

# Wildlife Census for Quota Setting in Arba Gugu Controlled Hunting Area, Oromia Regional State, Ethiopia

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## ABSTRACT

Oromia, due to its altitudinal and geographic variations, is endowed with diverse wildlife and a large number of endemic species that provide a unique opportunity for tourist (sport) hunting. There are a number of charismatic flagship species, most notably the gelada, (an endemic genus *Theropithecus gelada* and the world's only grazing primate) and mountain Nyala, both of which can be hunted on a quota basis in Oromia. Hunting can be practiced in Controlled Hunting Areas; but it is not permitted in the National Parks, Wildlife Sanctuaries, and Wildlife Reserves. The Game Mountain Nyala, Menelik's bushbuck, Leopard, Duiker and Klipspringer are the most commonly hunted wild animals. Oromia is an exclusive and ideal place where one can enjoy the hunting of three Endemic mammalian species, namely, the Mountain Nyala, Menelik's Bushbuck and Gelada Baboon from all around the World. Trophy hunting is a specialized form of game utilization, where adult males are selected for their trophy value. The business is typically and strictly controlled, monitored and regulated where safari must apply for government-issued permits for the number of animals permitted in quota setting. The number of animals to be hunted is decided based on the data from a wildlife census taken prior to hunting year. Trophy hunting is managed by the Ethiopia Wildlife Conservation Authority and Oromia Forest and Wildlife Enterprise together with the concessionaires who need to abide by a hunting quota. Accordingly, the objective of this study is to assess wild animals' population structure and set hunting quota in Arba Gugu Controlled hunting area. Point sample and line transects were used to conduct the wildlife census as per the habitat nature of the area. Six point sampling count fixed sighting radius of 1km was used for all of the sample points. Similarly six lines transect ranging from 0.8km to 2.19km were randomly selected covering 10.36km length in total. In this case perpendicular sighting distance of 500m on both sides of the line transects covering 1Km in total was used to count forest and thicket animals. All larger mammals encountered along the line transects were counted and recorded on the census sheet. Counts were made every morning hours from 6pm to 10pm and from 3pm to 6pm in the afternoon hours. Regarding the distribution of the wild animals, Mountain Nyala, Klipspringe, colobus Black and White and Leopard are naturally protected by deep and rugged landscape and recorded only in point samples; whereas Grey duiker and Menelik's Bushbuck were recorded in both point samples and line transects. Regarding to Age Structure the number of young and juvenile observed were low and the number of adult were high On the subject of the age and sex structure of the recorded wild animals the male to female ratio is more or less fairly represented except in the case of Mountain Nyala, Colobus Black and White and Anubis Baboon where the number of females is about double of the males. Population estimate of the recorded wild animals shows that Mountain Nyala is a relatively at a good population number with an estimate of 1082, followed by Menelik's Bushbuck, Colobus Black and White, Annubis Baboon and Klipspringer having 636 , 407, 318 and 191 respectively. The unfavorable human activities like deforestation, Overgrazing and expansion for agriculture would have a greater impact on the abundance and distribution of wild animals in the controlled hunting area. It is therefore advisable to all the stake holders to take immediate actions to solve the problems and make sure the wellbeing of the wild animals in the area. Additionally, wildlife conservation awareness program should be further strengthened by concerned stake holders to get the overall support of the community.

**Keywords:** Census, Qouta setting, Arba Gugu Controlled hunting area, sport hunting

## INTRODUCTION

Ethiopia experiences diverse climatic zones, landscapes & cultures which intern made the country being the mosaic of bio-diversity. For long period of time economic contribution of wildlife is overlooked in Ethiopian due to lack of awareness and coordination of activities and actors. Due to this and other related factors the real figure of economic contribution of wildlife is too less compared to other African countries which use the resource as the mainstay of national economy. In principle wildlife population can be utilized periodically without reduction of their breeding stock, which will produce harvestable surplus. In other words, the consumptive utilization has to be based on sustainable yield that could harvest a certain number of individuals from healthy population year after year without forcing that population into decline.

Oromia, due to its altitudinal and geographic variations, is endowed with diverse wildlife and a large

number of endemic species that provide a unique opportunity for tourist (sport) hunting. There are a number of charismatic flagship species, most notably the gelada, (an endemic genus *Theropithecus gelada* and the world's only grazing primate) and mountain Nyala, both of which can be hunted on a quota basis in Oromia. Hunting can be practiced in Controlled Hunting Areas; but it is not permitted in the National Parks, Wildlife Sanctuaries, and Wildlife Reserves, the Game Mountain Nyala, Menelik's bushbuck, Leopard, Duiker and Klipspringer are the most commonly hunted wild animals. Oromia is an exclusive and ideal place where one can enjoy the hunting of three Endemic mammalian species, namely, the Mountain Nyala, Menelik's Bushbuck and Gelada Baboon from all around the World. Trophy hunting is a specialized form of game utilization, where adult males are selected for their trophy value. The business is typically and strictly controlled, monitored and regulated where safari must apply for government-issued permits for the number of animals permitted in quota setting.

The number of animals to be hunted is decided based on the data from a wildlife census taken prior to hunting year. Trophy hunting is managed by the Ethiopia Wildlife Conservation Authority and Oromia Forest and Wildlife Enterprise together with the concessionaires who need to abide by a hunting quota. Accordingly, the objective of this study is to assess wild animals' population structure and set hunting quota in Arba Gugu Controlled hunting area.

## **MATERIALS AND METHODS**

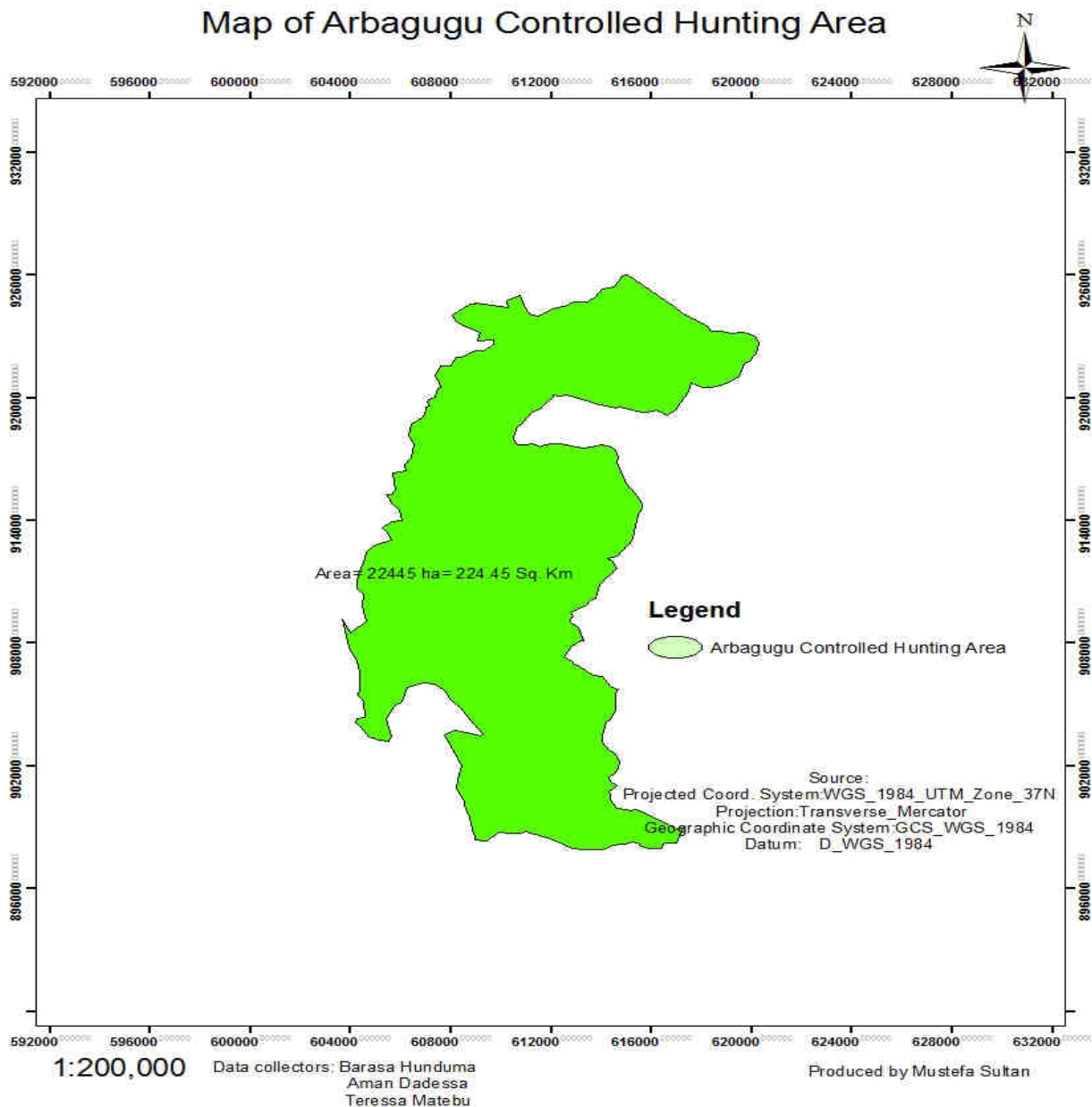
### **Description of the study area**

Arba Gugu controlled hunting area situated 250 km south east of Addis Ababa is located at the geographical coordinates of 37 P 067086 longitude and UTM 0912653 latitude at the centre of the controlled hunting area at the base camp. It is found in Arsi zone of Oromia regional state and is adjoined by Guna wereda in the north and north-west, Chole wereda in the south and south west and Gololcha wereda in the east.

The topography is generally a rugged landscape with deep gorges and vast undulated land which can be described as Erica zone habitat. The altitude of the area lies between 3000-3600 meters above sea level, mount ShekemSere being the highest peak with an elevation of 3,574 meters above sea level.

The area receives a bimodal rainfall with the long rainy season extending from July-October and the short rain from February-April with an annual rain fall of 600mm minimum and 1,200mm maximum. The area is also a source of such principal rivers as Kewe, Guracha, Dalecha and Washa that support the lives of many hundreds of thousands of people living both upland and downstream.

Previously the total area of the hunting block was estimated at 225 sq. km. However, according to a new agreement signed between the region and the concessionaire, the concessionaire has received a total area of 340.62 square kilometers, starting from 2007 lying within the co-ordinates of UTM 583000-624000 and 887700-927000.



**Fig.1 Map of the study area**

### Flora

Arba Gugu controlled Hunting area is composed of a mosaic of habitats of mixed open woodland in the rugged deep valley and an Erica zone outside the deep valley interspersed with extensive grass land habitats.

The mixed open woodland vegetation zone comprises the major tree species such as *Domya torrida*, *Hygenia abyssinica*, *Juniperus procera*, *Mytenus ovatus*, *Schefflera abyssinica*, *Schefflera volkensii* and *Croton mycrostachyus*. The glades of these mixed woodlands also have some endemic plants that include patches of *Euphorbia dumalis* and *Rubus steudeneri*. The Erica zone is mostly dominated by patches of Erica arborea shrubland and scrubland except that within them one could find irregularly scattered patches of the endemic plant *Knifofia foliosa*. Other plant species typical of the highland ecosystem are *Alchemelia brownii* and *Thymus schemperi* and *Helichrysum splendidum* is the dominant species in the afro alpine habitat above the tree line. *Echinops longisetus*, *Discopodium peninervum* and *Maesa lanceolata* are other major plant species found in the area

### Fauna

Major wild animals existing in the controlled hunting area are Mountain Nyala, Menelik's Bushbuck, Klipspringer, Grey Duiker, Spotted hyena and Colobus Black & White. Among birds it is the location of three endemic bird species namely, Ethiopian Siskin, Abyssinian Long Claw and Abyssinian Catbird and seven near

endemic species namely, Rouget's Rail, Black-headed Forest Oriole, Thick-billed Raven, Wattled Ibis, Black-winged Lovebird, Abyssinian Slaty Flycatcher and White-backed Black Tit. The area is also a marvelous destination to spot the graceful birds of Lammergeyer, Ruppell's Vulture and Verraux's Eagle. Other common bird species of the controlled hunting area include Mountain Thrush, Ground Scraper Thrush, Moorland Chat and Augur Buzzard. Generally, 46 species of birds were recorded during the study period some of them which have unique adaptations to the nature of the landscape and their general habits.

### Research methodology

Wildlife Surveys had been carried out every morning hours from 6pm to 10pm and from 3pm to 6pm in the afternoon hours. Point sampling and line transect methods were equally important since the controlled hunting area has natural site features that demands to use both methods. Point sampling method had been used for deep valleys that require vantage points to count the animals which have great limitations to stretch line transects. Whereas for sample sites which have vast plains line transect has been utilized.

For the point sampling count fixed sighting radius of 1kilo meter was used for all of the sample points. For the line transects which measures a total of 10.36 kilometer a sighting distance of 500 meters on both sides of the transects has been used

The total number of animals in each point sample has been added and using the formula  $\Pi r^2$  for the observed area density and population estimates of each species has been extrapolated. In the case of the line transect the formula  $2(L*W)$  was used for the sample area and density and population estimates have been extrapolated.

## RESULTS

The results of the sample counts at different localities are described below.

**Table 1: Wild Animals observed and counted in each Sample Site**

	Animal Species Observed	Results of counts in the Sample Sites												Total
		P1	P2	P3	P4	P5	P6	T1	T2	T3	T4	T5	T6	
1	Nyala, Mountain	13	9	34	4	5	20	-	-	-	-	-	-	85
2	Bushbuck, Menelik's	6	7	5	9	6	5	-	1	2	9	-	-	50
3	Klipspringer	-	-	2	-	7	6	-	-	-	-	-	-	15
4	Duiker, Grey	-	-	-	1	3	2	3	4	3	4	3	2	25
5	Colobus Black & White	-	-	24	-	8	-	-	-	-	-	-	-	32
6	Baboon, Anubis	25	-	-	-	-	-	-	-	-	-	-	-	25
7	Side stripped Jackal	-	-	-	-	-	-	2	-	-	-	-	-	2
8	Hyena, Spotted	-	-	-	-	-	-	4	-	-	1	-	-	5
9	Bush pig	2	-	-	-	-	-	-	-	-	-	-	-	2
10	Leopard	-	-	1	-	1	-	-	-	-	-	-	-	2
11	Porcupine, Crested	Dropping	-	-	-	-	-	-	-	-	-	-	-	

P= Point Samples

T= Transect Counts

**Table 2: Sex, Age Structure and Population Estimate of Wild Animals**

Ser. No	Animals Observed	Total Seen	Male Adult	Female Adult	Sub Adult	Juv.	Un	M/F Ratio	Total Sample Area km <sup>2</sup>	Density No./km <sup>2</sup>	Suitable Habitat Km <sup>2</sup>	Pop. Estimate
1	Nyala, Mountain	85	25	53	3	4	-	1:2	9.42	9.02	120	1082
2	Bushbuck, Menelik's	50	26	21	-	3	-	1:1	9.42	5.3	120	636
3	Klipspringer	15	7	7	-	-	1	1:1	9.42	1.59	120	191
4	Duiker, Grey	25	14	10	-	1	-	1:1	10.36	2.41	50	120
5	Colobus Black & White	32	10	22	-	-	-	1:2	9.42	3.39	120	407
6	Baboon, Anubis	25	8	16	-	1	-	1:2	9.42	2.65	120	318
7	Side stripped Jackal	2	1	1	-	-	-	1:1	10.36	0.19	180	34
8	Hyena, Spotted	5	3	2	-	-	-	1:1	10.36	0.48	150	72
10	Leopard	2	1	1	-	-	-	1:1	9.42	0.21	120	25
11	Porcupine, Crested	-	-	-	-	-	-	-	-	-	-	-

Juv= Juvenile, Un= unknown, M/F Ratio= male to female ratio, Pop= population

**Table 3: Male population Estimate and Suggested Hunting Quota**

Ser. No.	Animals Observed	Total Huitable Males Counted	Sample Area km <sup>2</sup>	Density No/km <sup>2</sup>	Suitable Habitat km <sup>2</sup>	Male Population Estimate	Off-take %	Suggested Hunting Quota
1	Nyala, Mountain	25	9.42	2.65	120	318	2	6.36 ~6
2	Bushbuck, Menelik's	26	9.42	2.65	120	331	2	6.6~7
3	Klipspringer	7	9.42	0.74	120	89	2.5	2.2~2
4	Duiker, Grey	14	10.36	1.35	50	68	2.5	1.7~2
5	Colobus Black & White	10	9.42	1.06	120	127	2.5	3.17~3
6	Baboon, Anubis	8	9.42	0.85	120	102	2.5	2.5~3
7	Side stripped Jackal	1	10.36	0.09	180	17	5	0.8~1
8	Hyena, Spotted	3	10.36	0.29	150	44	5	2.2~2

## DISCUSSION

A total of eleven species were recorded using direct and indirect counting in both point sample and transects. All species were observed directly except crested porcupine which was recorded by indirect evidence (dropping). Among 11 observed species Mountain Nyala were high in abundance which is 85 animals and Leopard, Bush Pig and Side stripped Jackal were low in abundance which is 2. Among these Mountain Nyala and Menelik's Bushbuck are naturally protected by deep and rugged landscape. Particularly Mountain Nyala, Klipspringer, Colobus Black & White, Anubis Baboon, Leopard and Bush pig were recorded only in the valley in point samples whereas Side stripped Jackal and spotted Hyena were exclusively observed in line transects. However, Grey Duiker and Menelik's Bushbuck were observed both in Line transect and point samples. In general Valley is rich both in number of species and abundance. This is due to fewer disturbances by human as it is not accessible as compare to transect sampled area.

According to Mustefa Sultan and Teyiba Amano et al 2017, On the subject of the age and sex structure of the recorded wild animals the male to female ratio is more or less fairly represented except in the case of Menelik's Bushbuck where the number of males is about double of the females and no age structure difference is observed and only adults were recorded. In contrast the current study revealed the number of young and juvenile observed were low and the number of adult were high. Thus population with many old and few young will decline and not sustained for a long time. On the subject of the sex ratio of the recorded wild animals the male to female ratio is more or less fairly represented except in the case of Mountain Nyala, Colobus Black and White and Anubis Baboon where the number of females is about double of the males. Population estimate of the recorded wild animals revealed that Mountain Nyala is a relatively at a good population number with an estimate of 1082, followed by Menelik's Bushbuck, Colobus Black and White, Annubis Baboon and Klipspringer having 636, 407, 318 and 191 respectively.

Total Huitable Males Counted for Mountain Nyala, Menelik's Bushbuck, Klipspringer, Anubis Baboon, Grey Duiker, Colobus Black and White, Side stripped Jackal and Spotted Hyena were 25, 26, 7, 8, 14, 10, 1 and 3 respectively.

Therefore based on total huitable males counted suggested hunting quota for Mountain Nyala, Menelik's Bushbuck, Klipspringer, Grey Duiker, Colobus Black and White, Anubis Baboon, Side stripped Jackal and Spotted Hyena were 6, 7, 2, 2, 3, 3, 2 and 1 respectively. The off-take present for Mountain Nyala, Menelik's Bushbuck, Klipspringer, Grey Duiker, Colobus Black and White, Anubis Baboon, Side stripped Jackal and Spotted Hyena were 2, 2, 2.5, 2.5, 2.5, 2.5, 5 and 5 respectively.

According to Mustefa Sultan and Teyiba Amano 2017, overgrazing, deforestation, agricultural expansion, illegal settlement, uncontrolled fire and illegal hunting were the main threats to the protected area in Ethiopia. In line with this current observation revealed that the anthropogenic threats such as deforestation, overgrazing and expansion for agricultural land and settlement expansion would have a greater impact on the abundance and distribution of wild animals in Arba Gugu controlled hunting area. To reduce these treats benefit sharing and awareness creation is important. According to Teyiba Amano, Mustefa Sultan et al 2017, Local community will have a sense of ownership and conserve protected area if there is benefit sharing.

## CONCLUSION AND RECOMMENDATIONS

Ethiopia is one of the most important countries in Africa for biodiversity conservation at local, regional and global levels. The range of habitats and vegetation is very wide resulting from the great diversity on climate,

altitude and topography. The country is also very rich in biodiversity with large number of endemic species, particularly in the eastern highlands.

Arba Gugu controlled hunting area is part of the eastern highlands that comprise many endemic plants, mammals and birds. However, current human-induced problems are imposing severe threats on the whole ecosystem. Expansion of non-sustainable agriculture by clearing a vast area of forest cover, expansion of settlements, overstocking of livestock reaching from various directions of adjacent districts, an increase in the population growth rate and poaching of wild animals are evident in the area. If this trend goes on unchecked it is inevitable to witness a great loss of the resource of the area very soon. Consequently, the following recommendations were drawn:

- ✚ The region by strengthening conservation institutions and creating strong local administration structures should take urgent measures to tackle the problem.
- ✚ The concessionaire should further strengthen the patrolling activities by constructing additional patrolling camps at selected resource potential sites.
- ✚ The region together with other concerned bodies has to take urgent measures to minimize the settlement in the controlled hunting area.
- ✚ Urgent and strong Monitoring and Evaluation is necessary to determine the fate of the controlled hunting area.
- ✚ Awareness creation and solving local communities problem were highly recommended

### ACKNOWLEDGEMENTS

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### APPENDICES

#### Geographical Co-ordinates where point samples were taken

- i. **Tenazo**  
37 P 0608255  
UTM 0913933  
Altitude 3205mt  
Distance from the base camp 1.58km
- ii. **Franco**  
37 P 0607854  
UTM 0912105  
Altitude 3225 mt  
Distance from the base camp 0.95km
- iii. **Dalecha**  
37 P 0608341  
UTM 0914335  
Altitude 3245mt  
Distance from the base camp 1.15km
- iv. **Washa**  
37 P 0608325  
UTM 0910935

- Altitude 3233mt  
Distance from the base camp 2.19km
- v. **Kewe**  
37 P 0608252  
UTM 0913936  
Altitude 3220  
Distance from the base camp 1.6 km
- vi. **Kululta**  
-  
Altitude 3210mt  
Distance from the base Camp 0.8km

**Geographical Co-ordinates where line transects were taken**

- i. **Line Transect 1**  
Start Transect 37 P 0606937  
UTM 0912634  
End of Transect 37 P 0603625  
UTM 0914117  
**Transect Length----- 3.63 km**
- ii. **Line Transect 2**  
Start Transect 37 P 0606391  
UTM 0912424  
End of Transect 37 P 0608060  
UTM 0910731  
**Transect Length----- 2.02 km**
- iii. **Line Transect 3**  
Start Transect 37 P 0607197  
UTM 0912537  
End of Transect 37 P 0607854  
UTM 0912105  
**Transect Length----- 0.79 km**
- iv. **Line Transect 4**  
Start Transect 37 P 0607080  
UTM 0912962  
End of Transect 37 P 0607997  
UTM 0914189  
**Transect Length-----1.53 km**
- v. **Line Transect 5**  
Start Transect 37 P 0607439  
UTM 0914281  
End of Transect 37 P 0608143  
UTM 0914960  
**Transect Length----- 1 km**
- vi. **Line Transect 6**  
Start Transect 37 P 0606226  
UTM 0912599  
End of Transect 37 P 0604988  
UTM 0913123  
**Transect Length-----1.39km**