Ethiopian National Strategy and Plan of Action for Conservation and Sustainable Utilization of Animal Genetic Resources

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FOREWORD

Ethiopia is endowed with large number and huge diversity of farm animal population. The most common domestic farm animal of the country can be categorized into mammalian, avian and honeybee species. According to a recent estimate (CSA 2015), the Ethiopian farm animal population comprises about 56.7 million cattle, 29.3 million sheep, 29.1 million goat, 56.9 million chickens, 2.0 million horses, 0.4 million mule, 7.4 million donkeys and 1.2 million camels. Within species diversity of domestic farm animal has been represented by a number of breeds in each species. Twenty eight breeds of cattle, 9 breeds of sheep, 8 breeds of goat, 7 breeds of camel, 6 breeds of donkey, 8 breeds of horse, 2 breeds of mule and 7 breeds of chicken have been identified so far. Besides domestic farm animals, honeybees are among the economically important species in the country. Most of the farm animal breeds are indigenous to the country. They have evolved over centuries through intimate involvement of the raisers who directed the process; and have been managed in remarkable environments (highlands, dry mountains, lowlands, arid localities and forests). The animals are thought to possess unique genetic traits which enabled their survival in diverse range of production environments and developed specific necessary features to deal with harsh environments such as severe feed and water scarcity, diseases challenges, extreme hot and cold environments and unpredictable long drought periods. Crossbreeding exercises driven by the demand to increase productivity, increasing change in land use and production systems, frequent drought, natural and manmade disasters are identified to be potential threats deteriorating the animal genetic resource. In order to reverse the challenges and to enhance the contribution of the sector to the country’s economic development, preparation and implementation of a National Strategy and Plan of Action constitutes fundamental step. This goes in line with the current endeavor in achieving sustainable economic development at a national level.

The preparation of Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for Food and Agriculture is an undertaking that followed the formulation of Ethiopia’s Country Report and also the development of Global Plan of Action tasks which were coordinated by the Food and Agriculture Organization of the United Nations (FAO). The Global Plan of Action for Animal Genetic Resources was developed involving 169 countries and was adopted by delegates of 109 countries at the International Technical Conference on Animal Genetic Resources which was held in Interlaken, Switzerland, from 3 to 7 September 2007. Ethiopia was an active participant of the development process of the Global Plan of Action.
The Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for Food and Agriculture was prepared mainly based on the First Country Report on the State of Ethiopia’s Animal Genetic Resources for Food and Agriculture, Global Plan Action, Ethiopian Climate Resilient Green Economy Strategy, the country’s Growth and Transformation Plan (GTP II) as well as the National Livestock Master Plan of the country. During the formulation process, all critical stakeholders were made to involve. The Ethiopian Biodiversity Institute, the focal institute, has organized a special committee which was in charge coordinating the document development and also coordinated key stakeholders relevant in the preparation of the strategy and action plan. The committee comprised of eight members representing four institutions: the Ethiopian Biodiversity Institute, Ministry of Agriculture, Ethiopian Institute of Agricultural Research and National Artificial Insemination Center. Committee members from the above mentioned institutions as well as two senior experts did their level best and contributed significantly for the realization of the strategy document.

The **Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for Food and Agriculture** is an important document. It contains valuable information on the resource base and its threats, strategic priority areas, time plan for the implementation of each action, lead implementing agencies, partner organizations and the expected outputs from the implementation of each action.

I would like to thank all the stakeholders involved in the preparation of this Strategy and Plan of Action. My special thanks go to the coordinator Dr. Misikire Tessema from our Institute and the committee members from key stakeholder institutions for successfully finalizing the document. I hope that this strategic document will encourage all stakeholders to play their part towards conservation, sustainable utilization and development of animal genetic resources in Ethiopia.

Finally, I request all stakeholders to positively contribute towards successful implementation of this National Strategy and Plan of Action.

Feleke Woldeyes (PhD)
Deputy Director General
Ethiopian Biodiversity Institute
## ABBEREVIATIONS AND ACCRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ADLI</td>
<td>Agricultural Development led-Industrialization</td>
</tr>
<tr>
<td>AnGR</td>
<td>Animal Genetic Resource</td>
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<tr>
<td>AnGRFA</td>
<td>Animal Genetic Resource for Food and Agriculture</td>
</tr>
<tr>
<td>AU-IBAR</td>
<td>African Union, Interafrican Bureau for Animal Resources</td>
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<tr>
<td>BoLF</td>
<td>Bureau of Livestock and Fisheries</td>
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<td>CSA</td>
<td>Central Statistics Agency of Ethiopia</td>
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<td>DRMFSS</td>
<td>Disaster risk Management and Food Security Sector</td>
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<tr>
<td>EBI</td>
<td>Ethiopian Biodiversity Institute</td>
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<tr>
<td>EMDTI</td>
<td>Ethiopian Meat and Dairy Technology Institute</td>
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<tr>
<td>FAO</td>
<td>World food and agriculture organization</td>
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<tr>
<td>GPA</td>
<td>Global Plan of Action</td>
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<tr>
<td>GTP</td>
<td>The Growth and Transformation Plan</td>
</tr>
<tr>
<td>HLI</td>
<td>Higher Learning Institute</td>
</tr>
<tr>
<td>ICARDA</td>
<td>International center for agricultural research in the dry areas</td>
</tr>
<tr>
<td>IGAD</td>
<td>Intergovernmental Authority for Development</td>
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<tr>
<td>ILRI</td>
<td>International livestock research institute</td>
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<tr>
<td>IPRO</td>
<td>Intellectual Property Right Organization</td>
</tr>
<tr>
<td>MoEFCC</td>
<td>Ministry of Environmental, Forest and Climate Change</td>
</tr>
<tr>
<td>MoE</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>MoFED</td>
<td>Ministry of Finance and Economic Development</td>
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<tr>
<td>EFAG</td>
<td>Ethiopia Federal Attorney General</td>
</tr>
<tr>
<td>MoLF</td>
<td>Ministry of Livestock and Fisheries</td>
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<tr>
<td>MoST</td>
<td>Ministry of Science and Technology</td>
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<tr>
<td>MoU</td>
<td>Memo random of Understanding</td>
</tr>
<tr>
<td>NADHIC</td>
<td>National Animal Health Diagnostic and Investigation Center</td>
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<td>NAIC</td>
<td>National Artificial insemination center</td>
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<tr>
<td>NARS</td>
<td>National agricultural research system</td>
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<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
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<tr>
<td>NVI</td>
<td>National Veterinary Institute</td>
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<tr>
<td>PASDEP</td>
<td>Plan for Accelerated and Sustained Development to End Poverty</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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EXECUTIVE SUMMARY

Ethiopia is one of the biodiversity rich countries, and centers of origin of animal domestication. This is attributed to the wide altitudinal and physico-geographic variations in the country which ranges from 126 masl in the Danakil depression to the highest peak of 4,620 meters above sea level (masl) on Mount Ras Dashen. The physico-geographic features are composed of high and rugged mountains, flat-topped plateaux, deep gorges, incised river valleys and rolling plains. The western and southeastern highlands are separated by the Great Rift Valley that runs from northeast to southwest of the country. Extensive semi-arid lowlands in the east, south and west are extensions of these highlands. Natural selection associated with highly variable macro- and micro-climatic conditions of the country, seasonality and variability of rainfall distribution and amount and wider temperature variations endowed the country with diverse ecosystems that are inhabited by amazingly great diversity of animal, plant and microbial genetic resources.

Almost all the major domestic animals of the world such as cattle, sheep, goat, chicken, camel, horse, donkey and mule are found in different physico-geographic, climatic and socio-cultural variations of the country. In addition to its diverse ecology, Ethiopia has served as one of a historic gateway to domestic animals from Asia to Africa favoured the diversification of animal genetic resources. Ethiopia has endowed with large domestic animal population and huge within species and within breed diversity. Within species diversity of domestic animals has represented by number of breeds in each species. Accordingly, 28 breeds of cattle, 9 breeds of sheep, 8 breeds of goat, 7 breeds of camel, 6 breeds of donkey, 8 breeds of horse, 2 breeds of mule and 7 breeds of chicken breeds are identified so far. Domestic farm animals or livestock play important roles in providing food, household income, drought power, manure and fuel, and ecological and social functions. Livestock also serves as sources of export commodities such as live animals, hides and skins, meat and meat products, honey and bees for earning foreign exchange. Assurance of the continuity of their role for current and future generation has been entirely depending on the existing diversity and proper utilization of animal genetic resources. Despite these importance, Ethiopian farm animal genetic resources are faced with various threats of different levels such as indiscriminate crossbreeding, change in production system, climate change, feed shortage, frequent drought, epidemic disease, interbreeding and poor management. As the result, the status of larger portion of breeds is classified as “at risk”, while that of the others remain as “unknown”.

Therefore, preparation and implementation of National Strategy and Plan of Action for Animal Genetic Resources is crucial not only to assess risk status of non-descript breeds and revert the ongoing trends of erosion, but also to ensure sustainable underutilization of the genetic resources. Preparation of Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for Food and Agriculture is the follow up of preparation of Ethiopia’s First Country Report on the state of animal genetic resources and consequent development of Global Plan of Action (GPA) that were coordinated by the Food and Agriculture Organization of the United Nations (FAO). The Ethiopian Biodiversity Institute (the focal institute) organized a committee and coordinated key stakeholders in the preparation of the strategy. The committee comprised of eight members that belong to four key stakeholders namely: the Ethiopian Biodiversity Institute, Ministry of Agriculture, Ethiopian Institute of Agricultural Research, National Artificial Insemination Center and two other senior livestock experts. The strategy was finalized after a series of consultations with stakeholders.

The structure of Ethiopian National Strategy and Plan of Action for Animal Genetic Resources conforms to that of the Global Plan of Action and it is comprised of introduction, which describes the country, its resources base and the need for and process of preparing Strategy and Plan of Action as well as four Strategic Priority Areas, namely: 1) Characterization, inventory and monitoring of trends and associated risks, 2) Sustainable use and development, 3) Conservation and 4) Policies, institutions and capacity-building). The National Strategic Plan is comprised of 15 Strategic Priorities and 68 actions that aim at ensuring conservation, sustainable use and development of animal genetic resources as well as in ensuring fair and equitable sharing of the benefits arising from the use of animal genetic resources for food and agriculture.
1. INTRODUCTION

It is generally believed that most domestic animals were first domesticated in southwest Asia, particularly Anatolia, or in southeast Europe, where their remains have been found in several sites dated between 9,000 and 8,000 years ago (Wendorf and Schild, 1994). However, the origin and development of African livestock are long ignored or marginalized and have become dramatically to the front over the past decade. This is primarily the result of fresh evidence for an indigenous origin for African cattle (Wendorf and Schild, 1994). The earliest African cattle originated within the continent, possibly as early as around 8000 BC. The exact centre(s) of domestication remain(s) unknown, but archaeological information suggests that it might have taken place in the northeastern part of the continent (Wendorf and Schild, 1994). There is currently no zoo-archaeological evidence that any of the diverse and abundant mammalian fauna of eastern Africa were domesticated, however, on the basis of distribution wild progenitors of domestic donkeys, cats and guinea-fowl could have been domesticated in East Africa (Marshal, 1994). Contact with the Sahara and movement of people in to East Africa (Sudan and Ethiopia) relate to the appearance of domestic animals such as *Bos Taurus* cattle, sheep and goat. On the other route trade in the Nile Valley, Red Sea and Indian Ocean influenced the appearance of camel, humped cattle (*B. Indicus*) in East Africa (Ethiopia) via Horn of Africa. East Africa as a region has an especially long and sustained tradition of specialized cattle, sheep and goat use which have been characterized for the past 5,000 years by highly diverse cultural and subsistence systems, ranging from hunting and gathering, to pastoral, settled agricultural and hierarchical state level societies (Marshal, 2000).

Ethiopia is one of the nine (Fertile Crescent, China, Mesoamerica, Ands/Amazon, eastern United States, Sahel, Tropical West Africa, Ethiopia and New Guinea) biodiversity rich countries, known as home of food production and ancient centers of origin of animal domestication (Diamond, 2002). This attributed to the wide altitudinal and physico-geographic variations in the country ranges from 126 meters below sea level in the Danakil depression to the highest peak of 4,620 meters above sea level (masl) on Mount Ras Dashen. The physico-geographic features are composed of high and rugged mountains, flat-topped plateaux, deep
gorges, incised river valleys and rolling plains. The western and southeastern highlands are separated by the Great Rift Valley that runs from northeast to southwest of the country. Extensive semi-arid lowlands in the east, south and west are extensions of these highlands. Natural selection associated with highly variable macro- and micro-climatic conditions of the country, seasonality and variability of rainfall distribution and amount and wider temperature variations may favor adaptive diversity within the population and endowed the country with diverse ecosystems that are inhabited by amazingly great diversity of animal, plant and microbial genetic resources (FAO, 2001). Almost all the major domestic animals of the world (cattle, sheep, goat, chicken, camel, horse, donkey and mule) found in different physico-geographic, climatic and socio-cultural variations of the country. In addition to its diverse ecology, Ethiopia has served as one of a historic gateway to domestic animals from Asia (believed to be centre of origin for most of the domestic animals) to Africa favoured the diversification of animal genetic resources. Ethiopia is ranked first in Africa and among the top 10 countries in the world in major farm animal populations (FAO, 2015).

Ethiopia has endowed with large domestic animal population in the world and huge within species and within breed diversity. The numbers of breeds of cattle, sheep, goat, camel, horse, donkey mule, and chickens breeds identified so far are 28, 9, 8, 7, 8, 6, 2 and 7, respectively (EBI, 2016). Breed characterization process is not exhaustive in the country. The current rigorous effort in inventory and characterization has been revealed distinct breeds and will be expected to boost the number of breeds of the country in each species. Domestic animals played significant role in sustaining the life of many rural people in Ethiopia being source of food and or major contributor of food production in the form of draught power. They also have multipurpose roles in providing transport service, ecosystem service, socio cultural roles, source of manure and fuel, saving and insurance service, and source of fiber, hide and skin.

Among the world 1458 breeds of all domestic mammalian and avian species, 17% of all breed are classified as being at risk and larger proportion (58%) are classified as unknown risk status (FAO, 2015). Information on threats level of breed diversity is remains far from complete. Majority of them classified as unknown risk status. Indiscriminate crossbreeding mentioned as a
major threat in developing countries (FAO, 2015). In addition, change in production system, over use, climate change, frequent drought and disease epidemic are threats for farm animal diversity in Ethiopia (EBI, 2014). Without strategically planned interventions that involve both in situ and ex situ conservation approaches genetic erosion of domestic animal genetic resources of the country will continue and may even accelerate. Inventory and characterization works aiming to reveal population size and risk status of non-descript breeds and reverting the ongoing trends of erosion and underutilization of genetic resources at risk through conservation and sustainable utilization is crucial.

Therefore, preparation and implementation of National Strategy and Plan of Action for Animal Genetic Resources for Food and Agriculture involving all stakeholders is important. The rationale for preparation of Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for Food and Agriculture not only recognizes the significant role of animal genetic resources for food and agriculture in the national food security and overall macroeconomic development of the country but also reflects Ethiopia’s commitment in meeting its international obligations.

The implementation of Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for food and agriculture will contribute significantly to eradicate poverty and hunger and to ensure environmental sustainability. Strategic priorities and actions contained in the National Strategy and Plan of Action document are in line with the Growth and Transformation Plan of Ethiopia. Its implementation will also reverse the ongoing trends of erosion and underutilization of the indigenous genetic resources.
2. PROCESS OF PREPARATION OF THE ETHIOPIAN NATIONAL STRATEGY AND PLAN OF ACTION

In 1990, the Food and Agriculture Organization of the United Nations (FAO) initiated the preparation of a comprehensive program for the sustainable management of animal genetic resources at the global level. In 1993, it launched the Global Strategy for the Management of Farm Animal Genetic Resources to guide national, regional and global efforts to strengthen the contribution of domesticated animals and their products to food security and rural development, and to prevent the erosion of animal genetic resources.

In 1997, FAO’s Intergovernmental Commission on Genetic Resources for Food and Agriculture was assigned to guide a country-driven process for the preparation of The State of the World’s Animal Genetic Resources for Food and Agriculture. In 2001, FAO invited all countries to submit Country Reports on the status and trends of their animal genetic resources; the current and potential contributions of farm animals to food, agriculture and rural development; and the state of national capacity to manage these resources; and provide lists of priority actions.

Accordingly, Ethiopia prepared its first country report and submitted to the FAO in 2004, a report that has become part of the State of the first World Animal Genetic Resources Report, produced by the FAO in 2007. It provides a comprehensive national assessment of the roles, values and status of animal genetic resources and highlights the importance of the livestock sector within agriculture. It also indicated that the full potential of animal genetic resources is far from being realized and confirmed the presence of serious erosion of farm animal genetic diversity in the country as well as the causes of genetic erosion.

Preparation of Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for Food and Agriculture is the follow up of preparation of Ethiopia’s Country Report and consequent development of Global Plan of Action that were coordinated by the Food and Agriculture Organization of the United Nations (FAO). Global Plan of Action for Animal Genetic Resources was developed involving 169 countries and was adopted by 109 country delegations at the International Technical Conference on Animal Genetic Resources, held in
Interlaken, Switzerland, from 3 to 7 September 2007. Ethiopia was an active participant of the development process of the Global Plan of Action, and was one of the countries that adopted it. Global Plan of Action for Animal Genetic Resources is comprised of four Strategic Priority Areas and twenty-three Strategic Priorities aimed at combating the erosion of animal genetic diversity and using animal genetic resources sustainably. Its implementation will contribute significantly to eradicate extreme poverty and hunger, and to ensure environmental sustainability.

The first country report on the State of Ethiopia’s Animal Genetic Resources for Ethiopian AnGR was used as a starting point in identifying national priorities to design the strategy, for achieving the sustainable use, development and conservation of animal genetic resources. In addition, reference materials like Global Plan of Action, A Guideline for preparation of national strategies and action plans for animal genetic resources by the FAO (2009), National Growth and Transformation Plans (I and II), Agricultural Growth Program, Livestock Master Plan, Livestock Growth Program, National Biodiversity Strategy and Action Plan, and Convention on Biological Diversity were used.

The Ethiopian Biodiversity Institute (the focal institute) organized a committee to draft Ethiopian National Strategy and Plan of Action for Animal Genetic Resources for food and agriculture. The committee comprised of eight members that belong to four critical stake-holding national institutions namely: the Ethiopian Biodiversity Institute, the former Ministry of Agriculture, Ethiopian Institute of Agricultural Research, National Artificial Insemination Center and two senior experts.
The strategy was finalized after a series of consultations with stakeholders by organizing workshops. Prior to the workshop, questionnaires on the status and trends as well as associated risks to animal genetic resources, conservation, sustainable utilization and development of animal genetic resources were sent to the stakeholders and their responses were collected. Comments and/or suggestions from the workshop as well as responses to the questionnaires were analyzed and incorporated into the document by the drafting committee. Finally, the document was endorsed as the official Ethiopian National Strategy and Pan of Action on Animal Genetic Resources for Food and Agriculture.

The structure of Ethiopian National Strategy and Plan of Action for Animal Genetic Resources conforms to that of the Global Plan of Action. The Global Plan of Action is comprised of four Strategic Priority Areas, namely: 1) Characterization, inventory and monitoring of trends and associated risks, 2) Sustainable use and development, 3) Conservation and 4) Policies, institutions and capacity-building) and 23 Strategic Priorities and 82 action (FAO, 2007) that aim at ensuring conservation, sustainable use and development of animal genetic resources for food and agriculture; poverty alleviation, ensuring food security; rural development as well as guaranteeing fair and equitable sharing of the benefits arising from the use of animal genetic resources for food and agriculture. Alignment of the progress made so far in the country with the global plan of action is presented in Appendix Table 1.
3. SITUATION ANALYSIS

3.1. Human population

Ethiopia is located in the horn of Africa, bordering Eritrea in the north, Djibouti and Somalia in the east, Kenya in the south and South Sudan and Sudan Republic in the west. The country stretches from 3° N of the equator to latitude 15° N and from 33° E to 48° E longitude. With a land area of 1,127,127km², Ethiopia is the ninth largest country in Africa. Ethiopia is an ecologically diverse country, ranging from the deserts along the eastern border to the tropical forests in the south to extensive Afromontane in the northern and southwestern parts (Figure 1). The wide range of altitude has given the country a variety of ecologically distinct areas, and this has helped to encourage the evolution of endemic species in ecological isolation.

![Figure 1. Climatic classification of Ethiopia.](image)

The human population estimate of Ethiopia in 2007 was 73,918,505 with an average annual growth rate of about 2.6% (CSA, 2008). The projected human population is estimated at 106 and 129 million in 2020 and 2030, respectively. The majority of Ethiopians dwell in rural areas.
The proportion of urban dwellers until about 1940s was less than 3%. Over the years, this proportion increased reaching 9.7, 11.4, 13.8 and 15.0% in 1970, 1984, 1994 and 2004, respectively. According to projections made by Genet Mengistu (2004) the proportion of the urban dwellers in 2010 and 2020 will be 17.2% and 19.9%, respectively. Today, Ethiopia is the second most populous country in Africa, next to Nigeria.

The recent study conducted by the Ministry of Finance and Economic Development, Dynamics of Growth and Poverty in Ethiopia (2008) shows that a 1% per capita GDP increase will result in a 1.7% decrease in the poverty head count index. Based on the identified relationship between economic growth and its elasticity to poverty, it is calculated that the poverty head count ratio and the food poverty ratio have declined to 29.2% and 28.2% by the end of the year 2009/10, respectively (MoFED, 2010).

3.2. Livestock resources base

Agriculture is the mainstay of the Ethiopian economy. It accounts for about 45% of GDP, almost 90% of exports, and 85% of employment and livestock are integral parts of the country's agricultural fabric. The most common farm animals of the country can be categorized into mammalian, avian and honeybee species. Cattle, sheep, goats, camels, donkeys, horses and mules are the major farm animals that lie under the mammalian category. Under the avian category, chicken (poultry), ostrich and turkey are found in the country even though the latter two avian species are not widely used.

3.3. Population size

Ethiopia is endowed with large domestic animal population in the world and huge within species and within breed diversity. Based on the 2014 FAO estimate, Ethiopia ranked 1st in Africa and 5th in the world in cattle population with 54 million heads following Brazil, India, China, United States of America having 212, 189, 114, and 89 million, respectively (FAO, 2015a). World rank of Ethiopia in other domestic animals were 1st, 5th, 3rd, 6th and 9th for donkey, mule, bee hives, camel and small ruminant, respectively. Among the world 54 million horses, only few countries have over a million horses, among them China, Mexico, Brazil, USA, Argentina, Colombia,
Mongolia, Ethiopia and Russian Federation are worthy to mention. Trends of farm animal population for over the last 20 years (1993 to 2014) are presented in Figure 2 and 3. Over a 20 years period all farm animals except mule showed an increasing trend.

**Figure 2.** Trends in population size of cattle, sheep, goat and chicken over years. Data source: (FAO 2015a).

**Figure 3.** Trends in population size of donkey, horse, mule and camel over years (1993 to 2014). Data source: (FAO 2015a).
3.4. Within species diversity

Within species diversity of domestic animals is represented by number of breeds in each species. Twenty eight breeds of cattle, 9 breeds of sheep, 8 breeds of goat, 7 breeds of camel, 6 breeds of donkey, 8 breeds of horse, 2 breeds of mule and 7 breeds of chicken breeds are identified so far (Wilson 1984; Tadelle Dessie, 2003; Tesfaye Alemu Tucho, 2004; Solomon Gizaw, 2008; Kefena Effa, 2011; EBI, 2016). Ethiopian breed and ecotype lists by name are presented in Appendix 2. Breed characterization process is not exhaustive in the country. The current rigorous effort in inventory and characterization has been revealed distinct breeds and will be expected to boost the number of breeds of the country in each species. For instance, recent studies made by EBI (unpublished data) in the western lowland of the country revealed presence of three plumage type (naked neck, frizzled and normal) chickens (Figure 4) and different breeds of sheep (e.g. Ruthana and Begayit) and goat (e.g. Begayit).

Most of the breeds (more than 98%) in Ethiopia are indigenous to the country (CSA, 2015), evolved over centuries, managed in a remarkable environments (highland, dry mountain, lowlands, arid and forest) and they are often expected to possess unique genetic traits that enable their survival in those diverse range of production environments and developed specific necessary features to deal with harsh environments such as severe feed and water scarcity, diseases challenge, extreme hot and cold environments and unpredictable long drought periods etc. In domesticated mammals, the hump of the Zebu and the tails of fat-tailed and fat-rumped sheep are striking examples of selection for fat deposition. Within species differences to extreme environments also exist. For example, Wuletaw et al. (2011) found breed differences in high altitudes (>3500 m) in Ethiopia, with locally adapted Simien cattle having a lower range of oxygen saturation than temperate breeds; they concluded that Simien cattle are genetically adapted to high altitude by largely eliminating the hypoxic pulmonary vasoconstrictor response. Great variation in the hair and coats of most domestic animal species observed. For example sheep and goat breeds in alpine regions have particularly thick wooly coats while breeds in the lowland lack wool/hair. Coat and plumage coloration were also selected by the environment, with light colored animals being more adapted to hotter environments and dark colored animals to cooler environments (Hall 2004).
The existence of both *Bos. taurus* and *B. indicus* cattle, all tail forms of sheep (short fat-tailed, long fat-tailed, thin-tailed and fat-rumped sheep), both wooly and hairy sheep and existence of both horned and polled sheep breed are evidences of huge genetic diversity in the country (Figure 5). Even though Zebu type (*indicinus*) or humped cattle are dominantly found, the first African cattle were humpless *Bos taurus*. They initially dispersed north, as well as south to the borders of the tropical rainforests. Today, the only remaining descendants of these indigenous African *taurine* cattle in East Africa are the trypanotolerant Sheko breed from Ethiopia (FAO, 2015b). Sheko cattle are now being intensively cross-bred with Zebu cattle (*Bos indicus*), and their unique genetic make-up is disappearing through unbalanced genetic admixture.

**Figure 4.** Chicken with different plumage types: naked neck hen (left), frizzled hen (middle) and normal feathered cock (right). Photo by EBI.
Figure 5. Some of Ethiopian sheep breeds showing genetic diversity; (a) thin tailed Gumuz, (b) short fat-tailed Menz, (c) medium fat-tailed Bonga, (d) long fat-tailed Ruthana, (e) fat-rumped Black Head Somali, (f) wooly and black Menz (g) wooly white Farta, (h) horned Semien, (i) hairy sheep Afar breed. (Photo source: Solomon Gizaw, EBI)

3.5. Within breed diversity

Livestock breeders in the developed world often favor uniformity in morphological characters and productivity, but in the tropics, diversity in morphological characters like coat colour may be preferred for ceremonial reasons, or simply to facilitate the identification of individual animals. Natural selection for adaptation and selection for multipurpose roles by smallholder farmers has contributed for the within breed diversity. For example preference of smallholders for different coat colours in their flock for socio-cultural occasions and manufacture of colored traditional clothes like blanket and carpet enriched within breed diversity of Menz sheep. Menz sheep have
shown more variability in coat color type, ear form, head profile and coat color pattern among other qualitative characters with coefficient of unalikeability ($u^2$) of 0.81, 0.61, 0.52, and 0.44, respectively (Getachew et al., 2005). This is obviously an indication of good reservoir of genetic diversity (Figure 6). Within breed genetic variability in productive, reproductive and adaptive performances were also documented in different species of farm animals (Solomon Gizaw, 2008; Gizaw et al 2013; Tesfa and Garikipati, 2014; Getachew et al., 2015; Wondmeneh et al., 2015).

![Figure 6. Within breed coat colour diversity of Highland Zebu breed in Gojjam (left) and Metekel (right) areas, Ethiopia.](image)

### 3.6. Exotic breeds

Quite large number of exotic domestic animals mainly cattle, sheep, goat and chicken has been introduced into the country. The purpose of importation of exotics into the country was to improve milk, meat and wool production; and for research.

**Exotic cattle breeds:** The breeds so far imported are Holstein-Friesian, Jersey, Brown Swiss, Hereford, Brahman, Angus and Simmental. Out of the exotics, Holstein-Friesians, Jersey, and their crosses with different indigenous breeds are being mostly used in medium and low input system of the country. The approach is by producing crossbred animals using exotic breed as sire line and indigenous breeds (mainly Ethiopian Boran, Horro, Fogera, Arsi, Begait and other highland zebu types) as dam line.
**Exotic sheep breeds:** Exotic sheep breeds introduced into the country for their wool and mutton production as well as for research. Introduction of Merino, Romney, Corriedale, Hampshire, and Rambouillet (between 1944 and 1967) was targeted to cross them with local sheep breeds aiming to supply wool for the Debre Berhan blanket factory. They were not preferred by farmers due to their physical characteristics (face covered with hair, absence of horn in males and thin tail), fatty nature of wool making it difficult to spin wool in the traditional way, and the suspected poor skin quality. In 1983, Awassi breed was introduced from Israel and has been well accepted by Ethiopian farmers due to its similar physical appearance to that of local breeds. Dorper sheep were introduced into the Jijiga area (Somali Region) in the late 1980s. All sheep were looted from the ranch during the political instability in 1991. A total of 120 Dorper sheep (ewes and rams) were imported again from the Republic of South Africa in 2007 by the Ethiopian Sheep and Goat Productivity Improvement Program (ESGPIP) (Awgichew and Gipson, 2009). Regional research institutions also showed interest in Dorper sheep and additional ~250 sheep were imported in 2011, aiming to establish new nucleus flocks. Currently Awassi and Dorper sheep has been used for the improvement of local breeds in different parts of the country.

**Exotic goat breeds:** The aim of introducing exotic goat breeds was to improve milk or meat production of the local goat breeds. Anglo-Nubian and Toggenberg are exotic goat breeds that were introduced by Farm-Africa and higher learning institutions. Thus, crossbreeds between Anglo-Nubian and Hararghe Highland and Anglo-Nubian and Somali are being used for milk production by smallholders in central, eastern, southeastern, and southern parts of the country. Toggenberg and their crosses with Hararghe Highland are used for research purposes at the Haramaya and Hawassa Universities. Recently, Boer goats’ semen and live animals have been imported from the United States of America and the Republic of South Africa for multiplication and crossbreeding purposes to improve meat production of local goats. Boer goat’s semen was also imported initially from the United States of America and lately from the Republic of South Africa along with the live animals for the purpose described above.

**Exotic chicken breeds:** Several layer, broiler and dual-purpose exotic chicken breeds or hybrids introduced into the country are being used for food and agriculture. Rhode Island Red (RIR),
White Leghorn, Lawman Brown, Cobb-500, Fayoumi, Bovans Brown, Arob Acre and Bubcocks, Potcheftsroom Koekoek, Dominant Brown D102, Lahhman Silver, Hubbard Classic, Hubbard JV and ISA Brown are reared by small and large-scale commercial producers in urban and peri-urban areas. Besides, RIR, White Leghorn, Bovans Brown and Potcheftsroom Koekoek, as well as their crosses with indigenous chicken are used by rural smallholders for egg and meat production. Many past efforts to make smallholder chicken production more productive in sub-Saharan Africa based on exotic genotype have failed to deliver impact because they tried to use high-producing genotypes created for intensive temperate feeding systems. Recently, African Chicken Genetic Gain (ACGG) project has been imported more productive tropical chicken ecotypes and testing along with local ecotypes aiming to produce high producing but low input chicken.

3.7. Livestock products and services

3.7.1. Milk
Despite the large livestock resource base and an ecological setting suitable for dairy production, the country is not yet self-sufficient in milk production. The growth in milk production has been slow. Although the total amount of milk produced has increased due to increases in cattle and human population, the per capita milk production appears to have declined from 26 liters per annum in 1980 to 22 liters per annum in 1993 and 19 liters per annum in 2000, one of the lowest in the world. Milk is produced in all agro-ecological zones of the country and mainly from cattle followed by goats and camels (MoA, 2007).

Milking cows in the traditional sector have an average lactation length of 190 days and an average milk yield of 1.9 liters per day, excluding what the calf has suckled (MoA, 2005). Although the figures represent very low levels of productivity, the genotype of these cows cannot be totally blamed for such a limited level of productivity under the present standards of feeding and management. The milk thus produced is a function of climate and its interactive influence in the quantity and quality of feed, the presence of disease and parasites, and initialization of technology to alleviate nutritional and health limitations (MoA, 2007).
Four main dairy production systems can be identified in the country: a small commercial sector consisting of large private and state farms; small urban/peri-urban systems rising cross-bred or both cross-bred and local cattle and having access to milk collection centers or co-operatives; smallholder mixed farming systems in the highlands using indigenous breeds; and pastoral/agro-pastoral system in the lowlands. Reliable figures on the relative importance of these systems in terms of number of farms/herds, dairy population or share of milk produced are not available. However, a rough estimate indicates that out of the total 1.43 billion liters of milk produced annually, 900 million liters (63.3%) is produced by rural small-scale mixed farms in the highlands, 205 million liters (14.3%) by small urban/peri-urban farms in the highlands, 320 million liters (22.4%) by pastoral/agro-pastoral producers in the lowlands and 5 million liters (less than 0.03%) by large private and state farms (Ahmed et al. 2003; Feleke and Geda 2001).

Extrapolating the labor requirement figures per 1000 liters of milk produced to the systems level, the urban/peri-urban system, which produces 205 million liters of milk a year, creates annually 4.4 million person days of work or 14,760 full-time jobs (assuming a 300 day working year). The figure increases to 16,400 full-time jobs if it is assumed that 270 days are worked per year. The small-scale mixed farming systems, which produce 900 million liters of milk annually, can create 166 million person days of work, equivalent to 553,500 full-time jobs at 300 days per year (615,000 jobs at 270 days per year). Employment figures for the pastoral livestock system, which produces 320 million liters of milk, could not be calculated due to lack of information.

3.7.2. Meat

According to FAO statistics, red meat production in Ethiopia showed a steadily rising trend over the 20-year period of 1993-2013 (FAO, 2015a). Availability per person increased marginally over the same period from about 5.3 kg per person per year to about 5.6 kg per person per year 14. Beef production increased by about 57% over the period and was equivalent to more 70 to 80% of all red meat both at the beginning and at the end of the period. The production of poultry meat increased by about 58%; between 1993 and 2013 and its availability per person by about 4.5%. Beef production in Ethiopia had better performance than world production over the review period but poultry meat performance was very much worse. Total meat availability in relation to
the national stocks of domestic animals remains, however, derisory in comparison to the capability. There is a paucity of reliable data on meat production in Ethiopia over the stipulated 30 year reference period. FAO data, which may not be exactly correct are nonetheless indicative of quantities and trends and are here used as a proxy for reliable national data. These figures are calculated from FAO data: within Ethiopia it is generally considered that consumption per person has declined in recent years; World Meat Production Trends and Overall per Caput Availability in the 30-year Period 1976-2005 (FAO 2015a).

### 3.7.3. Draft power

About 80% of Ethiopian farmers use animal traction to plough their land. Both the mean area cultivated by a farm household and their yields per hectare are positively associated with cattle ownership and ploughing, in comparison to hand cultivation. The value of the animal draught power input into arable production can be estimated at 26.4% of the value of annual crop production. This calculation transfers 26.4% of the value of the production of annual crops from the arable to the livestock subsector. Based on these figures, nearly a third (31%) of the total gross value of livestock output is represented by the value of animal draught power as an input into crop cultivation. As a livestock service (albeit one provided by agriculture for agriculture) rather than a livestock product, ploughing services are classified for GDP purposes as animal husbandry service activities under the agricultural sector of national accounts (IGAD, 2011).

Transportation of the harvested crops to and from threshing sites, threshing itself, transportation to and from the market is conducted by the farm animals. Similarly, transportation of water, firewood, mobile houses, construction materials and other goods is conducted by farm animals and they are the main means of human transport.

Historically, pack donkeys are extremely important in both rural and urban economies of Ethiopia. Donkeys have long been important in the history of salt trade in northern Ethiopia and are represented in traditional Ethiopian art. Under the Pharaoh Pepi II (2270 BC) caravans with pack donkeys were trading with Punt (Ethiopia) (Roger & Kevin, 2000). Currently, it is also
estimated that 75 percent of farms in the country are located more than a day and a half’s walk from all-weather roads (FAO, 2015b), and equines are therefore vital for the transportation of farm produce to the market. Their role in cultural and social ceremonies is significant. They are also used for cultural issues such as dowry, racing and spiritual offerings. In some rural areas, they are main indicators of cultural prestige.

3.7.4. Income source

The contribution of livestock to agricultural GDP is the most commonly quoted single measure of livestock’s contribution to the overall national economy. It is therefore a very important figure (IGAD, 2011). In 2008-09 according to MoFED the gross value added of crop production was 6.385 billion USD. This figure does not include all of the intermediate costs of crop cultivation, now estimated at an additional 1.229 billion USD for animal traction. When these cultivation costs are deducted from the gross value of crop output, the revised estimate of the gross value added of crop production is 5.156 237 billion USD billion birr. In the same year, the gross value added by all branches of livestock production (ruminant livestock, poultry and bees) was 4.248 billion USD (including the value of ploughing services) at prices at that time. Total re-estimated agricultural gross value added in 2008-09 was therefore 9.404 billion USD. If we include the value of ploughing services, livestock provided 45% of agricultural GDP in 2008-09. 2008-09 MoFED estimates for place livestock’s contribution at about 25% of total agricultural GDP. The gap between MoFED estimates of the contribution of livestock and the estimates in this report suggests that the significance of livestock relative to crop production has been considerably underestimated in past calculations of agricultural GDP (IGAD, 2011).

Accounts of agricultural GDP considers the direct use value of livestock output (the immediately useful products and services both traded and for home consumption that livestock provide). Livestock also provide less tangible but no less important economic benefits. For rural smallholders, the most commonly cited economic functions of this kind are the use of livestock as savings, as assets that provide interest-free credit, and as insurance to mitigate risk. Without access to formal financial institutions, many farmers and pastoralists depend instead on their livestock for these important financial services (IGAD, 2011).
The value of official livestock and meat exports has fluctuated widely over the decades. However, official exports of hides, skins and leather is relatively more stable. The LDMPS (2007) provides annual export figures for the value of live animals, meat and hides/skins from 1984 to 2004. According to these figures, hides and skins averaged a yearly export value of $52,160,000 USD, livestock averaged $3,390,000 USD, and meat $2,380,000. Over this twenty-one year period, hides and skins provided on average 90% of official livestock sector exports, live animals provided 6% and meat 4%. In the 1990s, hides, skins and leather were Ethiopia’s second largest export earner, after coffee. Export of live animals, meat and hides, skins and leather products has held steady at about 11% of the national total, with declines in the value of skins, hides and leather being offset by roughly comparable increases in live animal exports. By 2008-09 the position of hides, skins and leather exports had declined to the point where these constituted less than half of the livestock sector’s contribution to official exports (IGAD, 2011).

Including cross border trade, live animals were the second most important national export by value in 2002-03, following coffee and the third most important export in 2008-09, following coffee and oilseeds. The revised total value of livestock and their products now stands at about 20% of all national exports, up from 11%, according to official calculations of LMA (IGAD, 2011).

Even including the cross-border trade, the vast bulk of Ethiopia’s livestock output is consumed domestically. Household expenditure on livestock products was estimated in 2008-09 at 1.086 billion USD. Generous estimates of the total value of livestock sector exports places their value at slightly more than 0.229 billion USD in that year. Domestic consumption outweighs exports by a factor of nearly five to one. Based on the relative importance of livestock related manufactures to each scale of enterprise, manufactures using livestock products contributed approximately 4.9% or 0.035 billion USD to total manufacturing GDP in 2008-09 (IGAD, 2011).
3.7.5. **Ecosystem services**

For the vast majority of small-holders, nutrient recycling through manure compensate for lack of access to chemical fertilizer, and help to maintain the variability and environmental sustainability of production (National Livestock Development Program, 1997; Steinfeld *et al.*, 1998). A wide variety of animal breeds supply important ecosystem services in specific landscapes, in particular grazed ecosystems and difficult terrains, that otherwise cannot be used for other uses such as crop production. Such productive links between breeds and landscapes need to be maintained and better managed, through appropriate land-use policies and strategies.

Livestock play a significant role in maintaining soil fertility. When spread on cropland, animal manure increases soil organic matter, and improves soil texture. For the vast majority of small-holders, nutrient recycling through manure, compensate for lack of access to chemical fertilizer. While global fertilizer use increased from 81 to 96 kg/ha of cropland, fertilizer use in Sub-Saharan Africa in 1988 to 1990 was estimated to be only 11 kg/ha of harvested land. A rate projected to increase to only 21 kg/ha harvested land by 2020 (Animal Agriculture and Global Food Supply, 1999).

3.7.6. **Trends in livestock resources base**

Despite, *inter alia*, the uncompromising contributions the livestock sub sector plays in the livelihoods of the majority of Ethiopians and in the overall national economic development, the attention given to develop the sub sector has not been so significant. Needless to say, this is despite their huge diversity and intrinsic capability to adapt to adverse and ever-worsening environmental conditions and the future implications of this potential. Thus, the fate of production and productivity of the sub sector is still left to depend on the scarce and ever-declining marginal and commonly used lands. Provision of health facilities and services are far below the required minimum. They have been left to undergo untraceable levels of inbreeding and crossbreeding. And yet, depicted as the "low performers", they are expected to gradually give way to other "best performing" genotypes. Consequently, if indiscriminate distribution of the "best performing exotic genotypes" to different parts of the country, without delineating areas
for keeping and maintaining high producing farm animals, is to continue at the current pace, the
gene pool of the indigenous animal genetic resources would be lost in the near future before they
are even fully described and understood (IBC, 2004). For example, Sheko and Fogera cattle
breeds are reported as threatened breeds.

3.7.7. Trends in livestock products

Output of meat and milk in Ethiopia is low and growth in productivity has been lagging behind
population growth rates. As a consequence, the trend in per capita output of livestock products
has been negative. Between 1995 and 2000, total milk and meat production increased by 2.6%
and 1.4% per year, respectively. The picture for milk appears much worse than for meat.
Proportion of per capita intake of calories (5.8%) and proteins (13.7%) as compared to 6.3% and
19.5% in SSA and 26.5% and 56.1% in developed countries is also relatively smaller (FAO,
2001).

Additionally, demand for livestock products is expected to increase as a result of urbanization.
The proportion of urban population in Ethiopia has increased from about 13.8% in 1994 to
15.0% in 2004 and is expected to reach 19.9% in 2020. Accordingly, the rural agricultural sector
is expected to feed 21.2 million urban populations in 2020 compared to about 9.0 million in
2000. While the overall population increase suggests that overall food supply has to increase
greatly, higher urbanization would mean a shift in dietary preferences towards higher quality
food items such as meat, milk and eggs. However, increase in total number of livestock (cattle,
sheep and goat) did not show improvement in total meat productivity (Figure 7)
3.7.8. Threats to livestock resources

Ethiopia has long been recognized as a center of diversity for domestic animal genetic resources. It appears that the country has served as a gateway to genetic material from Asia to Africa and its diverse ecology gave rise to further diversification and thus contributed to develop the large number of genotypes the country host today.

Loss of local breeds will cause cultural erosion and diminish the ability of communities to maintain their cultures and livelihoods. Structural changes in the livestock sector may result in a situation where the previous keepers of a breed are no longer in a position to maintain it: In such circumstances, ways need to be identified to preserve the breed, as part of the country’s and global heritage of animal genetic resources.
The main factors compromising the genetic integrity of local indigenous domestic resources of Ethiopia are: scarcity of feed and water; increasing focus to rely on few high input-output exotic breeds, transforming traditional systems into external input-oriented systems; inbreeding, indiscriminate crossbreeding (with exotics and among locals); shrinking of grazing areas through bush encroachment and expansion of cultivated agriculture; outbreaks of diseases and parasites; climate change; unpredictable and recurrent drought, lack of animal breeding policy; poor coordination between stakeholders, lack of participatory approach to involve pastoralists and farmers in planning and decision making. Recurrent drought and climate change resulted in loss of valuable genetic resources. Breeding animals with valuable genetic recourses are either died or sold during drought time. Furthermore, pastoralists and smallholder farmers tempted to sell their fast growing animals for their immediate cash need.

Loss of animal genetic resources reduces opportunities to develop rural economies. It may also have negative social and cultural impacts, given the long history of domestication and the resulting incorporation of domestic animals into community cultures. Replacement of indigenous breeds could result in the loss of products and services preferred by local people, and the conservation of local breeds must therefore be considered within the broader context of sustaining rural communities and their existing economic foundations. Moreover, such losses may limit future development options, based on animal products and services from specific breeds, that otherwise could have added considerable micro- and macro-economic values as consumer demands become more varied.

The loss of local breeds may have negative environmental impacts in some production environments, especially in dry lands and mountainous areas. Locally adapted breeds play significant roles in landscape management, vegetation control and rangeland ecosystem sustainability.
3.8. Existing policies and strategies related to conservation, development and access and benefit sharing of AnGR

3.8.1. National policies

The Ethiopia Federal constitution (August 21, 1995) stipulates that current and future legislation and the conduct of the Government of Ethiopia should conform to a Bill of Rights. The basics of sustainable development and environmental rights are entrenched in Articles 43 (The Right to Development) and 44 (Environmental Rights). The establishment of a Federal Body to oversee environmental health of Ethiopia, i.e., the then Environmental Protection Authority (EPA) now Ministry of Environmental, Forest and Climate Change (MoEFCC), has emerged from the requirements of the Constitution itself (Proclamation No. 9/1995). In view of the potential inflicts of certain social and economic development on environment and responsibilities vested on all to safeguard a healthy environment, (Environmental Pollution Control Proclamation (Proclamation No. 300/2002) was placed as required by Article 55(1) of the Constitution of the Federal Democratic Republic of Ethiopia.

Ethiopian Climate Resilient Green Economy Strategy (CRGE, 2011)
Ethiopian Climate Resilient Green Economy Strategy (CRGE) serves as a green growth strategy to attain what is set forth in Growth and Transformation Plan of the country, which is reaching at middle income status before 2025 with zero net carbon emission. To achieve this, CRGE follows sectoral approach such as exploiting the vast hydropower potential; large-scale promotion of advanced rural cooking technologies; efficiency improvements to the livestock value chain; Improving performance and management in these resources and the activities planned to be undertaken in the strategy. Adoption of agricultural and land use efficiency measures and protecting and re-establishing forests for their economic and ecosystem services, which include using of them as carbon stocks, (REDD+), are among the actions that have direct relation with biodiversity conservation and sustainable use.
Regarding, implementing CRGE, key sectors have established sectoral CRGE units and developed their sectoral adaptation plans, including Agriculture Sector Programme of Plan on Adaptation to Climate Change (MoA, 2011). The Agriculture Sector Programme of the Plan on Adaptation identified loss of biodiversity as one of the impacts of climate change. Accordingly the plan suggested the enhancement of the on-going measures to conserve ecosystem level biodiversity through protected area networks and through sustainable use and management systems; ensuring equitable benefit sharing and preserving Ethiopia’s biodiversity in terms of its domestication of agricultural crops and the high level genetic diversity of both crops and livestock, as key climate change adaptation measures.


Growth and Transformation Plan II (GTP) is a five year plan (2015/16-2019/20) and is directed towards achieving Ethiopia’s long term vision and sustaining the rapid and broad based economic growth anchored on the experiences that has been drawn from implementing development policies and strategies and undertaking policy measures for the challenges that has been surfaced in the course of implementation. The overriding development agenda of GTP is to sustain rapid and broad-based growth path witnessed during the past several years and eventually end poverty.

Ethiopian strategy for sustaining the rapid and broad-based growth path hinges on seven pillars, namely: sustaining faster and equitable economic growth, maintaining agriculture as a major source of economic growth, creating favorable conditions for the industry to play key role in the economy, enhancing expansion and quality of infrastructure development, enhancing expansion and quality of social development, building capacity and deepen good governance, and promoting women and youth empowerment and equitable benefit. The objectives and activities of GTP are, *inter alia*, linked to environmental issues in Ethiopia National legal frameworks.


The Conservation Strategy of Ethiopia (CSE), approved by the Council of Ministers in 1996, provides a comprehensive and rational approach to environmental management in a very broad sense, covering national and regional strategies, sectoral and cross sectoral policies, action plans
and programs as well as providing the basis for development of appropriate institutional and legal frameworks for the implementation (MoEDAC, 1996). It also deals with providing a strategic framework for integrating environmental planning into a new and existing policies and projects. It mainly recognizes the importance of incorporating environmental factors into development activities from the beginning so that planners may take into account environmental protection as an essential component of economic, social and cultural development.

**Proclamation on Rural Land Administration and Use (No. 456/2005)**

This law defines the state ownership of rural land and the tenure rights of the land occupant including rights to ‘property produced on his land’, rights of inter-generational tenure transfer, and rights of exchange and limited leasing rights. Provisions are made for the registration and certification of tenure rights. The rural land administration and land use laws are being implemented by the regional states.

**National Policy on Biodiversity Conservation and Research (1998)**

Ethiopian Biodiversity Institute (EBI) is to undertake conservation and promote development and sustainable utilization of the country’s biological resources, namely: plants, animals and microbial genetic resources as well as associated traditional knowledge and the ecosystems. On the basis of national legislation, the institute has the responsibility and duty to implement international conventions, agreements and obligations on biodiversity to which Ethiopia is a party.

**National Biodiversity Strategy and Action Plan (EBI,2015-2020)**

As a party to the Convention on Biological Diversity (CBD), Ethiopia has prepared and submitted National Biodiversity Strategy and Action to the secretariat of the convention dealing on the conservation, sustainable use and access and benefit sharing of the domestic farm animal genetic resources of the country.
Access to Genetic Resources and Community Knowledge, and Community Rights
Proclamation (No. 482/2006) and Regulation (169/2009)

After ratifying the Convention on Biological Diversity (CBD) and International Treaty on Plant Genetic Resources for Food and Agriculture, as well as adopting international model laws and guidelines, Ethiopia has issued Access to Genetic Resources and Community Knowledge, and Community Rights Proclamation (No. 482/2006) and Regulation (169/2009). The legislations focus on prior informed consent, material transfer agreement, Multilateral System of Access and how to implement relevant activities.

3.8.2. International policies

There is a growing international interests and commitment on sustainable utilization, development and conservation of AnGR to reverse the ongoing erosion of AnGRs due to many reasons. Accordingly, the global plan of action for animal genetic resources was developed by involving the participation of 169 countries including Ethiopia. It was adopted by 109 countries delegations of the International Technical Conference of Animal Genetic Resources held in Interlaken, Switzerland, from 3 to 7 September 2007. This proposes specific measures to reverse the ongoing trends of erosion and underutilization of animal genetic resources.

Interlaken declaration on Animal Genetic Resources is another low adopted by the 109 countries, by which they confirmed their common and individual responsibilities for the conservation, sustainable use and development of the AnGR for food and agriculture; for world food security, for improving human nutrition status and for rural development. They also committed themselves facilitating access to these recourses, and ensuring the fair and equitable sharing of the benefits from their use.

3.9. Current status of implementation

Similar to the world report, majority of the breeds risk status is unknown and less effort has been made in animal genetic resource management, particularly in developing countries, breed inventory, characterization, assessing the risk status of the breed and conservation programs for threatened breeds in Ethiopia is at infant stage.
Considering the national and international policies and declarations mentioned in the previous sub topic, actions related to characterization, inventory, conservation and sustainable utilization of farm animal genetic resources have been implemented in the country, mainly by Ethiopian Biodiversity Institute, research institutions and Universities. Efforts in breed characterization and inventory based on phenotypic information, production system studies, initiation of in situ and ex situ conservation programs are promising in the country. Ethiopian government has given more attention to maintain genetic diversity of breeds under threat. Identification of threatened breeds and revisiting and maintaining genetic diversity is in place. Many (more than 20) farm animal breeds of cattle, sheep, goat, chicken and horse are being conserved in situ using community based conservation and breeding program in different regions of the country. Reviving process of small number of Kundudo feral horses found in Kundudo Mountain at altitude of above 2900 m in eastern Hararghe zone, with full participation of the community is also promising. Ex situ conservation of five threatened cattle breeds has been implemented. More than 40, 000 straws of semen is conserved from Sheko, Fogera, Begayit, Irob and Boran cattle breeds and has been used to revive threatened breeds through artificial insemination. However, animal identification, establishing national database for recording and breed level survey remain priority. Progresses made so far in Ethiopia coinciding to the global plan of action (FAO, 2007) are presented in Table 1.
Table 1. Status of implementation of inventory, characterization, conservation and sustainable utilization of AnGRs in Ethiopia coinciding to the Global Plan of Action

<table>
<thead>
<tr>
<th>Strategic Priority Areas of the Global Plan of Action</th>
<th>National strategic priorities as contained in the Country Report or other relevant Strategies</th>
<th>Status of implementation of each strategic priority</th>
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<tbody>
<tr>
<td></td>
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<td>Completed</td>
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<tr>
<td>Characterization, inventory and monitoring of trends and associated risks</td>
<td>1. Identification and description of breeds of farm animals</td>
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<td></td>
<td>2. Molecular genetics characterization and classification into breeds</td>
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<td></td>
<td>3. Breed level census</td>
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<td></td>
<td>4. Conduct survey on breeds biogeographic distribution</td>
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<tr>
<td>Sustainable use and development</td>
<td>5. Devise effective research and development programs geared towards better utilization of AnGR</td>
<td>X</td>
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<td></td>
<td>6. Collaborate and network with various national, regional and international institutions.</td>
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<td>7. Form breed societies and breeders associations</td>
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<tr>
<td>Conservation</td>
<td>1. Effective research and development programs geared towards better conservation of AnGR</td>
<td>X</td>
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<td></td>
<td>2. Collaboration and networking with various national, regional</td>
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<td>National strategic priorities as contained in the Country Report or other relevant Strategies</td>
<td>Status of implementation of each strategic priority</td>
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<tr>
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<td>and international institutions.</td>
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<tr>
<td>3. Implementation of <em>in situ</em> and <em>ex situ</em> conservation of threatened breeds</td>
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<tr>
<td>Policies, institutions and capacity building</td>
<td>1. Developing institutional set up and strengthening of coordination between stakeholders.</td>
<td>X</td>
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<tr>
<td></td>
<td>2. Capacitating of institutions engaged in AnGR.</td>
<td>X</td>
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<td></td>
<td>3. Promoting the roles of professional associations, civil societies and private sector.</td>
<td>X</td>
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<tr>
<td></td>
<td>4. Promoting formation of breeds and breeders associations.</td>
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<td></td>
<td>5. Capacity building in animal breeding, reproduction, nutrition, health and other related disciplines.</td>
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<td></td>
<td>7. Develop database management system, information network and early warning system at a national level.</td>
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<tr>
<td>Strategic Priority Areas of the Global Plan of Action</td>
<td>National strategic priorities as contained in the Country Report or other relevant Strategies</td>
<td>Status of implementation of each strategic priority</td>
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<tr>
<td>8. Establishment of a national recording system.</td>
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<tr>
<td>9. Establish systems to monitor the status and trends of breeds.</td>
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</table>

3.10. Gaps and constraints

The following gap and constraints were identified in the inventory, characterization, conservation and development of the domestic animal genetic resources of Ethiopia.

- Absence of national survey and census program to identify and quantify animal breeds.
- Absence of national animal breeding policy.
- Limited resource mobilization towards animal genetic resource conservation and production of the required technical expertise.
- Limited capacity of the national animal genetic resources center with cryo-conservation facility.
- Lack of centralized database and information on the classification, description and identification of local breeds/strains; individual animal identification, performance and pedigree recording for each domestic animal species along with their main production systems and environments under which they are maintained.
- Lack of understanding, of the traditional domestic animal genetic resources husbandry practices in the context of indigenous knowledge.
- Limited information on the geographic distribution and structure of the genetic variation in the existing breeds/populations to develop sound production and conservation strategies.
- Lack of properly stratified species based, commodity oriented and production system directed domestic animal genetic resources utilization strategy and management plan.
• Absence of monitoring and evaluation system on indiscriminate use of genetic material in the form of artificial insemination and distribution of exotic live animals for crossbreeding purposes
• Lack of interest and incentives to promote the use of indigenous breeds for production or conservation and undervaluation of the genetic diversity.
4. NATIONAL STRATEGIC PRIORITIES AND ACTIONS

National strategic priorities, actions, and tasks for conservation, sustainable utilization, and development, ensuring the fair and equitable sharing of the benefit of AnGRs are presented in the following tables.

1.1. Purpose of this strategic plan

This strategy is prepared to:

- Guide implementations of breed inventory, characterization and breed level census.
- Encourage AnGR development and conservation programs for sustainable utilization of AnGRs.
- Enhance capacity building and participation of all stakeholders to mobilize resources for effective breed characterization, inventory, development and conservation activities.

1.2. Vision

- By 2025, conservation and sustainable utilization of animal genetic resources of the country is attained and contribution of the sector to poverty eradication and improved quality of lives of the Ethiopian people is improved.

1.3. Goal

- To ensure the livestock diversity is conserved and sustainably utilized for food and agriculture and to promote its use in support of national food security and sustainable development.

1.4. Objectives

- To characterize, make inventory and monitor breeds of farm animal genetic resources and assess their status and associated risks,
- To promote sustainable use and development of farm animal genetic resources for food security, sustainable agriculture and human well-being,
To ensure conservation of farm animal genetic resources diversity for present and future generations and halt loss and erosion of these crucial resources,

To put in place effective policies, institutions and capacity to ensure use sustainable development and conservation of animal genetic resources for food and agriculture.

In order to achieve the vision, goal and objectives of the strategic plan of action, the following points will be given due emphasis in the implementation:

- Recognize and promote the role of indigenous knowledge, innovations and practices relevant to the conservation of animal genetic resources and their sustainable use,
- Ensure a fair and equitable sharing of the benefits arising from access/use of animal genetic resources and associated indigenous knowledge,
- Meet the needs of pastoralists and farmers, individually and collectively, within the framework of national law, to have non-discriminatory access to genetic material, information, technologies, financial resources, research results, marketing systems, and natural resources,
- Assist national regional states and institutions to establish, implement and regularly review national and regional priorities for the sustainable use, development and conservation of animal genetic resources,
- Strengthen federal and national regional states’ programs and enhance institutional capacity, namely education, research and training to address the characterization, inventory, monitoring, conservation, development and sustainable use of farm animal genetic resources,
- Promote activities aimed at raising public awareness and bringing the needs of sustainable use, development and conservation of animal genetic resources to the attention of concerned stakeholders.
1.5. Strategic priority areas

The 15 strategic issues and 68 actions outlined under four strategic priority areas that have been set to realize the goal with their respective expected outputs, implementers and action plans are indicated as follows.

- **Strategic priority area 1**: Characterization, inventory and monitoring of trends and associated risks
- **Strategic priority area 2**: Sustainable use and development
- **Strategic priority area 3**: Conservation
- **Strategic priority area 4**: Policies, institutions and capacity building
Strategic priority area 1. Characterization, inventory and monitoring of trends and associated risks (US$ 6,000,000)

### Strategic priority 1. Inventory and characterization of animal genetic resources (US$ 4,500,000)

**Action 1.** Promote participatory approaches for characterization and inventory that foster collaboration among all stakeholders

**Tasks:**
- Synthesizing of an approach that promotes participatory characterization and inventory with the stakeholders.
- Identifying critical stakeholders.
- Identify venues to conduct stakeholder workshops.
- Presenting, discussing and agreeing on the approach that promotes participatory characterization and inventory with the stakeholders.
- Signing the MoUs on the agreed upon document that promotes participatory characterization and inventory with the stakeholders.
- Compilation of report on synthesized approach and the outcomes of the workshop.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000US$)</th>
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<tr>
<td></td>
<td>Four stakeholder workshops conducted and MoU for participatory characterization and inventory with stakeholders signed.</td>
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</table>

**Action 2.** Establish/strengthen/initiate national and regional information system and network for inventory and characterization

**Tasks:**
- Identifying of gaps in national and regional information system needs and networks for...
inventory and characterization.

- Identifying means that will fill the identified gaps in national and regional information system needs and networks for inventory and characterization.
- Putting in place of national and regional information system and networks required for participatory inventory and characterization.
- Compilation of report on the information systems put in place and networks established.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
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</table>

**Expected outputs**

- A national information system and network for inventory and characterization established
- A regional information system and network for inventory and characterization initiated and strengthened

**Action 3. Strengthen breed level characterization of animal genetic resources**

**Tasks:**
- Reviewing of the existing data on breed level characterization
- Reviewing and standardization of methodologies for breed level characterization on species basis
- Upgrading of human capacity to breed level characterization using on-job and short term trainings
- Setting of priorities for breed level characterization on the species basis
- Conducting of breed level characterization
- Compilation of report on the outcomes of breed level characterization
### Lead implementation organization
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</table>

### Expected outputs
- Characterized breeds of all domestic farm animals

**Action 4.** Conduct inventories of location, population status and trends of animal genetic resources

**Tasks:**
- Reviewing of the existing data from different sources on locations, population status and trends of all breeds of domestic animal genetic resources
- Collecting of primary data on locations, population status and trends of all breeds of domestic animal genetic resources
- Compiling of a complete report on locations, population status and trends of all breeds of domestic animal genetic resources
- Producing of a distribution map on the locations of the population of all breeds of domestic animal genetic resources

### Lead implementation organization
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### Expected outputs
- Location, population status and trends of all domestic farm animal breeds inventoried
**Action 5.** Initiate and/or undertake international cooperative inventory and characterization activities among countries sharing trans-boundary breeds and similar production systems

**Tasks:**
- Reviewing of existing data from different sources on the hitherto international cooperative inventory and characterization activities
- Initiating of communication with countries which will involve in inventory and characterization of trans-boundary domestic animal genetic resources
- Setting of inventory and characterization priorities at breeds level for trans-boundary domestic animal genetic resources
- Signing of MoU with countries that are of priority to trans-boundary domestic animal genetic resources inventory and characterization.
- Conducting of inventory and characterization of trans-boundary breeds as per the priority and MoU.
- Compilation of report on the outcomes of inventory and characterization.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
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</table>

**Expected outputs**
- MoU for inventory and characterization between countries signed
- Six trans-boundary species inventoried and characterized
Strategic priority 2. Monitoring of trends and risks associated with animal genetic resources (US$ 1,200,000)

**Action 1.** Promote participatory approaches for monitoring of trends and associated risks

**Tasks:**
- Reviewing of the existing approaches for monitoring of trends and associated risks
- Identifying of strengths, weaknesses and gaps in the existing approaches for monitoring of trends and associated risks
- Synthesizing of effective means that promotes participatory approach for monitoring of trends and associated risks
- Identifying critical stakeholders
- Identify venues to conduct stakeholder workshops
- Presenting, discussing and agreeing on the approaches on participatory characterization and inventory with the stakeholders
- Signing the MoUs on the agreed upon participatory monitoring of trends and associated risks with the stakeholders
- Compilation of reports on outcomes of the workshops

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
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</table>

**Expected outputs**
- Four stakeholder workshops conducted and MoU for participatory monitoring of trends and associated risks signed
**Action 2.** Establish institutional responsibilities and infrastructure for monitoring of trends and associated risks in animal genetic resources, including identification, registration and pedigree systems

**Tasks:**
- Reviewing of the existing institutional responsibilities and infrastructure for monitoring of trends and associated risks in animal genetic resources, including identification, registration and pedigree systems.
- Identifying strengths, weaknesses and gaps of the existing institutional responsibilities and infrastructure for monitoring of trends and associated risks in animal genetic resources, including identification, registration and pedigree systems.
- Proposing of effective set-ups for institutional responsibilities and infrastructure for monitoring of trends and associated risks in animal genetic resources, including identification, registration and pedigree systems.
- Getting the proposed institutional responsibilities and infrastructure evaluated and agreed upon by the stakeholders.
- Compiling of a report on the agreed upon new institutional responsibilities and infrastructure for monitoring of trends and associated risks in animal genetic resources, including identification, registration and pedigree systems.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
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</table>

**Expected outputs**
- Institutional responsibilities and infrastructure for monitoring of trends and associated risks in animal genetic resources, including identification, registration and pedigree systems.
identification, registration and pedigree systems established.

**Action 3.** Establish national and regional information systems and networks for monitoring trends and associated risks in animal genetic resources

**Tasks:**
- Identifying gaps on national and regional information system needs and networks for monitoring trends and associated risks in animal genetic resources.
- Devising of means that will fill the identified gaps in national and regional information systems and networks for monitoring trends and associated risks in animal genetic resources.
- Getting the proposed national and regional information system needs and networks evaluated and agreed upon by the stakeholders.
- Putting in place of national and regional information system needs and networks required for monitoring trends and associated risks in animal genetic resources.
- Compilation of report on the information systems put in place and networks established.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
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**Expected outputs**
- A national information system and network for monitoring of trends and associated risks established.
- A regional information system and network for monitoring trends and associated risks established.

**Action 4.** Monitor trends and risks to animal genetic resources

**Tasks:**
- Reviewing of data and information on trends of and risks on animal genetic resources.
• Identifying of causes for the observed trends of and risks on animal genetic resources.
• Devising of effective ways to monitoring trends of and risks on animal genetic resources.
• Compiling of guidelines that will be used for the monitoring trends of and risks on animal genetic resources.
• Getting the guideline evaluated and agreed up-on by the stakeholders.
• Monitoring of trends on and risks to animal genetic resources as per the guideline.
• Compilation of report.

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<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
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</table>

**Expected outputs**

• Trends on the status and causes of risks on all domestic farm animal genetic resources identified.

• Trends and risks of all domestic farm animal genetic resources monitored.

**Action 5.** Initiate and undertake international cooperative monitoring of trends and associated risks among countries sharing trans-boundary breeds and similar production systems.

**Tasks:**

• Reviewing of existing data from different sources on the hitherto international cooperative monitoring of trends and associated risks among countries sharing trans-boundary breeds and similar production systems.

• Initiating of communication with trans-boundary countries to cooperative monitoring of trends and associated risks on breeds and similar production systems.

• Setting of mechanisms to cooperative monitoring of trends and associated risks on trans-boundary breeds and similar production systems.

• Signing of MoU with countries sharing trans-boundary breeds and similar production systems.
systems to take off cooperative monitoring of trends and associated risks.

- Undertaking of cooperative monitoring of trends and associated risks on all trans-boundary breeds and similar production systems.
- Compilation of periodic reports on the outcomes of cooperative monitoring of trends and associated risks on all trans-boundary breeds and similar production systems.

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<th>Lead implementation organization</th>
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</table>

**Expected outputs**

- International cooperative monitoring of trends and associated risks among countries for all species of trans-boundary domestic farm animals and similar production systems initiated and undertaken.

**Strategic priority 3.** Establish country-based early warning and response systems for animal genetic resources (US$ 300,000)

**Action 1.** Establish early warning system for animal genetic resources such as breed endangerment through development of national, regional and global risk monitoring mechanisms

**Tasks:**

- Reviewing of existing data from all possible sources on the available early warning system for animal genetic resources such as breed endangerment through development of national, regional and global risk monitoring mechanisms.
- Devising of effective means which will fill the identified gaps on the early warning system for animal genetic resources.
- Putting in place of effective early warning system required for animal genetic resources.
- Compiling of report detailing the devised early warning system.
• Setting of criteria to monitor and evaluate of the early warning system established.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
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</table>

**Expected outputs**

- An early warning system for animal genetic resources through development of national, regional and global risk monitoring mechanisms established.

**Action 2.** Establish national response systems through adoption of regional and global risk monitoring mechanisms.

**Tasks:**

- Reviewing of existing data on the hitherto national, regional and global response systems and risk monitoring mechanisms.
- Identifying of strengths, weaknesses and gaps in national risk monitoring mechanisms.
- Devising of means that will help to fill gaps in national risk monitoring mechanisms through adoption of best practices from regional and global experiences.
- Compiling of a report detailing about the adopted national response systems to risk monitoring.
- Establishing of effective national response systems to animal genetic resources at risk.
- Setting of criteria to monitor and evaluate the performance the newly established national response systems to risk monitoring.
- Compilation of report.

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<tr>
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<td>Expected outputs</td>
<td>National response systems through adoption of regional and global risk monitoring mechanisms established.</td>
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SR= short term plan; plan accomplished within a year, MT= medium term plan; plan accomplished within 2 to 5 years period and LT= Long term plan; plan takes more than 5 years.
Strategic priority 4. Establish and/or strengthen national sustainable use policies (US$ 1,897,500)

**Action 1.** Review all existing national policies on sustainable use to assess their impacts on animal genetic resources management

**Tasks:**
- Reviewing of all the existing national policies on sustainable use and assessing of their impacts on animal genetic resources management.
- Preparing of a report indicating the impact of each national policy on the management of animal genetic resources.

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<th>Lead implementation organization</th>
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</table>

**Expected outputs**
- All existing national policies on sustainable use and their impacts on animal genetic resources management assessed and reviewed.

**Action 2.** Develop national policies on sustainable use of AnGR.

**Tasks:**
- Reviewing of all the existing national policies on sustainable use of animal genetic resources.
- Preparing of a report on the strengths, weaknesses, and gaps of the existing national policies in the sustainable use of animal genetic resources.
- Preparing of a draft policy document that will ensure sustainable use of domestic animal genetic resources.
- Submitting of the draft policy on sustainable use of domestic animal genetic resources to the concerned competent body for approval.
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<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
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</table>

**Expected outputs**
- A National policy on sustainable use of AnGR developed.

**Action 3. Conduct valuation of animal genetic resources.**

**Tasks:**
- Reviewing of data on the hitherto studies conducted on valuation of animal genetic resources.
- Reviewing of international best practices applied in valuating animal genetic resources.
- Upgrading of know-how of valuation of animal genetic resources through short and medium term trainings.
- Identifying of strengths, weaknesses and gaps on the methodologies that have been applied so far.
- Preparing of protocol for valuation specific to the potentials of breeds within species.
- Setting of priorities for valuation of breeds within species, based on such criteria as the country’s short to long term conservation and development needs.
- Valuating of the country’s animal genetic resources.
- Preparing of detailed report on the outcomes of valuation on the breeds basis.

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<th>Partner organization (s)</th>
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**Expected outputs**
- Valuation of all breeds of domestic animal genetic resources conducted.

**Action 4. Develop approaches to support wide access to, and the fair and equitable sharing of, benefits arising from the use of animal genetic resources and associated traditional knowledge.**
Tasks:
- Reviewing of all the existing approaches that support wide access to, and the fair and equitable sharing of benefits arising from the use of animal genetic resources and associated traditional knowledge.
- Identifying of the strengths, weaknesses and gaps on the existing approaches that support wide access to, and the fair and equitable sharing of benefits arising from the use of animal genetic resources and associated traditional knowledge.
- Enriching and finalization of the approaches using the stakeholder consultations.
- Developing of effective approaches that support wide access to, and the fair and equitable sharing of, benefits arising from the use of animal genetic resources and associated traditional knowledge.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
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Expected outputs
- Approaches to support wide access to, and the fair and equitable sharing of, benefits arising from the use of animal genetic resources and associated traditional knowledge developed.
## Strategic Priority 5. Establish national species and breed development strategies and programs (US$ 3,650,250)

**Action 1.** Develop long-term plan and strategic breeding programs which include efforts to improve underutilized breeds, especially within low to medium external input production systems

**Tasks:**

- Reviewing of data and information on the existing strategic breeding programs, taking into account of all breeds, input levels and production systems.
- Identifying of the strengths, weaknesses and the gaps in the existing strategic breeding programs.
- Setting of priorities to long-term plan and strategic breeding programs, based on the attributes of specific breeds of each species in all production systems and input levels.
- Devising of long term plans for strategic breeding programs for the prioritized breeds in the selected input levels and production systems.
- Enriching and finalizing of the proposed plan using the stakeholder consultations.
- Developing a long-term plan and strategic breeding programs which include efforts to improve underutilized breeds, especially within low to medium external input production system.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<td>ST-LT</td>
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</table>

**Expected outputs**

- A long-term plan and strategic breeding programs which include efforts to improve underutilized breeds, especially within low to medium external input production systems developed
**Action 2.** Establish and develop organizational structures of breeding programs, especially breeders’ organizations and breeding schemes, including recording systems

**Tasks:**
- Reviewing of data and information on the existing organizational breeding programs, especially breeders’ organizations and breeding schemes, including recording systems.
- Identifying of strengths, weaknesses and gaps in the existing organizational breeding programs, especially breeders’ organizations and breeding schemes, including recording systems.
- Establishing of bodies with the organizational structure responsible for spearheading breeding programs, especially breeders’ organizations and breeding schemes, including recording systems.
- Compilation of the report on the process of establishment.

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<tr>
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<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
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**Expected outputs**
- A body with organizational structure for domestic farm animal breed improvement established.
- Four (cattle, sheep, goat and poultry) breeding programs, especially breeders’ organizations and breeding schemes, including recording systems established.

**Action 3.** Establish recording schemes to monitor changes in production and non-production traits, and periodically adjust breeding goals accordingly

**Tasks:**
- Reviewing of data and information on the existing recording schemes.
- Identifying of strengths, weaknesses and gaps in the existing recording schemes.
- Setting of priorities of breeds on the species basis to which recording schemes are required.
• Establishing of the recording schemes on the priority basis.
• Developing of criteria that aid monitoring and evaluation of the established required schemes to monitor changes in production and non-production traits, and adjust breeding goals periodically.
• Compilation of report on the process of the breeding schemes establishment.

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<th>Lead implementation organization</th>
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</table>

**Expected outputs**

- Four (cattle, sheep, goats and chicken) recording schemes to monitor changes in production and non-production traits established, and breeding goals periodically adjusted.

**Action 4.** Incorporate consideration of the impacts of selection on genetic diversity into breeding programs and develop approaches to maintain the desired variability.

**Tasks:**

- Reviewing of the hitherto selection programs.
- Identifying of strengths, weaknesses and gaps of the selection programs on genetic diversity into breeding programs and develop approaches to maintain the desired variability.
- Devising of programs that would capitalize on the strength and avoid the weaknesses as well as fill gaps on the existing selection programs.
- Getting of the devised selection programs evaluated and agreed up-on by the stakeholders.
- Developing of the selection programs that will have positive impacts on genetic diversity of all breeding programs considered and the approaches to maintain desired variability.
- Compilation of the report on the newly developed selection programs and approaches that have positive impacts on genetic diversity to all breeding programs considered and will maintain desired variability.
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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
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**Expected outputs**

- Impacts of selection on genetic diversity into all breeding programs considered and the approaches to maintain desired variability developed.

**Action 5.** Establish backup collections of frozen semen and embryos to ensure maintenance of genetic variability

**Tasks:**

- Setting of priority for of back collections of frozen and embryos.
- Choosing of donor animals based on their genetic make-up and health status.
- Conducting back collections for frozen semen and embryos.
- Processing of the collected frozen semen and embryos for storage.
- Storing of back up collections of frozen semen and embryos.
- Keeping of record on the backup collections of frozen semen and embryos.

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<th>Lead implementation organization</th>
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</table>

**Expected outputs**

- Backup collections of frozen semen and embryos of all domestic farm animal breeds at risk established.
**Action 6.** Provide training and technical support for the breeding activities of pastoralist and farming communities.

**Tasks:**

- Identifying of gaps on the hitherto training and technical support for the breeding activities of pastoralist and farming communities.
- Developing of the training manual.
- Setting of priorities and schedule for the training.
- Training of pastoralist and farming communities on the breeding activities.
- Providing of the required technical support for the pastoralists and breeding communities that assist breeding activities.
- Compiling of report the trainings and technical support provided.

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<tr>
<th>Lead implementation organization</th>
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<th>Expected cost (‘000 US $)</th>
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**Expected outputs**

- 1000 trainings (two trainings in 500 districts) for 35,000 farmers and 15,000 pastoralists on the breeding activities for pastoralist and farming communities provided.
- Technical support on the breeding activities of pastoralist and farming communities for 50% of the trainees in 500 districts provided.

**Action 7.** Integrate improved husbandry practices in animal genetic resources development programs.

**Tasks:**

- Reviewing of existing data and information on the existing animal husbandry practices in animal
genetic resources development programs.

- Identifying of the strengths, weaknesses and gaps of the existing husbandry practices.
- Devising of means that will avoid the existing weakness and gaps.
- Getting the newly proposed animal husbandry practices evaluated by the stakeholders.
- Implementing of the newly developed animal husbandry practices in animal genetic resources development programs.
- Compiling of report on the newly developed animal husbandry practices in animal genetic resources development programs.

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</table>

**Expected outputs**

- Improved husbandry practices in four animal genetic resources development programs integrated.

**Action 8.** Assess breed development programs, with the aim of meeting foreseeable economic and social needs and market demands.

**Tasks:**

- Reviewing of the existing data and information on breed development programs.
- Identifying strengths, weaknesses and gaps in existing breed development programs.
- Producing of reports on breed development programs, with the aim of meeting foreseeable economic and social needs and market demands.

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<tr>
<th>Lead implementation organization</th>
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**Expected outputs**

- Two reports on breed development programs, with the aim of meeting
Action 9. Assess the impact of exotic animal breeds and the development of measures for producers to realize positive impacts and prevent negative impacts.

Tasks:
- Reviewing of the existing data and information on impact of exotic animal breeds and the development of measures.
- Gathering of data and information on the impact of exotic breeds and development measures through field surveys.
- Preparing of reports on the impact of exotic animal breeds and the development of measures for producers to realize positive and prevent negative impacts.

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</table>

Expected outputs
- Three survey reports assessing the impact of exotic animal breeds produced, and measures for producers to realize positive impacts and prevent negative impacts developed.

Action 10. Provide information to farmers and livestock keepers to assist in facilitating access to animal genetic resources from various sources.

Tasks:
- Reviewing of information on the existing means used to facilitate access to animal genetic resources to farmers and livestock keepers.
- Preparing of training materials to farmers and livestock keepers on facilitating access to animal genetic resources.
- Setting of priorities and schedule for trainings.
● Providing of trainings to farmers and livestock keepers that will help to facilitate access to animal genetic resources from various sources.

● Compilation of reports.

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<th>Lead implementation organization</th>
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**Expected outputs**

- Information through 1000 trainings (two trainings in 500 districts) to farmers and livestock keepers that assist in facilitating access to animal genetic resources from various sources provided.

**Action 11.** Avail information about breeds and production systems to consumers.

**Tasks:**

- Reviewing of data on breeds and production systems.

- Compiling of information in such means as reports and posters on breeds and production systems in a way that can be availed to consumers.

- Identifying of efficient means of availing the compiled information to the consumers.

- Availing of the information on breeds and production systems to consumers.

- Compiling of report on information preparation and availing processes.

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<td>ST-LT</td>
<td>189.75</td>
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### Expected outputs

- 90 hrs of air time information through the mass media (10 minutes per week) about breeds and production systems to consumers disseminated.
- Reports on breeds and production systems reviewed, and important qualities identified.
- A breed and ecotype catalog and four posters on important qualities of breed and production systems (about 1000 copies from each) prepared and distributed.

### Strategic priority 6. Promote agro-ecosystems approaches to the management of animal genetic resources (US$ 1,138,500)

### Action 1. Assess environmental and socio-economic trends that require a medium- and long-term policy development and/or revision in animal genetic resources management

#### Tasks:

- Reviewing of the existing policies that are associated with the animal genetic resources management.
- Conducting of a review on environmental and socio-economic trends that are related with the animal genetic resources management.
- Identifying of the trends that require a medium- and long-term policy development and/or revision in animal genetic resources management.
- Compiling of reports on the findings of trends requiring a medium- and long-term policy development and/or revision.

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<th>Lead implementation organization</th>
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### Expected outputs

- Two reports on the assessment of environmental and socio-economic trends that require a medium- and long-term policy development and/or revision.
revision in animal genetic resources management produced.

**Action 2.** Integrate agro-ecosystem approaches in national agricultural and environmental policies and programs of relevance to animal genetic resources, particularly those directed towards pastoralist and rural smallholder communities, and fragile environments.

**Tasks:**

- Reviewing of approaches of the existing national agricultural and environmental policies and programs of relevance to animal genetic resources, particularly those directed towards pastoralist and rural smallholder communities, and fragile environments.
- Identifying of strengths, weakness and gaps on whether the existing national agricultural and environmental policies and programs of relevance to animal genetic resources integrate the ecosystem approaches.
- Devising of means to effectively integrating ecosystem approaches into the national agricultural and environmental policies and programs of relevance to animal genetic resources.
- Getting the proposed ecosystem approaches to be integrated into the national agricultural and environmental policies and programs of relevance to animal genetic resources be evaluated and agreed by the stakeholders.
- Integrating of the agreed upon ecosystem approaches into the national agricultural and environmental policies and programs of relevance to animal genetic resources, particularly those directed towards pastoralist and rural smallholder communities, and fragile environments.
- Compiling of reports on the process of devising and integrating the approaches in to the relevant policies and programs of relevance to animal genetic resources, particularly those directed towards pastoralist and rural smallholder communities, and fragile environments.

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<td>Expected</td>
<td>• Agro-ecosystem approaches in all national</td>
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### Action 3. Establish network to enhance interaction among the main stakeholders, scientific disciplines and sectors involved.

**Tasks:**
- Reviewing of the existing networks with which mains stakeholders scientific communities and actors are interacting.
- Identifying of strengths, weaknesses and gaps within the existing network.
- Designing of mechanisms for the efficient network that will enhance interaction among the main stakeholders, scientific disciplines and sectors.
- Establishing of the network that will enhance efficient interaction among the main stakeholders, scientific disciplines and sectors.
- Compilation of the report on the network establishment process.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
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<th>Expected cost ('000 US $)</th>
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</table>

**Expected outputs**
- A network to enhance interaction among the main stakeholders, scientific disciplines and sectors established.

### Strategic priority 7. Support indigenous and local production systems and associated knowledge systems of importance to the maintenance and sustainable use of animal genetic resources (US$ 759,000)
**Action 1.** Assess the value and importance of indigenous and local production systems to identify trends and drivers of change that may affect the genetic base, and the resilience and sustainability of the production systems.

**Tasks:**
- Reviewing of values and importance of indigenous and local production systems.
- Identifying of trends in indigenous and local production systems.
- Identifying of drivers of change in trends in indigenous and local production systems that may affect the genetic base, and the resilience and sustainability of the production systems.
- Compilation of reports on value and importance, trends in indigenous and local production systems, factors affecting the genetic base of the production systems as well as their resilience and sustainability.

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<th>Lead implementation organization</th>
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</table>

**Expected outputs**
- Two reports on assessment of value and importance of indigenous and local production systems to identify trends and drivers of change that may affect the genetic base, and the resilience and sustainability of the production systems produced.

**Action 2.** Support indigenous and local livestock systems of importance to animal genetic resources, including removal of factors contributing to genetic erosion.

**Tasks:**
- Reviewing of the hitherto mechanisms on supporting indigenous and local livestock systems of importance to animal genetic resources.
- Conducting of review on factors that contribute to genetic erosion in indigenous and local...
livestock systems.

- Devising of effective mechanism that will support indigenous and local livestock systems and remove factors contributing to the genetic erosion in the systems.
- Identifying of the effective venue of providing the support.
- Providing of the support using the venue.
- Compilation of the report on support system identified and its way of provision.

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<tr>
<th>Lead implementation organization</th>
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</table>

**Expected outputs**

- Indigenous and local livestock systems of importance to animal genetic resources supported.
- Factors contributing to genetic erosion of animal genetic resources identified and removed.

**Action 3.** Promote and enable relevant exchange, interaction and dialogue among indigenous and rural communities, scientists, government officials and other stakeholders, in order to integrate traditional knowledge with scientific approaches.

**Tasks:**

- Reviewing of the hitherto approaches used in facilitating relevant exchange, interaction and dialogue among indigenous and rural communities, scientists, government officials and other stakeholders, in order to integrate traditional knowledge with scientific approaches.
- Identifying of strengths, weaknesses and gaps in the reviewed hitherto approaches.
- Devising of effective approaches that promote and enable relevant exchange, interaction and dialogue among indigenous and rural communities, scientists, government officials and other stakeholders, in order to integrate traditional knowledge with scientific approaches.
- Identifying of critical stakeholders that will discuss and enrich the proposed approach.
• Conducting of the stakeholder workshop to discuss, enrich and finalize the approach and identify effective venue to promotion of the agreed up on approach.

• Compilation of reports on the devised approach and the venue for promotion.

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<th>Lead implementation organization</th>
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</table>

**Expected outputs**

• Two stakeholder workshops promoting relevant exchange, interaction and dialogue among indigenous and rural communities, scientists, government officials and other stakeholders, in order to integrate traditional knowledge with scientific approaches conducted.

**Action 4.** Promote the development of niche markets for products derived from indigenous and local species and breeds, and strengthen processes to add value to their primary products.

**Tasks:**

• Identifying of products derived from indigenous and local species and breeds that require niche markets and value addition to their primary products.

• Setting of priorities to products derived from indigenous and local species and breeds that require niche markets and value addition.

• Reviewing of data from national and international sources on experiences and effective ways of developing niche markets and value addition.

• Developing of the niche markets to the prioritized products.

• Devising of effective means to add value on the primary products as per the priority.

• Getting the agreements of critical stakeholders on the products proposed for niche markets, the
- Choosing of the effective venues to the promotion of niche markets.
- Promoting of the niche markets.
- Compilation of report on the niche markets development and value addition processes.

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**Expected outputs**

- Niche markets for products derived from ten indigenous species and breeds developed, and process to add value to their primary products promoted and strengthened.

SR= short term plan; plan accomplished within a year, MT= medium term plan; plan accomplished within 2 to 5 years period and LT= Long term plan; plan takes more than 5 years.
Strategic priority area 3. Conservation (US$ 1,164,713)

Strategic priority 8. Establish national conservation policies (US $ 75,000)

Action 1. Set and regularly review conservation priorities and goals.

Tasks:
- Reviewing of the existing conservation priorities and goals.
- Identifying of the strengths, weaknesses and gaps in the existing conservation priorities and goals.
- Revising of the conservation priorities and goals taking into account the realities on the ground.
- Getting of the revised conservation priorities and goals evaluated by the stakeholders.
- Setting of new conservation priorities and goals.
- Compiling of the report on the process of setting the new conservation priorities and goals.
- Reviewing of the newly set conservation priorities and goals, five years after commencement of its implementation.
- Updating of, if necessary, of the conservation priorities and goals, based on the realities on the ground.

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<th>Lead implementation organization</th>
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<td>ST-LT</td>
<td>15.00</td>
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</table>

Expected outputs
- Within three years, conservation priorities and goals for all AnGRFA set
- Every five years, conservation priorities and goals for all
**Action 2.** Strengthen and/or establish the existing institutional structures and policies, including specific measures to conserve breeds at risk of extinction, and to prevent breeds from becoming at risk.

**Tasks:**
- Reviewing of the existing institutional structures and policies, including specific measures to conserve breeds at risk of extinction, and to prevent breeds from becoming at risk.
- Identifying of the strengths, weaknesses and gaps in the existing institutional structures and policies, including specific measures in relation to their effectiveness to conserve breeds at risk of extinction, and prevent breeds from becoming at risk.
- Developing of effective organizational structure and infrastructure to be established in each of the national regional state.
- Establishing of a body in each national regional state, with an organizational structure for domestic farm animal breed conservation.
- Developing of a policy on specific measures to conserve breeds at risk of extinction, and to prevent breeds from becoming at risk.
- Compiling of reports on the organization structures for domestic animal genetic resources established and the policy measures developed.

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<th>Lead implementation organization</th>
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**Expected outputs**

- A body in each of the national regional state, with an organizational structure for domestic farm animal breed conservation, strengthened
and/or established.

- A policy on specific measures to conserve breeds at risk of extinction, and to prevent breeds from becoming at risk developed.

**Action 3.** Assess factors leading to the erosion of animal genetic resources and formulate appropriate policy responses.

**Tasks:**
- Reviewing of existing development, conservation, investment and similar strategy and policy documents that lead to erosion of animal genetic resources.
- Identifying of strengths, weaknesses and gaps of the revised documents.
- Compiling of assessment reports on factors leading to the erosion of animal genetic resources.
- Formulating of appropriate responses to factors leading to the erosion of animal genetic resources.

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**Expected outputs**
- Two reports on assessment of factors leading to the erosion of animal genetic resources produced and appropriate policy responses formulated.
**Action 4.** Establish information system on animal breeding approaches, in order to enable breeders make appropriate choices in improvement programs.

**Tasks:**
- Reviewing of existing information systems on animal breeding approaches that enable breeders to make appropriate choices in improving programs.
- Identifying of strengths, weaknesses and gaps in the existing information systems.
- Devising of appropriate information system on animal breeding approaches that enable breeders to make appropriate choices in improving programs.
- Getting of the devised information system evaluated by the stakeholders.
- Establishing of appropriate and effective information system on animal breeding approaches that enable breeders to make appropriate choices in improving programs.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>MoLF</td>
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</tbody>
</table>

**Expected outputs**
- Information systems on animal breeding approaches, in order to enable breeders make appropriate choices in improvement programs established.

**Action 5.** Provide and catalyze modalities and systems for producers to support conservation of animal genetic resources at risk in consonance with existing international agreements.

**Tasks:**
- Reviewing of appropriate data and information on the existence and types of incentives for producers to support conservation of animal genetic resources at risk in consonance with existing international agreements.
- Identifying of strengths, weaknesses and gaps on the existing incentive system, if any.
- Devising of effective incentives for producers to support conservation of animal genetic resources at risk in consonance with existing international agreements.
- Getting of the devised incentives evaluated by the stakeholders.
- Compiling of the report on the incentive systems devised.
- Providing and catalyzing of the incentives for producers to support conservation of animal genetic resources at risk in consonance with existing international agreements.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBI</td>
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</tbody>
</table>

**Expected outputs**

- Incentives for producers of ten breeds at risk to support their conservation in consonance with existing international agreements provided and catalyzed.

**Strategic priority 9. Establish or strengthen in situ Conservation programs (US$ 890,195)**

**Action 1. Set and regularly review in situ conservation priorities and goals**

**Tasks:**

- Reviewing of the hitherto in situ conservation priorities and goals.
- Reviewing of best international practices in areas of setting in situ conservation priorities and goals.
- Setting of in situ conservation priorities and goals to domestic animal genetic resources.
- Agreeing with the critical stakeholders on the proposed in situ conservation priorities and goals.
- Compilation of the report on the process of setting of priorities to in situ conservation and its goals.
- Reviewing of the priorities set to *in situ* conservation and the corresponding goals at regular intervals.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (<em>'000 US $</em>)</th>
<th>Source of financing</th>
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<tr>
<td>EBI</td>
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<td>ST-LT</td>
<td>89.02</td>
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</tbody>
</table>

**Expected outputs**

- Within three years, *in situ* conservation priorities and goals for all the breeds of AnGRFA set.
- Every five years, *in situ* conservation priorities and goals for all AnGRFA reviewed.

**Action 2.** Encourage the development and implementation of national *in situ* conservation programs for breeds and populations that are at risk.

**Tasks:**

- Reviewing of the hitherto national *in situ* conservation practices and programs for breeds and populations that are at risk.
- Identifying of strengths, weakness and gaps in the existing practices and programs.
- Developing of effective community based national *in situ* conservation programs.
- Setting of priorities to breeds and populations that require community based *in situ* conservation programs.
- Agreeing with critical stakeholders on the newly developed *in situ* conservation programs and proposed priorities.
- Devising of effective mechanisms for the implementation of the programs.
- Implementing of the developed community based *in situ* conservation programs as per the priority.
• Compiling of report on the process of development of effective community based in situ conservation programs and mechanism of their implementation.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
<th>Source of financing</th>
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</table>

Expected outputs

- Ten community-based in situ conservation programs for breeds and populations that are at risk developed and implemented.

**Action 3.** Promote policies and means to achieve the sustainable use of a diversity of local breeds, without the need for support from public funds or extra funding, through in situ conservation.

**Tasks:**

- Reviewing of the existing policy on the sustainable use of a diversity of local breeds.
- Reviewing of data and information on existing public support and extra funding to achieve the sustainable use of a diversity of local breeds through in situ conservation.
- Identifying of strengths, weaknesses and gaps of the reviewed policies and support systems.
- Developing of a policy document and means that will bring the sustainable use of a diversity of local breeds, without the need for support from public funds or extra funding, through in situ conservation.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
<th>Source of financing</th>
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<td>ST</td>
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<td>EBI</td>
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</tbody>
</table>
### Expected outputs

- A policy document and means to achieve the sustainable use of a diversity of local breeds, without the need for support from public funds or extra funding, through *in situ* conservation promoted.

### Action 4. Identify and fill gaps for *in situ* conservation.

#### Tasks:
- Reviewing of the existing documents regarding the *in situ* conservation.
- Identifying of strengths, weaknesses and gaps in the existing *in situ* conservation practices.
- Compiling of reports indicating gaps in the *in situ* conservation practices.
- Devising of means that fill the identified gaps in the *in situ* conservation.
- Implementing of the means that fill the identified gaps.
- Compiling of report.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
</tr>
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<table>
<thead>
<tr>
<th>Expected outputs</th>
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</thead>
<tbody>
<tr>
<td>• Two reports that identify gaps in <em>in-situ</em> conservation prepared.</td>
</tr>
<tr>
<td>• All identified <em>in situ</em> conservation gaps filled.</td>
</tr>
</tbody>
</table>
**Action 5.** Establish modalities to facilitate use of genetic material under in *situ* conservation under fair and equitable arrangements for access and use of animal genetic resources.

**Tasks:**
- Reviewing of the existing modalities used to facilitate use of genetic material under in *situ* conservation under fair and equitable arrangements for access and use of animal genetic resources.
- Identifying of strengths, weaknesses and gaps in existing modalities.
- Devising of means that will better assist to facilitate use of genetic material under in *situ* conservation under fair and equitable arrangements for access and use of animal genetic resources.
- Establish the modality that will be used to facilitate use of genetic material under in *situ* conservation under fair and equitable arrangements for access and use of animal genetic resources.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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</thead>
<tbody>
<tr>
<td>EBI</td>
<td>MoLF, BoLF/Livestock Agency, NAIC, Pastoral Com., Breeders community</td>
<td>ST-MT</td>
<td>89.02</td>
<td>EBI</td>
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</tbody>
</table>

**Expected outputs**
- A modality to facilitate use of genetic material under in *situ* conservation under fair and equitable arrangements for access and use of animal genetic resources established.

**Action 6.** Develop guideline for in *situ* conservation.

**Tasks:**
- Collecting of data and information that will help to develop guideline for in *situ* conservation.
- Developing of the draft guideline for the *in situ* conservation.
- Getting of the draft *in situ* guideline evaluated by the stakeholders.
- Developing of the guideline for the *in situ* conservation.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
<th>Source of financing</th>
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<td>MoLF, BoLF/Livestock Agency, NARS, NAIC, FAO Pastoral Com.</td>
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<td>44.51</td>
<td>EBI</td>
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</table>

**Expected outputs**
- A guideline for *in situ* conservation developed.

**Strategic priority 10. Establish or strengthen *ex situ* Conservation programs (US$ 199,518)**

**Action 1.** Set and regularly review *ex situ* conservation priorities and goals.

**Tasks:**
- Reviewing of the hitherto *ex situ* conservation priorities and goals.
- Reviewing of best international practices in areas of setting *ex situ* conservation priorities and goals.
- Setting of *ex situ* conservation priorities and goals to domestic animal genetic resources.
- Agreeing with the critical stakeholders on the proposed *ex situ* conservation priorities and goals.
- Setting of the *ex situ* conservation priorities and goals to all breeds of domestic animals.
- Compilation of the report on the process of setting of priorities to *ex situ* conservation and its goals.
- Reviewing of the priorities set to *ex situ* conservation and the corresponding goals in regular intervals.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
<th>Source of financing</th>
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<tbody>
<tr>
<td>EBI</td>
<td>MoLF, BoLF/Livestock Agency, NARS, NAIC, HLI, Pastoral Com.</td>
<td>ST-LT</td>
<td>9.98</td>
<td>EBI</td>
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</table>
**Expected outputs**

- Within two years, *ex situ* conservation priorities and goals for the ten breeds of AnGRFA set.
- Every five years, *ex situ* conservation priorities and goals for all AnGRFA reviewed.

**Action 2.** Establish and/or strengthen national and regional facilities for *ex situ* conservation, in particular cryogenic storage.

**Tasks:**

- Reviewing of information on the existing national and regional facilities for *ex situ* conservation.
- Identifying of strengths, weaknesses and gaps in the national and regional facilities for *ex situ* conservation.
- Establishing of national *ex situ* cryo-conservation facility and one for *ex situ* in *vivo* conservation.
- Identifying of countries that will be interested for establishment regional *ex situ* cryo storage.
- Creating of contacts with the interested parties to regional *ex situ* cryo storages.
- Signing of the MoU with the interested countries in regional cryo storage.
- Securing of funds for the establishment of regional *ex situ* cryo storage, in coordination with the member countries.
- Establishing of a regional animal *ex situ* conservation facility.
- Compilation of reports on the national and regional animal *ex situ* establishment processes.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
<th>Time frame</th>
<th>Expected cost (’000 US $)</th>
<th>Source of financing</th>
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<tr>
<td><strong>Expected outputs</strong></td>
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<tr>
<td></td>
<td>• The national animal gene bank and <em>ex situ</em> conservation (<em>in vivo</em>) strengthen.</td>
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</table>
A regional animal gene bank established.

**Action 3.** Develop and implement measures to secure *ex situ* collections from loss of genetic diversity resulting from disease outbreaks and other threats, in particular by establishing backup samples.

**Tasks:**
- Reviewing of the hitherto measures used to secure *ex situ* collections from loss of genetic diversity.
- Identifying of strengths, weaknesses and gaps in the existing measures.
- Conducting of review on the international best practices used to secure *ex situ* collections from loss of genetic diversity.
- Developing of measures that lead towards constructing a backup cryo conservation facility.
- Selecting of an ideal place for the construction of the back-up facility.
- Writing up of the financial proposal to the appropriate ministry to get support for the construction of the back-up facility.
- Establishing of the back-up facility to secure *ex situ* collections from loss of genetic diversity resulting from disease outbreaks and other threats, in particular by establishing backup samples.
- Compilation of the report on the process of establishment.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
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<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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</table>

**Expected outputs**
- One animal gene bank that serves as backup to secure samples in *ex situ* collections established.
**Action 4.** Identify and fill gaps in *ex situ* collections.

**Tasks:**
- Reviewing of data and information on the existing *ex situ* collections.
- Identifying of gaps in the existing *ex situ* collections.
- Bridging up of the gaps in the identified *ex situ* collections.
- Compilation of report on gap identification and its filling processes.

<table>
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<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<tbody>
<tr>
<td>EBI</td>
<td>MoLF, BoLF/Livestock Agency, NARS, FAO, NAIC, HLI, Pastoral Com.</td>
<td>ST-LT</td>
<td>69.83</td>
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</table>

**Expected outputs**
- Two reports that identify gaps in *ex situ* collections prepared.
- 75% of the identified gaps in *ex situ* collections filled.

**Action 5.** Establish modalities to facilitate use of genetic materials stored in *ex situ* gene banks under fair and equitable arrangements for storage, access and use of animal genetic resources.

**Tasks:**
- Reviewing of the existing modalities used to facilitate use of genetic materials stored in *ex situ* gene banks under fair and equitable arrangements for storage, access and use of animal genetic resources.
- Identifying of strengths, weaknesses and gaps in the existing modalities.
- Establishing of effective modalities that will facilitate the use of genetic materials stored in *ex situ* gene banks under fair and equitable arrangements for storage, access and use of animal genetic resources.
- Compiling of report on the established modality.
<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
<th>Source of financing</th>
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<tbody>
<tr>
<td>EBI</td>
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<td>ST-LT</td>
<td>9.98</td>
<td>EBI</td>
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</table>

**Expected outputs**

- A modality to facilitate use of genetic material stored in *ex situ* gene banks under fair and equitable arrangements for storage, access and use of animal genetic resources established.

**Action 6.** Develop procedures for replenishment of genetic material taken from gene banks, by systematically developing links with live populations, or establishing *in vivo* populations of breeds at risk at off-farm locations.

**Tasks:**

- Conducting of reviews on the international best practices used for replenishing genetic materials taken from gene banks.
- Developing of procedures for replenishment of genetic materials taken from gene banks.
- Developing of systematic links between *ex situ* collections and live populations, or establishing *in vivo* populations of breeds at risk at off-farm locations that serve for replenishment for genetic material taken from gene banks.
- Establishing of *in vivo* population of breeds at risk at off-farm locations that serve for replenishment for genetic material taken from gene banks.
- Compilation of reports on the procedures developed for the replenishment of genetic materials taken from the gene banks.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
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<tbody>
<tr>
<td>EBI</td>
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<td>ST-MT</td>
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</tbody>
</table>
Agency, Pastoral Com.

**Expected outputs**
- Four procedures for replenishment of genetic material taken from gene banks, by systematically developing links with live populations developed.
- An *in vivo* population of breeds at risk at off-farm locations established.

**Action 7. Develop guideline for *ex situ* conservation**

**Tasks:**
- Collecting of data and information that will serve for the preparation of guideline for *ex situ* conservation.
- Developing draft guideline for *ex situ* conservation.
- Getting the draft guide line commented and enriched by the critical stakeholders.
- Developing of the guideline for *ex situ* conservation.
- Compilation of the report on the guideline preparation process.

<table>
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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
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<th>Expected cost (’000 US $)</th>
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**Expected outputs**
- A guideline for *ex situ* conservation developed.

SR= short term plan; plan accomplished within a year, MT= medium term plan; plan accomplished within 2 to 5 years period and LT= Long term plan; plan takes more than 5 years.
Strategic priority area 4. Policies, institutions and capacity building (US $ 1,902,000)

Strategic priority 11. Strengthen national institutions, Including National Focal Point, for planning and implementing animal genetic resources measures, for livestock sector development (US $ 100,000)

**Action 1.** Analyze national institutional capacity in support of holistic planning of the livestock sector.

**Tasks:**
- Reviewing of data and information on the existing national institutional capacity associated with holistic planning of the livestock sector.
- Identifying of strengths, weakness and gaps of the existing national institutional capacity in relation to holistic planning of the livestock sector.
- Developing of a review report on the existing national institutional capacity *vis-a-vis* its support of holistic planning of the livestock sector produced.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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</table>

**Expected outputs**
- A review report on national institutional capacity in support of holistic planning of the livestock sector produced.

**Action 2.** Establish or strengthen fully functional National Focal Points for animal genetic resources.

**Tasks:**
- Identifying of the strengths, weaknesses and gaps in national focal point for animal genetic resources in relation to its full functionality.
- Preparing of a proposal that will bring the full functionality of the national focal point for animal genetic resources.
- Submitting of the proposal to the concerned ministry.
- Implementation of the proposed action to strengthen the national focal point.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
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</table>

**Expected outputs**

- 75% of strategic priority areas of Ethiopian National Strategy and Plan of Action for AnGRFA achieved.

**Action 3.** Promote coordination and synergy between the different authorities dealing with various aspects of planning, within and across ministries, as well as with other stakeholders, and ensure their participation in the process.

**Tasks:**

- Conducting of review on the existing level and nature of coordination and synergy between the different authorities dealing with various aspects of planning, within and across ministries, as well as with other stakeholders.
- Identifying of strengths, weakness and gaps in the coordination and synergy between the different authorities dealing with various aspects of planning, within and across ministries, as well as with other stakeholders in relation to their effectiveness in ensuring their participation in the process.
- Developing of mechanism that will bring effectiveness in coordination and synergy between the different authorities dealing with various aspects of planning, within and across ministries, as well as with other stakeholders, and ensure their participation in the process.
- Promoting of the newly developed mechanism to enhance coordination and synergy between the concerned stakeholders and ensure their participation in the process.
- Ensuring of the participation of most of the critical stakeholders in planning and implementation of various aspects of AnGRFA.
- Compilation of the report.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<td>ST-LT</td>
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</table>

**Expected outputs**

- Participation of at least 75% of the stakeholders in planning and implementation of various aspects of AnGRFA achieved

**Action 4.** Develop strong national coordination between the National Focal Point and stakeholders involved in animal genetic resources, such as the research system, the breeding industry, government agencies, civil society organizations, NGOs and networks and advisory committees.

**Tasks:**

- Reviewing data and information on the existing level and nature of national coordination between the National Focal Point and stakeholders involved in animal genetic resources, such as the research system.
- Identifying of strengths, weakness and gaps in the existing coordination between National Focal Point and stakeholders involved in animal genetic resources.
- Devising of an effective system that will ensure strong coordination between the National Focal Point and stakeholders involved in animal genetic resources, such as the research system, the breeding industry, government agencies, civil society organizations, NGOs and networks and advisory committees.
- Compiling of report on the process of devising the system.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<td>Expected outputs</td>
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<tr>
<td>• A system for national coordination between the National Focal Point and</td>
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<td>stakeholders involved in animal genetic resources developed.</td>
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<tr>
<td>• Advisory committee that oversees sustainable use, development and conservation</td>
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<td>of animal genetic resources established.</td>
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**Action 5.** Develop and implement intervention tools for national planners to shape the future development of the livestock sector in accordance with national priorities, including deployment of animal genetic resources, and the effects of animal production systems on the environment.

**Tasks:**

- Conducting of review on the existing intervention tools used by the national planners to shape the future development of the livestock sector in accordance with national priorities.
- Identifying of the strengths, weaknesses and gaps in the reviewed intervention tools.
- Devising of the effective implementation tools that will be used by the national planners to shape the future development of the livestock sector in accordance with national priorities, including deployment of animal genetic resources, and the effects of animal production systems on the environment.
- Compiling of reports on the effective implementation tools devised.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<tbody>
<tr>
<td>MoLF</td>
<td>NARS, NAIC, MEF, Ministry of Federal Affairs, BoLF/Livestock Agency, Pastoral Com. FAO</td>
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</table>
### Strategic priority 12. Establish or strengthen educational and research facilities (US $ 550,000)

**Action 1.** Review national research and education capacities in relevant fields, and set targets for training to build the national skill base.

**Tasks:**

- Conducting of review on the existing national research and education capacities in areas of conservation sustainable use, development access and equitable sharing of benefits.
- Identifying of strengths, weaknesses and gaps in the reviewed national capacity areas.
- Setting of targets for trainings aimed at building national skill base.
- Preparing of reports on the national research and education capacities needs in the relevant fields.
- Compiling of a report on the target setting process to national skill base building.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBI</td>
<td>MoE, HLI, NARS, MoST, EBI</td>
<td>ST-LT</td>
<td>55.00</td>
<td>MoLF</td>
</tr>
</tbody>
</table>

**Expected outputs**

- Two review reports on national research and education capacities in relevant fields produced, targets for training to build the national skill base set.
Action 2. Review the national educational needs of livestock keepers, while respecting traditional knowledge and indigenous practices, and set targets for their training.

Tasks:
- Conducting of review on the national educational base of livestock keepers.
- Identifying of strengths, weaknesses and gaps in the educational needs of the livestock keepers.
- Preparing of reports on the national educational needs of livestock keepers, while respecting traditional knowledge and indigenous practices.
- Setting of training targets that will satisfy the training needs of the livestock keepers, while respecting their traditional knowledge and indigenous practices.
- Compiling of a report on the training target setting process.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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</thead>
<tbody>
<tr>
<td>EBI</td>
<td>MoE, HLI, NARS, MoST, Ministry Federal Affairs, BoLF/Livestock Agency, Pastoral Community, EBI.</td>
<td>ST-LT</td>
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</tbody>
</table>

Expected outputs
- Two review reports on national educational needs of livestock keepers produced and targets for their training set.

Action 3. Identify the short, medium and long-term needs for research and education, and promote the formation of the relevant experts, nationally or through international training.

Tasks:
- Conducting of review on the existing national research and education in the relevant fields, and the available expert groups.
- Identifying of strengths, weaknesses and gaps in the reviewed research and education
capacities in relation to the short, medium and long term need as well as of the relevant expert groups.

- Producing of reports on the short, medium and long-term needs for research and education.
- Formation of relevant expert groups for short, medium and long-term needs for research and education, nationally or through international training.
- Compiling of a report on the formation process of the relevant expert groups.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<tbody>
<tr>
<td>EBI</td>
<td>MoLF, MoE, HLI, NARS, Ministry of Federal Affairs, EBI, BoLF/Livestock Agency, Pastoral Com.</td>
<td>ST-LT</td>
<td>220.00</td>
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</table>

**Expected outputs**

- Two assessment reports on short, medium and long-term needs for research and education produced.
- Two expert groups for short, medium and long-term needs for research and education, nationally or through international training, formed.

**Action 4.** Strengthen, in partnership with other countries, as appropriate, relevant research, training and extension institutions, including national and regional agricultural research systems, to support efforts to characterize, inventory and monitor trends and associated risks, sustainably use and develop, and conserve animal genetic resources.

**Tasks:**

- Conducting of review on the hitherto efforts conducted in partnership with relevant research, training and extension institutions of other countries in areas of characterization, inventory and monitoring trends and associated risks, sustainable use and development, and conservation of animal genetic resources.
- Identifying of strengths, weakness and gaps in the reviewed efforts.
- Identifying of relevant research, training and extension institutions in countries with best practice of characterization, inventory and monitoring trends and associated risks, sustainable use and development, and conservation of animal genetic resources.
• Creating contact with those institutions and requesting for the partnership.
• Signing of the MoU with the identified institutions to work in partnership in areas of research and training on characterization, inventory and monitoring trends and associated risk, sustainable use development and conservation of animal genetic resources.
• Compiling of the report on the process of forming partnerships.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
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<tr>
<td>EBI</td>
<td>EBI, NAIC, MoE, HLI, NARS, FAO, MoST, BoLF/Livestock Agency, Pastoral Com.</td>
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</table>

**Expected outputs**

- MoU with five regional and international relevant research and training institutions that will work in partnership in areas of characterization, inventory and monitoring trends and associated risk, sustainable use development and conservation of animal genetic resources signed.

**Strategic priority 13.** Strengthen national human capacity for characterization, inventory, and monitoring of trends and associated risks, for sustainable use, development, and conservation (US $ 1,150,000)

**Action 1.** Establish and/or strengthen training and technology transfer programs, and information systems for the inventory, characterization and monitoring of trends and associated risks; sustainable use, development and conservation.

**Tasks:**
- Conducting of review on the existing training and technology transfer and information
systems for the inventory, characterization and monitoring of trends and associated risks; sustainable use, development and conservation.

- Identifying of strengths, weaknesses and gaps in the existing training and technology transfer and information systems.

- Devising of mechanisms that will strengthen training and technology transfer and information system needs for the inventory, characterization and monitoring of trends and associated risks; sustainable use, development and conservation.

- Strengthening of the required training and technology transfer programs and information system needs to cattle, goats, poultry, sheep, camel & equines.

- Compiling of report on the training and technology transfer programs and information system needs devised and strengthened.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost ('000 US $)</th>
<th>Source of financing</th>
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<td>EBI</td>
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</table>

**Expected outputs**

- Six (cattle, goats, poultry, sheep, camel & equines) training, technology transfer programs and information systems on the inventory, characterization and monitoring of trends and associated risks; sustainable use, development and conservation strengthened.
**Action 2.** Establish and/or strengthen collaborative networks of researchers, breeders and conservation organizations, community-based organizations and other public, civil and private actors, within and between countries, for information and knowledge exchange for sustainable use, breeding and conservation.

**Tasks:**
- Conducting of review on the existing collaborative networks of researchers, breeders and conservation organizations, community-based organizations and other public, civil and private actors, within and between countries, for information and knowledge exchange for sustainable use, breeding and conservation.
- Identifying of strengths, weaknesses and gaps in the existing collaborative networks.
- Devising of mechanisms that will strengthen the desired collaborative networks.
- Strengthening of the required collaborative networks of researchers, breeders and conservation organizations, community-based organizations and other public, civil and private actors, within and between countries, for information and knowledge exchange for sustainable use, breeding and conservation.
- Compiling of report on the devised and strengthened collaborative networks.

<table>
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<tr>
<th>Lead implementation organization</th>
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<th>Expected cost (‘000 US $)</th>
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<td>MoLF</td>
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<td>ST-LT</td>
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</table>

**Expected outputs**
- A collaborative network of researchers, breeders and conservation organizations, community-based organizations and other public, civil and private actors, within and between countries, for information and knowledge exchange for sustainable use,
breeding and conservation established.

**Strategic priority 14.** Raise national awareness of the roles and values of animal genetic resources (US $ 52,000)

**Action 1.** Provide targeted, effective information through media, public events and other means to raise awareness about the important roles and values of animal genetic resources.

**Tasks:**
- Conducting of review on the hitherto methods used to raise awareness about the important roles and values of animal genetic resources.
- Identifying of strengths, weaknesses and gaps in the hitherto methods used to raise awareness about the important roles and values of animal genetic resources.
- Devising of mechanisms that will help to provide targeted and effective information through media or other means to raise awareness about the important roles and values of animal genetic resources.
- Providing of targeted and effective information used to raise awareness about the important roles and values of animal genetic resources.
- Compiling of report on the devised means and means of disseminating targeted and effective informant to the awareness raising.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
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<td>ST-LT</td>
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</table>

**Expected outputs**
- 90 hrs of information through the mass media (10 minutes per week) about roles and values of animal genetic resources disseminated.
- Five of public events and other means to raise awareness about the
important roles and values of animal genetic resources.

Strategic priority 15. Review and develop national policies and legal frameworks for animal genetic resources (US $ 50,000)

Action 1. Periodically review existing national policies and regulatory frameworks, with a view to identifying any possible effects they may have on the sustainable use, development and conservation of animal genetic resources, especially with regard to the contribution and needs of local communities keeping livestock.

Tasks:
- Conducting of review on the existing national policies and regulatory frameworks related to national policies and regulatory frameworks.
- Identifying of strengths, weaknesses and gaps in the reviewed national policies and regulatory frameworks.
- Producing of a review report that identifies possible effects of the existing national policies and regulatory frameworks on the sustainable use, development and conservation of animal genetic resources, especially with regard to the contribution and needs of local communities keeping livestock.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
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<td>EBI</td>
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</table>

Expected outputs
- A review report on the existing national policies and regulatory frameworks, with a view to identifying any possible effects they may have on the sustainable use, development and conservation of animal genetic resources, especially with regard to the contribution and
needs of local communities keeping livestock produced.

**Action 2.** Consider measures to address any effects identified in reviews of policy and legal frameworks.

**Tasks:**
- Reviewing of the existing policy and legal frameworks that are associated with domestic animal genetic resources.
- Identifying of strengths, weaknesses and gaps in the reviewed policy and legal frameworks.
- Suggesting of amendments and/or any other measures, as necessary.
- Compiling of a report on the revision process and the measures suggested.

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<tr>
<th>Lead implementation organization</th>
<th>Partner organization(s)</th>
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</table>

**Expected outputs**
- All the existing policies and legal frameworks reviewed, and when necessary, amendments suggested.

**Action 3.** Ensure that relevant research results are taken into consideration in the development of national policies and regulations on animal genetic resources.

**Tasks:**
- Conducting of review on the hitherto experiences on whether relevant research results are taken into consideration during development of national policies and regulations on animal genetic resources.
- Identifying of strengths, weaknesses and gaps in relation to using of relevant research results during development of national policies and regulations on animal genetic resources.
- Raising of awareness of policy makers on the need of taking into consideration of the relevant research results during development of national policies and regulations on animal genetic resources.
- Following-up and ensuring that the relevant research results have been taken into account.
consideration during the development of national policies and regulations on animal genetic resources.

- Compilation of reports of the process.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
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<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<td>ST-LT</td>
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<td>MoLF</td>
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</tbody>
</table>

**Expected outputs**
- In the development of national policies and regulations on animal genetic resources, all relevant research results taken into consideration.

**Action 4.** Ensure consistency of national law and policies concerning animal genetic resources with relevant international agreements, as appropriate.

**Tasks:**
- Conducting of reviews on whether the national law and policies concerning animal genetic resources are consistent with relevant international agreements.
- Identifying of gaps in consistency of national law and policies concerning animal genetic resources with relevant international agreements.
- Devising of means that national law and policies concerning animal genetic resources will, as appropriate, be consistent with relevant international agreements.
- Producing of reports indicating the identified gaps in and proposed solutions to ensuring, as appropriate, the consistency of the national laws and policies with relevant international agreements.

<table>
<thead>
<tr>
<th>Lead implementation organization</th>
<th>Partner organization (s)</th>
<th>Time frame</th>
<th>Expected cost (‘000 US $)</th>
<th>Source of financing</th>
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<tr>
<td>Expected outputs</td>
<td>• Two review reports on the consistency of national law and policies concerning animal genetic resources with relevant international agreements, as appropriate ensured produced.</td>
<td></td>
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</tbody>
</table>

SR= short term plan; plan accomplished within a year, MT= medium term plan; plan accomplished within 2 to 5 years period and LT= Long term plan; plan takes more than 5 years.
2. PROGRESS EVALUATION, FINANCING AND REPORTING PROCEDURES

2.1. Progress evaluation and reporting system

Lead implementation organization for each strategic issue will be responsible for the development of annual work plans and working proposals as well as monitoring of their implementation. Monitoring and reporting requires periodic assessment of progress made in the implementation of the National Strategy and Plan of Action. Actions taken should be assessed routinely to determine whether the desired results are being achieved and review and adjust timely solutions.

National monitoring on progress of implementation is also important to promote further international support for efforts to achieve sustainable use, development and conservation of animal genetic resources. National reporting on the progress of the implementation and status will help to find means that will fill gaps, rectify imbalances or lack of coordination and to consider new initiatives or activities. Therefore, a system for monitoring, evaluating and reporting on the implementation of the Ethiopian Strategy and Plan of Action for animal genetic resources has been prepared as per the FAO guideline. A detailed monitoring and evaluation will be undertaken to ensure effective follow-up of implementation.

The FAO guideline on reporting progress in the implementation and status recommends that each lead agency to report to the National Advisory Committee and that the National Advisory Committee provide an annual synthesis report with recommendations to the minister responsible for animal genetic resources and EBI director for any adjustments that may be required. It also recommends that the implementation progress be monitored on a yearly basis in order to plan responses to possible obstacles to implementation as well as to prepare effective work plan and budget for the subsequent year of implementation. Progress of each strategic area will be reported by the respective lead implementation organization using the format presented in Appendix 3. Evaluation criteria will be filled by both the task force and the lead implementing agency. Outputs achieved, and Opportunities and challenges to implementation of each fiscal year will be reported by the respective lead agency at the end of the fiscal year.
2.2. Financing

The main responsibility for implementing ENSPA-AnGRFA rests with the Federal and national regional governments. The government should take the necessary and appropriate measures to ensure due priority and attention to the effective allocation of predictable and agreed resources for the implementation of activities within the Strategic Priority Areas of the National Plan of Action for Animal Genetic Resources. The government should attach due attention, including funding, to the implementation of activities through bilateral, regional and multilateral cooperation. The Government should accord due priority in its own plans and programs to building capacity in animal genetic resources.

Implementation of ENSPA-AnGRFA will require substantial financial resources and long term support for national and regional animal genetic resources programs and priority activities. There is a need to develop a funding strategy for implementation. The extent to which the country will effectively implement its commitment under the Global Plan of Action for Animal Genetic Resources will depend on the effective provision of funding. The process of securing fund should involve and support the participation of the government and all relevant stakeholders.

Mobilizing financial resources from within the country will be aggressively pursued. However, the financial demand of implementation of ENSPA-AnGRFA is huge and can’t be met from internal sources alone.

Thus, there is a strong need for support from international sources. Multilateral and bilateral funding and development institutions should be invited to examine ways and means of supporting ENSPA-ANGRFA. Voluntary contributions should also be encouraged, in particular from private sector and non-governmental organizations.

Funding for animal genetic resources for food and agriculture can be potentially provided from the following sources.

- Government –Federal and Regional, Projects such as AGP,
- Non-Governmental Organizations,
International Organizations such as UNFCCC, FAO, ILRI, ICARDA, UNDP, UNEP, GEF and UNESCO,
Bilateral and multilateral sources such as USAID, GIZ, JICA,
Private sector, and
Civil Societies.

The essential role of the FAO in supporting implementation of ENSPA-AnGRFA, especially in facilitating regional collaboration and networks and mobilizing donor resources for animal genetic resources, developing communications products is of the utmost importance. Technical guidance and assistance in implementing ENSPA-AnGRFA is expected to be provided by FAO. In addition to that, Ethiopia should work with FAO so that it should pursue within relevant international mechanisms, funds and bodies, means by which they might contribute to the implementation of ENSPA-AnGRFA.

Capacity development in such areas as human resources and technological needs by, _inter alia_, technology transfer are expected to be supported and largely financed through bilateral and multilateral initiatives and from other international sources.

The National Focal Point for animal genetic resources is required to initiate formation of national networks to mobilize and engage stakeholders in the implementation of ENSPA-ANGRFA. The country has determined its own priorities in light of those agreed in the Global Plan of Action for Animal Genetic Resources, as appropriate, and in line within the framework of the country’s food and agricultural development needs.
3. REFERENCES


FAO. 2001. FAOSTAT. FAO statistical databases on agriculture, fisheries, forestry and nutrition, Food and Agriculture Organization, Rome, Italy.


## Appendix 1. Progress of the country in achieving the Global Plan of Action for characterization, conservation and sustainable utilization, development and capacity building for animal genetic resources.

<table>
<thead>
<tr>
<th>Global strategic priority</th>
<th>Global actions</th>
<th>National status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRIORITY AREA 1: Characterization, inventory and monitoring of trends and associated risks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Inventory and characterize animal genetic resources, monitor trends and risks associated with them, and establish country-based early warning and response systems</td>
<td>1. Conduct or complete inventories of the location, population status, trends and characteristics of animal genetic resources.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>2. Expand characterization and monitoring of trends and risks to animal genetic resources.</td>
<td>X</td>
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<tr>
<td></td>
<td>3. Encourage the establishment of institutional responsibilities and infrastructure for monitoring trends in animal genetic resources, including identification, registration and pedigree systems.</td>
<td>X</td>
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<tr>
<td></td>
<td>4. Promote participatory approaches to characterization, inventory and monitoring of trends and associated risks that foster collaboration among all stakeholders, including livestock keepers and researchers.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>5. Undertake international cooperative</td>
<td>X</td>
</tr>
<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<tr>
<td></td>
<td>monitoring of trends and associated risks, inventory and characterization activities among countries sharing trans-boundary breeds and similar production systems.</td>
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<td></td>
<td>6. Strengthen national and regional information systems and networks for inventory, monitoring and characterization.</td>
<td>X</td>
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<tr>
<td></td>
<td>7. Establish breed endangerment early warning and response systems, through development of national, regional and global risk monitoring mechanisms.</td>
<td>X</td>
</tr>
<tr>
<td>STRATEGIC PRIORITY AREA 2: Sustainable use and development</td>
<td>3. Establish and strengthen national sustainable use policies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Review existing national policies on sustainable use to assess their impacts on animal genetic resources management.</td>
<td>X</td>
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<tr>
<td></td>
<td>2. Develop national policies that incorporate the contribution of animal genetic resources to sustainable use, which include setting strategic objectives for breeding and sustainable use; conducting economic and cultural valuation of animal genetic resources; and developing approaches, including mechanisms, to support wide access to,</td>
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<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<tr>
<td>4. Establish national species and breed development strategies and programs</td>
<td>and the fair and equitable sharing of, benefits arising from the use of animal genetic resources and associated traditional knowledge.</td>
<td></td>
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<tr>
<td>1. Develop long-term planning and strategic breeding Programs which, include efforts to improve underutilized breeds, especially within low to medium external input production systems; assessments of the impact of exotic animal breeds and the development of measures for producers to realize positive impacts and prevent negative impacts; training and technical support for the breeding activities of pastoralist and farming communities; and the integration of improved husbandry practices in animal genetic resources development programs.</td>
<td>Achieved</td>
<td>X</td>
</tr>
<tr>
<td>2. Assess breed development programs, with the aim of meeting foreseeable economic and social needs and market demands. The information about breeds and production systems should be made available to consumers.</td>
<td></td>
<td>X</td>
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<tr>
<td>3. Establish and develop organizational structures of breeding programs,</td>
<td></td>
<td>X</td>
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<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<td>Achieved</td>
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<tr>
<td>Global actions</td>
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<tr>
<td>especially breeders’ organizations and breeding schemes, including recording systems.</td>
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<td>4. Incorporate consideration of the impacts of selection on genetic diversity into breeding programs and develop approaches to maintain the desired variability.</td>
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<td>5. Establish recording schemes to monitor changes in production and non-production traits, and develop and periodically adjust breeding goals accordingly.</td>
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<tr>
<td>6. Encourage the development of backup collections of frozen semen and embryos to ensure genetic variability.</td>
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<tr>
<td>7. Provide information to farmers and livestock keepers to assist in facilitating access to animal genetic resources from various sources.</td>
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<tr>
<td>5. Promote agro-ecosystems Approaches to the management of animal genetic resources</td>
<td>1. Assess environmental and socio-economic trends that require a medium- and long-term policy development and/or revise in animal genetic resources management.</td>
<td></td>
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<tr>
<td></td>
<td>2. Integrate agro-ecosystem approaches in national agricultural and environmental</td>
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<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<td>Achieved</td>
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<td>To be addressed</td>
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<tr>
<td>Global actions</td>
<td></td>
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<tr>
<td></td>
<td>policies and programs of relevance to animal genetic resources particularly those directed towards pastoralist and rural smallholder communities, and fragile environments.</td>
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<tr>
<td>3. Establish networks to enhance interaction among the main stakeholders, scientific disciplines and sectors involved.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6. Support indigenous and local production systems and Associated knowledge systems of importance to the maintenance and sustainable use of animal genetic resources</td>
<td>1. Assess the value and importance of indigenous and local production systems to identify trends and drivers of change that may affect the genetic base, and the resilience and sustainability of the production systems.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>2. Support indigenous and local livestock systems of importance to animal genetic resources, including through the removal of factors contributing to genetic erosion.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>3. Promote and enable relevant exchange, interaction and dialogue among indigenous and rural communities and scientists and government officials and other stakeholders, in order to integrate traditional knowledge with scientific</td>
<td>X</td>
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<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<td>Achieved</td>
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<tr>
<td>approaches.</td>
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<tr>
<td>4. Promote the development of niche markets for products derived from indigenous and local species and breeds, and strengthen processes to add value to their primary products.</td>
<td></td>
<td>X</td>
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<tr>
<td><strong>STRATEGIC PRIORITY AREA 3: Conservation</strong></td>
<td></td>
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<tr>
<td>7. Establish national Conservation policies</td>
<td>1. Set and regularly review conservation priorities and goals.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>2. Assess factors leading to the erosion of animal genetic resources and formulate appropriate policy responses. Establish information systems on animal breeding approaches, in order to enable breeders make appropriate choices in improvement programs.</td>
<td>X</td>
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<tr>
<td></td>
<td>3. Establish institutional structures and policies, including specific measures to conserve breeds at risk of extinction, and to prevent breeds from becoming at risk.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>4. Provide and catalyze incentives for producers and consumers to support conservation of animal genetic resources at risk in consonance with existing international agreements.</td>
<td>X</td>
</tr>
<tr>
<td>8. Establish or</td>
<td>1. Set and regularly review <em>in situ</em></td>
<td>X</td>
</tr>
<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<td>---------------------------</td>
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</tr>
<tr>
<td>strengthen <em>in situ</em> conservation programs</td>
<td>conservation priorities and goals.</td>
<td>Achieved</td>
</tr>
<tr>
<td>2</td>
<td>Encourage the development and implementation of national and regional <em>in situ</em> conservation programs for breeds and populations that are at risk.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Promote policies and means to achieve the sustainable use of a diversity of local breeds, without the need for support from public funds or extra funding, through <em>in situ</em> conservation.</td>
<td></td>
</tr>
<tr>
<td>9. Establish or strengthen <em>ex situ</em> conservation programs.</td>
<td>1. Set and regularly review <em>ex situ</em> conservation priorities and Goals.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Establish and/or strengthen national and regional facilities for <em>ex situ</em> conservation, in particular cryogenic storage.</td>
<td></td>
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<tr>
<td></td>
<td>3. Establish modalities to facilitate use of genetic material stored in <em>ex situ</em> gene banks under fair and equitable arrangements for storage, access and use of animal genetic resources.</td>
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<td></td>
<td>4. Develop and implement measures to secure <em>ex situ</em> collections from loss of genetic diversity resulting from disease outbreaks and other threats, in particular by establishing backup samples.</td>
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<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<td></td>
<td>5. Identify and fill gaps in <em>ex situ</em> collections.</td>
<td>To be addressed</td>
</tr>
<tr>
<td></td>
<td>6. Develop procedures for replenishment of genetic material taken from gene banks, by systematically developing links with live populations, or establishing <em>in vivo</em> populations of breeds at risk at off-farm locations.</td>
<td></td>
</tr>
<tr>
<td>STRATEGIC PRIORITY AREA 4: Policies, institutions and capacity building</td>
<td>1. Analyze national institutional capacity in support of holistic planning of the livestock sector.</td>
<td></td>
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<tr>
<td></td>
<td>2. Establish or strengthen fully functional National Focal Points for animal genetic resources.</td>
<td>Achieved</td>
</tr>
<tr>
<td></td>
<td>3. Develop strong national coordination between the National Focal Point and stakeholders involved in animal genetic resources, such as the breeding industry, government agencies, civil society organizations, and networks and advisory committees.</td>
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<td></td>
<td>4. Develop and implement intervention tools for national planners to shape the future development of the livestock sector in accordance with national priorities, including in relation to the</td>
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<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<tr>
<td></td>
<td>deployment of animal genetic resources, and the effects of animal production systems on the environment.</td>
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<tr>
<td></td>
<td>5. Promote coordination and synergy between the different authorities dealing with various aspects of planning, within and across ministries, as well as with other stakeholders, and ensure their participation in the process.</td>
<td>X</td>
</tr>
<tr>
<td>13. Establish or strengthen National educational and research facilities</td>
<td>1. Identify the short-term, medium-term and long-term needs for research and education, and promote the formation of the relevant experts, nationally or through international training.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>2. Review national research and education capacities in relevant fields, and establish targets for training to build the national skill base.</td>
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<tr>
<td></td>
<td>3. Establish or strengthen, in partnership with other countries, as appropriate, relevant research, training and extension institutions, including national and regional agricultural research systems, to support efforts to characterize, inventory and monitor trends and associated risks,</td>
<td>X</td>
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<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<td></td>
<td>sustainably use and develop, and conserve animal genetic resources.</td>
<td>Achieved</td>
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<td></td>
<td>4. Review the national educational needs of livestock keepers, while respecting traditional knowledge and indigenous practices.</td>
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<tr>
<td>14. Strengthen national human capacity for characterization, inventory, and monitoring of trends and associated risks, for sustainable use, development, and conservation</td>
<td>1. Establish or strengthen training and technology transfer programs, and information systems for the inventory, characterization and monitoring of trends and associated risks; sustainable use, development and conservation.</td>
<td></td>
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<tr>
<td></td>
<td>2. Establish or strengthen training and technology transfer programs, and information systems for the inventory, characterization and monitoring of trends and associated risks; sustainable use, development and conservation.</td>
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<td></td>
<td>3. Establish or strengthen community-based organizations, networks and initiatives for sustainable use, breeding and conservation.</td>
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<tr>
<td>18. Raise national awareness of the roles and values of animal genetic resources</td>
<td>1. Provide targeted, effective information through media, public events and other means to raise awareness about the important roles and values of animal genetic resources.</td>
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</tr>
<tr>
<td>Global strategic priority</td>
<td>Global actions</td>
<td>National status</td>
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<tr>
<td>20. Review and develop</td>
<td>1. Periodically review existing national policies and regulatory frameworks, with a view to identifying any possible effects they may have on the sustainable use, development and conservation of animal genetic resources, especially with regard to the contribution and needs of local communities keeping livestock.</td>
<td>Achieved</td>
</tr>
<tr>
<td>national Policies and</td>
<td></td>
<td>To be addressed</td>
</tr>
<tr>
<td>legal frameworks for</td>
<td>2. Consider measures to address any effects identified in reviews of policy and legal frameworks.</td>
<td></td>
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<tr>
<td>animal genetic</td>
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<tr>
<td>resources.</td>
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<td></td>
<td>3. Ensure consistency of national law and policies concerning animal genetic resources with relevant international agreements, as appropriate.</td>
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<tr>
<td></td>
<td>4. Ensure that relevant research results are taken into consideration in the development of national policies and regulations on animal genetic resources.</td>
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</tbody>
</table>
## Appendix 2. Indigenous and exotic breeds of farm animal domestic species of Ethiopia.

<table>
<thead>
<tr>
<th>Species</th>
<th>Indigenous breeds</th>
<th>Exotic breed names</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sheep</strong></td>
<td>Simien, Short fat tailed (Sekota, Farta, Tikur, Wello and Menz), Washera, Gumuz, Horro, Arsi (Arsi-Bale, Adilo), Bonga, Afar, Black Head Somali</td>
<td>Merino, Romney, Corriedale, Hampshire, Rambouillet, Awassi, Dorper</td>
</tr>
<tr>
<td><strong>Goat</strong></td>
<td>Arsi-Bale, Gumuz, Keffa, Woyto-Guji, Abergelle, Afar, Highland Goats, the Somali Goats</td>
<td>Anglo-Nubian, Toggenburg, Boer</td>
</tr>
<tr>
<td><strong>Donkey</strong></td>
<td>Abyssinian, Afar, Hararghe, Ogaden, Omo, Sinnar</td>
<td>--</td>
</tr>
<tr>
<td><strong>Horse</strong></td>
<td>Abyssinian, Bale, Boran, Horro, Kafa, Kundido feral horse, Ogaden/Wilwal, Selale horse</td>
<td>--</td>
</tr>
<tr>
<td><strong>Mule</strong></td>
<td>Sinnar, Wollo</td>
<td>--</td>
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<tr>
<td><strong>Camel</strong></td>
<td>Amibara, Gellbe, Hoor, Jijiga, Liben, Mille, Shinnie camel</td>
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</tr>
<tr>
<td><strong>Chicken</strong></td>
<td>Farta, Horro, Jarso, Konso, Mandura, Tepi, Tillili</td>
<td>Rhode Island Red (RIR), White Leghorn, Lawman Brown, Cobb-500, Fayoumi, Bovans Brown, Arob Acre, Bubcocks, Potcheftsroom Koekoek, Dominant Brown D102, Lahlman Silver, Hubbard Classic, Hubbard JV, ISA Brown</td>
</tr>
</tbody>
</table>
**Appendix 3. Framework for evaluating the National Strategy and Plan of Action.**

<table>
<thead>
<tr>
<th>Lead agency</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Name of strategic priority area</td>
<td></td>
</tr>
<tr>
<td>Name of strategic priority</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td></td>
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<tr>
<td>Tasks</td>
<td></td>
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<tr>
<td>Evaluation criteria</td>
<td></td>
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<tr>
<td>Output archived</td>
<td></td>
</tr>
<tr>
<td>Opportunities and challenges to implementation</td>
<td></td>
</tr>
<tr>
<td>Future actions</td>
<td></td>
</tr>
</tbody>
</table>