55	4.65	2
Pigs	11.85	4.05	3
Cattle	10.95	4.90	4
Sheep	1.55	2.00	5

Source : DANIDA 2002

Table 13. Summary and comparison of two production systems, major breeds and inputs

Characteristic	Smallholder	Commercial
Livestock proportions	Large (> 80 %)	Small (around 10 %)
Production systems	Extensive, integrated	Intensive, specialised or sideline
Breeds in use	Mostly local (indigenous) Traces of exotic in chickens, goats and pigs	Mostly exotic pure and crossbreeds
Main areas of production	Rural areas	Urban and peri – urban
Inputs	Low	High
Management and attention	Low, usually family members	High, with use of hired labour
Herd (Flock) sizes	Small, from 1 – 20 (depending on species)	Large (up to 3000 in beef feedlots)
Production efficiency per animal	Low	High
	Output usually based on numbers	Output based on numbers and productivity
Production goal	Multipurpose	Commercial oriented
Breeding programs	Random communal mating	AI in dairy
		Natural mating in pigs
Sources of breedstock	Many (mostly from within the villages)	Specialised
Improvement programs	Crossbreeding efforts (in chickens, goats and pigs)	Mainly use of AI in dairy
Animal health	Some disease control (vaccinations and dipping)	Disease control
Supporting institutions	Government Veterinary Services	Government Veterinary Services
	NGOs	Specialised private companies
	University (BCA)	
	Community	

Source: T.N. Gondwe

Table 14. Distribution and Ownership of Cattle Kept on Customary Land in Malawi

ADD	Total Cattle	% Malawi Herd	% HH per ADD with Khola	Average Number of Cattle in Khola
SVADD	81 129	13.8	6.5	10
BLADD	42 547	7.2	1.9	6
MADD	38 716	6.6	1.0	9
LADD	73 128	12.4	2.9	6
SLADD	44 965	7.6	2.2	10
KADD	91 501	15.5	7.6	5
MZADD	130 502	22.2	8.5	10
KRADD	86 687	14.7	24.8	6
MALAWI	589 175	100	4.0	n.a.

Source: NLDMP Census and Surveys 1997 - 1998

Table 15. Livestock Technical Coefficients – Malawi

Livestock System	Technical efficiency			Mortality rates		
	Births per 100 breeding females per year	Young per birth	Young per 100 breeding females per year	Breeding stock %	Young stock %	Sucking stock %
CATTLE						
Village extensive	63	1	63	5	5	26
Small-scale crossbred	65	1	65	5	5	30
Large scale pure bred	85	1	85	5	5	10
GOATS						
Village extensive local	120	1.2	144	5	10	30
SHEEP						
Village extensive						
Large-scale intensive	100	1.0	100	5	10	30
PIGS						
Village extensive	120	6	720	15F 10M	20	50
Small-scale intensive	160	10	1 600	13F 9M	15	20
Large-scale intensive	200	11	2 200	10F 5M	7	10
CHICKENS/EGGS	Eggs/pa	kg feed/kg. Egg		>20 wks	8 – 20wks	<8 wks
Village extensive	40	n.a		5	21	50
Small-scale intensive	200	7.0		15	5	15
Large-scale intensive	260	3.3		12	2	4
POUTRY MEAT		kg feed/kg Lwt				
Small-scale intensive broiler		3.4		15	5	25
Large-scale intensive broiler		2.8		12	2	5

Source: NLDMP Census and Surveys, 1998

Table 16. Distribution of Intensive Smallholder Poultry Production

ADD	HH with layer unit	Average size of unit	HH with broiler units	Average size of unit
SVADD	316	14	66	118
BLADD	1 327	13	224	96
MADD	312	24	232	24
LADD	647	50	395	82
SLADD	1 129	11	5	95
KADD	234	30	56	140
MZADD	166	54	22	197
KRADD	8	131	10	124

Source: NLDMP Census and Surveys 1999

Table 17. Distribution and Ownership of Small Ruminants kept on Customary Land

ADD	GOATS				SHEEP			
	Total Goats	% Malawi Herd	% HH per ADD with khola	Av. No of goats in khola	Total sheep	% Malawi Flock	% HH per ADD with khola	Av. No of sheep in khola
SVADD	218 370	14.0	20.7	8	2 987	3.1	0.2	13
BLADD	211 666	13.5	11.9	4	2 481	2.5	0.1	4
MADD	217 001	13.9	9.7	5	38 391	39.2	1.6	5
LADD	349 680	22.3	21.1	4	9 544	9.7	0.6	4
SLADD	149 930	9.6	12.9	6	13 499	13.8	1.1	6
KADD	264 822	16.9	25.8	5	11 913	12.2	1.2	5
MZADD	130 345	8.3	11.6	7	14 580	14.9	1.7	5
KRADD	23 700	1.5	11.6	3	4 521	4.6	2.2	3
MALAWI	1 566 514	100	15.4	5.16	97 916	100	1.0	5.06

Source: NLDMP Census and Surveys, 1998

Table 18. Livestock Farmers by Class of Livestock – Blantyre ADD

Livestock Class	Farm Type	
	Smallholder farmers	Private farms
Beef cattle	64 491	3 553
Sheep	12 657	3 941
Goats	146 540	51 267
Pigs	84 646	2 163

Source: NLDP, 1998

Table 19. The Role of Cattle in the Community

Roles	Rank
Sales	1.7
Dowry	2.4
Manure	3.1
Household food	3.4
Transport	3.7
Draught	3.8
Rituals	4.0
Gifts	4.9

Source: MASP 1998

Table 20. Cattle Production Practices and Gender Roles

Production Practices	Major responsibility
Buying	Male
Selling	Male
Herding	Male and Female
Feeding	Male and Female
Milking	Male and Female
Khola cleaning	Male
Breeding	Male
Treatment	Male
Dipping	Male and Female
Khola construction	Male
Marketing	Male
Slaughter	Male

Source: MASP 1998

Table 21. Land Distribution of Smallholders (%)⁴

Holding size	Smallholders	Smallholders	Holding size	Smallholders
Hectares	1980/81	1992/93	Hectares	1998
Less than 0.5	24	44	<1	78
0.5 – 0.99	31	29		
1 – 1.49	19	13	1-2	17
1.5 – 1.99	11	6		
2 – 2.99	10	5	≥2	5
3 and over	5	2		

Source : MRSA, 1999