FIRST REPORT ON ERITREAN
ANIMAL GENETIC RESOURCES

July 2003
1. INTRODUCING THE COUNTRY

Eritrea is a country of northeastern Africa bordered on the east by the Red Sea, the south by Djibouti and Ethiopia, and the north and west by Sudan. It has a land area of 125,000 square kilometers and a population estimated at 3.67 million. The country has an estimated annual population growth of 3.1%.
Livestock play a significant role in the national economy, contributing about 25% of the agricultural GDP and representing a major part of the total export earnings. In the Central highlands, the importance of livestock is second only to cropping, while in the low lands they are the major source of for the people. Livestock have social, security, prestigious and economic
value for their owners. Cattle and camels play a significant role in the agricultural sector for use as drought power for agriculture. Other animals are used for transportation and are important as a human protein food source of milk and meat. They also provide raw materials for the industry, including hides, skins, bones and manure for fuel and to improve crop fertility.

Agriculture is a foundation of Eritrea’s economy but its productivity is so low to raise rural income or ensure food security. The root of the problem is that the rural environment—soils, rainfall, temperature, markets and infrastructure is unfavorable to rapid growth. Moreover the long conflict in itself had devastating effect

It is evident that poverty is widespread and that much of the population depends on food aid. The urban poverty incidence was 62 %. The rural incidence was 65 % on average; poverty incidence was 81 % in the rural highlands and 52 % in the lowlands.

The majority of pastoral household are exceptionally poor, food self-sufficiency ratios were as low as 10 % and generally did not exceed 60 %. It acknowledges that poverty and high output variability put many of the rural and urban poor at a sharp risk of food insecurity, and that this risk is very unlikely to diminish for the foreseeable future. Given their low base of productivity Eritrean farmers are unable to generate much of a marketable surplus. Imports are high even in good years; for example, despite 1998 being a year of good rainfall, national import requirements were nearly 200,000 mt or 30.5 % of consumption.
**Agro-climatic condition**

Eritrea has, in spite of its smallness, a wide range of agro-climatic conditions related with altitude, which goes from below sea level up to 2,400m. and, few locations, above. Based on agro-climatic and soils parameters, the region can be grouped in to six zones, as shown in the attached map and summarized below (FAO REPORT, 1994):
The Central Highland Zone (CHZ)

The zone is above 1,500m, which comprises the heavily eroded plateau and most part with warm to cool semiarid climate.

The annual rainfall, accruing in summer (June-September), ranges from less than 400mm, to more than 700mm, and the potential evapotranspiration is 1,300-1,800mm.

The production systems are:

a) **Rainfed cereal/pulses system**: depending on animal power ploughing and threshing (oxen). Major crops grown are wheat, barley, *sorghum*, finger millet, maize and taff, peas, beans, chick pea and linseed. Small ruminants are reared by most families for meat and milk and, as a source of cash; communal grazing areas and seasonal migration of herds to low lands is the main feature—Donkeys and mules are important for transport;

b) **Irrigated horticulture based system**: Main crops grown under irrigation are potato, tomato, onions, pepper and leafy vegetables.

c) **Semi commercial periurban livestock (dairy poultry) system**: Small-scale periurban semi commercial specialized production mainly milk and poultry to supply increasing urban demand (Asmara and main provincial capitals).

The CHZ includes three subzones having many common features and in particular the major crops, but distinguishable in altitude, annual rainfall, topography, population density and degree of environmental degradation.
The three sub zones are

1) **Highland (H):** above 2,000m, and most densely populated where any available and suitable land is cultivated. The average annual rainfall is 500 to 600 mm.

2) **Southern Midland (SM):** from 1,500 to 2,000 m. with generally lower population density and greater rainfall, especially in the extreme south.

3) **Northern Midland (NM):** the altitude of this sub zone is also 1,500 to 2,000 m., but arid with less than 400 mm. Of precipitation and very low population density.

The Western Escarpment Zone (WEZ)
The WEZ, which ranges between 600-1,500, has a warm to hot semiarid climate and its soils are determined by the geology of the central highlands. However, in terms of climate, cropping and population density has much in common with the southwestern lowlands with which it joins. The average annual precipitation, occurring in summer like in the CHZ, is between 400-500 mm.

The production system is agro-pastoralist and the main crops grown are *sorghum*, finger millet, taff, maize, sesame, cowpea and chick pea. Larger herds compared to the CHZ including cattle, sheep and goats. The area crossed by the river Anseba is particularly suitable for production of citrus, grapes, a wide range of tropical fruits and all kind of vegetables under irrigation.
The South Western Lowland Zone (SWLZ)
The elevation of this zone is more or less 600-950 m. with a hot semiarid climate and summer rainfall in excess of 400 mm, increasing especially towards the south west. Topography flat with soils quite different, from those of the highland and transition zone, which includes large areas of vertisols. The population density is very low.

The production systems are:

a) **nomadic pastoralist system:** rearing of mixed herds (camels, cattle, sheep and goats) with seasonal long transhumance of the entire herd and family in search of pastures

b) **Semisedentary agropastoralist system:** mainly livestock rearing practised by ethnic group such as Tigre and BenAmer with short term transhumance of homestead to nearby riverine areas and long term transhumance of cattle. During the rainy season cultivation of crops such as *sorghum*, millet and sesame around the villages is an important activity.

c) **Crop livestock mixed system:** the main activity of population groups such as Kunamas and Naras as well as small scale highland settlers is agriculture with extensive cultivating of *sorghum*, pearl millet and sesame in a long fallow rotational system. Sedentary rearing of mixed herds (cattle, sheep and goats) with occasional seasonal transhumance in dry areas is also practiced.

d) **Small scale irrigated horticultural system:** along the Gash river, in addition to the mixed rainfed crop production and livestock raising described in the former system, farmers have access to irrigation
(pump) and cultivate fruits (bananas, citrus and other tropical fruits) and all kind of vegetables.

e) **Commercial farming system:** recently developed after independence favoured by distribution of land concessions and availability of capitals, mechanized large scale rainfed cultivation of *sorghum* and sesame and/or medium scale irrigated plantations of bananas and citrus for internal market and export.

**The North Western Lowland Zone (NWLZ)**
Zone from 400 to 1,500 m, a hot arid climate with at most 300 mm. Of summer precipitation and in the extreme north west below 200 mm; potential of evapotranspiration 1,500-2000 mm.

**The production systems are:**

a) **nomadic pastorals system**

b) **irrigated commercial fruit and vegetables system.**

The first is practiced by Tigre, Binamer and Hidaraeb tribes rearing mixed herds (mostly camels, cattle and also small ruminants) with long migration during the dry season. Some cultivation of sorghum, millet and vegetables along the river beds are practical.

The second production system is practiced in the northern part of the zone along the river Barka and the production is mainly of citrus and banana, but also vegetables.
**The unique Green Belt Zone (GBZ)**

The GBZ, located on the eastern escarpment of the CHZ, has elevation more or less 750 to 1,000 m. with microclimate range from subhumid temperate to humid tropical. It is the highest rainfall area with average annual precipitation from 700 to 1,000 m. occurring between November and March. The slopes are often steep and the permanent population density is low, but used also by neighboring highland people for seasonal transhumance. The production system is mixed cereal/pulse based including cultivation of permanent trees (coffee in the higher areas), annual crops (maize, wheat, barley, sorghum) as well as different pulses and vegetables, potato in particular. In the lower areas citrus, bananas, vegetables, maize and sorghum are cultivated.

**The Coastal Plain Zone (CPZ)**

The CPZ ranges from below sea level to 600 m. with desert climate where rainfall, occurring during winter like in the GBZ, is less than 200 mm. The potential evapotranspiration is in excess of 2,000 mm.

The zone is of poor pasture resources and the production systems are:

**a) nomadic pastorals:** used in the northern part of the coastal plains (Sahel) by Rashaidas and in the southern part (Dankalia) by Afar ethnic groups. Mixed herds are kept (camels, cattle, small ruminants) and long transhumance in search of feed and water are practiced Traditionally salts and other commodities are also traded.

**b) agropastoralist spate irrigation based:** main activity is rearing of mixed herds (cattle, camels and small ruminants) and seasonal migrations towards the adjacent highland during the hot dry season. In areas where rivers originating from the highlands flow through the eastern escarpments, the
farmers divert the water in to the bulded fields and using animal traction cultivate sorghum, maize, cotton, groundnut, as well as watermelon on residual moisture.

2. PRODUCTION SYSTEMS

Livestock production can be classified as traditional and modern systems. The traditional system is followed with varying husbandry practiced, depending on ecology and feed resources, and can be undertaken as:

(a) crop livestock production system;
(b) pastoralist and agro-pastoralist production system; and
(c) rural and peri-urban.

In the eastern coastal lowlands an agro-pastoral spate irrigation system is followed. The modern production system is essentially a semi-commercial, peri-urban livestock system.

**Crop-Livestock Production System.**

In the highlands, the crop-livestock production system is followed commonly. Most farmers keep cattle in order to produce oxen, which they need to cultivate annual crops. Few highland farmers have more than one ox and a cow, this is due to limited feed resources due to the intensity of precipitation. The rainy season is from June to August, followed by grazing of crop stubbles in agricultural areas beginning in October to November and lasting to the end of January. From February to June, the animals rely on crop residues (straw or stover ) and browse. In the highlands, specific areas are reserved by the village for the grazing of oxen. These areas, which are generally selected high sites, are closed to animals with the onset of rain
season, and grazing is allowed during land preparation. In some areas of highlands, animals are moved seasonally in search of grazing. The highland farmers also keep sheep and goats, but in small flocks of 5 to 10 animals. They scavenge freely on the steeper hillsides and the crop land after harvest, being tethered or confined to avoid damage of important crops.

In Western Lowlands livestock is also kept in sedentary mixed farming systems. The mixed livestock species and use of their products is similar to those in the agro-pastoral system (see below). Harvesting and storage of sorghum stalks for dry season feeding is common but usually not adequate to maintain large numbers of livestock.

**Pastoralist and Agro-Pastoralist System.**

Livestock owners in low rainfall areas consist of two groups – pastoralists and agro-pastoralists. The latter system graze their animals in the riverine areas during dry season and keeping their stock away from the river in the wet season (June to September) to avoid the poor ground conditions, biting flies and mosquitos. Their movements are influenced by rain, water and feed resources. They remain in the northern wet season camp during the rain until November, and also start moving southwards for better grazing and water in the dry season camps, remaining there from December to April. This is followed by a period when crops residues and dry grass are fed. The pastoralists, most of them are semi-sedentarized, migrate their animals longer distances in search of grazing, often crossing the national boundaries to get better grazing areas. The true pastoralists are mainly concentrated in the extreme north.

The composition of livestock herds of pastoralists varies considerably: those who migrate only locally tend to have more small ruminants than cattle and camel. Of those who migrate extensively, the poor farmers have more sheep
and goats, and the rich farmers have more camels and cattle. Sheep and goats have the vital role of providing cash for economic necessities. Goats are often milked more than sheep. Despite a low yield per animal, milk from a reasonable number of goats is a vital contribution to family welfare. Although milk is the mainstay of the extensive pastoral systems, their major role is as a source of meat for consumption and sale or exchange. Additionally goats have high fertility rate, and twin birth is common. The males are sold away at an early age.

**Peri-Urban Semi–Commercial Production System**

Milk production for sale is mainly a feature of the peri-urban areas in the highlands. Traditional skills in cattle handling, together with the experience gained during Italian colonial times, have resulted in a large number of small commercial producers. Most dairy farms in the peri-urban areas have high grade Friesian crosses at this time many farmers are upgrading their stock using Friesian crossbred bulls. In these areas farmers who have means for irrigation have introduced leguminous forages, specially alfalfa, into their cropping systems.

Meat production is mainly from culled animals. However, there are few individuals, including butchers, who buy oxen and bulls from the main market particularly in the capital city Asmara, and keep and finish cattle on a ration of mainly wheat bran, oilseed cake and often barley straw over a period of two to three months, depending on their condition and the availability of feed.

**Poultry production**

Two main types of poultry production are practiced: (a) backyard production system covering nearly all the poultry population, where management is
poor with no special feed, apart from the provision of household scraps: and (b) a few white leghorn poultry flock reared under the semi-intensive production system. These farmers buy the day–old chicks from the government or private farms and rear them for egg production.

3. GENETIC DIVERSITY
Locally Adopted Breeds.
The breeds of different species raised in the country are almost exclusively an indigenous origin.

Cattle
There are four indigenous types of cattle in Eritrea; these are the Barka, Arado, Arabo and the Afar. The Afar type is found mainly in Denkalia and along the southern Red sea coast, where they are moved to take advantage of seasonal pasture. The Arabo is found mostly in eastern lowlands north Massawa, whilst the Arado is found throughout the highlands, but also moving seasonally down into eastern lowlands. The availability of grazing is now so limited in the highlands that these seasonal movements are an essential part of the production cycle for the highland populations. All animals except draught oxen, milking cows and sick animals making the seasonal movement. Barka is found throughout the western lowlands. This type is a dual purpose breed but most farmers keep them for milk.
**Goats**

There are five main types of goat in Eritrea. Hassan (Shukria, langae) – they are found in western lowlands (Gash-Barka) kept by the nomadic Hidareb and Nara ethnic groups mainly for milk production. The goats are also kept for milk production around urban areas.

Barka- this type is also found in the western lowlands kept by the nomadic Tigre, Kunama and sedentary Tigre ethnic group. Tseads(Milege, Worre) they are found mainly in eastern lowlands and mid-altitudes around keren and Nakfa. Afar (Adal, Danakil) they are kept by the Afar ethnic group. The central highland (Brown goat) they are found in southern Eritrea (Akale Guzay and Seraye).

**Sheep**

There are four main types of sheep. The Rashaida is a fat-rumped type used by the Rashaida pastoralists who move along the Red sea coast especially north of Massawa. In Western lowland there are two hairy thin-tailed types the Hmale the dairy type and Barka dual type breed. The Shamazana (Akale-guzai) is a smaller, fat tailed found mostly in the southern highlands.

At present, the diversity of indigenous livestock species is relatively intact-all breeds are still widely distributed, population numbers are increasing and the rate of introduction of improved stock from overseas is low. However, there is a need to characterize the indigenous breeds more clearly as part of the national livestock improvement program in order to guarantee that the best characters of the different varieties can be sustainable for future breeding work.
**Recently Introduced breeds.**
Exotic cattle, mainly Holstein-Friesian from Europe, Kenya and more recently from Ethiopia, have been introduced mainly, in the urban areas of the Highlands.

**Continually Imported Breeds**
After liberation in 1991 Holstein-Friesian have been imported from Holland. Semen from different countries is the main source of genes.

**Knowledge of AnGR**
Eritrea has a very diversified livestock species. This wealth in animal diversity is currently not being well managed nor is it being extensively exploited. Current constraints and threats include disease, drought and poor management. In addition because Eritrea is a new nation there is a lack of appropriate national policies.

Preliminary data was collected and analyzed, concerning goat and sheep for estimation of body weight from heart girth and height at withers. Data of cattle for estimation of lean muscle from body weight that had been estimated from heart girth on Barka and Arado cattle types.

Adaptation of lowlands goats in the highlands. Body weight gain for fat-tailed sheep through different feeding system was conducted at Halhale research center and college of Agriculture University of Asmara.

The priorities for capacity building to enhance efforts to improve the current understanding of the state of diversity of important breeds is the re-establishment of the research stations, upgrade the educated human resource through scholarships and middle classes of diploma beside establishment of an independent of extension both in the college of Agriculture, of University
of Asmara and Ministry of Agriculture. No systems have been created for monitoring the status and trends in breeds of each species. Primary studies have been conducted on local breeds of goats, cattle and sheep, beside unpublished data on the adaptation and the production and reproductive performance of Friesian-Holstein at Elabered agro-industrial by improving the available information. 

Since the available information are preliminary, a proper scheme should be conducted to collect information on the country wide concerning AnGR. These information will be the base for the AnGR on all types of livestock, to see adaptability, body conformation, utility maintenance of the genetic resource and the effect of different environmental conditions on the production and reproductive performance of animal types. 

No survey of AnGR has been conducted in the country and real information is not maintained that relate to economically important animal species. 

The country’s priority is to identify the phenotypic and genetic characteristics of each animal species and evaluate the AnGR for each species.

Sheep, goat and cattle are considered important types, they play a significant role in the national economy and represent a major part of total export earnings. In the central highlands, the importance of livestock is second only to cropping, while in the lowlands they are the major source of livelihood for the people, it is important as human protein food source of milk and meat, they also provide raw materials for the industry, including hides, skins, bones and manure for fuel and to improve the crop fertility. Until now no changes have been conducted on the traditional production and reproduction performance of these breeds.
However programmes in place to assist farmers or organizations to conserve specific breeds and no significant changes have been observed in the traditional management systems.

4. UTILIZATION OF AnGR

Eritrea does not have polices and legislations:

- That crate different use patterns between breeds
- That support or discourage, the use of particular species or breeds nationally or in a particular production system.
- That enable and promote technologies that affect and support the use of particular AnGR.
- That support the establishment of institutional mechanisms that enable and support the use of AnGR.
- That support and promote sharing of benefits that are derived from the use of AnGR.
- That related to environmental sustainability that has an important on AnGR.

There is no strategy for the improved use of AnGR considering as a primary element for enhancing food and agricultural production.

There is no study conducted about breeds, that are used for domestic and export markets, social influences and their importance to food and agriculture.

Crossbreeding are being used for dairy cattle that is for Peri-urban dairy production systems to utilize crossbred animals in structured mating system. Currently Artificial Insemination technology is practiced for dairy cattle under the department of Animal Resource within the ministry of
Agriculture. The Research and Human resource development department is also doing research with Barka (Begait) cattle under the farmers management at Shambuko research station. The aim of this is to study the reproductive performance and to select (Elite) Barka cattle.

The impact of breed difference within each species at the domestic and export market is common among small ruminants. In the domestic market usually breeds with wide and tall physical conformation have strong market, while in the external market & in particular the middle east regions sheep with short & broad tails have strong market demand. Impact of such situation on the AnGR, even though not well assessed and evaluated is quite minimal.

Cultural and religious diversity has a great influence on different species. In particular on the cultural side because of the agro-pastoral production system, which is quite dominant in the country, farmers usually like to keep variety of species, which they can use for, different purposes (transportation, draught and milk). And with the semi-urban farmers/small holder farmers where most of them are included in the production of egg, milk (dairy cattle) and meat (cattle fattening) or a combination of any of these two are having strong impact on the local market.

On the religious side the impact may differ. For example there are people, which don’t consume pig or camel (or both). But on religious holidays all types of major species including poultry are slaughtered for consumption. Besides, because of these religious holidays a high number (above the usual level) of sheep and goats are exported to neighboring Middle East countries. Animals are rarely used for recreational and other purposes. Camel race is practiced commonly in the some parts of the country. As a result, traditional breeding practice is exercised by some subsistence farmers. All these factors
do have a positive impact on the sustainable use and management of the AnGR. However the negative attitude towards the consumption of pig meat by the two main religious is hampering the development of swine industry. This situation is however slowly changing for the better.

The contribution of the locally adapted (dairy cattle and poultry) and the continually introduced breed (poultry) to food and agriculture had been quite great, where by the locally adapted dairy cattle (kept under small holder and small scale commercial farmers) are the major source of milk to the large and medium urban centers.

The continually introduced breeding group (poultry) kept under different production systems and regions with wide climatic difference are also contributing to the food security.

Breeding structure (commonly used among the dairy farms) is based on straight breeding and systemic crossing which are used mostly for self-replacing. And in particular cross breeding is used to upgrade indigenous breeds and the locally adapted groups and then to use the crossbred in structured mating systems. The improved technology that is applied in crossbreeding includes artificial insemination, performance recording and pedigree information. Involvement of private sector (farmer) to acquire and use improved breeding stock is done with no interference from the public sector, even though rules and norms related to the application of improved technologies is strictly controlled by the public sector. And the capacity of the research, technical, extension and training services is tremendously limited with many factors that would influence on the use of the AnGR. The prospect for the future development of milk production will remain high for decades to come. Because of this using technological inputs and advanced
methodologies at the level of farmers and farm co-operatives all over the country is justified.

At the present even though the genetic development of AnGR is not listed as a primary element in our country, it is still moving at an equal pace with the other non-genetic development approach even though its impact is not fast enough to show result, but there is no doubt that the different market demand for animal product would strongly from genetic development of different of AnGR within the coming short span of years. And this could easily be measured with the change of the trend of the market demand shown at the present for the livestock products of all species, and in particular, for milk and milk byproducts, poultry products, meat and meat products as well as their by products.

Contribution of all breeds within all species of AnGR for food and agriculture is actually more than significant. However, operational and measured planned genetic improvement program based on current principles of animal genetics has no influence in most of AnGR with the exception of dairy cattle (be it indigenous and locally adapted breeds and their crossbred). And this is due to the combination of institutional services, limitation in capacity and awareness, and no breeding program and no animal breeding for genetic trend analysis is done by private sector, other than what is done by the public sector at a research level. As a result it is very difficult to state whether the disseminated breeding animals are straight bred or crossbred.

The common tools used for the selection of male/female animals for breeding within dairy cattle are phenotypic appraisal, pedigree and progeny information and individual performance. And the focus of government institutions involvement on the development of AnGR is limited to
technical, extension, training and partly research services and leaving a very wide gap.

The most important opportunity for improved use and increased genetic development of AnGR for all species related with all breeding groups is the availability of policy and legal instruments, availability of service institutions (Some due to their own limitations) and the diversification of breeds within each species.

For maintaining and developing our locally adapted breeds and each major production system relies on expansion of services, technology, and skill so that the contribution toward food and agriculture may increase. Equally, the development of traditional breed product market focuses toward the sustainability of subsistence production system so that the farmers at the marginal areas may get opportunity where by they can increase production of food.

In most cases, practically within each species, the information on basic characterization of all breed groups is done at research centre, but its use to support and develop the AnGR is not well spread among different relevant production system. Based on this limited information of these breeds, some facts are listed within a recommendation as priorities for development. The priorities includes additional characterization work are surveying, evaluation of breeds and crosses for use in particular production system (mainly at research level with the small ruminants). Up to now the priorities for enhancing public understanding and awareness of the role and values of AnGR and the need for sustainable development and conservation of those resources relies on, organization of short seminars, workshops and short training programs. The main obstacles for this approach had been limitations with finance and shortage of human skill and materials other wise
there are wide opportunities like the evenly spread of infrastructure, communication channels and facilities as well as diversified culture with homogenized social structure that encourages and recognizes particular roles that women, men and children play in the development and use of AnGR.

Primary constraints related to the improved usage and genetic development of AnGR are the availability of resources, education, training and technological skill. As a result the need for capacity building would cover the training of skilled man power (professionals and technicians) accompanied by short-term training and regional workshops. During the last two to three decades, livestock industry had been limited to subsistence production due to many socioeconomic and political factors. But as for now because of the change to wards market production or peri urban production there is a strong pressure of change affecting the supply of products that influence the use and the development of AnGR.

5. CONSERVATION OF AnGR

Traditional conservation programme is adopted by herds and flock owners with great a focus on the following characteristics: milking ability, size and coat colour, temperament (character) and walking ability. These are the main four characteristics with regard to breeding objectives. Herd/flock owners use a females with known geneology and carefully selected males with desired traits inorder to achieve their breeding objectives. Daughters of a pedigree female maintain their mothers name for several generations, to keep trace the origins of their animals. This is an important genetic record, which is maintained by oral traditions.
To the herd /flock owners male selection and controlled breeding is seen as an essential part of good management. Good male gives good daughters and good sons come from productive mothers. This traditional approach gives an understanding of the role of conservation in term of sustainable use and development of AnGR in the future.

The country is using all available efforts to develop niche markets and specially products to support the conservation of breeds. Conservation strategies or action plans of AnGR programme is not yet developed because the country has passed through long years of war and, conservation strategy is not developed due to lack of financial resources, technology and technical capacity, trained human resources and a very young private sector which has not yet assumed any role in this aspect. The Animal Resource Department and the Research Institute of the Ministry of Agriculture, with the cooperation of the Department of animal Science, college of agriculture, university of Asmara are the two institutions, which will be responsible for AnGR conservation programme with inputs from relevant organization.

- The main factors included in this programme is to maintain and improvement of local breeds in the pastoral systems and cross breeding of local breed with exotic breeds around the urban areas for milk production and small ruminants for meat production for export with the emphasis to upgrade the marketing systems and improvement of the rangeland areas. Beside developing programme to promote the animal health, through resource and human resources is important.

None of the domestic livestock are identified as being “at risk” and no programme has been conducted in ex situ.

The livestock research was aware of breed characterization and conservation
Identified research topics are:

- Population size: development of appropriate methodologies for estimating livestock population.
- Characterization of the production environment.
- Breed inventory:
  - Identification of available breeds in the various production environments.
- Productive traits:
  - Establishment of baseline production traits *viz.*: reproduction, milk, meat, draft;
  - Establishment of genetic potential of indigenous animals under improved production environments. Assess the economics of each production system.

- Adaptive traits:
  - Identification and characterization of adaptive traits.
  - Resistance/tolerance to major diseases and other environmental stresses.
- Genetic Improvement and Conservation
  - Identification of end users priorities.
  - Development of appropriate recording schemes.
- Development and adaptation of appropriate selection schemes.

There is a livestock research programmed which needs to be rehabilitate, this was started in 1995 about the characterization and
conservation of Barka cattle at Shambuko research station which was destroyed by the Ethiopian invasion during the war.

At this time there is a research programme for characterization of Eritrean livestock AnGR which is funded by Italian Government. The main constraints, challenges an opportunities in implementing conservation within the country are lack of awareness, lack of financial resources, human development, institution/policy development. Training facilities is available in the country in the department of Animal resources, college of Agriculture, University of Asmara and Ministry of Agriculture research station (Halhale), but these institutions needs support to conduct such training programme.

6. POLICY DEVELOPMENT AND INSTITUTIONAL ARRANGEMENTS FOR AnGR

The state of Eritrea came into being in May 1993, following a long war of independence. Thus all ministries, policies and programmes are still being developed. The country has a large population of well adapted animals. The important aspect of institutional strengthening to create a minimum legislative base for quarantine regulations and protocols, veterinary surgeon registration and conditions, drug handling and registrations, livestock product inspection and public health interests, notifiable disease, zoonoses, milk regulations and veterinary pharmacies are operating without any underlying legislation.

The majority of livestock in Eritrea are indigenous stock that has been selected for the prevailing eco-climatological conditions, and to a lesser extent for resistance to the major animal diseases present in the country. Now a days date, the introduction of exotic breeds has been negligible, but for the livestock improvement will rely heavily upon the introduction of
exotic genetic material through artificial insemination, especially from Holstein-Freisian breed for dairy production in the highlands. Indigenous breeds will insure the continued survival of all existing breeds if they continue to meet the requirements of farmers and pastoralists.

Eritrea imported purebred Friesian cow after liberation, as has been demonstrated since Italian colonial times, survive and prosper in the Eritrean highlands provided there is adequate feed and management. On the other hand, in the western lowlands and other similar areas the local Barka breed provides a hardy well adapted source of milk at low production per cow and per lactation. The Barka breed has many desirable characteristics: adaption to hard conditions, reasonable milk production, they are good mothers for cross bred oxen or improved dairy cows, to mention a few. The government is establishing a herd for a research work at Shambuko research station and there is a plan to make alert the Beni-Amer tribe to explore the possibilities of assisting them to maintain a purebred population.