Status and Distribution of Faunal Diversity in Kafa Afromontane Coffee Forest

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Acronyms

CMS	Convention on Migratory Species
EFAP	Ethiopian Forestry Action Programme
EIA	Environmental Impact Assessment
EMA	Ethiopian Mapping Authority
EPA	Environmental Protection Authority
EWCD	Ethiopian Wildlife Conservation Department
EWDCA	Ethiopian Wildlife Development and Conservation Authority
EWCA	Ethiopian Wildlife Conservation Authority
EWCO	Ethiopian Wildlife Conservation
EWNHS	Ethiopian Wildlife and Natural History Society
GDP	Gross Domestic Product
GPS	Global Positioning System
GTZ	Deutsche Gesellschaft Für Technische Zusammenarbeit
IBC	Institute of Biodiversity Conservation
IUCN	International Union for Conservation of Nature and Natural Resources
MaB	Man and Biosphere
masl	Meter Above Sea Level
mm	Millimeter
MoFED	Ministry of Finance and Economic Development
NABU	Nature and Biodiversity Conservation Union
NGOs	Nongovernmental Organizations
NPA	National Population Authority
NPP	National Population Policy
PASDEP	Programme of Accelerated and Sustainable Development to End Poverty
PPP	Public-Private Partnership
PRSP	Poverty Reduction Strategy Paper
SDPRP	Sustainable Development and Poverty Reduction Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization

Executive Summary

The present field study was conducted in Kaffa Zone, Southern Peoples, Nationality and Nations Regional State between the periods of February 22 to March 27, 2008. The objective of the study was mainly to submit a standalone report with the view to collect information on the diversity of the fauna including the status and distribution to serve as part of the requirements for the nomination of the site for the inclusion in Man and Biosphere Programme set by UNSECO.

A total of 27 intensive field days were spent for both foot and road assessments to come up with exhaustive lists on mega fauna (mammals, Birds, Reptiles, amphibians and fishes), including the compilation of threats, distribution and status of the species were as well given due considerations. The survey on faunal species was conducted using the accepted procedures and the conventional methods.

The study focused on adjoining Kaffa Afromontane Coffee Forest blocks, namely Bonga, Boginda and Makira forests and is regarded as one of the last remaining southern Ever Green Coffee Forest ecosystems in Ethiopia. The Kaffa Coffee Forest has been found to be rich in its faunal diversity. A total of 294 animal species were recorded. It harbours 61 mammalian species, 210 bird species, 10 reptiles, seven amphibians and six fish species. The mammals belong to nine Orders and 26 Families. The bird composition belongs to 16 Orders and 51 Families. Reptiles belong to one Order and two Families while Fishes belong to three Orders and five Families. Compared to the country's total mammalian and bird species, it holds about 21% and 23%, respectively. The area embraces primary vegetation communities reflected by typical arboreal species of mammals like Guereza and that have restricted range in the country like De Braza's monkey, Blue monkey, Forest Hog, Bush Pig and threatened species like Leopard. In the area, endemicity of smaller mammals is quit low and no endemic larger mammal was recorded. However it holds important species of birds that are migrant, endemic, endangered and vulnerable. Of the 210 birds recorded, five are endemic, six others are near endemic, 170 are resident, 24 are Palaearctic and 10 are Intra-African migrants. Moreover, of the total 47 Highland Biome bird species of Ethiopia 27 occur in Kaffa forest and surroundings. Boginda forest has been relatively found to be richer in faunal diversity and density than the Bonga and Mankira forests.

The rapidly expending population and improper land use practices are threatening the unique Afromontane Coffee Forest Ecosystem leading to lose of valuable plant and animal genetic resources. This problem calls for effective land management system and strategies that address the need of immediate and long-term integrated development, incorporating the interest and requirements of the local communities. This report endeavours to shed light on possible management recommendations and strategies at local and international levels that would help address the prevailing shortfalls.

Introduction

Faunal diversity embraces big and small animals; mammals, birds, reptiles, amphibians, fishes and invertebrates together with their habitats. These animate biological resources interact with non-animate components and develop into particular bionetwork, and the interactions between them produce ecological processes that are essential for the sustained existence of mankind. Man's survival is strongly connected and dependent on these ecological processes and life-support systems. Hence it is crucial to conserve and utilize these environmental components for sustainable development. The value of conserving these environmental resources is not only to maintain the diversity and integrity of the biological resources, but their benefit and services play important roles to sustain life and to meet the basic needs of all human kind. The benefits and services may perhaps be the contribution they offer to rural communities by providing fresh water or moderating seasonal waters as catchments and buffering the effects of drought or other ecological problems. Conservation of the resources may well also be essential for agriculture that depends on basic ecological processes such as in recycling of nutrients, pollination, fertilization and decomposition processes.

But, in contrast, many ecosystems that are rich biologically and promising in material benefits are severely threatened with no notice for their values (Leykun, 2000). Failure to understand the linkages between the living resources and their functional relationship to other development has already led these valuable resources beyond their abilities to regenerate. These resources are given low priorities and in consequence it resulted in extensive land degradation, human sufferings and loss of genetic resources, which in a way would have met the economic and ecological demands in the coming decades. Call for ecologically sound management and exploitation of the resources on a sustainable basis are therefore urgent and timely and an assessment to initiate a holistic strategy that serves both the long term economic growth and stable environment is highly essential.

Towards this end, a balanced development and integrated land management system that would link the maintenance of bio-ecological and other functions with other production values is a prerequisite and is to be in place. This implies broader application concept integrating the conservation principles into other land-uses or related development plans

that would guarantee the benefits and services and to effectively manage and use the man-made or natural ecosystems on sustainable basis.

The old concept, too, that regards protected areas as islands is no longer able to work as surrounding land are degraded and where incompatible land-use forms exists (Leykun, 1991). Protected areas need to be part of the broader development plan that includes the surrounding lands and buffer area in which larger areas of varying intensity of human use are integrated and managed. The idea of Man and Biosphere Reserve concept developed by UNESCO can be viewed as a viable strategy to this end, and to practice and improve relationships between conservation of environmental resources and other development needs. This entails and leads to have a baseline data to arrive at any development plans and integrated management. Thus, the planning considerations have to involve an inventory of the resource base, research, zoning, long-term monitoring and application of results with effective involvement efforts.

In view of this, the present field study was undertaken with an intention to lay foundations through collecting basic information that are required for long term viability and sustained yield production systems of a particular environment.

The collection of present primary data on faunal diversity was carried out in the south-western highlands of Ethiopia. The area under investigation is not at the moment represented in Ethiopian Wildlife Protected Area Systems and the faunal diversity and status, except for avifauna, was not also thoroughly investigated previously. This area is located partly, around the Bonga National Forest Priority Area in Kaffa Zone, in the Southern Nations, Nationals and People's Regional State (SNNPRS). The study focuses on adjoining coffee forest blocks, namely Bonga, Boginda and Mankira forest areas and is regarded as one of the last remaining southern Ever Green Forest ecosystems in Ethiopia, characterized to represent mainly, the western Afro-tropical Highland Biome (EWHNS, 1996).

This study was therefore conducted with the aim of making a general assessment on the mega faunal diversity including the status, distribution and trends of species with an assumption that the results serve as part of the integral components of a study required in completing the overall Biosphere Reserve–MAB Nomination Form.

Literature Review Related to Faunal Diversity and Management

Macro Policies and Priorities

Ethiopia covers a total surface area of 1,104,000 sq km with a population of over 79.2 million and living in rural areas with about 83.3% that are mainly agrarian and forest dwelling (Eshetu, 2008). Agriculture holds a dominant position contributing about 55% of the GDP and 85% of the total export earnings of which coffee takes 67% or is the dominant item (Gole, 2002; Aga, 2005). The central development objective of the government is to build a market-led economic system which will enable the economy to develop rapidly, allow the country to get out from food-aid dependency and to ensure the distribution of the benefits of growth is fair and equitable. To achieve this objective, the government has launched Poverty Reduction Strategy Paper (PRSP), as an overall program for Ethiopia and known as Sustainable Development and Poverty Reduction Program, SDPRP, (MoFED, 2005).The Program embraces four pillars upon which it is guided. These are Agricultural Development-Led Industrialization, Civil Service and Judiciary Reforms, Capacity Building, and Decentralization and Empowerment. Based upon this, the government has also devised a new initiative recently to dwell on and to strengthen poverty reduction program known as Programme of Accelerated and Sustainable Development to End Poverty (PASDEP).

The government of Ethiopia believes that it has achieved so far, modest successes and has delivered satisfactory results in the following major areas:

- ➢ All-round capacity buildings,
- ➢ Broad-based and sustainable growth,
- ➢ Balanced economic growth,
- ➢ Strengthening infrastructural development,
- ➢ Managing risks,
- ➢ Strengthening human resource development,
- ➢ Creation of employment opportunities and in,
- ➢ Investment in tourism and developing parks for eco-tourism

Environmental Protection Policy

The macro-environmental objectives of the government as defined in Article 92 of the Constitution ensures that all Ethiopians live in a clean and healthy environment and further states that the design and implementation of the program and development projects do not damage or destroy the environment (EPA, 1997). In line with this, the Environmental Protection Authority (EPA) establishment and law of the Federal Government enact a policy for the preservation, conservation and sustainable use of biological and environmental resources in the country. EPA has formulated the National Conservation Strategy, and the Regional Conservation Strategies have been formulated in line with the National Conservation Strategy (EFAP, 1989). The strategy emphasizes the need to preserve, develop, manage and sustainably use the biological diversity of Ethiopia's species of wild and domesticated flora and fauna and its natural and man-managed ecosystems for the country's social and economic development and for the integrity of the biosphere at large. The National Population Policy (NPP) in supplementing the protection of the environment has stipulated as its major objective and on the harmonization of the rate of population growth with the capacity of the country to develop and utilize its natural resources. The government aims to support the conservation of biodiversity through the population policy by making population and economic growth compatible. This involves, among others, closing the gap between high population growth and low economic productivity, expediting economic and social development, maintaining/improving the carrying capacity of the environment, and raising the economic and social status of women and vulnerable groups.

An important step, what EPA recently introduced in Ethiopia is establishing a system of Environmental Impact Assessment (EIA) including the preparation of Procedural and Sectoral Guidelines as a prerequisite for approval of any new development initiatives. But, this step is hardly put on the ground due to lack of capacity and enforcement to implement it at least in major developments carried out has almost certainly affected the critical environments in the country.

Wildlife Development / Management Policy

Ethiopia has diverse and endemic wildlife species and unique ecosystems. The economic and environmental values of Ethiopia's biological diversity for the nation and the world at large are well recognized by the Federal Government of Ethiopia (Hillman, 1993; Leykun, 2000). Ethiopia is party to many International Conventions, among others the Convention on Biological Diversity, World Heritage Convention, Convention on International Trade in

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Endangered Species of Wild Flora and Fauna, and African Convention on the Conservation of Nature and Natural Resources, Convention on the prohibition of development, Production, Stockpiling of Bacteriological and Toxic Weapons and on their Destruction (IUCN,1993).

The Ethiopian government has given due attention to biodiversity conservation and environmental protection through issuance of policies and strategies (EPA, 1997). At macro level the relevant government institutions that are related to the management and development of wildlife conservation are the Ministry of Agriculture and Rural Development, Institute of Biodiversity Conservation (IBC), Ethiopian Wildlife Development and Conservation Authority (EWDCA) and the Environmental Protection Authority (EPA). Recently the government has declared a Wildlife Policy and has been endorsed to strengthen the sector with clear vision and to lead the wildlife development sector more appropriately in the country. Furthermore, recently a new proclamation has been passed and endorsed by the House of Representatives to restructure with the newly established autonomous institution, the Ethiopian Wildlife Conservation Authority (EWCA) under the Ministry of Tourism and Culture. The new proclamation is made in Addis Ababa on 22nd May 2008 on 14th year no 31, under the Proclamation number of 575/2008 and is designated as Ethiopian Wildlife Development and Conservation Authority (EWDCA). It is believed that the new institutional set up would help the country with clear direction and coherence to implement and develop the wildlife resources effectively with sound management procedures and accountability. More analysis of the sub-sector is given in subsequent chapters as is specific to the present undertakings.

Analysis of Wildlife Sector in Ethiopia

Ethiopia is one of the most physically and biologically diverse countries of the world. It consists of a dissected highland massif surrounded by arid lowlands. The country has a wide variety of wildlife habitats ranging from alpine moor lands to lowland savannahs with extensive wetlands. Having evolved on relative ecological isolation from the rest of African mainland contains approximately 40% of all land above 2,500 m in altitude (Hillman, 1993; EWCO, 1996). Majority of these highlands are associated with many unique species of endemic wild plants and animals.

Wildlife conservation in Ethiopia embodies both utilization of wildlife resources and conservation to make allowance for its continuity in as near natural as state as possible. The need for wildlife conservation evidently became apparent in the 1900-1945. But modern system of wildlife conservation in Ethiopia began after 1960s, when international conservation interest was initiated. The Ethiopian Wildlife Conservation Organization under the Ministry of Agriculture was established in the 1960s and a semi-autonomous government body was set up to run all aspects of wildlife conservation activity in the country (Hillman, 1993).

Philosophy of wildlife management in Ethiopia mainly focuses on larger mammals and birds together with their habitats. Ethiopia's present wildlife potential consists of 277 terrestrial mammals, over 861 bird species, 201 species of reptiles, 63 species of amphibians and 150 species of fish. Among these, 31 mammals are believed to be endemic and out of these 20 are considered highland forms. Among birds, Ethiopia owns about 32 endemic species, some of which are shared with Eritrea. To date, 24 amphibians, four fish and nine reptiles are believed to be endemic. At least, 1,000 species out of over 7,000 flowering plant species are also restricted and endemic to the country. Many other forms of lower plants and invertebrates are yet to be inventoried. So far 324 butterflies are recognized of which seven are taken as endemic (Hillman, 1993).

The wildlife resources are not distributed evenly across the country. The large mammal species are most common in the more arid southern and western parts. The densely populated highlands support mainly smaller numbers of species and endemic mammals that have global importance or in few areas of high altitudes where interactions with development are comparatively less (EWCO, 1989). Ethiopia has therefore unique and rare wildlife resources of national and global importance that must be conserved and wisely used in the country.

The focus of wildlife situation in Ethiopia has been based on a system of wildlife conservation areas. The main strategy used has been until now the 'traditional system' of protected wildlife conservation areas; National Park, Wildlife Reserves, Sanctuaries, etc. Definition of each reserved areas and management categories has been enacted legally in 1965 (Hillman, 1993). The appropriateness of this system to modern Ethiopia however needs to be

clearly reviewed with particular reference to the needs and benefits of local communities, local and global importance, investment and tourism development per se.

The reserved areas currently are widely distributed in the country and representing different biomes of the country. These biomes are the Afro-tropical Highlands, Sudan-Guinea Natural savannah, the Sahel-Transitional Zone and the Somali-Masai Biomes (EWNHS, 1996). Within these biomes there are nine National Parks of which two are legally gazetted and three Sanctuaries, 11 Wildlife Reserves and 18 Controlled Hunting Areas and are established and managed according to their management requirements. The National Parks and the Sanctuaries are referred to as Principal Conservation Areas and cover approximately about 2.7% of the country's land area. Definition of each conservation categories and objectives follow that of IUCN Criteria (IUCN, 1990). Yet, there are more and major representative biotic communities and critical areas to be included in the Protected Areas System of the country.

Ethiopia still has a wildlife potential comparable, if not identical to that of East Africa. This legacy exists partly because of the network of conservation areas set aside long ago and partly because wild lands remain with little human exploitation or modification (Hillman, 1993).

Wildlife development is rural in nature that could contribute immensely to the philosophy and policy objectives of the present Government. Ethiopia needs the natural ecosystem including the wildlife areas for their indirect contribution to agriculture, energy, water catchments, public investment enterprises and other sectors of the national economy. It is essential especially for food security enhancement to rural economy that depends on basic ecological processes and ecological stability. The value of conserving wildlife can also contribute directly to the economy of the country mainly through consumptive and non-consumptive uses. The consumptive use is wildlife farming, safari hunting and wildlife trade that would bring substantial foreign exchange earnings to the national economy. The non-consumptive use includes eco-tourism development that the country has still great potential, if facilities for suitable accommodation and other services are available, and properly marketed (Callimanopolus, 1982).

However, the new economic policy that gives priority to agriculture productivity is affecting severely many ecosystems through extensive land development schemes with no con-

cern required to their ecological, economic and social values. The expansion of human development is usually at the expense of wildlife leading to loss of both flora and fauna together with their habitats (Leykun, 2000). Thus, the challenges facing the conservation of wildlife in Ethiopia are complex and require a readiness to address a clear development strategy by reviewing the inherent constraints the sub-sector is facing.

Physical and Ecological Description of the Study Area

The Kaffa Zone of Southern Nations National State is located in the south western part of Ethiopia at about 450 km from Addis and lies within the latitude of $07^o8'$ -$07^o26'$ North and longitude of $35^o53'$-$36^o36'$ East (see Map 1). The Zone has a surface area of 1,328,923 ha with a population of 725,086 inhabitants (IBCR, 2000). The Zone is bounded by Oromia Regional State in the north, Sheka Zone in the north-west, Bench-Maji in the south-west, South Omo Zone in the south and Konta in the south-east.
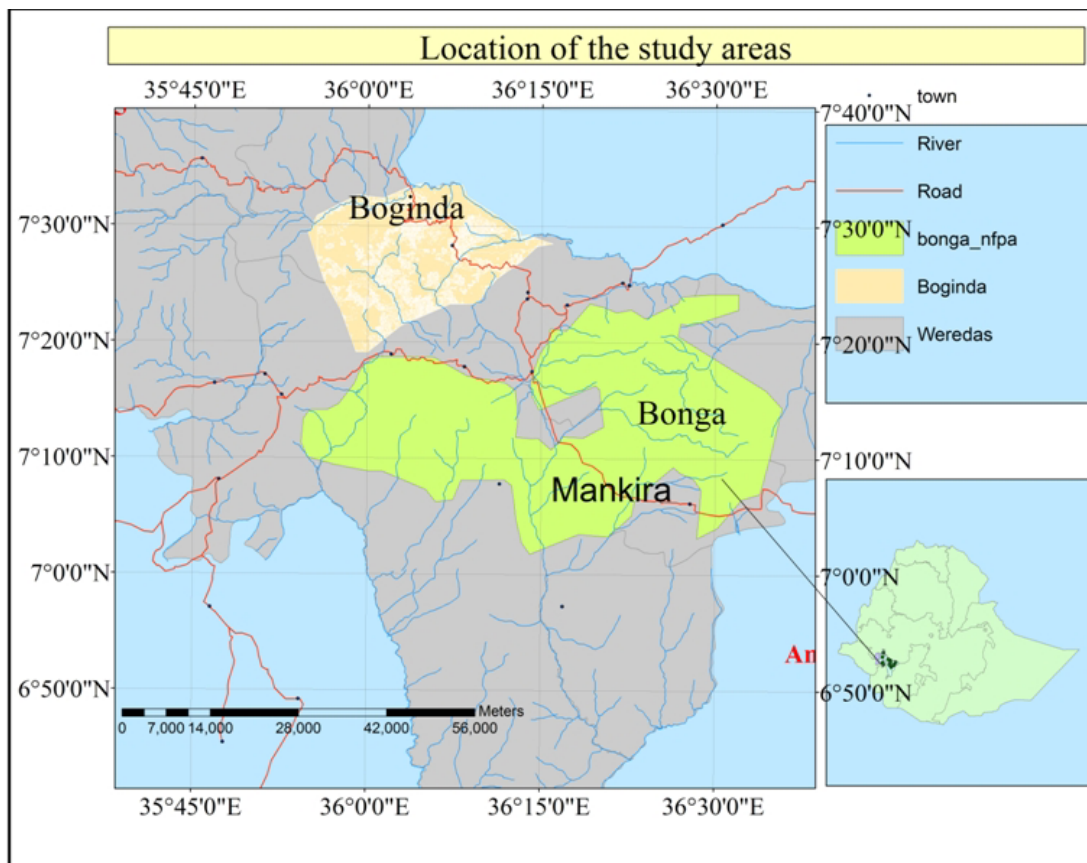
Source: Flora survey, 2008

Map 0. Study Area of Bonga, Boginda and Mankira

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The altitude and the topography of the area ranges between 1000-3500 masl consisting of a highly dissected plateau with flat and undulating terrain on areas above 1500 masl. The drainage system comprises of three major river systems, all origin from the area. The Gojeb River in the north and Dincha River in the central area drains to Omo River and the Woshi River drains into the Baro River to the west. The Zone experiences a mean annual rainfall of around 1,800 mm and a mean annual temperature of 19.5 ^{0}C with a mean minimum of 11.6^{0}C and mean maximum of 27.4 ^{0}C. There is one long rainy season and is from March to November and the wettest months are between months of May and June, (Bekele, 2003).

Administratively, the Zone is divided into ten Woredas. Under the new administration set up, the former Bonga Woreda has been divided into Gimbo and Bonga special Woredas, Boginda is now under Gewata Woreda and Mankira is under two Woredas namely Decha and Menjiow Woredas. Bonga town is still the Zonal capital. The Kaffa Zone is known as the birth place of coffee and the origin of *Coffee Arabica* and specifically is at a location known as Mankira which has been growing under a shade of trees in Kaffa's Humid Agro-ecological Zone (TAM, 2004). The Bonga, Boginda and Mankira forests are still among the few coffee forest areas in Ethiopia and are one of the main sources of natural/wild coffee or gene pool in the country (Gole, 2002). The forest holds varieties of wild animal species, which play a significant role in gene flow between coffee trees and adjacent forest tree populations (Aga, 2005). The forests are also important resources for non-timber products and commercial commodities like honey, 'Korerima' (*Aframomum angustifolium*) and Enset (*Enset ventricosum*).

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Objective of the Present Study

The major assignment of present study was to give exhaustive information on faunal diversity and status with the goal of providing species lists that will be used for the purpose of fulfilling the requirements set by UNESCO for the nomination of the areas under Man and Biosphere Reserve Programme.

In view of this, the following specific objectives were set:

1. Inventory of major and characteristic faunal species in the area using standard census techniques and accepted classification methods,

2. Description of mega fauna with particular reference to their status i.e., rare, endangered, endemic, etc.

3. Description of the main threats to the faunal species and the conflicts between the conservation of fauna and the surrounding communities, and

4. Revise the existing literature in the area and to examine the local level institutional wildlife management structures.

Methodology

General Approach

The first important point considered was the decision made in designing the objective of the census. The data collection by no means was not estimation of numbers but was to provide data with checklist and distribution of macro-faunal diversity of the area (Western, 1979). Therefore, a reconnaissance survey for four days was made to stratify the census zone by making use of topographic map of 1:50,000 (Ethiopian Mapping Authority, 1989) and based on vegetation types and altitudes. Taking into account, the nature of vegetation and topography it was decided to use foot survey, and supplementing it with vehicle count. Having the objective clear, some assumptions of technical and administrative considerations were taken into account. Firstly, the location of the three coffee forest areas, i.e., Bonga, Boginda and Mankira forests were found different from that of the terms of reference given. Naming of Woreda administration was changed and the three coffee forest areas fall under different administrative units. Bonga forest falls under Gimbo and Decha; Boginda falls under Gewata Woreda and Mankira under Decha and Menjiow Woredas. Renaming accordingly was not felt necessary and instead it was felt to use the former names of the forest and the study was conducted aligning and designing to the general approaches and according to the terms given. Thus, the coffee forest range that lies between 1500 and 1800 masl were ensured to fall within the new Woredas and are included in the study. Secondly, to relate the faunal diversity distribution with coffee forest areas it was felt necessary to concentrate on the area of study both within and adjacent areas so that both resident and migratory species are included as the animals directly or indirectly are affected by the Afromontane coffee forest ecosystem. Hence, other areas that were felt important habitats to the Afromontane, the upper humid areas and the wetlands were also included in the study. Thirdly, at least two season cycles (wet and dry seasons) are recommended to have a good assessment of faunal diversity in a particular area, (Norton-Griffith, 1978. Due to time limitation, however, the present assessment period is considered suitable time as it would give the most likely data between the late dry season and early wet season or to have the impression of having the apparent technical requirements needed of both different seasons. Yet still, it has not been possible to capture most of the migratory bird species, as they have already left for their breeding grounds when the survey was conducted.

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Field Study and Duration

The consultant spent over 35 days in the area, between the periods of February 22 and March 28, 2008. The whole area was surveyed and stratified on the map and the three major blocks of forests, Bonga, Boginda and Mankira were observed and recognized as core area and regarded as sample zones.

During the study, utmost efforts were made to exhaustively list the mega fauna, i.e. mammals, birds, reptiles, amphibians and fish and their distribution, status and threats, etc. by making use of standard and systematic wildlife census techniques (Norton-Griffith, 1978; Western, 1979).

A total of 27 intensive days of foot and road transects investigation were used in the three coffee forest areas and the surroundings. Six additional days were spent in the study area and the surroundings interviewing the local people, NGOs and local officials by making use of a semi-structured questionnaire and conducting formal meetings.

The study and inventory of birds was undertaken by subcontracting a knowledgeable expert for ten days stay in the field.

Foot Transects

Foot sample count was chosen as practical for the survey to get ideas on distribution and density of the forest species. The forests in the four Woredas were considered as the census zone and then divided into three sample zones, Bonga, Boginda and Mankira forests. Each sample zone or block of forests was divided into sample units or grids, depending on nature of vegetation and topography and at different locations, transects four sample counts were chosen and fixed for intensive assessments. Due considerations were given to avoid settlements and agricultural fields in the area. A minimum of three km between stations and 200 m away from the baseline of road transect were also considered to avoid over counts of animals. A total of 30 transect lines - eight each in Bonga and Boginda and 14 in Mankira and surrounding areas were fixed (see Table 1 & Map 2). At each station a transect length of 500 meters and a width of 20 meters on either side of the transect lines were fixed (Table 1). Counts of animals were made during 6:00 – 10:00 am in the morning and 4:00 – 6:00 pm in the afternoon. A total of 60 counts, 16 in Bonga, 16 in Boginda and 28 in Mankira were made with a maximum of eight counts per day, four in the morning and four in the afternoon (Table 1). Four additional transects for wetland and riverine species -

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two in Gojeb/Gewata, one in Bita/Bonga and one in Gimbo/Kuti area - were made as exploratory assessments. By making use of the GPS and compass reading, the orientations of counting were done perpendicular to the main road depending on vegetation types and nature of topography. GPS and a pair of binoculars during the direct observations were used to guide directions and for ease of identifications, respectively. Whenever GPS reading was not possible in thick forests compass reading and pacing were considered. Indirect methods for the presence of wild animals such as droppings, foot prints, dead organism or feed, wallowing places, dens and burrows were used during the foot count investigations.

The objective of the sample counting was to estimate the number of animals in the sample zone from the number counted in the sample unit. Density and distribution of faunal diversity was then calculated by making use of conventional methods. Area of the sample units was done by multiplying the length by width of transects. Animal numbers sighted and recorded in all observations grouped for each species population on a summary sheet (see Table 2). Thus, density of each species was calculated summing all the number of animals sighted in all number of observations and then divided by the product of number of total counts and the total area of the sample unit in each block of forests (Table 1).

The expertise of native Menjas who were knowledgeable of the area and wild animals was hired and used to guide and assist during the foot survey.

Road transects

Road transects in each sample zone were fixed to supplement the foot counts by making use of standard road counting methods (Norton-Griffiths, 1979; Western, 1978). The road networks that pass through the three major blocks of forests were chosen as baselines for road transect. By making use of vehicle (mobile) platform, road counts were made to estimate species density and to take assessments on characteristic wild animals' distribution in each forest block and surroundings. A total of six transects in the three sample zones or block of forests, two in Bonga, two in Boginda and two in Mankira Weredas were fixed (Table 1 & Map 2). At each sample unit, a transect length of 10 km and a width of 50 meters on either side of the road were fixed. In all blocks of forests, a total of 38 counts, six times [(2x6) + (2x7) + (2x5)] in Bonga, seven in Boginda and five times in Mankira blocks of forests were undertaken (Table 1). Times of counts were made between 6:00 and 10:00 am in

the morning and between 4:00 – 6:00 pm in the afternoon and the speed of the vehicle were controlled and these were between 35 and 45 km/hr.

During the wildlife assessments, the level of threats and status of the habitats were noted. Name and number of species, time and activities, etc were recorded during the observations. At different intervals, night drives with spot lights were arranged for nocturnal animals.

The density of the species was calculated by summing the number of each species in all number of counts and dividing by the product of number of counts in each transect and area of transects, i.e., the density of each species is calculated by summing the total number of each species of animals counted in each transects and in all number of observations divided by the total areas (width x length) of the transects and number of counts in each blocks of forests.

During the whole period of field investigation and road counts, two resourceful men as technical assistances for recording wildlife data, animal counts and data processing were hired.

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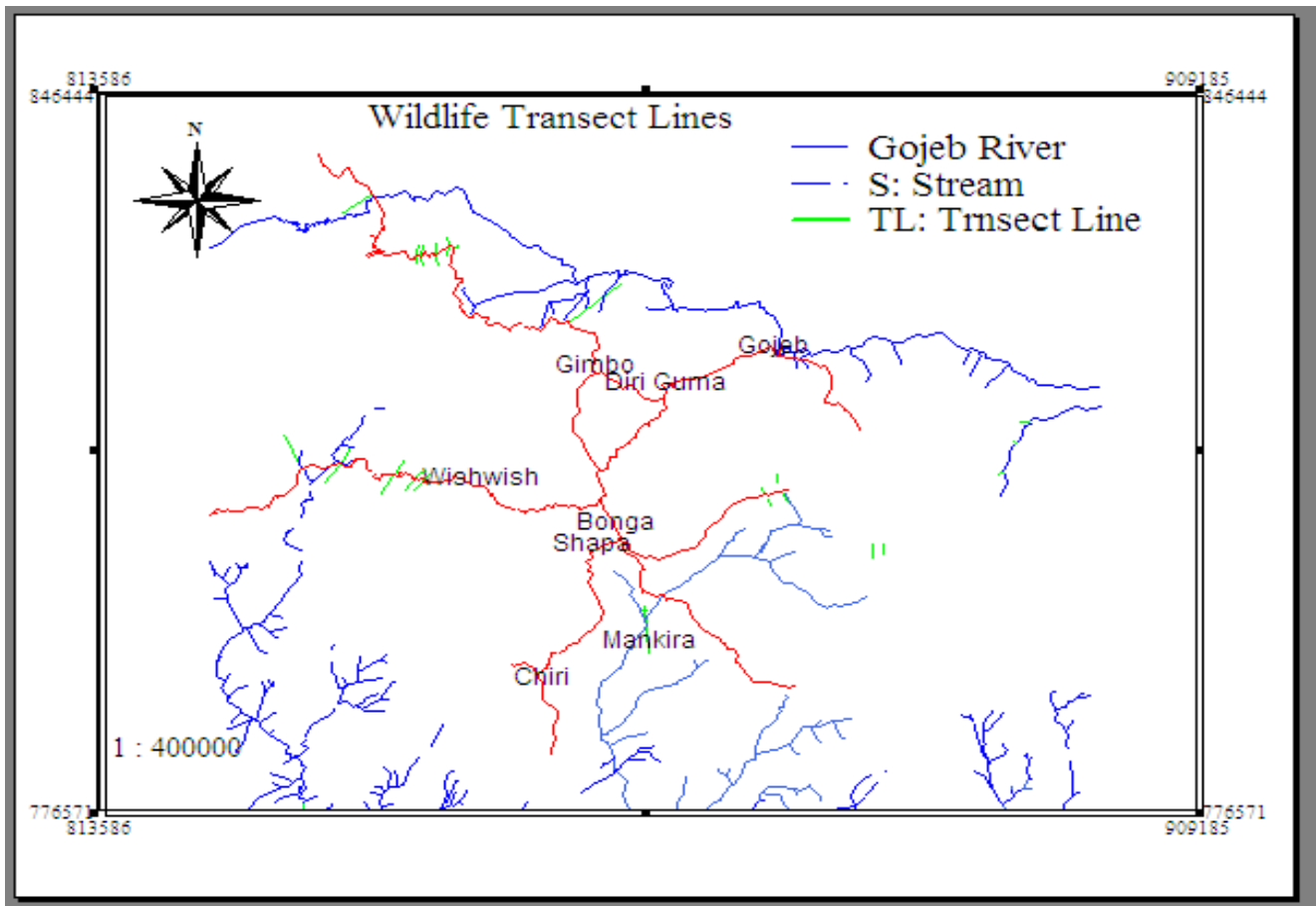
Map 0. Wildlife Transect Location

Secondary data

A semi-structured questioner was prepared to collect secondary data on the status and trends of wild animals in the area. A total of 60 native people living in the forest area and surroundings were interviewed and information on history and status of faunal diversity in three blocks of forests collected and was analyzed (see Annex 2). Formal meetings with relevant and local officials and as well as with local and international NGO personnel that are actively operating in the area were conducted and information on institutional structures, management of faunal and floral diversity, on the constraints, etc were collected. One local assistant for the translation and recordings of the data was hired.

Table 1: Sample Area, Number and Length and Altitudes of Transects in Different Blocks of Forests during Foot and Road Counts

A. *Foot Transect*

Name of Block	No transect	Sample area/km^2	Total/km^2	Altitude/m
1. Bonga/Gimbo				
1.1 Woshi	4	0.5*0.04 (0.02)	0.08	1750
1.2. 460[1]	4	0.5*0.04 (0.02)	0.08	1960
1.3. Kuti	1	1.0*0.04 (0.04)	0.04	1850
1.4. Bita	1	1.0*0.04 (0.04)	0.04	1770
2. Boginda/Gewata				
2.1 Saja	4	0.5*0.04 (0.02)	0.08	2060
2.2 Kobech	4	0.5*0.04 (0.02)	0.08	2190
2.3 Gojeb/Boginda	1	0.5*0.04 (0.02)	0.04	1560
2.4 Gojeb/Kobech	1	7.0*0.04 (0.28)	0.28	1380
3.Mankira/Decha				
3.1 Gedam/Mankira	4	0.5*0.04 (0.02)	0.08	1620
3.2 Boka/ Mera	4	0.5*0.04 (0.02)	0.08	2210
3.3 Adio/Menjio	4	0.5*0.04 (0.02)	0.08	2610
3.4 Mankira Coffee Forest	2	0.5*0.04 (0.02)	0.04	1618
Total	**34**	**0.54 km2**	**1.0km2**	

[1] 460 is the name of an area

B. Road Transects

Blocks/Woreda	No of counts	Sample area (km2)	Altitude range /m/
1. Bonga/Gimbo			
1.1 460	7	10*0.1 (1)	1910-1990
1.2 Woshi	7	10*0.1 (1)	1750- 1880
2. Boginda/Gewata			
2.1 Boginda/Yeba	6	10*0.1 (1)	1950-2190
2.2 Sanja	6	10*0.1 (1)	1860 -2110
3. Mankira/Decha/Menjo			
3.1 Mera/Boka	5	10*0.1 (1)	2210-2430
3.2 Adio/kaka	5	10*0.1 (1)	2380-2610
Total	36	6 km^2	

[1] 460 is the name of an area

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Results and Discussion

Ecological Appraisal

Biogeographically, the study area lies within the Western Afro-tropical Highland Biome in Ethiopia and characterized by distinct floral and faunal assemblages, ecological characters and functions (EWHNS, 1996). Its location is also strategic in terms of the catchments area, which in a way causes the ecology of the lower basin unique and productive. The biome is not only important in its topographical features but also for its ecological functions as it contains unique biome assemblages restricted to the area and that have both local and global importance. This includes an area that contains one of the few remaining intact primary Afromontane Evergreen Forest Ecosystem, unique floral and arboreal primate species and natural or wild coffee genetic resource and rich bird species diversity. The function of the ecosystem is reckoned as vital as it could serve mainly to the maintenance of the biodiversity, of its watershed values, the environmental services it renders and of its economic values both at local and global levels (Demel, pers. Com. 2008).

The range of habitats of this Afro-tropical Highland Biome can be characterized by at least three types of wildlife habitats or wildlife ecosystems. These are the Upland Humid Forest Vegetation/Habitat, the Upland Rain Forest Vegetation/Habitat and the Riparian Habitat and Wetlands. Classification of vegetation or habitats adapted after Taye Bekele, 2003, and can be described briefly, in terms of faunal importance as follows:

The Upland Humid Forest Vegetation

This type of vegetation community lies approximately between the altitudes of 1800 and 2600 masl in cool humid agro-climatic zone. This area covers much of the intact and larger part of the forest area in terms of composition and diversity. The vegetation is not only unique in its composition and diversity; it is also important habitat for unique species of wild fauna particularly for primates. In this type of habitat important browse species of trees, like *Hagenia abyssinica, Hypericum revolutum, Prunus africana, Oxytenanthera abyssinica* (Bamboo), *Ficus spp, Millettia ferruginea, Syzgium guineense*, *Sapium ellipti-cum*, etc. are found. This Plant community holds some disturbed and undisturbed areas. The undisturbed areas holds primary vegetation communities reflected by typical arboreal

species of mammals like Gureza, De Brazza's monkey, Blue monkey, Forest hog, Bush pig, Leopards, etc. In this area endemicity of smaller mammals is quit low (Prof. Afework Bekele Pers. Com, 2008) and no endemic larger mammal was recorded. However it holds important species of birds, for example, the birds of prey like Crowned Eagle (endangered) and Greater Spotted Eagle (vulnerable) and endemic birds including the Abyssinian Catbird, Banded Barbet, Abyssinian Black-headed Oriole, Black winged Love Bird, etc. and as well as is ascertained that it has a new extension in range distribution for some species of mammals that had very restricted range of Biome assemblage in the country. This includes among mammals particularly the De Brazza's and Gentle monkeys and many endemic and threatened species of birds that have as well global importance, See annex1. Other notable mammals in this type of vegetation includes Giant forest hog, Bush pig, Leopard, Grevit monkey, Senegal bush baby, Dega rat etc. Among birds too, it harbours typical arboreal bird species like, White-cheeked Turaco, Silvery-cheeked Hornbill, Crowned Hornbill, Narina Trongon, African Green Pigeon, Lemon Dove, Cuckoo Shrikes, Crowned Eagle, etc.

The Upland Rain Forest Vegetation:

This vegetation type lies approx between 1500 and 1800 masl and forms to the lower altitudes of Moist Ever Green Montane forest covering the southern lands of warm and semi arid parts of the ecosystwm. This ecosystem is a relatively disturbed area and is widely used for extensive coffee production, where wild coffee grows mainly as an under-storey species within this vegetation type. Mankira forest, where the wild coffee breed was first identified is also located within this ecosystem. In this habitat browse species, as was observed during the survey are *Vernonia amygdalina*, *Albizia gummifera*, Syzygium *guineense, Olea africana, Euphorbia candelabra, Croton macrostachys, Militia ferruginea, Ficus spp and Coffea arabica,* etc. This area holds richer faunal diversity than the moist Afro-mantane forest as it holds more habitat diversity for animals. This includes various species of rodents, bats, primates, bovid and carnivores, birds, snakes, etc. The most significant mammals in this type of vegetation are Gureza, Anubis baboon, Vervit monkey, Common bushbuck, Bush duiker, African civet, Spotted hyaena, Black backed jackal, Lion, White tailed mongoose, Aardvark, Crested porcupine, etc. Among birds the most notable ones are White-throated Bee-eaters, Abyssinian Ground Hornbill, Scaly Francolin, Mountain Thrush, Thick-billed Raven, Ruppell's Robin Chat, Banded Barbet, Abyssinian Black-headed Oriole, Wire-tailed Swallow, Abyssinian Crimson-wing, etc.

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The Riparian Woodlands and Wetlands

This type of ecosystem lies north and north west of Kaffa Zone within an altitude of 1500 and 1700m asl. It is a vast stretch of marshland and river streams with pockets of forests within and around the forest ecosystem. The wetland is made up of the two major rivers of Gojeb and Woshi that drain to the Omo River to the east and Baro River to the west, respectively. The Gojeb and Woshi rivers together with their tributaries drain to Omo and Baro rivers to the east and west, respectively. The function of these rivers is, therefore, important not only to the resident and migratory faunal species diversity but also it influences the biotic communities of Sudan-Guinea Biome that lies in the west and the Somali-Massai Biome that lies in the east (Leykun, 2003). These areas hold aquatic and wetland species that are important for conservation. These include, among the water dependent mammals, Hippopotamus, African buffalo, Reedbuck, Clawless otter, Swamp rat. The area is important too, as it abodes for various species of aquatic birds, such as, Long-tailed Cormorant, Egrets, Herons, Egyptian Goose, African Fish Eagle, Black-crowned Crane, King Fishers and including the endemic birds such as Rouget's Rail, Abyssinian Longclaw and Wattled Ibis. Quite a number of amphibians, fishes and invertebrates also occur in the area, See Annex 1.

Faunal Species Diversity and Density

The Kaffa coffee forest is rich in its faunal diversity. A total of 294 animal species were recorded during the present investigation in the area. It harbours 61 mammalian species, 210 bird species, 10 reptiles, seven amphibians and six fish species (see Table 2 and Annex 1). The mammals belong to nine Orders and 26 Families. The bird composition belongs to 16 Orders and 51 Families. Reptiles' belong to one Order and two Families, Fishes belong to three Orders and five Families (see Table 2 and Annex 1). Compared to the country's total mammalian and bird species, it holds about 21% and 23%, respectively. This figure is quite high compared to such altitudinal ranges and similar habitats in the country. In both foot and road counting methods, variation in species density and distribution were observed. The findings in foot count showed quite an extensive number of animal species than in road counts (Tables 3 and 4). This can be explained easily as most of the animals avoid disturbances and of the road traffic and tend to prefer more secured areas away from the road. In both transect counting methods, however, the distribution and density of wild fauna

shows high at Boginda, followed by Bonga and Mankira areas, respectively. In foot counts; the densities of Guerezza, De Brazza's and Blue monkeys in Boginda were; 18.36 $\pm$ 1.83, 4.3 $\pm$ 0.51 and 8.2$\pm$ 0.86 respectively. Forest hog, 7.81$\pm$ .81 and Bush pig 6.25 $\pm$ 0.79 showed higher concentration in Boginda preferably due to the availability of food and shelter (Table 3). In both counting methods, the primates tends to prefer associations but were competitively exclusive in feeding habits. Many species that were recorded show more habitat preference to disturbed forest as seen in Bonga and Mankira forest possibly due to wider availability of food and habitat diversity. Overall, species show no significant difference in habitat preference among selected few species in average densities (P value=0 Species densities ranges between 18/km2 for Guereza and 0.26/km2 for Leopard.11) and found a tendency to distribute widely throughout all the Montane forests and in all ranges of altitudes. However, the density of many species except for Gureza (11.2/km^2) and Baboons (11.1/km^2), as it is found in foot count, is relatively low. The high density of the two species may be explained by food habit as Guereza is arboreal and folivorous or concentrate feeder on fruits and on specific plant parts at the upper reaches of Montane forest. Whereas the Baboons showed wide ranging feeding habits and as it has successful behaviour in changing the diets between the primary and disturbed forests. It feeds as well on any available food both on plant parts and animals. Among the densities of carnivores, in foot counts, the density of leopard in particular was low, 1.63$\pm$ 1.11 (Table 3) and this can be due to the over hunting for their skins and demands for its meet in the area. The low density of Leopards and other carnivores could also be related to the causes for high number of primates as there is less predation to control the population. Results of Foot and Road counts showed wide differences in species density and distribution. In the Road count, few species of mammalian fauna were observed than the foot count (see Table 1 and 2). However, the Gureza densities in the road count was high in all blocks of forests, 2.27$\pm$1.35; in Boginda it was 3.8$\pm$ 27.63, in Bonga was 1.24$\pm$ 6.03, and in Mankira was 1.78$\pm$ 7.48. This could be explained by the edge effects, a tendency of preference and availability of feed, as it supports increased species diversity and higher densities between adjoining two habitats, forest and open woodlands (Odum, 1971). In general, the results of the animal counts in both methods showed there is an ecological imbalance both in the prey-predator and animal-habitat interactions in the area that needs careful manipulation and

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management considerations to safeguard and maintain the diversity of animals and habitats.

Table 2. Species Classification and Hierarchy

Class	Order	Family	Species
Mammalian	9	26	61
Birds	16	51	210
Reptiles	2	6	10
Amphibian	1	4	7
Fishes	3	5	6
Total	31	92	294

Table 3. Species Distribution and Average Density of Foot Counts in Three Blocks of Forests

	Boginda/Gewata		Bonga/Gimbo		Mankira/Decha		Density in all Blocks	
Species	Density	±	Density	±	density	±	Average	±
Gz	18.36	1.83	8.2	1.0		0.4	13.28	7.184205
Dm	4.3	0.51	1.96	0.31	0.99	0.09	2.42	1.701597
Bm	8.2	0.86	5.07	0.92	0.89	0.16	4.72	3.667547
Bb	14.84	2.8	12.9	2.58	5.49	0.65	11.1	4.934474
FG	7.81	0.81	2.34	0.41	1.66	0.3	3.9	3.371592
Bp	6.25	0.79	4.69	0.84	1.4	0.2	4.1	2.47589
Vm	1.95	0.46	1.17	0.38	3.02	0.33	2.05	0.928781
Bk	3.01	0.36	3.13	0.87	1.02	0.11	2.39	1.185088
DK	1.95	0.47	1.95	0.3	0.26	0.07	1.39	0.975722
Lp	1.95	0.31	0.39	0.2	2.55	0.09	1.63	1.114989
Pp	0.78	0.39	3.52	0.5	0.77	0.13	1.69	1.584834
Ln	0	0	0	0	0.77	0.13	0.26	0.44456
Hn	0.39	0.17	1.17	0.43	0.38	0.07	0.65	0.453248
Cvt	1.17	0.59	3.9	0.14	1.78	0.07	2.28	1.432911

Key: Gz = Gureza, DM = De Brazza's Monkey, BM = Blue Monkey, Bb = Baboon, FG = Forest hog, BP = Bush pig, Vm = Vervit Monkey, BK = Bushbuck, Dk = Duiker, Lp = Leopard, Pp = Porcupine, LN = Lion, HN = Hyaena, Cvt = Civet

Table 4. Density of Characteristic Species of Round Counts in three forest blocks

Species	Boginda/Gewata		Bonga/Gimbo		Mankira/Decha		Whole Forest Blocks	
	Density	±	Density	±	Density	±	Density	±
GZ	3.8	27.63	1.24	6.03	1.78	7.48	2.273333	1.34942
DM	0.23	1.34	0.07	1.97	0	0	0.1	0.117898
BM	0.39	3.13	0.07	1.72	0	0	0.153333	0.207926
BB	1.16	9.73	1.77	7.74	1.36	9	1.43	0.310966
FG	0	0	0.19	5.16	0.03	0.76	0.102144	0.102144
Vm	0.05	1.17	0.33	5.39	0.2	2.07	0.193333	0.140119
Bp	0.083	2.9	0	0	0	0	0.994333	1.650877

Key: GZ = Gureza, DM = De Brazza's monkey, BM = Blue monkey, BB = Baboon, FG = Giant Forest hog, Vm = Vervit monkey, Bp = Bush pig

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Faunal Distribution, their Importance and Status

For ease of understanding of species' importance and to evaluate their status, grouping of animals according to their taxonomic and ecological relationship is found simple to explain the distribution, habitat requirements and trends. Group classification based on species number, natural history, niches and ecological importance are therefore accordingly described in the following paragraphs based on the filed observations, on local information collected and on the Field Guides (Kingdon, 1997and Dorst, 1970).

Mammals:

The Chiroptera; (Fruit and Insect Bats)

Under this group, 2 species of fruit bats and 5 species of insect bats were recorded. Both are found in relatively good numbers in Kaffa Montane forest and surroundings and their activities are active by night. The fruit bats are mainly arboreal that feed on flowers, seeds and nectars. Their ecological importances are dispersing seeds and pollination and hence are known as important agents of reforestation. They are capable of flying long distances to sources of fruits in a wide range of habitats. Insect bats feed on insects, like crickets, grasshoppers, cicadas and other invertebrates and play very important role in the forest ecosystem in controlling insect pests. Both groups are widespread in Africa and relatively common in Kaffa Montane forest (See Annex1).

The insectivores; (Shrews and Hedgehogs)

In this group 4 species; one species of hedgehog and three species of shrews were recorded. Both shrews and hedgehogs are primitive groups that are successful and are widespread in Ethiopia. Both are nocturnal and some as well are crepuscular. Both inhabit open and closed forests and feed on invertebrates and insects. Shrews feed on frogs as well. Though owls and some carnivores have little difficulty in killing and eating the hedgehogs, the main predators of shrews are birds and snakes in the area. Both hedgehogs and shrews are uncommon in Kaffa Montane Forest (see, Annex1).

The Rodents; (the Squirrels, Porcupines and Rats)

The Kaffa Montane forest has representatives of three rodent groups, the squirrels, porcupine and the rats. This comprises of 15 species of rodents; one squirrel, one porcupine and 13 species of rats (see Annex 1). They are specialized, most successful and widespread

animals. They are well-known pests but play important structural roles in the ecosystem. This includes pruning or eliminating vegetation types, spreading seeds, and especially in decomposition and fertilizing tree seeds. They are also popular threats to local farmers as they are pests of agricultural and raids crop fields quit extensively specially by the porcupines. They feed on extensive varieties of plant parts that include seeds, grass, roots, bulbs, tubers, shoots. Some occasionally feed on insects and are known of competing with other animals.

The Primates; (Colopids, Cheek-pouch Monkey, Bush Baby)

The Kaffa Montane Forest is unique in the country, firstly as it is the only area to hold eight primates in one arboreal ecosystem. This includes one Colobid, five Cheek-pouch monkeys and two Bush babys. Secondly, the area is important in having new extension for De Brazza's monkey and is the only area in the country to have this species in Tropical Afromontane Highland Biome. The recognition of the Gentle/Blue monkey yet require further investigation and needs to be confirmed to which cluster of *Mitis* it belongs or may be a new species, altogether. According to Professor Afework Bekele of the Addis Abba University, it is likely that hybridization between De Brazza's and Gentle monkey could occur in the area. This is justifiable by the present findings that more than 50% of the observations were found both species in overlapping ranges. In most of the observation, the Guereza, the De Brazza's and Blue monkey were seen associated together, possibly due to their specialization of feeding habits. Almost three-fourth of the Gureza's diet consists of leaves. Though the Colobus do rarely leave trees (Kingdon, 1997) but during the present assessment more often they were observed in Boginda between the hours of 4:00 and 6:00 pm and lying along the road in groups. Lying on open ground could be possibly for heat absorption and can as well be concluded that the groupings could possibly is to justify the high density of the Gureza results during the road counts. Among Colobids, only one *Colobus Guereza* is represented but often sighted in an association with other primates. Among the Check-pouch Monkeys, five species are represented; Olive/Anubis baboon, De Brazza's monkey, Gentle or Blue monkey, Grivet monkey and Vervet monkey (see Annex 1). Except the Bush baby, which is nocturnal all other primates found in Kaffa Montane Forest are active by day. The Guereza use quite extensive areas both in altitude and arboreal areas, where as the Blue and De Brazza's prefer very specialized areas of riverine oriented forest habitats. Olive baboon is taken as vermin locally as it depredates crops. Other pri-

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mates feed on fruits and seeds in the forest and play pivotal roles in the germination of forest seeds particularly in fertilizing the seeds of coffee. The habitats of these three primates are currently diminishing due to clearance of vegetation and extension of cultivation areas. The Gurezas are threatened species locally as they are over hunted for their skin and known also as major sources of meet for Menja people.

The Carnivores; (Mongoose, Dogs, Cats, Hyena, Genet and Civet)

Under this group, 14 species of the carnivorous species were recorded (see Annex 1 for details). The Carnivores play important roles in maintaining the richness and diversity of habitats and animal community in any ecosystem as they are chiefly at the top of the food chain. There are many representatives of these groups in Kaffa Montane forest though the density is low due to persecution and disturbance of the ecosystem. Leopards' density is low as it is mainly hunted for its fur both for commercial and cultural purposes. It is also listed as threatened species in the IUCN Red Data classification list. The lions are customary visitors to the areas during the dry period and often attack livestock. Lions are highly respected canids among the carnivores and traditionally not hunted or killed by the locals. Mongoose, Genet, civet and hyena are regarded as pests by local communities as they attack crops and livestock in the area. Both the Mongoose and the civets feed on crops where as hyena, though density is low but complained by locals as they often attack cattle and small domestic stocks. The African Civet (*Civvetta civettica)* is known species for its musk production in most parts of Ethiopia. Civets are still kept in captivity and traditionally practiced by some people in Kaffa Zone for export of civet musk and local people get substantial income. For details on civet farm, see in subsequent chapters.

The Even-toed Ungulates; (The Artiodactyls)

Under this group, a total of nine species of ungulates were recorded (see Annex1). The major species identified belonging to this group are; the Giant forest hog, Bush pig, Bushbuck, Bush duiker, Bohor reedbuck, African buffalo, Warthog and Hippopotamus. Except the Reed buck, Hippopotamus and Warthog that were recorded in riverine and wetland area, others are forest species. The Giant Forest hog, Bush pig and Common bush buck and the Bush duiker are arboreal species and their distribution ranges in areas between the altitudes 1500 to 2600m above sea level and ranging from moist to dry Afromontane forests and riverine forest to bamboo thickets and as well as in open glades or savannah as well.

The Mountain reed buck, the African buffalo and Hippopotamus are riverine and wetland species inhabiting the lower parts of the Moist Montane forest. The warthog prefers the lower altitude and drier parts of the forest. The density of these bovid species except the Forest hog and Bush pig is quite low in Kaffa forest area as they are over-hunted extensively for their meet by local people. This deserves protection as the range and number of these species alarmingly declining and the rare species particularly the forest hog as are becoming absent in most of the former ranges in the country.

Other important groups are Hyracoidea, Lagomorpha and Tubulidentata that contains two species, one species and one species in each group respectively. In this group of species, Aardvark (*Orycteropus afer*) in particular is a known keystone species that plays key role in maintaining the diversity of habitats by its excavation of holes that serve as dens and burrows for the reproduction of a large variety of other animal species.

Distribution and Status of Birds

During the intensive bird survey conducted in Kaffa and surrounding forests, a total of **210 bird species** have been recorded. All bird species encountered during the survey were assertively identified. Richness of bird species diversity indicates the richness of the area in habitat diversity.

The bird species recorded in the study area comprises of 51 families, accounting for about 61 per cent of the total 83 bird families of Ethiopia. The top four families represented by more than 10 bird species were *Accipitridae* (birds of prey), *Sylviidae* (Warblers and Cisticolas), *Turdidae* (Thrushes, Chats and Wheatears) *and Hirundinidae* (Saw-wings, Martins and Swallows), each family with *22, 16, 13, and 10* species, respectively. On the other extreme, 16 families have been represented only by a single species. The finding points out that the study area is an optimal habitat for birds of prey (22 species) and Warblers and Cisticolas (16 species). Of the seven abundantly encountered species, two of them are flycatchers (see Annex 1). This fact is, presumably, related to the abundance of food availability for the species in the area.

On the basis of movement, the birds encountered during the survey can be divided into two broad categories, namely, **residents** and **migrants**. A species resident in Ethiopia occurs in Ethiopia as well as in other geographical areas of Africa (e.g. Sacred Ibis), Arabia and occasionally in other areas of Asia and/or Europe (e.g. Red-rumped Swallow).

Five of the resident species, that is, Rouget's Rail (*Rougetius rougetii*), Yellow-fronted Parrot (*Poicephalus flavifrons)*, the Abyssinian Longclaw (*Macronyx flavicollis*), Abyssinian Slaty Flycatcher (*Dioptrornis chocolatinus*) and the Abyssinian Catbird (*Parophasma galinieri*) are exclusively confined in the boundary of the country and hence are **endemic** species to Ethiopia. Another six resident species are considered to be **near-endemic** as they are shared only with one neighbouring country (in this case with Eritrea). These include Wattled Ibis (*Bostrychia carunculata*), Black-winged Love Bird (*Agapornis taranta*), Banded Barbet (*Lybius undatus*), the Abyssinian Woodpecker (*Dendropicos abyssinicus*), the Abyssinian Black-headed Oriole (*Eurocephalus rueppelli*) and Thick-billed Raven (*Corvus crassirostris*).

Of the birds recorded, the seven species that were seen or heard in large numbers (more than 20 individuals a day) and hence are categorized as **abundant species**. These included: Tambourine Dove (*Turtur tympanistria*), White-cheeked Turaco (*Tauraco leucotis*), Silvery-cheeked Hornbill (*Bycanistes brevis*), Blackcap (*Sylvia atricapilla*), Yellow-fronted Tinkerbird (*Pogoniulus chrysoconus*), Dusky Flycatcher (*Muscicapa adusta*) and Abyssinian Slaty Flycatcher (*Dioptrornis chocolatinus*). Blackcap breeds in the Palearctic and winters in the Ethiopia while the rest are all resident species. Twenty six species have been categorized as **frequent** due to the fact that they have not been seen or heard daily, but were in most days during the survey. Of the species categorized as frequent, five species are either Inter-African or Palearctic migrants while 21 of them are the resident species. Of the birds recorded during the survey, about 164 species were only encountered a few times and hence are reckoned as **uncommon species**.

Of the total recorded birds, 170 (81 per cent) species have been found to be residents in Ethiopia and it is known that there is a breeding confirmation for 134 (64 per cent) of them. On the other hand, there is no confirmation thus far whether the remaining 36 species breed in Ethiopia or not though their continuous existence is a circumstantial evidence that they breed.

Though not encountered during this particular survey, the Kaffa Forest area (along with the other South-west forest proper) is supposed to be the only suitable habitat for the following forest bird species; the African Cuckoo Hawk (*Aviceda cuculoides*), Red-capped Robin

Chat (*Cossypha natalensis*), the Northern Masked Weaver (*Ploceus taeniopterus*), the Black-necked Weaver (*Ploceus nigricollis*) and Blue-headed Wood Dove (*Turtur brehmeri*).

The Migratory species (as defined by CMS) are species that "cyclically and periodically cross one or more national jurisdictional boundaries". The survey indicated that the Kaffa Forest and surroundings are serving as resting and feeding stages for 24 Palearctic migrants that breed in the Palearctic but winter in Ethiopia. Three other Palearctic migrants are also known to have resident breeding populations that occur in these forest areas. Some **Passage Palearctic migrants** breed in Europe and/or Asia and winter in Africa, only passing through Ethiopia to their wintering grounds (e.g. the European Bee-eater). One such migrant, the European Bee-eater (*Merops apiaster*) has been encountered in good numbers feeding in the forests. Other than the Palearctic migrants, the forests are also shelters for 10 Intra-African migrants that have also the resident breeding populations in Ethiopia.

Biome is a major regional ecological community characterized by distinctive life forms and principal plant species. Ethiopia has four of the Biomes that are related to the birds' assemblages and three of these occur in Kaffa and the adjoining areas (EWNHS, 1996). Of the total 47 **Highland Biome** species of Ethiopia, 27 (57 per cent) bird species occur in the Kaffa Forest and surroundings. Furthermore, it was possible to record three **Somali Massai Biome** species (3 per cent of the total 100 for Ethiopia), which include Grey Flycatcher (*Bradornis microrhychus),* White-rumped Babbler (*Turdoides leucopygius*) and Abyssinian White-eye (*Zosterops abyssinicus*). One **Sudan-Guinea Biome** species, Foxy Cisticola *(Cisticola troglodytes*) was also encountered, which represents 6 per cent of the total 17 **Sudan-Guinea** Biome species of Ethiopia. From the biome-affiliated bird species recorded, it can be possible, therefore, to conclude the presence of various habitat types within the forest proper, depending on the wide altitudinal ranges of the area.

Herpetiles (Reptiles and Amphibians)

17 Herpitiles, 10 reptiles and seven amphibians were recorded under the group (see Annex 1). This group includes reptiles such as snakes, lizards, tortoise and amphibians such as frogs and toads that are found distributed in the Kaffa Mantane forest, rivers and the surroundings. Unlike the mammals and birds, these groups do not produce heat internally, instead are dependent on outside sources of heat. Amphibians prefer lower temperature than reptiles and both adjust themselves according to the surroundings and deserve special

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care. Thus, amphibians in general are water dependent and require water in the vicinity whereas reptiles prefer a warmer temperature for breeding and shades against extreme heat. Most are either ground dwelling or arboreal, live in trees and some are even burrowing or are nocturnal. Most of the reptiles are carnivorous in feeding on a wide range of animals ranging from ants up to smaller mammals. Amphibians are also carnivorous feeding on invertebrates and algae while feeding in the rivers and swamps. Thus, the two groups play important role in the forest ecosystem in controlling pest animals like insects and rodents that may raid agricultural fields.

Fishes

Under Fish Class, only six species were recorded during the present investigation (see Annex 1), but believed more to occur in the area. The running waters, rivers and ponds within the forest ecosystem play important role in determining the productivity of the terrestrial ecosystem and vice, versa (Leykun, 2001). Fishes are both the herbivorous and carnivorous and are the major interfaces governing the food chain between the terrestrial and aquatic ecosystems. The carnivores feed on crustaceans and insects and the herbivores feed on algae and weeds and in turn both are fed by predators of the terrestrial animals and by so doing the productivity of both ecosystems are maintained and controlled.

There is a possibility of fishes migrating upstream from the Omo River and the Baro River to the Gojeb and Woshi rivers, respectively. If adequate protection and management is instituted both upland rivers could be restocked with more fish species, which may fetch a good economic income to the rural communities. Moreover, if the population of fish is regulated on the sustainable basis, they could contribute as well to the protein requirement of the local population.

Results of Socio-economic Survey

The Kaffa ethnic group are the majority in Kaffa Administrative Zone followed by new settlers, the Oromo and Amhara people (IBCR/GTZ, 2000). The main activity of these people is agriculture, mainly coffee production and to some extent honey, Cardamom, and fuel wood and Enset making. Among the Kaffa ethnic group, the minority group are the Menjas who live on hunting wild animals and on fuel wood and making charcoal for subsistence and as sources of alternative livelihood. One can also conclude that Menjas' involvement in hunting, charcoal, and fuel wood selling should be seen in relation to their resource pos-

session as they are often denied of basic resources in the area like land (IBCR/GTZ, 2000). Menjas too, are often blamed for the destruction of forest and taken into account when the degree of deforestation is raised. But, it was witnessed that there are many non-Menjas, as well, involved in hunting and extraction of charcoal and fuel wood.

The Biodiversity and the Local Communities

The indigenous populations living in and around the forest are 'forest ecosystem people' and have been using the forest for a long time on sustainable basis. Their lifestyle and even their survival depend largely on the continuous existence of the forest; their culture is also closely linked with the forest and all claimed that they practice it as they inherited from their ancestors. Thus, the natural forest to the local communities is a source of farm implements, construction materials, fuel wood, and feed for wild and domestic animals. It is also sources of the non-timber products and it serves as well as to hang the beehives, to collect coffee seeds and cardamom, etc.

But, in recent times, the traditional practices and customs are changed due to political and anthropogenic factors; such as to new and emergence of market economy, land entitlements, etc. The ambiguities of forest ownership and changes in the exploitation of resources recently in this natural forest ecosystem have brought a long-term tension among traditional coffee forest users. The recent demarcation of forests created by government has seemingly assumed that the forest belongs to the government, which in a way, the implication perceived by communities is as alienating the traditional use right. Furthermore, the new demarcated forest areas were given to private investors as incentive to boost the national economy. Even those who are organized themselves into Cooperatives and Unions for coffee production are not supported by local government. These situations not only denied the traditional use rights and disruption to the livelihood of the rural people but also created loss of the natural and viable genetic resources of coffee and as well as of the faunal species diversity found in the prime forest ecosystem. Thus, it has created conflicts between the traditional owners and new investors on one hand that require appropriate and timely measures by the local government and on the mismanagement of forests and lose of the valuable genetic resources, on the other.

The results of present socio-economic analysis showed that the prime forest area of Kaffa is not only suggested by locals as useful for coffee production, but also important in terms

of faunal diversity. Among the respondents 85% indicated that the wildlife living in the forest is important and taken as integral part of the ecosystem (see Annex 2). The services and products of wild animals in various forms are justified as valuable by local communities. This includes their contribution in terms of maintenance of genetic resources of the forest and also for subsistence living as source of food, medicine and cultural values. But, these valuables genetic resources are believed by local communities as further deteriorating due to deforestation (60%), over hunting (18%) and absence of legal protection (21%). Most victims of this episode and due to habitat destruction and that led to fast declining in size are mainly the carnivores (52%), the bovid (27%) and the primates (17%). Furthermore, the conflicts between human and wild animals that arises due to factors of ecological imbalances between habitat and population of animals was costly and were reflected by all to seek solutions and to holding back the concerns of the pests in the area. The most important argument mentioned as concerns by the local communities were the threats inflicted by wild animals. These threats in the order of importance are raiding crops (52%), attacks on livestock (25%) and on humans (23%). More so, present investigation showed that absence of effective management and answerable institutions has aggravated the situation. There is a need therefore, for sound and acceptable strategies that serve both the local communities and the local government that would guarantee the long term economic livelihoods and the conservation of genetic diversity in the area.

Birds and the Local Communities

It is known that naturally, there is no deliberate persecution of birds in Ethiopia. There has been a close observation all the time during the survey to see if there are any direct conflicts between birds and native people in the area that can lead to bird persecution. The finding was that almost all the local people in the area do not even recognize the presence of birds around them and did not report any obvious harm from birds. They just live together in harmony. Though, of course, unnoticed by the local community, the only obvious conflict of interest observed between birds and humans is that bee-eaters are heavily foraging on the bees kept in traditional bee-hives hanging from trees in the forest. The survey indicated that five bee-eater species, namely: European Bee-eater (*Merops apaister*), Little Bee-eater (*Merops pusillus*), Blue-breasted Bee-eater (*Merops variegates*); Cinnamon-chested Bee-eater (*Meropos oreobates*) and White-throated Bee-eater (*Merops albicollis*) were commonly seen actively feeding on bees. As the European Bee-eater is a Passage

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Palearctic migrant, its effect might not be that serious compared to the resident species that harvest the bees all round the year. The effect of the White-throated Bee-eater is very significant as it is seen frequently and found in a large group. However there is a need for awareness and information on the values and importance of birds to local communities so that they may develop sense of responsibility associated with conservation and production values of birds. The local communities must be informed on the importance of birds as at least many species of plants are dependent on frugivorous birds and other animals (insects, mammals) for reproduction, seed dispersal and pollination.

Traditional Practices of Wild Coffee Production

The Kaffa Zone covers an area of 1,328,932 ha of land and has a population of 725,086. The Zone is endowed with 29 % of dense primary forest that contains natural coffee forest found only in few places in Ethiopia. Coffee production has been a traditional system that was practiced by local communities to producing reliable and environmentally sensitive form of sustainable agriculture. The wild fauna like primates, birds and other herbivores play significant role in coffee and in the production of forest and reforestation through fertilization and pollination of seeds and in establishing stable bionetwork within the coffee forest ecosystem. The production of wild coffee too is labour-intensive and efficient to have maximum economic returns to local communities. The traditional practice has been contributing very much to the social cohesion of the people and for the effective utilization of wild coffee resources. The well organized traditional system of production and conservation of the biological resources is, however, threatened by new advent of technology and short term economic income. This is, by making use of the monoculture practices that led to disruption of the traditional socio-economic settings and on the integrity of valuable genetic resources. The organic coffee both certified and non certified forms are the valuable commodities that have high demands at international level that it would contribute a high income to the development of the rural areas and at the same time to earning the foreign exchanges.

The well organized and sustainable management of the traditional forest management system must be the basis of any development in Kaffa. Any development must be acceptable to the local communities, and they must feel it will contribute to meeting their own direct needs. It is only when land looked as a public heritage that it could be conserved and used to the greatest good of humanity. But, due to advent of the new investment policy, it has excluded and displaced the local communities from the land which was traditionally considered their own and has disrupted the traditional and efficient use of land management system. There is a need, therefore, for policy intervention and further research for an appropriate land management programme that would address the socio-economic needs of the rural people and genetic resource conservation.

Traditional Civet Farming and Musk Production

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The Kaffa Zone or the western region of Ethiopia as a whole is known for traditional civet musk production. There are still local people practicing civet farm in Kaffa at house hold level. The African Civet, *Civettica civetta* is well known for its musk production that is used commercially all over the world as a basic ingredient in perfume industry. Since the time of Queen Sheba, Ethiopia is known for musk production. Until 1980's the civets were kept in large numbers in captivity for collection and extraction of civeton which constituted the major export sources into international market. Recently, synthetic musk has been developed, but not popular and could not fully replace the natural musk and most of the natural musk is exported from Ethiopia, (Pers. Com. Prof. Balakrishnan, AA University, 2008). As the demand for civet musk is growing, there is therefore, an in-depth research need for better production and incentives to local communities to enhance economic development in rural areas of the country. Thus, it is imperative to boost the industry through application of research to encourage and involve the local people and in improving and enhancing the traditional practice in Kaffa Zone.

Development and Conservation Challenges of Faunal Diversity in Kaffa Zone

The challenges facing the Conservation and development of faunal diversity in Kaffa Afromontane Forest are complex and require reviewing issues and solutions for the constraints that the sub-sector is facing. The inherent constraints however, can be regarded as both internal and external and calls for clear policy with legal, institutional, technical, financial and integrated planning frameworks. These are the major logical foundations that are envisaged as basic challenges currently in ensuring the socio-economic values of faunal diversity in Kaffa and at the same time for long-term sustainability of resource use required at local, national and international levels. In line with this the major constraints that require attention to bring sustainable development in Kaffa Zone are given in the following paragraphs, based on the information gathered or from the questionnaires circulated to key stakeholders and as well as on field observation.

Genetic Erosion and Ecological Degradation

Many areas of the Afromontane Forests and critical areas in Africa, including Ethiopia are subjected to ecological degradation and deterioration that resulted in habitat fragmentation, scarcity in faunal resources and poverty (Timberlake, 1985; EFAP, 1989). The outstanding habitats and the water holding capacity in most part of the forest ecosystem of Kaffa are under severe threat from the pressure for living space under the expansion of cultivation, settlement and as well as clearing of coffee forests for large scale coffee production, timber and fuel wood purposes. The unscientifically planned resource use has affected the ecological integrity of the area leading to the critical loss of faunal and floral genetic resources of the primary forest. These activities were witnessed during the field trips, where it was observed physically disrupting the ecosystem through clearing of forests for large scale production of coffee and other plantations particularly in Gimbo Woreda.

Kaffa Zone is reputed as a centre of origin for wild form of *Coffea arabica* and one of the sources for coffee export commodity which is at the same time is the major source of foreign exchange in Ethiopia (pers.com. Ato Abayneh Alemu, 2008). The demand for coffee in its wild form is high where it is maintained in natural forest, which has been also practiced by local people for long on a sustainable basis (pers. com. Dr Demel Teketay, 2008). This

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practice, however, is no longer supported and the monoculture coffee production is encouraged for high yield production. This practice has led to extensive deforestation and land degradation leading to depletion of primary forest and loses of valuable coffee genetic pool. The deforestation and the change in land use not only affect the coffee genetic resource, but also influence other forest biodiversity resources. The forest is one of the remaining primary and high gallery forests in the country that shelters unique primates and other important avian fauna that have restricted range and faunal assemblages. Thus, the conversion of this unique ecological setting not only erodes the genetic resources but also could disrupt the hydrological functions and the economic resource-bases of the area.

Birds are reputed as bio-indicators that have attributes in determining the trends and health of a particular environment. Different bird species prefer different altitudes and specific habitats and in that are valuable tools to show current changes and trends in the area. While some species are cosmopolitan in occurrence, certain species are **Biome specific**, exclusively confined in a given biome. Bird species associated to certain biomes are used therefore, as indicators of the biomes of which they are a part. As it is highly unlikely that these species can survive out side the biomes of which they are a part, degradation or modification of such biomes is of high concern for the conservation of faunal species. Accordingly, there is a need therefore, to follow up and should not be lost due to anthropogenic pressures.

And in that, due to rates of decline in population levels, range sizes, habitat fragmentation and degradation, IUCN has categorized over 20 bird species in Ethiopia as **threatened** to extinction. Seven of these threatened species are found in the Bonga and surrounding forests. One of the seven threatened species, the Crowned Eagle (*Stephanoaetus coronatus*) has been designated as **Endangered**, as it is facing a very high risk of extinction in the wild in the near future (20 per cent chance of going extinct in 20 years). This species mostly feeds on primates and rodents that are associated with high forests and as the size of such forests continues to shrink and fragment, the chance of extinction of this species and associates increases. Two of the bird species recorded, the Lappet-faced Vulture (*Torgos tracheliotus*) and Greater Spotted Eagle (*Aquila clanga*), fall under **Vulnerable** threat category as they are facing a high risk of extinction in the wild in the medium-term future i.e. it has a 10 per cent chance of going extinct in a 100 years time.

Four of the threatened species found in the Bonga and associated forests are **Near-threatened**, which are of less concern or are presently abundant and unlikely to face extinction in the foreseeable future. A taxon is assigned the status of Near-threatened when it is close to qualifying for the threatened categories. Birds recorded in the area that qualify for this category include the White-backed Vulture *(Gyps africanus)*, Ruppell's Vulture *(Gyps ruppellii)*, Black Crowned Crane *(Balearica pavonina)* and Abyssinian Longclaw *(Macronyx flavicollis)*. Though no immediate threats is foreseen to the avian population, there is no doubt that if the present rate of forest destruction and misuse of land continues, the possible impact would likely put on adverse changes to the avian population that could be resulted in deleterious effect on the overall ecosystem. It is therefore commendable to check and continue monitoring the status and trends of the avian/faunal/ population and at the same time to seek corrective measures against the negative tendency, currently occurring in the overall ecological system and of its functions.

Lack of Sectoral Integration and Accountability for Proper Land-Use

Development of biological resources is rural in nature and could coincide well with the philosophy and objectives of the present Government's policy. Conservation of water, soil, vegetation and wildlife are inextricably tied together and cannot be separated from socio-economic development (McNeely, 1988). Effective cooperation among the authorities in these fields is necessary at all levels. In contrast, however, failing to understand the functional relationship of biological resources to the overall development has rendered these productive assets in many places of the Kaffa Zone ineffective and unproductive. Moreover, the new economic policy that gives priority to coffee production is affecting the forest ecosystem and social infrastructures through extensive land development schemes for coffee production with no concern to ecological and socio-economic values of forest and wildlife ecosystems. All do not understand the importance of linkages to lateral and vertical governmental structures for integrated planning and development. Despite being depicted in the National Conservation Strategies and Environmental Conservation Principles (EPA, 2004; EFAP, 1989) the importance of sectoral and cross-sectoral integration were neither observed on the ground nor found implemented effectively. It has been observed and is put into practice clearly at the Zone level where lacks of clear direction and prior-

ity settings were insolent towards the overall objective of economic development and environmental protection. The conflicting responsibility and lack of coherence among various sectoral agencies particularly between the Zonal Administration, Investment Desk and Rural and Agriculture Department can be taken as an example. Lack of integrated planning between them has caused the resource base to be under intense use due to the pressure from population growth, inappropriate coffee production, and the lack of appropriate land development practices leading the area to the environmental degradation and to food and social insecurity problems.

According to the information gathered from the local authorities and the NGOs, many difficulties have been encountered in the field of coffee forest development by the government and private investment project interventions on one hand and the communal forest management, cooperatives and non-governmental intervention projects on the other. Absence of clear directives and land-use policy are manifested with mismanagement and degradation of the valuable genetic resources. Inappropriate land tenure system and mismanagement of land for the coffee production are resulted in the disruption of the ecological systems, social organization and traditional resource management systems.

Through with the efforts of different NGOs operating in the area, very commendable activities are being tried to introduce sustainable land management with integrated development and planning approaches. Recently, the Zonal administration has set up an ad-hoc technical committee that would oversee the land administration, tourism and museum development and the investment issues, (Tilahun Teshome, Pers. Com. 2008). This is also a very commendable and worthwhile and helpful to supporting and strengthening the efforts and to respond to pressing problems that the area is currently facing. It is time, too for an effective coordination office to be in place with a legal backing to develop the mechanisms for sustainable land development that would ensure the integrity of the ecosystem and social security.

Lack of Policy Implementation Capacity and Law Enforcement

Institutional mandates for wildlife management and policies governing wildlife in the country is enacted at the Federal level. The new laws and policies will obviously take time until when they are implemented on the ground. The laws and policies that are effected at the moment are out-dated and incomplete (Leykun, 2000). Wildlife management is a very specialized field requiring special arrangements and to follow accepted international procedures and promotion (Pearce, 1995). No legal laws at the moment exist to safeguard the protected areas and wildlife species throughout the country. In the absence of legal regulation, governing the management of forest ecosystem and the unregulated use of the forest ecosystems have already brought irreversible effects on animal species diversity and composition of the coffee forest ecosystem in Kaffa Zone (Senbeta, 2006). This has been witnessed during the present assessment in that most of the wild animal species that occur in the area are very much reduced, and hardly one finds a good number of the faunal population as that were used to occur in their former ranges. Most of the wild animals are presently found only in patches of primary forest, mainly in Boginda area, where there is little human intervention.

There is a Communal Land Proclamation Act endorsed in 2005 by the government of Southern Nations, Nationalities and Peoples State on the management of the communal lands in the Region (Asrat Mekuria, 2008, pers.com) but has never been enforced on the ground. Instead the private investors that are not liked by the local people in Kaffa Zone, are observed clearing important trees and wildlife habitats for large scale coffee production and other plantations, and have increasingly and heavily threatening the habitats of arboreal species and nesting sites of wild fauna. There is a need, therefore, to stamp out against the encroachment of people and the private investors to forest ecosystem and to be safeguarded by law enforcement. There is a need, too to develop mechanisms for the collaborative management against the encroachments and for unregulated use of forest resources. Policies and laws that are relevant to present situation for the development of wildlife that are enacted and hence setting aside the area for protection and regulation must soon be implemented to fulfil the needs of the local communities and against the prevailing situations. Moreover, to ensure integration and linkages with routine adminis-

trative, financial and technical matters, the Zonal governments have to establish modern systems of management strategies and enforcement of laws which would enable and create opportunities to make use of the environmental resources and in such a way that their ecological and economic functions might contribute for an overall integrated development and utilizations on a sustainable yield basis.

Institutional Issues and Administrative Procedures

The institutional arrangements for wildlife management at the moment are not clearly defined and duplication of efforts is observed. At Zonal level, both the Rural and Agricultural Development and Trade and Industry Departments are accountable for faunal and forest resources development. Furthermore, no qualified wildlife personnel are present in the area even for the routine wildlife patrolling. If the development of faunal diversity and other natural resources are required to achieve its objective, effective administrative machinery, procedures and accountability must be clearly designed and the long-term objectives need to be mapped out.

Not only proper administrative structures are lacking in wildlife management, but also the existing skilled manpower is not self-motivated to do field work. The Zonal administration should understand that wildlife development is a specialized field, requiring investment for technical up-grading and morale boosting with the necessary knowledge and skills. There is insufficient manpower in the area and inadequately deployed without clear management plans to achieve development targets. Thus, efficient administrative structures must be set up through the improvement of human resources in business management and technical skills together with clearly defined and expected targets with accountable and proper administrative procedures.

Both at Regional and Zonal levels, strategic planning for short and long-term training and capacity building programs are required. One must make sure to raise the morale of wildlife management staff in general, which is essential to fulfil the personnel requirements with provisions of incentives and improving the facilities for work and living conditions. Thus, efficient administrative structures must be set-up through the improvement of human resources for management as well for marketing and technical skills with appropriate motivations.

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Institutionally, a separate and semi-autonomous body that would report to the respective Federal and Regional States would be an appropriate establishment to effectively run the wildlife development and eco-tourism development in the Zone. Thus, the sub-sector needs institutional strengthening with legal coherence and reforms together with applicable institutional and administrative structures based on the new formulated Federal policy principles and accepted development procedures.

Faunal Conservation and Development Strategies and Recommendations

Integrated Wildlife Management

The Kaffa Afromontane Forest Ecosystem is endowed with rich geo-morphologic formations, ecological and faunal composition and diversity. Though the number of wildlife species except for birdlife is low within the Montane forest ecosystem, there still exists a good potential for wildlife development as eco-tourism or wildlife marketing are lucrative business in any country in general (Steel, 1995). The Forest holds a variety of species assemblages varying from rare, endemic, resident and migratory species of mammals and birds occurring in various habitats throughout the coffee forests and the surroundings (see Annex 1 and 2). Conservation of these species not only justifies the linkages between the biological and socio-economic values at local level, but has strategic importance at national and global levels as well. The benefits of the conservation of wildlife as discussed earlier too are important for socio-economic growth. Other ecological functions of the wildlife are the direct interactions with gene flow between the environmental components to enhance the socio-economic production, ecological stability and regulation of climate. These interactions help agricultural (coffee) productivity and to the advancement of the rural economy.

In contrast, these ecosystems, which are rich in ecological productivity and promising to human development, are, however, severely threatened. The rapidly expanding rural-urban population and encroachment to the primary forest increasingly expands on the complex web of ecological processes with extensive land degradation, loss of habitat together with the loss of valuable genetic resources. The pressure of intense human activity and improper farming and coffee production practices pose serious threats to the sustainability of the natural resources and towards maintaining the ecological balance. The consequences of this unscientifically planned and unsustainable use of natural resources are the environmental problem that leads to poverty and to lose of the valuable genetic resources. Such process must therefore be stopped and an effective management system with detailed study of traditional knowledge for sustainable development and stable ecosystem prospects has to be in place. This requires appropriate land-use strategies and ap-

plied researches that address the need of immediate and long-term integrated development, incorporating the interest and requirement of the local communities.

There is a Project proposed by the EU-Netherlands for the he initiation of Sustainable Land Management in Kaffa, with an assumption to develop a strategy to harmonize existing land use conflicts in the area. This fits with the NABU/PPP's present initiative and requires appropriate and joint land use strategies (MaB Concept) that address the need of the immediate and long-term integrated development in the area.

A multiple land-use concept based on agro-ecological zones and traditional knowledge for comparative advantages is a sustainable option to arrest the environmental degradation and food self-sufficiency, particularly in the prime natural forest areas. The community based integrated natural resources management approach has also equal opportunity to apply the principles of conflict-free management that may arise between the economic gains and biodiversity values, by improving the relationships between the local people and the coffee forest management. Zoning of the prime areas for the biodiversity values with graded limitations of human use and with agreed management objectives would be an option to avoid the threats on wildlife habitat/coffee genetic pool and for stress factor management. Application of this approach includes the collaborative management and planning of resource use with local people including the revenue sharing and the offer for off-farm income generation activities through the non-timber products, eco-tourism development and compensation for the infrastructural facilities (Steel, 1995).

The strategy of traditional management has been disrupted after the advent of the modern intervention of various investment projects and has led to severe exploitation of the forest resources through the extensive use of monoculture coffee plantation and fuel wood production, leading to the deterioration of the natural resource-base including the wild animal. The basic natural resources of the forest ecosystem are the soils and water, and the products are the vegetation, livestock, wildlife and possibly the inhabiting people. The traditional system of conserving the ecosystem and preservation and utilization of the coffee genetic resources and the associated products has been carried out very efficiently and on sustainable basis for many years.

This strategy therefore, and to be maintained and entails a well-organized and sustainable system with details of history and dynamics of the traditional coffee production systems

that would guarantee the genetic resources and the economic welfare of the rural communities. Thus, integrated and sustainable management of natural resources is vital and entails incorporating the predominant uses of the coffee forest production with that of the natural and genetic resource conservation, both for the economic and ecological benefits. This must be promoted and practiced so as to bring developments aimed at enhancing and ensuring the ecological stability and the economic viability of the ecosystems. Under the prevailing situation, however, the investment policy to replacing genetic diversity with monoculture production is ruinous. Instead, the optimum utilization of the forest ecosystem with differed management systems is essential for an effective and efficient arrangement which involves integrated management and harmonization that could guarantee the maintenance and wise use of the last remaining primary mosaic forest located uniquely in the western part the country.

Conservation of Wild Faunal Diversity

Site and species-specific conservation approach is an indispensable management requirement as the area has embodied rare, endemic and endangered wildlife species with some hotspots for conservations. The status and requirements of some of the species found in Kaffa such as De Brazza's, Blue and Grevit monkeys and Giant Forest Hog are little known. The Kaffa Zone is not thoroughly studied so far and the area is of special concern as it contains high number of endemic flora and bird fauna that are at the same time poorly studied and well managed. Thus, special measures and programmes must be considered to help and improve the habitats and the requirements of the threatened species through adequate protection and habitat maintenance. Enforcing conservation laws with improved patrolling could also help against the decline and to safeguarding the dangerously small population particularly to those that contain special interest and concerns.

The wetlands that comprise the riverine habitats are constituted with about 49,000 ha, (Mesfin, Pers Com, 2008). It contains various wildlife species occurring along the Gojeb and Woshi rivers and their tributaries as well as the associated wetlands call for a systematic management approaches. These rivers and associated wetlands contain various forms of aquatic and terrestrial animals that include the unique mammals and birds, reptiles, amphibians and fishes as well as the valuable invertebrates. Yet, it is not appreciated by all and is instead are subjected to inappropriate use of deforestation, overgrazing and exten-

sive cultivation that are leading to ground water depletion, land slides, genetic erosion etc. The maintenance of these habitats is not only an important contribution to genetic diversity conservation but has also a valuable contribution to watershed management and to the hydrological functioning and life supporting systems. There is a proposal by World Bank to initiate a Watershed Management project comprising of two Woredas. At the same time there is a proposal by the government to let the Gojeb river wetlands for sugar plantation scheme (Mesfin, Pers Com, 2008), which is contradictory management in itself and requires careful reconsiderations.

It is necessary, therefore, to have a long-term planning and to initiate an overall river-based integrated management and auditing that would avoid overuse, misuse and to mitigate the water and land resource use conflicts that are occurring in the area. The forest ecosystems that are subjected to degradation and the scenic sites that are under-valued have to be monetised and be accounted for possible tourism-use purposes as it is as well is a valuable productive asset to contribute towards the rural economy and for sustainable livelihood. The Kaffa Zone, too, has a strategic advantage in its location as it is situated between the northern and the southern road tourist circuit. The Kaffa Zone, apart to the faunal and floral diversity, is rich in its natural (landscape, waterfall etc.), historical and cultural endowments. If community-base tourism with the appropriate market infrastructures and tourism facilities are developed, it has the potential in fetching high income through the tourism investment and promotion that could in turn boosts, both the eco-tourism development potential and the cultural assets of the area.

In conclusion, the management of prime Montane Forest in Kaffa Zone requires new approaches that would serve for both development and conservation purposes. This entails zoning of protected areas into Core, Buffer and Intensive Use zones based on different managing categories and uses. This is in line with UNESCO's Man and Biosphere Programme concept and principles. The application of differed management system based upon different land-use forms could be an option to sustainably use and justifies to safeguarding against the existing unplanned practices in the area. This involves introduction of core area, buffer zone and intensive use zone. The Core areas (could be one or more) are where critical environments like the prime forest area are to be protected, the Buffer area (could be corridors between core areas) are where controlled use of resources like wildlife and coffee reserves are managed and sustainably used which could serve as well as a transition

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area between the core and Economic Use Zones. The Economic Use Zone is an Intensive Use Zone that could be set aside for multiple and intensive management use purposes, where other socio-economic and other productive values can be of use and operated safely.

Thus, the present undertakings of the NABU Biosphere delimitations' proposal and the EU-Netherlands' Sustainable Land Management Project have similar purpose but must jointly work and be devise coherently for an appropriate watershed-based-land–use-strategy in the area. This involves developing a wise-use-land criterion for the multiple and sustainable resource uses that would assist to facilitate and to produce an applicable policy and laws that may ultimately serve the felt needs of the integrated development and land managements that are essential for both local government and the local people in the area.

Towards this end, the local government must solicit international aid agency's' support so that the agency may provide fund for technical assistance in setting the priorities and strategies and that may eventually lead to implement the integrated land development and conservation programme of UNESCO in the area.

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Annexes

Annex 1:Checklist of Faunal Diversity (Five Classes)

Annex 1-1. Class Mammalia

Order/Species	Common Names	Status
Order Chiroptera		
Megachiroptera- Fruit bats		
Family Pteropidae		
Epomophorus anurus	Epauletted fruit bat	UC
Rousetus angolensis (syn aegypyicus)	Bocage's fruit bat	UC
Microchiroptera-Insect bats		
Family Hipposideridae		
Hiposideros commersoni	Commerrsonis Leaf-nosed bat	UC
Family Vespertilionidae		
Pipistrellus nanus	Banana bat	UC
Scotophilus sp	House bat	UC
Family Emballonuridae		
Coleura afra	Sheath-tailed bat	UC
Family Nycteridae	Slit-faced bat	UC
Nycteris sp		
Order Insectivora		
Family Erinaceidae		
*Atelerix albivetr*is	African hedgehog	UC
Family Soricidae		

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Order/Species	Common Names	Status
Crocedura fulvastra	White-toothed shrew	UC
Crocedura bottegi	? Shrew	UC
Sylvisorex megalura	Climbing shrew	UC
Order Redentia		
Famliy Gliridae		
Graphiurus murianus	African dormice	UC
Family Sciuridae		
Xerus rutilus	Pallid Ground Squirrel	C
Family Hystricidae		
Hystirix Cristata	Crested Porcupine	C
Family Rhizomyidae		
Tachyoryctes splenderis	Common Molerat	C
Family Muridae		
Arvicanthus abyssinicus	Ethiopian grass rat	C
Desmomys harringtoni	Dega rat	R
Dendromus mesomelas	Brant's mice	UC
Grammomys macmillani	Tree rat	UC
Mus domesticus	House muse	C
Mus triton	Common mice	C
Lophiomys imhasil	Crested Rat	UC
Lophuromys flavopunctatus	Harsh-furred mice	R
Stenocephalemys albipes	Ethiopian meadow rat	E
Oenomys bypoxanthus	Rusty-nosed rat	UC
Otomys typus	Swamp rat	UC
Order primates		
Family Lorisidae		
Galago Senegalensis	Senegal Bush baby	UC

Order/Species	Common Names	Status
Galago sp	? Galago	R
Family Cercopithecidae		
Papio anubis	Anubis (Olive) Baboon	C
Cercopethicus aethiops	Grevit Monkey	C
Cercopethicus a. pygerythus	Vervet monkey	C
C. (nictitans) mitis/albogularis/	Blue /Gentle/ Monkey	C
Cercopethicus neglectus	De Brazza's momkey	C
Family Colobidae		
Colobus guerza	Guereza	C
Order Carnivora		
Family Mustelidae		
Aonyx capensis	Clawless otter	R
Mellivora capensis	Honey Badger	C
Family Canidae		
Canis aureus	Common Jackal	UC
Canis mesomelas	Black-backed Jackal	UC
Family Felidae		
Felis silvestris	African Wild Cat	UC
Felis serval	Serval Cat	UC
Panthera leo	Lion	R
Panthera pardus	Leopard	C
Family Viverridae		
Atilax palidinosus	Marsh Mongoose	UC
Ichneumia albicauda	White-tailed Mongoose	UC
Herpestes ichneumon	Egyptian mongoose	UC
Herpestes Senguineus	Slender Mongoose	C
Viverra civetica	African Civet	C
Family Hynaenidae		

Order/Species	Common Names	Status
Crocuta Crocuta	Spotted Hyaena	UC
Order Hyracoidae		
Family Procaviidae		
Hetrohyrax brucai	Yellow-spotted Hyrax	UC
Procavia capensis	Rock Hyrax	C
Order Lagomarpha		
Family Leporidae		
Lepus habissincus	Abyssinia Hare	UC
Order Tubulidentata		
Family Orycteropodidae		
Orycteropus afer	Aardvark	UC
Order Artiodactyla		
Family Hippopotamidae		
Hippopotamus amphibious	Hippopotamus	R
Family Bovidae		
Kobus defassa	Dafassa Waterbuck	R
Redunca redunca	Bohor Reed buck	UC
Sylvicapra grimmia	Grimm's/Bush/ Duiker	C
Syncerus cafer	Buffalo	R
Tragelaphus scriptus	Common Bush buck	C
Family Suidae		
Hyochoerus meiertzhageni	Giant forest hog	C
Phacochoerus africanus	Common Warthog	R
Potamocherus larvatus	**Bush pig**	C

Source: Yalden, D.W. 1976, 197, 1980, 1984, 1986; Hillman, 1993 and Field Observation

KEY: C: Common- if chance of seeing is 100% in every time of the visit

UC: Uncommon- if chance of seeing is more than 50%

R: Rare- if chance of seeing is less than 50%

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Annex 1-2. Class Aves/ Birds

Bird Checklist of Bonga Forest and its surroundings

FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
ORDER PELECANIFORMES				
1. Phalacrocoracidae	1	*Phalacrocorax africanus*	Long-tailed Cormorant	RB, U
2. Anhingidae	2	*Anhinga rufa*	Darter	RB, U
ORDER CICONIIFORMES			%	
3. Ardeidae	3	*Bubulcus ibis*	Cattle Egret	AM, RB, U
	4	*Butorides striata*	Green-backed (Straited)Heron	RB, U
	5	*Egretta alba*	Great White Egret	R, U
	6	*Ardea cinerea*	Grey Heron	PW, RB, U
	7	*Ardea melanocephala*	Black-headed Heron	MB, U
4. Scopidae	8	Scopus umbretta	Hamerkop	RB, U
5. Ciconiidae	9	*Ciconia abdimii*	Abdim's Stork	AM, RB, U
	10	*Ciconia episcopus*	Wooly-necked stork	PW, R, F
	11	*Ciconia ciconia*	White Stork	PW, R, U
6. Threskiornithidae	12	*Bostrychia hagedash*	Hadada Ibis	RB, F
	13	*Bostrychia carunculata*	Wattled Ibis	EE, RB, F
ORDER ANSERIFORMES				
7. Anatidae	14	*Alopochen aegyptiacus*	Egyptian Goose	RB, U
	15	*Anas sparsa*	African Black Duck	RB, U
ORDER FALCONIFORMES				
8. Accipitridae	16	*Pernis apivorus*	European Honey Buzzard	PW, U
	17	*Machaerhamphus alcinus*	Bat Hawk	R, U
	18	*Milvus aegypticus*	Yellow-billed Kite	AM, RB, UR, F
	19	*Haliaeetus vocifer*	African Fish Eagle	RB, U
	20	*Necrosyrtes monachus*	Hooded Vulture	RB, U
	21	*Gyps africanus*	White-backed Vulture	RB, NT, U
	22	*Gyps ruppellii*	Ruppell's Vulture	RB, NT, U

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FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
	23	*Torgos tracheliotus*	Lappet-faced Vulture	RB, VU, U
	24	*Circaetus cinerascens*	Western Banded Snake Eagle	R, U
	25	Terathopius ecaudatus	Bateleur	RB, U
	26	Polyboroides typus	African Harrier Hawk	AV, RB, F
	27	*Accipiter melanoleucus*	Black/ Great Sparrow-Hawk	R, U
	28	*Accipiter rufiventris*	Red-breasted/Rufous-chested Sparrow hawk	R, U
	29	*Accipiter minullus*	Little Sparrowhawk	RB, U
	30	*Accipiter tachiro*	African Goshawk	R, U
	31	*Buteo augur*	Augur Buzzard	RB, F
	32	*Aquila pomarina*	Lesser Spotted eagle	PW, U
	33	*Aquila clanga*	Greater Spotted Eagle	PW, VU, U
	34	*Aquila rapax*	Tawny Eagle	RB, AM, U
	35	*Aquila nipalensis*	Steppe Eagle	PW, U
	36	*Lophoaetus occipitalis*	Long-crested Eagle	RB, U
	37	*Stephanoaetus coronatus*	Crowned Eagle	R, EN, U
9. Falconidae	38	*Falco ardosiaceus*	Grey Kestrel	R, U
ORDER GALLIFORMES				
10. Phasianidae	39	*Francolinus squamatus*	Scaly Francolin	RB, U
	40	*Francolinus castaneicollis*	Chestnut-napped Francolin	RB, U
ORDER GRUIFORMES				
11. Gruidae	41	*Balearica pavonina*	Black Crowned Crane	RB, NT, F
12. Rallidae	42	*Ruogetius rougetii*	Rouget's Rail	E, HB, RB, F,
13. Heliornithidae	43	*Podica senegalensis*	African Finfoot	RB, U
ORDER CHARADRIIFOR-MES				
14. Scolopacidae	44	*Tringa ochropus*	Green Sandpiper	PW, U
	45	*Tringa hypolucos*	Common Sandpiper	PW, U
ORDER COLUMBIFORMES				

FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
15. Columbidae	46	*Columba guinea*	*Speckled Pigeon*	RB, U
	47	*Columba arquatrix*	*African Olive Pigeon (Rameron Pigeon)*	RB, U
	48	*Aplopelia larvata*	*Lemon Dove*	RB, F
	49	*Streptopelia lugens*	Dusky (Pink-breasted) Turtle Dove	RB, HB, U
	50	*Streptopelia semitorquata*	Red-eyed Dove	RB, F
	51	*Turtur afer*	Blue-spotted Wood Dove	RB, U
	52	*Turtur chalcospilos*	Emeraled-spotted Wood Dove	RB, U
	53	*Turtur tympanistria*	Tambourine Dove	RB, A
	54	*Treron waalia*	Bruce's Green Pigeon	RB, U
	55	*Treron calvus*	African Green Pigeon	R, U
ORDER PSITTACIFORMES				
16. Psittacidae	56	*Agapornis taranta*	Black-winged Love Bird	EE, RB, HB, U
	57	*Poicephalus flavifrons*	Yellow-fronted Parrot	E, RB, U
ORDER CUCULIFORMES				
17. Musophagidae	58	*Tauraco leucotis*	White-cheeked Turaco	RB, E?, HB, A
18. Cuculidae	59	*Clamator jacobinus*		AM, Breeding possible, U
	60	*Clamator levaillantii*	Striped Crested/Levaillant's Cuckoo	RB, AM, U
	61	*Cuculus solitarius*	Red-chested Cuckoo	AM, RB, U
	62	*Chrysococcyx cupreus*	African Emerald Cuckoo	RB, U
	63	*Chrysococcyx klaas*	Klaas's Cuckoo	RB, U
	64	*Ceuthmochares aereus*	Yellowbill/ Green Coucal	R, U
	65	*Centropus monachus*	Blue-headed Coucal	RB, F
	66	*Centropus senegalensis*	Senegal Coucal	RB, U
ORDER STRIGIFORMES				
19. Strigidae	67	*Bubo lacteus*	Verreaux's Eagle Owl	RB, U
	68	*Strix woodfordi*	African Wood Owl	R, U
ORDER COLIIFORMES				
20. Coliidae	69	*Colius striatus*	Speckled Mouse Bird	RB, U

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FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
ORDER TROGONIFORMES				
21. Trogonidae	70	*Apaloderma narina*	Narina Trogon	R, U
ORDER CORACIIFORMES				
22. Alcedinidae	71	*Alcedo semitorquata*	Half-collard Kingfisher	R, U
	72	*Alcedo cristata*	Malachite Kingfisher	R, U
	73	*Ceyx pictus*	Pygmy Kingfisher	R, U
	74	*Halcyon senegalensis*	Woodland Kingfisher	RB, U
	75	*Halcyon chelicuti*	Striped Kingfisher	RB, U
	76	*Ceryle rudis*	Pied Kingfisher	RB, U
23. Meropidae	77	*Merops pusillus*	Little Bee-eater	RB, U
	78	*Merops variegatus*	Blue-breasted Bee-eater	RB, U
	79	*Meropos oreobates*	Cinnamon-chested Bee-eater	RB, U
	80	*Merops albicollis*	White-throated Bee-eater	MB, F
	81	*Merops apaister*	European Bee-eater	PW, F, Passing by
24. Coraciidae	82	*Eurystomus glaucurus*	Broad-billed Roller	RB, U, AM,
25. Bucerotidae	83	*Tockus alboterminatus*	Crowned Hornbill	R, U
	84	*Bycanistes brevis*	Silvery-cheeked Hornbill	RB, A
	85	*Bucorvus abyssinicus*	Abyssinian Ground Hornbill	RB, U
ORDER PICIFORMES				
26. Capitonidae	86	*Pogoniulus chrysoconus*	Yellow-fronted Tinkerbird	RB, A
	87	*Tricholaema diademata*	Red –fronted Barbet	RB, U
	88	*Lybius guifsobalito*	Black-billed Barbet	RB, U
	89	*Lybius undatus*	Banded Barbet	EE, HB, RB, F
	90	*Lybius bidentatus*	Double-toothed Barbet	R, U,
27. Indicatoridae	91	*Prodotiscus insignis*	Cassin's Honeyguide	RB, U
	92	*Indicator variegatus*	Scaly-throated Honeyguide	R, U
	93	*Indicator indicator*	Greater Honeyguide	RB, U
28. Picidae	94	*Jynx ruficollis*	Red-throated Wryneck	R, U

FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
	95	*Campethera nubica*	Nubian Woodpecker	RB, U
	96	*Dendropicos abyssinicus*	Abyssinian Woodpecker	EE, HB, RB, U
	97	*Dendropicos fuscescens*	Cardinal Woodpecker	RB, U
	98	*Thripias namaquus*	Bearded Woodpecker	RB, U
	99	*Dendropicos spodocephalus*	Grey-headed Woodpecker	RB, U
ORDER PASSERIFORMES				
29. Hirundinidae	100	*Psalidoprocne prestoptera*	Black Saw-wing	RB, F,
	101	*Riparia paludicola*	African Sand Martin	RB, U
	102	*Pseudhirundo griseopyga*	Grey-rumped Swallow	RB, U
	103	*Hirundo senegalensis*	Mosque Swallow	RB, U
	104	*Hirundo abyssinica*	Lesser Striped Swallow	RB, U
	105	*Hirundo daurica*	Red-rumped Swallow	PW, RB, U
	106	*Hirundo fuligula*	African Rock Martin	PW, RB, U
	107	*Hirundo smithii*	Wire-tailed Swallow	RB, U
	108	*Hirundo rustica*	Barn Swallow	PW, F
	109	*Delichon urbicus*	House Martin	PW, U
30. Motacillidae -	110	*Motacilla flava*	Yellow Wagtail	PW, U
	111	*Motacilla cinerea*	Grey Wagtail	PW, U
	112	*Motacilla clara*	Mountain Wagtail	RB, F
	113	*Motacilla alba*	White Wagtail	PW, U
	114	*Motacilla aguimp*	African Pied Wagtail	R, U
	115	*Anthus cinnamomeus*	African Grassland/ Richard's Pipit	RB, U,
	116	*Macronyx flavicollis*	Abyssinian Longclaw	E, HB, RB, NT, U
31. Campephagidae	117	*Campephaga phoenicea*	Red-shouldered Cuckoo-shrike	R, U
	118	*Campephaga flava*	Black Cuckoo-shrike	RB, U
	119	*Coracina caesia*	Grey Cuckoo-shrike	R, U
	120	*Coracina pectoralis*	White-breasted Cuckoo-shrike	R, U
32. Pycnonotidae	121	*Pycnonotus barbatus*	Common Bulbul	RB, U
33. Turdidae	122	*Turdus abyssinicus*	Mountain/Olive Thrush	RB, U

FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
	123	*Turdus pelios*	African Thrush	RB, U
	124	*Psophocichla litsipsirupa*	Ground-scraper Thrush	RB, U
	125	*Zoothera piaggiae*	Abyssinian Ground Thrush	RB, HB, U
	126	*Cossypha semirufa*	Ruppell's Robin-Chat	RB, HB, F
	127	*Cossypha heuglini*	White-browed Robin Chat	RB, U
	128	*Cossypha niveicapilla*	Snowy-crowned Robin-Chat	R, U
	129	*Saxicola torquata*	Stonechat (Ethiopian Race)	E? RB, U
	130	*Saxicola rubetra*	Whinchat	PW, U
	131	*Oenanthe oenanthe*	Northern Wheatear	PW, U
	132	*Oenanthe pleschanka*	Pied Wheatear	PW, U
	133	*Oenanthe isabellina*	Isabelline Wheatear	PW, U
	134	*Phoenicurus phoenicurus*	Common Redstart	PW, U
	135	*Cercomela sordida*	Hill Chat	RB, HB, U
34. Sylviidae	136	*Bradipterus cinnamomeus*	Cinnamon-bracken Warbler	RB, F
	137	*Acrocephalus schoenobaenus*	Sedge Warbler	PW, U
	138	*Chloropeta natalensis*	Dark-capped Yellow Warbler	R, U
	139	*Hippolais languida*	Upcher's Warbler	PW, U
	140	*Phylloscopus trochilus*	Willow Warbler	PW, U
	141	*Phylloscopus collybita*	Chiffchaff	PW, U
	142	*Phylloscopus sibilatrix*	Wood Warbler	PW, U
	143	*Phylloscopus umbrovirens*	Brown Woodland Warbler	RB, HB, U
	144	*Sylvia atricapilla*	Blackcap	PW, A
	145	*Cisticola natalensis*	Croaking Cisticola	R, U
	146	*Cisticola robustus*	Stout Cisticola	RB, U
	147	*Cisticola troglodytes*	Foxy Cisticola	R, SG, U
	148	*Cisticola erythrops*	Red-faced Cisticola	RB, U,
	149	*Cisticola cantans*	Singing Cisticola	RB, U,
	150	*Prinia subflava*	Tawny-flanked Prinia	RB, U
	151	*Phyllolais pulchella*	Buff-bellied Warbler	RB, U

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FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
	152	Cameroptera brachyura	Grey-backed Cameroptera	RB, U
35. Muscicapidae	153	Bradornis microrhychus	Grey Flycatcher	RB, SM, U
	154	Melaenornis chocolatinus	Abyssinian Slaty Flycatcher	E, RB, HB, A,
	155	Melaenornis edolioides	Northern Black Flycatcher	RB, U
	156	Muscicapa adusta	Dusky Flycatcher	RB, A
36. Platysteiridae	157	Batis orientalis	Grey-headed Batis	RB, U
	158	Batis minor	Black-headed Batis	RB, U
	159	Platysteira cyanea	Brown-throated Wattle-eye	R, F
37. Monarchidae	160	Terpsiphone viridis	Paradise Flycatcher	RB, F
38. Timaliidae	161	Pseudoalcippe abyssinica	African Hill Babbler	RB, HB, U
	162	Turdoides leucopygius	White-rumped Babbler	RB, SM, U
	163	Parphasma galinieri	Abyssinian Catbird	E, HB, RB, U
39. Paridae	164	Parus leucomelas	White-winged Black Tit	RB, U
40. Certhiidae	165	Salpornis spilonotus	Spotted Creeper	RB, U
41. Nectariniidae	166	Nectarinia olivacea	Olive Sunbird	R, U
	167	Nectarinia senegalensis	Scarlet-chested Sunbird	RB, U
	168	Nectarinia venusta	Variable Sunbird	RB, U
	169	Hedydipna collaris	Collared Sunbird	RB, U
	170	Nectarinia cuprea	Coppery Sunbird	R, U
	171	Nectarinia tacazze	Tacazze Sunbird	RB, HB, U
42. Zosteropidae	172	Zosterops abyssinicus	Abyssinian White-eye	RB, SM, F
	173	Zosterops poligastrus	Montane White-eye	RB, HB, F
43. Oriolidae	174	Oriolus monacha	Abyssinian Black-headed Oriole	EE, RB, HB, F
44. Laniidae	175	Lanius collaris	Fiscal Shrike	RB, U
	176	Dryoscopus gambensis	Northern Puffback	RB, U
	177	Laniarius aethiopicus	Tropical Boubou	RB, F
	178	Tchagra minuta	Marsh Tchagra	R, U
45. Corvidae	179	Corvus capensis	Black Crow	RB, U
	180	Corvus crassirostris	Thick-billed Raven	EE, RB, HB, U
46. Sturnidae	181	Poeoptera stuhlmanni	Stuhlmann's Starling	R, HB, U

FAMILY / ORDER	NO.	LATIN NAME	VERNACULAR NAME	REMARKS
	182	Onychognathus morio	Red-winged Starling	RB, U
	183	Onychognathus tenuirostris	Slender-billed Starling	R, HB, U
	184	Lamprotornis chaylbaeus	Greater Blue-eared Starling	RB, U
	185	Lamprotornis splendidus	Splendid Glossy Starling	R, U
	186	Cinnuricinclus sharpii	Sharp's Starling	R, HB, U
	187	Cinnuricinclus leucogaster	Violet-backed Starling	AM, R, U
	188	Buphagus erythrohynchus	Red-billed Oxpecker	RB, U
47. Passeridae	189	Passer swainsonii	Swainson's Sparrow	RB, HB, U
48. Ploceidae	190	Ploceus baglafecht	Baglafecht Weaver	RB, HB, U
	191	Ploceus ocularis	Spectacled Weaver	RB, U
	192	Ploceus intermedius	Lesser Masked Weaver	RB, U
	193	Ploceus cucullatus	Village Weaver	RB, U
	194	Anaplectes rubriceps	Red-headed Weaver	RB, U
	195	Quelea quelea	Red-billed Quelea	RB, U
	196	Euplectes axillaris	Fantailed Widowbird	RB, U
	197	Euplectes ardens	Red-collared Whydah	RB, U
	198	Euplectes franciscanus	Northern Red Bishop	RB, U
	199	Amblyyospiza albifrons	Thick-billed Weaver	RB, U
49. Estrildidae	200	Cryptospiza salvadorii	Abyssinian Crimsonwing	RB, HB, U
	201	Lagonosticta senegala	Red-billed Firefinch	RB, U
	202	Coccopygia quartinia	Yellow-bellied Waxbill	RB, U
	203	Estrilda astrild	Common Waxbill	RB, U
	204	Lonchura cucullata	Bronze Manikin	RB, F
	205	Lonchura bicolor	Black-and-White Manikin	R, U
50. Viduidae	206	Vidua chalybeata	Village Indigobird	R, U
	207	Vidua macroura	Pintailed Widow	RB, U
51. Fringillidae	208	Serinus citrinelloides	African Citril	RB, HB, U
	209	Serinus tristriatus	Brown-rumped Seed-eater	RB, HB, U
	210	Serinus striolatus	Streaky Seed-eater	RB, HB, U

Annex 1-3. Class Reptilia

Order Serpents – Snakes		
Family Typhlopidae		
Rhinotyphlops schlegelii	Variable blind snake	UC
Family Boidae		
Python sabae	African python	UC
Family Colobridae		
Dispholidus typus	Boomslang	R
Lamprophis fuluginosus	Brown house snake	UC
Lycophidon depressirste	Wolf snake	UC
Psammophylax variabilis	Grass snake	UC
Family Elapidae		
Dendroaspis polylepis	Black mamba	R
Naja melanoleuca	Forest cobra	UC
Order Sauria- Lizards		
Family Geckkonidae		
Hemidactylus mabouia	Common house gecko	UC
Family Chamaeleonidae		
Chamaeleo calcaricarens	Montane chamaeleon	R

Source: Hillman, J. 1983 and field observation

KEY: C: Common- if chance of seeing is 100% in every time of the visit; **UC:** Uncommon- if chance of seeing is more than 50% ; **R:** Rare- if chance of seeing is less than 50%

Annex 1-4. Class Amphibia

Order Amphibia		
Family Pipidae		
Xenopus clivii	Clawed toad	C
Family Bufonidae		
Bufo garmani	Bufo frog	C
Bufo dodsoni	?Frog	UC
Family Hyperolidiidae		
Kassina senegalensis	?Frog	C
Family Ranidae		
Rana occipitalis	Tree frog	C
Phrynobatrachus minutes	Lesser tree frog	C
Ptychadena pumilio	**? frog**	UC

Source: Hillman, J. 1983 and field observation

KEY:

C: Common- if chance of seeing is 100% in every time of the visit

UC: Uncommon- if chance of seeing is more than 50%

R: Rare- if chance of seeing is less than 50%

Annex 1-5. Class Fishes

Order Lepidosirenformes		
Family Lepidosirenidae		
Protopterus aethiopipicus	Lungfish	UC
Order Cypriniformes		
Family Cyprinidae		
Labeo bottegi	Mud sucker	C
Barbus anema	Barbus	UC
Order Siluriformes		
Family Bagridae		
Bargus bayad	Catfish	UC
Family Clariidae		
Clarias anguillaris	Claria	UC
Family Mockokidae		
Synodontis sp	? Baro fish	UC

Source: Hillman, J. 1983 and field observation

KEY: **C:**   Common- if chance of seeing is 100% in every time of the visit; **UC:** Uncommon- if chance of seeing is more than 50%

         R: Rare- if chance of seeing is less than 50%

Annex 2. Summary of Socio-economic Survey

No.	ISSUE	RESPONSE	Mankira		Bonga		Boginda		TOTAL	
	Participants		No. 20	%	No. 20	%	No. 20	%	No. 60	%
1	Benefit of wildlife	YES	20	100.00	18	90.00	13	65.00	51	85.00
		NO	0	0.00	2	10.00	7	35.00	9	15.00
2	Type of benefit	subsistence	20	100.00	18	90.00	13	65.00	51	85.00
		economic	0	0.00	2	10.00	7	35.00	9	15.00
3	Status of wildlife	increasing	10	50.00	3	15.00	12	60.00	25	41.67
		decreasing	8	40.00	15	75.00	3	15.00	26	43.33
		stable	2	10.00	2	10.00	5	25.00	9	15.00
4	Reason of declining	deforestation	15	75.00	15	75.00	6	30.00	36	60.00
		Over kill	3	15.00	3	15.00	5	25.00	11	18.33
		no protection	2	10.00	2	10.00	9	0.00	13	21.67
5	Conflicts with wildlife	human	3	15.00	2	10.00	9	45.00	14	23.33
		livestock	4	20.00	4	20.00	7	35.00	15	25.00
		crops	13	65.00	14	70.00	4	20.00	31	51.67
6	Species de-clining	Bovid	12	60.00	7	35.00	5	25.00	24	40.00
		carnivores	5	25.00	9	45.00	12	60.00	26	43.33
		primates	3	15.00	4	20.00	2	10.00	9	15.00
7	Major activities	Coffee	14	70.00	12	60.00	8	40.00	34	56.67
		Honey	2	10.00	4	20.00	9	45.00	15	25.00
		wood sale	3	15.00	2	10.00	2	10.00	7	11.67
		Other	1	5.00	2	10.00	1	5.00	4	6.67

									10	16.67
11	most threatened wildlife	carnivores	9	45.00	14	70.00	8	40.00	31	51.67
		Bovid	7	35.00	2	10.00	7	35.00	16	26.67
		Snakes	1	5.00	0	0.00	0	0.00	1	1.67
		Fishes	1	5.00	1	5.00	0	0.00	2	3.33
12	Importance of forest to coffee	Good	15	75.00	7	35.00	9	45.00	31	51.67
		Bad	3	15.00	8	40.00	2	10.00	13	21.67
		Do not know	2	10.00	5	25.00	9	45.00	16	26.67

Annex 3. Persons Contacted

Abayneh Alemu- Coffee Sector Manager, USAID Contractor, Agribusiness and Trade Expansion Program. Implemented by Fintrac Inc. AA

Afework Bekele (Prof) - Lecturer and smaller mammals' specialist at AA University, Science Faculty, Biology Department. AA

Alemayehu Alemu- Expert, Kaffa Zonal Rural and Agricultural Development Department. Bonga

Asrat Mekuria - Chair, Zonal Technical Ad Hoc Committee and Coffee Expert, Kaffa Zonal Rural and Agricultural Development Department. Bonga

Ayele Wolde Gebriel- Natural Resources Dept Head, Kaffa Zonal Rural and Agricultural Development Department. Bonga

Birhanu Gebre Mohe- Department Head, Zonal Investment and Trade Department, Bonga

Demel Teketay (Dr)- Regional Coordinator, Forest Stewardship Council. African Regional Office. Ghana. AA

Firehiwot Getachew- Manager, Kaffa Forest Coffee Farmers Cooperatives Union. PPP-NABU, German Support Pogramme. Bonga

Hibist Mamo- Tourism Development and Information Expert, Zonal Investment and Trade Department, Bonga

Jochen Vorfelder- Sustainable Media, Communications. Web Solutions. Journalism. Hamburg, Bonga

Kinfe Mamo- Coordinator, Kaffa Forest Coffee Farmers Cooperatives Union Project. PPP-NABU, German Support Pogramme. AA

Ludwig Siege (Dr) – Consultant, German Technical Cooperation- Sustainable Utilixation of natural Resources for Improved Security. SUN-Program. AA-Bonga

Luwiza W/Gebriel- Deputy Team Leader, Farm Africa- Bonga Integrated Participatory Management. Mobile-0911 709060

Melisew Asfaw-Planning Head, Kaffa Zonal Rural and Agricultural Development Department. Bonga

Mesfin Tekle- Head , Kaffa Sustainable Land Development, EU-Netherlands Support. FAO Zonal level Representative. Bonga

Meseret Mariu- Wildlife Expert, Land for Sustainable Development, EU-Netherlands Support. FAO Zonal level Representative. Bonga

Netsanet Tezera –Deputy Head, Land for Sustainable Development, EU-Netherlands Support. FAO Zonal level Representative. Bonga

Terefe W/Michael- Natural Resources Desk, Kaffa Zonal Rural and Agricultural Development Department. Bonga

Tilahun Teshome- Tourism Officer, Zonal Investment and Trade Department, Member of Zonal Technical Ad Hoc Committee, Bonga

Solomon Hailu- Expert Farm Africa- Bonga Integrated Participatory Management

Solomon Yirga, (Dr)- Lecturer and Primate specialist, at AA University, Science Faculty, Biology Department, Bonga

Yoshida Sayuri- Department of Anthropology. Graduate School of Letters. Nagoya University. Japan. Bonga

Annex 4. Questionnaire Formats

4.1   Socio-economic Data Sheet

1. **Conservation area name:**

    1.2 Central longitude/latitude location   No___' ____ Eo ____'

2. **Natural attributes:**

    2.1   Total area ____ km², land____km², Water _____ km²

    2.2   Ethiopian altitude/climate zone

    Berha: _____   <600m

    Lower kolla: _____ 600-1500m

    Upper kolla: _____ 1500-1900m

    Woina dega _____ 1900-2500m

    Dega _____   2500-3400m

    Wurch: _____   3700m

    2.3   Altitude range _____masl

    2.4   Rainfall : mean annual total ….mm periods

    2.5   Temperature range: min. 0^oc   max. ……0^oc

    2.6   Vegetation type

    2.7   Ecological zone

    2.8   Major river catchments

    2.9   Major wildlife species

    2.10   Other wildlife species

2.11 Number mammal species recorded: ……Rare/……endemic………

2.12 Number bird species recorded: Rare/……endemic………

2.13 Major physical/geological features

2.14 Major anthropological/historical features

3. Management features:

3.1 Date established/proposed

3.2 Maps available

3.3 Regional administration

3.4 Number of buildings

3.5 Number of staff

3.6 Number of vehicles

3.7 Other machinery

3.8 Communication radio

3.9 Road/track distance in park

3.10 Visitor accommodation facilities

3.11 Education /Information facilities

3.12 Guide book/brochure/info sheet…….

3.13 Average annual visitor – Total………

Ethiopian Natural:- _____

Foreign Resident:- _____

Foreign Tourist:- _____

Student : _____

3.14 Average annual income……….Birr

3.15   Research facilities

3.16   Settlement - approx;-- People- Houses/huts

3.17   Livestock – approx- cattle- shoats- camels- others

3.18   Other natural resource use- fuel wood- minerals- camels- others

3.19   Principal reference

3.20   Remarks

4.2   Questionnaire Format on Wildlife and Tourism Assessment

1. Regional/Zonal level:

1.1   What major conservation area exist in the Region/Zone

1.2   What management plans to the conservation area have?

1.3   Who is responsible for the management?

1.4   What benefit the Region/Zone get? From what? How?

1.5   What legal backing is there for management?

1.6   Is there any research activity on fauna and flora? If so where and by whom?

1.7   What percentage of the Region surface area is allocated for the conservation?

1.8   What are the major tourist attractions? Natural, historical, cultural?

1.9   What are the major economic activities in the Region?

1.10   What are the major constraints in the management of wildlife and tourism?

2.   Woreda, Community (local):

2.1   What are the significant wildlife and plant species of the Woreda? Abundance/distribution

2.2   What benefits does the local community get from wildlife? Tourism?

2.3   Is there wildlife tabu?

2.4   What type of conservation area is there in the Woreda? NP, WR, FR, CHA.

2.5   What are the major tourist facilities in the Woreda?

2.6   What is the wildlife status and trends of wildlife? Past, present and future.

2.7   What is the altitude of the local community towards wildlife?

2.8   Is there conflict between wildlife and other land use in the area? Livestock or cultivation.

2.9   Is there wildlife poaching? Subsistence of economic?

2.10   Who is responsible for wildlife and tourism management?

2.11   Is there wildlife/Tourism expert in the Woreda?

2.12   What major attractions are there in the Woreda for Tourists?

Woreda for tourists? - Landscape - sunset/sunrise point- Wildlife-   bird watching - Hot and cold springs   -   religious- Mountains

Anthological sites

2.13   Local participation and beneficiaries towards wildlife and tourism development
2.14   What are the major constraints for the development of wildlife and tourism?
2.15   Which wildlife species is threatened most? Why? By whom?

2.16   What is the basic social service required by the community? Priority - road- electricity- school- clinic- credit service- off farm activities- water (potable)- others
2.17   What is the situation in terms of stability and peace in the area?

2.18   What tourism infrastructure and access exist in the area?

2.19   How is the Zoning or regulation for conservation function in the area?

2.20   How does the land tenure system work?

2.21   Any information on wildlife census of area

2.22   No. of cases recorded for illegal hurting or poaching in 10 years.

Annex 5. Monitoring and Wildlife Assessment Data Sheet

5.1   Area/locality name: ----------------------

Date_____ Starting from (place)_____ Finishing time_____

Start time_____ Stop time_____ Total time _____

Start km_____ Stop km _____ Total distance _____km_____

Observers 1._____ 2._____ 3._____

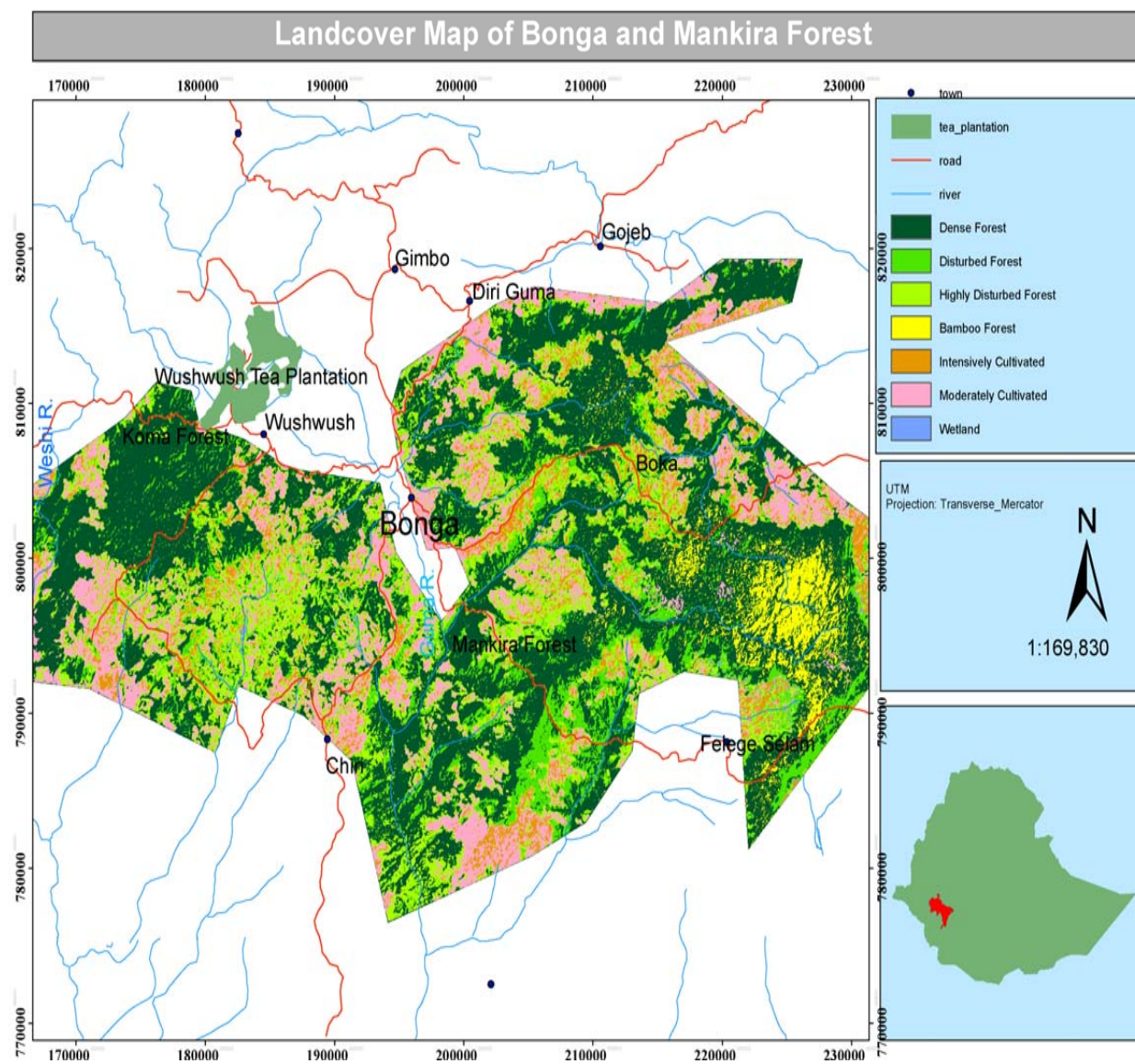| Time (24hrs)	Distance (km)	Species	Sight Dist.	Total No.	Sex		Age		Alt. (m)	Latitude/ longitude	Habitat types	Comments
					M	F	Y	A				

5.2   Tourism Potential Data Sheet

a)   Social infrastructure

Tourist site or localities	Means of transport Bus/Flight	No of Hotels	Bank service	Power	Tele	Potable water	Road access

b) Tourism infrastructure

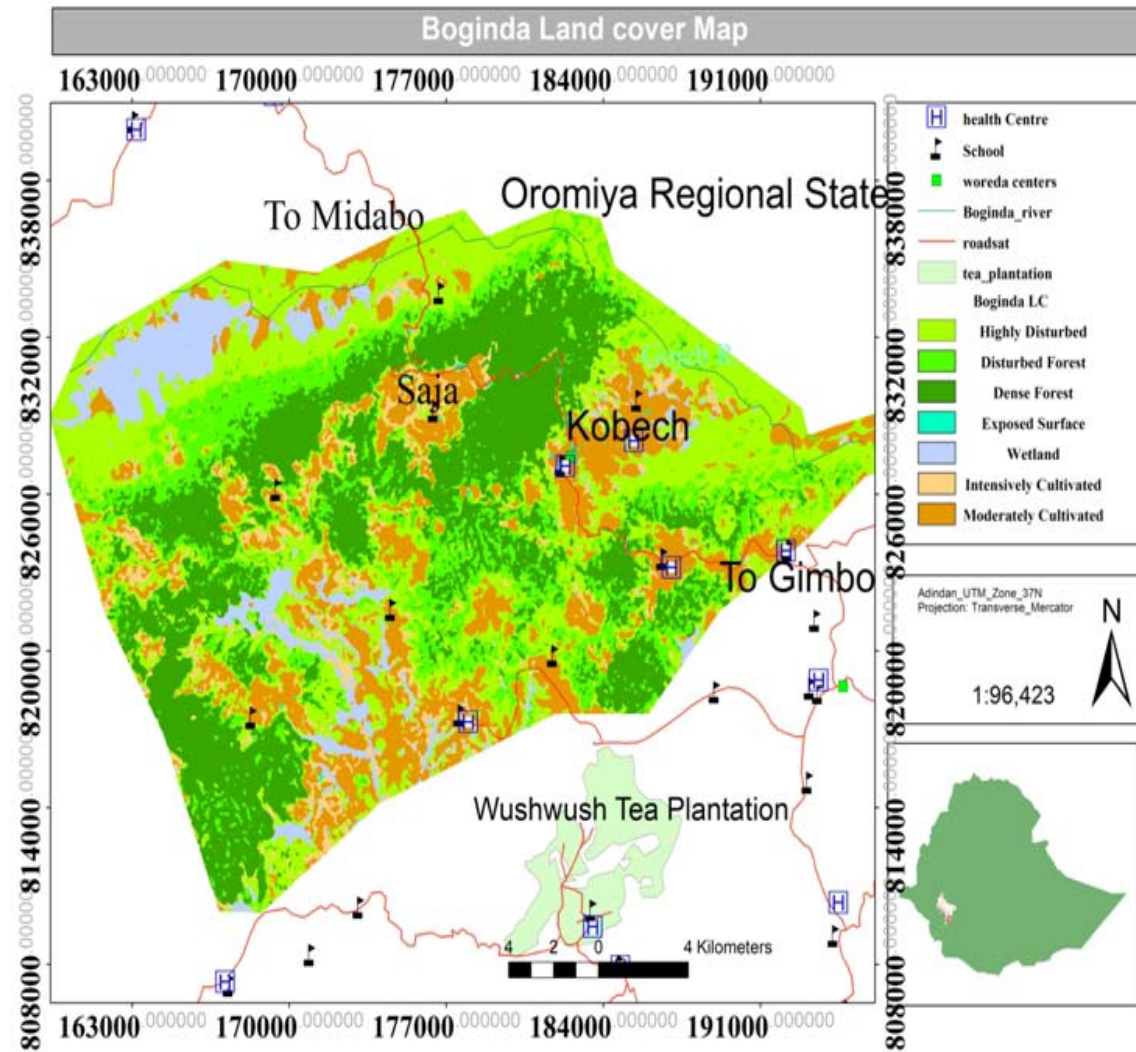| Tourist site or localities	Staff accommo-dation	Park ring facilities	Road net work	Bird watch Sites	Horse/camel ride

Annex 6. Maps

Landcover Map of Bonga and Mankira Forest

Annex 6- Map 1 Land Use map of Bonga and Mankira

Source: Flora biodiversity assessment and GIS mapping, 2008

Annex 6- Map 2 Boginda Land use Map

Source: Flora biodiversity assessment and GIS mapping, 2008