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MINISTRY OF NATURAL RESOURCES AND TOURISM WILD LIFE DIVISION

BASELINE STUDY FOR THE PROPOSED PILOT WILDLIFE MANAGEMENT AREAS (WMAS)

BASELINE DATA AND ANALYSIS FOR ENDUIMET PILOT WMA

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BASELINE DATA AND ANALYSIS FOR ENDUIMET PILOT WMA

1. INTRODUCTION

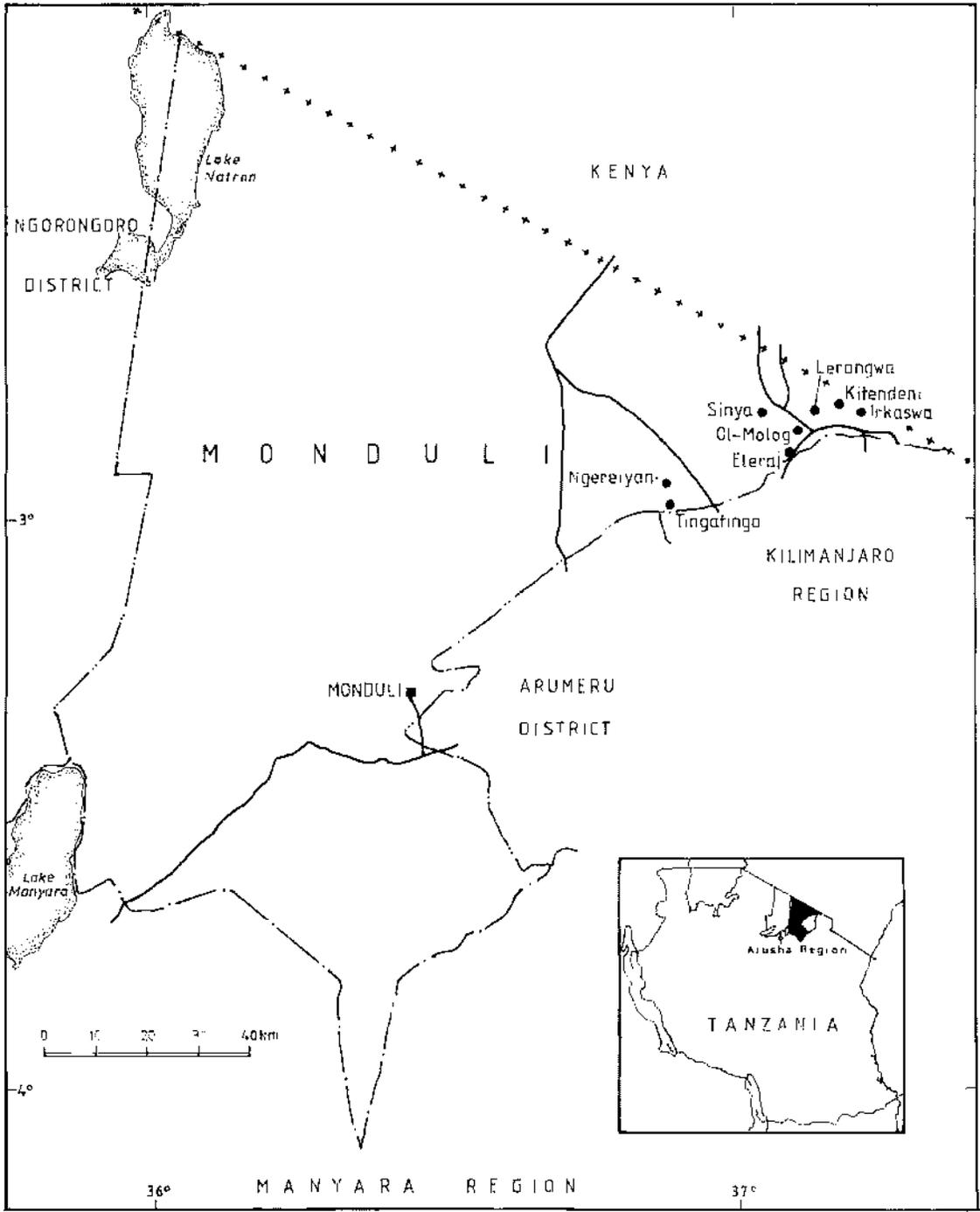
The proposed Endumeit pilot Wildlife Management Area (WMA) is in Enduimet Division, Monduli District, Arusha Region in northern Tanzania. Of the 128,179 ha which the Division covers, 110,000 ha which accounts for about 86% is set aside as a WMA. Apart from licensed hunting, other activities that take place in the WMA in particular at Sinya village includes photographing, camping, walking safaris, specialized bird watching and wildlife viewing. In the WMA, together with wildlife conservation, livestock grazing is practiced. The climatic condition of the Division whose rainfall ranges between 400 and 900 mm per annum explains why the area set aside as rangelands is relatively bigger than that of other land uses.

Eight villages have been proposed to form Longido pilot WMA; these with the area set aside for the WMA in brackets are Sinya (17,716ha), Tingatinga (not available), Ngereiyan (not available), Irkaswa (not available), Kitenden (4,000ha), Lerangwa 12,857ha), Olmolog (2,000ha) and Elerai (not available).

During the current study, six villages including Sinya, Kitenden, Irkaswa, Lerangwa, Elerai and Olmolog were visited. One week before the team visited the area there was a team of 40 youths who had visited the Arusha Regional Commissioner's Office from Irkaswa village to register their claim over the land, which is under dispute. They claim that a portion of the famous Kitenden corridor belongs to Irkaswa and not Kitenden village. Some of Irkaswa residents want plots to be allocated for crop production in the corridor. The village office was forcibly closed and village leaders were not available for discussion. With this situation, no useful information was obtained from this village with respect to WMA concept. However, observations indicate that because of the ethnic diversity, which exists at Irkaswa village, crop farming was a priority over conservation and the traditional Maasai institution set up was no longer powerful in controlling and allocating land in the village.

The Maasai community, which forms the majority of tribes living in these villages, except Sinya, is now in a process of change from a pastoral lifestyle. Most of them now grow crops, eat maize and beans and few especially the youth eat wild meat. This probably is among other factors, brought about by the influence of other ethnic groups, which have migrated into this area. Sinya village is almost exclusively a pastoralist zone because its low rainfall cannot support rainfed farming.

Because all the villages share the same ecosystem, it is assumed that the baseline information collected from the villages visited is a representative of the whole WMA including Tingatinga and Ngereiyan villages that were not visited and Irkaswa where information was not available.



Map 1: Map of Monduli District showing constituent villages for the proposed Enduimet pilot WMA.

2. SITUATION ANALYSIS

2.1 Progress Towards Implementation of WMA

Status of preparations for the establishment of the Enduimet Pilot WMA is encouraging. The stage of implementation has reached a high level and local communities are quite positive about the whole idea of WMAs. Measuring progress requires looking at the implementation of the various pre-requisites for the establishment of WMAs which include; Land Use Planning and designation of land for wildlife, enactment of village by-laws which will provide legal backing for the implementation of WMA, training of Village Game Scouts (VGSs) and establishment of the Authorised Association (AA) to run the WMA activities. The following is the status of implementation.

2.1.1 Land Use Planning

The remaining landmass of Enduimet Division is used for large-scale farming (6,923 ha) and settlement and small-scale agriculture (11,256 ha). Together with 110,000 ha that is set aside for WMA rather livestock grazing also takes place.

2.1.2 Formulation of By-laws

The village governments with the facilitation of experts have drawn up by-laws. In the case of Enduimet proposed pilot WMA Such facilitation was provided by the African Wildlife Foundation.

In all villages, by-laws had been prepared by the respective village governments and taken to the district. It is anticipated that the review of these By-laws will be effected now that the WMA regulations and guidelines are out.

2.1.3 Training of VGSs

All the visited villages in Enduimet WMA reported that two VGSs have been trained and are casually helping in antipoaching activities.

2.1.4 Establishment of AA

The Monduli District council is now preparing to facilitate the village governments constituting the proposed Enduimet WMA to establish AAs by providing various training workshops for capacity building.

2.2 Economic Situation

2.2.1 Incomes and Expenditures

The proposed Enduimet pilot WMA is within Monduli district in Arusha region. Sources of income data for the district show that natural resources contribute significantly to the economy of the district.

At the WMA level, the main economic activities include, Livestock keeping and agriculture. In agriculture the main crops are maize, beans and wheat. Major source of income for the village governments is tourism based mainly on photo-tourism. In Lerangwa, Olmolog and Sinya (where data was available) tourism contributed 44.4%, 27% and 100% respectively⁴. Wildlife base tourism is already popular and benefiting local communities. The proposed WMAs however, are introducing the management aspects which are envisaged to bring even greater benefits to the local communities economically, socially and environmentally.

2.2.2 Production trends and productivity

The majority of villagers engage in both farming and livestock keeping. Farming is done mainly for food and cash crops to provide the necessary subsistence and income generation, while livestock keeping is mainly for store of wealth and therefore prestige apart from the nutritional aspect of milk supply.⁵ Productivity of agricultural output is estimated at 7 bags⁶ of maize per acre during short-rains season and slightly higher during long-rains season at 7.15 bags. Productivity for beans is estimated at 3.1 bags/acre during short-rains and 4.6 bags/acre during long-rains (see Table C25). These levels of productivity however, are below the expected productivity levels due to inadequate use of fertilizers and poor crop husbandry practice.

2.2.3 Economic Agents Infrastructure and Markets

With the exception of Sinya and Tingatinga which are located in the lowlands connecting the Amboseli National Park in Kenya, the rest of the villages into this WMA are well connected by all weather roads. Ngereiyan, Irkaswa, Kitenden, Lerangwa, Olmolog and Elerai are in Western Kilimanjaro area at the foot of Mount Kilimanjaro. Credit facilities are non-existent at village level, and the savings and credit societies have not yet been established. Few shops supply agricultural inputs, but normally villagers have to travel to nearby urban center of Sanya Juu and Boma Ng'ombe to obtain their agricultural and livestock production inputs needs. Transport services are available in most villages, thus opening up possibilities of market access.

⁴ See Table B2 for more details.

⁵ The belief that Maasai eat meat as their main food is a fallacy. They do eat a lot of meat at special rituals like "OLPURU".

⁶ These are 100 kilogram bags.

One demand which inhabitants put forward, was that of telecommunication facilities. They argued that they could afford to pay for using telephone facilities which they could use to obtain market information from many parts at any time without having to travel to major urban centers for the service thus losing time and money! Most products however were reported to have good markets though the situation could be improved.

2.2.4 Natural Resource Use

Table C16 lists the main non-commercial uses of natural resources by local communities around the Enduimet WMA. The majority of people in these areas use the natural resources around them for most of the uses with the exception of pottery soil and game meat. The Maasai, which are the majority around this WMA are famous for their co-existence with wildlife for time immemorial. This is because in Maasai culture game meat is not among the basket of food items to choose from. Anyone known to partake game meat is despised by their community⁷. This explains why the proportion of people using game meat is low at 15%. Commercial uses of natural resources has been discussed in the previous section on income generation. In this area, tourism is the commercial activity which uses wildlife resources both consumptive (hunting) and non-consumptive (photo) ways to generate significant sums of money for the proximate custodians of these resources, i.e. the local communities living adjacent wildlife sanctuaries.

The Maasai are also renowned for their rich knowledge of herbal medicine most of which is found in their areas.

The availability of these natural resources as perceived by people interviewed to be relatively abundant with the exception of game meat which is shown to be low.⁸

2.2.5 Poverty levels

Poverty status is reviewed with the help of anecdotal evidence presented in five indicators. The first is the income base earnings from main occupational activities, second is earnings from Income Generating Activities (IGAs) other than the main occupational activity, the third is the financial transfers from relatives and friends outside village. The other measures are the wealth accumulation and Villagers Perception Index (VPI) of poverty/wealth.

The earnings from last season from main occupational economic activities shows that 80% of the respondents earned an average of less than one United States of America dollar a day, while the remainder earned above one US dollar a day. (See Table C19). Earnings from IGAs other than the above, show that about 16% of respondents earned about US \$0.017 per day⁹. Similarly with transfers, about 44% of respondents received transfers worth a mode of US 0.055 per year, which is not much though it complements

⁷ Today some Maasai have started eating game meat when made available, but, as they argue, they do not set forth to go and hunt for the purpose of food.

⁸ Indiscriminate issuing of hunting permits and poaching are blamed for this state of affairs.

⁹ Using the mode value due to existence of extreme values. See Table C22(a).

individual efforts of the beneficiaries. The above are money metric measures of absolutely poverty. The wealth indicator considers assets accumulated by an individual some of which can be readily converted to each to meet immediate needs as they arise, and some are used as store of value and prestige in society for one who owns them. Table C23 shows the wealth status of households using selected assets which most of the respondents possess. Here the table shows that individuals are not rich. However if we include livestock, we would be able to determine the approximate wealth status, but livestock numbers reported were unreliable due to respondents fearing to reveal them for various reasons. Two of the reasons advanced was cultural and fear of taxation. Culturally, people avoid counting their livestock for fear of losing them.

The final indicator we have used to characterize the poverty situation is that of the villagers' perception Index of Poverty or Wealth. Table B5(a) and (b) show that most of the livestock keepers were poor ranging from 50% to 82% of the total in Kitenden, Lerangwa, Olmolog and Sinya. Elerai had only 20% poor, while the majority were middle class using their perception weights of wealth and poverty presented in Table B5(b).

2.2.6 Possible Economic Activities

These are presented in Table C21 where handcrafts for sale emerge having the most potential of benefiting from the establishment of WMAs. Tourism business and wage employment appear the second and third potential activities respectively. Having observed the economic activities in these areas and their future prospects, Tourism, cultural Bomas which may house handcrafts and wage employment stand a better chance of benefiting from the establishment of WMAs due to mainly the fact that two (2) of them are already being practiced. The employment of VGSs and those who will be employed as guards and guides by the tourism investors would facilitate the creation of significant employment opportunities. This pilot WMA is situated in a beautiful scenery at the foot of mount Kilimanjaro, and four of the villages overlooking the Amboseli National Park in Kenya.

2.3 Ecological Status

2.3.1 Wildlife resources

Longido WMA is relative rich in wildlife and the species, which are found in the area, are shown in Table D1 but their numbers and distribution are not accurately known. On one hand, villages that are adjacent to Kilimanjaro Forest Reserve/National Park have wildlife species that are not recorded in relatively dry areas like Sinya. These are Black and white colobus and Kilimanjaro blue monkey (*Kibonotensis cornberg*). On the other hand, Oryx, cheetah, and gerenuk are found on plains habitat at Sinya village but are not recorded in villages neighbouring the mountain forest.

There is seasonal and daily movement of animals within and among the villages that comprise the Enduiment WMA. Forage for both wildlife and livestock is not a limiting factor which, implies that movement of animals within and outside the WMA is influenced by water availability.

Most of the animals are abundant in the area during wet seasons which is between November and January and between March and May whereas few animal species which are referred to as residents remain in the WMA throughout the year Table D1. The migrating elephants and plains game in particular travel between the Enduiment WMA and Amboseli National Park in Kenya through Kitenden corridor and to Kilimanjaro Forest Reserve and Arusha National Park through Kilimanjaro corridor.

Although no data on wildlife numbers is available, long term observations have indicated that there is a declining trend in eland, zebra and lion populations a situation which is associated with over-hunting. The Northern Hunting Company with a license that is issued by the Central Government does wildlife hunting in Sinya village. Although information from the hunting office in Arusha indicates that hunting quota is not fully exploited (Mremi, personal comm.), village leaders suspect that more animals are hunted than it is permitted. It is believed that no monitoring on numbers and distribution of wildlife is currently done and hunting rules and regulations are not exactly followed. However, if hunting quotas are based on reliable estimates and if these quotas were respected, licensed hunting would not threaten wildlife resources.

Traditionally Maasai do not hunt wild animals for meat, except in periods of drought when food products from livestock are diminished. In this view, poaching is not a major threat at Sinya except for small-scale illegal hunting that is done by outsiders and which villagers fail to control due to lack of equipment, firearms and recognition of the Village Game Scouts (VGS) by the Central Government and District game staff.

The most poached wildlife species at Sinya is eland. However, at Lerangwa, Olmolog, Kitenden, and Elerai; the villages that are adjacent to Kilimanjaro Region, poaching was a serious and increasing problem until in 2000, when the poaching incidences started declining as a result of the presence of Village Game Scouts (VGS) who have intensified security. Outsiders from Dodoma, Tanga and Kilimanjaro regions mainly do poaching. The most poached animals are wildebeest, eland, zebra, buffalo and gazelles. The giraffe despite being a nationally protected species is also hunted. Due to the fact that VGS cannot distinguish between legal and illegal hunters and because some of the poachers are government officials who use firearms and government vehicles, it becomes relatively difficult for them to combat the activity. The continuing increase of livestock meat prices in Kilimanjaro region is attached to increased poaching activities and therefore illegal hunting is high during holidays.

Observations indicate that elephant, zebra and buffalo numbers have increased during the past two to three years. There is no explanation for the increase in zebra and buffalo numbers but the increase in elephant is associated to the international ban on ivory trade and habitat degradation in Amboseli National Park. While the populations of other wildlife species have been observed to be stable, lion numbers seem to be declining and therefore regarded by the villagers as a threatened species.

Few dominant bird species were recorded in the field Table D2 but data on reptiles, invertebrates, and insects is totally lacking.

2.3.2 *Vegetation*

The main habitat types in Enduiment WMA are grassland, wooded grassland, woodland, bushed grassland and Montana forest. The percent accounted for by each type to the total area is not available. Animal species that utilize each of the identified habitat types are as shown in Table D1. The main tree species that were recorded in the woodland include *Acacia tortilis*, *Combretum molle*, *Balanite spp.*, *Acacia lahai*, *Acacia xanthophloea*, *Acacia drepanolobium*, *Acacia nilotica*, *Acacia mellifera*, *Commiphora africana*, *Euphorbia spp.* and *Rhus natalensis* which are interspersed with *Cynodon dactylon*, *Spolobolus ioclodes*, *Themeda triandra*, *Chloris gayana* and *Digitaria* grass species. The forest tree species include *Juniperus procera*, *Olea africana*, *Croton megalorcapus*, *Ozoroa insignis*, *Ficus sycomorus*, *Salvadora persica*, *Grewia bicolor* and *Erythrina abyssinica*.

Firewood and poles are collected from the WMA by obtaining a permit from the village government. No person is allowed to cut down live trees otherwise if it happens and discovered, a person concerned is fined. Charcoal making is prohibited, thus forests in the WMA are relatively intact when compared to areas inhabited by agriculturists in the nearby Hai District. Photo number 3 shows a relatively intact riverine forest at Lerangwa. *J. procera* is mainly exploited for poles. Once used the poles last for more than six years when need for replacement arises. *O. africana* is another tree species used for poles and together with *A. lahai* is used for firewood. However, the availability of forest products and in particular building poles and firewood are increasingly becoming scarce mainly because of over utilization resulting from rapid human population growth, lack of alternative resources, inadequate conservation education, laxity in law enforcement and insufficient trained staff.

2.3.3 *Water resources*

At Sinya, with the exception of Sinyamen-Silange dam, which provides water throughout the year both to human beings, livestock and wildlife, all other sources are seasonal. In the wet seasons distance for water fetching and livestock watering becomes relatively short and many wildlife which distribute themselves all over the WMA utilize the area effectively. At Kitenden, water supply is tapped from Kilimanjaro Forest Reserve but its supply shows seasonal variations. There is also a cattle trough in the village that was built in 1950s whose source is Kilimanjaro Forest Reserve but it is currently in a dilapidated state. Apart from this trough being used by both livestock and wildlife, resident elephants have developed aggressive behaviour of uprooting and breaking up the pipes when searching for water during dry periods.

At Lerangwa, water distribution over time and space has become more skewed resulting into it being scarce both for humans and livestock. When Ematasya River which is the only source dry up, people and livestock are forced to enter Kilimanjaro Forest Reserve

at a source which is also used by elephants during this time of the year. Because both animals and human beings share this source, water becomes unsafe for human consumption and sometimes unavailable in case elephants decide to spend the whole day at the source. During wet seasons, and early in dry periods, apart from people depending on Ematasya River for water supply, the Mukao natural ditch (Korongo) is used. Also this source is useful for wildlife and livestock. The biggest problem of sharing water between animals and people is contamination.

At Olmolog village there is no permanent river, therefore people are experiencing acute shortage of water during dry periods. While in wet seasons water is fetched from seasonal springs and ponds, during dry periods they have to travel with their livestock to Amboseli were dams hold water throughout the year.

Although the village kiosk for water supply and a place for livestock watering are available, there is no permanent water source at Elerai. Gravity water from Kilimanjaro Forest Reserve and which, in previous years used to flow all year round until in 2002 is now available for six months only starting from December through to May. Current water scarcity from this source is associated to indiscriminate cutting of trees and increased human population and settlement in the forest, the location that is outside the village. When water dry up in taps in early dry seasons, people rely on natural ditches but water from this source is not clean and safe because is shared by both animals and humans. Late in dry seasons, people have to walk 12 kilometers to fetch water from Simba River, which is in Hai District and more than 8 hours are spent on this activity. At Tingatinga and Ngereiyan small-scale irrigation is practiced.

With respect to water resources, the government target to provide clean and safe water to each household within a walking distance of 100 metres by year 2002 is far from the current situation in Enduiment WMA.

2.3.4 Other natural resources

Bee-keeping: Although in the preliminary stages, few individuals at Kitenden and Lerangwa do practice bee keeping. Basic training in bee keeping was assisted by African Wildlife Foundation (AWF). While the majority of honey is gathered from natural sources such as in logs and caves, there are about 5 individuals who are engaged in bee keeping at Lerangwa and they own about 30 traditional beehives. Honey is used as food, in making local brew, in preparation of medicines and sometimes it has significance in the performance of traditional ceremonies. The potential of the market for honey in the WMA is very high. Bee keeping is not practiced at Sinya, Olmolog and Elerai villages.

Mining: Although the presence of some minerals is reported at Sinya, currently no mining is done in Enduiment WMA.

Charcoal making: The institutional arrangement among the Maasai community in this area is still relatively intact. Among other things, the government leaders and traditional institutions control the use of natural resources. This arrangement has ensured that neither

charcoal making nor logging is practiced, if done is against the by-laws and if caught the culprits are fined.

Fishing: Sinyamen-Silange dam at Sinya and one dam at Kitenden provide good sites for fishing but only outsiders do fishing. This is because, although some youths have gradually started eating fish, for the Maasai, eating fish is taboo and they equate fish to snakes.

Medicinal resources: The Maasai at Enduiment WMA use most shrubs and trees to make medicine for both humans and livestock. Examples that were given include *Olea Africana*, which apart from being medicine is also used to sterilize milk gourds, *Commiphora spp.* serves as tick repellent and *Acacia nilotica* is used during youth retreats. Parts of the latter tree species are cooked in soup to provide appetite for the consumption of more meat.

Intangible benefits: There are a number of intangible benefits of which Maasai in the WMA consider important. Among others is the value of mountain forests, which are used as worshipping centres and as sites for other ceremonies such as initiation of youths (Morans). Also animals like the pangolin (Kakakuona) are considered sacred for the Maasai community; it is associated with prosperity.

Rivers and streams that originate in the nearby Kilimanjaro Forest Reserve are considered to constitute indirect values because their provision of water within walking distances saves time, which is used for other developmental tasks. Finally it was mentioned that trees provide shade and in most cases, village meetings are carried out under specific trees where participants enjoy fresh air and cool environment.

2.3.5 Human-wildlife interactions

With the exception of Sinya where climatic conditions and scarcity of permanent water supply do not allow viable crop production, the increasing trend of some wildlife species and the increasing trend of crop cultivation in other villages have resulted in blockage of some wildlife routes. Consequently, wildlife are opening up new routes which results into increasing incidences of crop raiding. Animals mentioned most for destroying crops are elephants, buffalo, zebra, eland, baboon, porcupine and dikdik and the most damaged crops are maize, beans and wheat. Although people guard farms overnight, on average 50% to 60% of the expected yields are damaged. Scarring is no longer effective due to the high learning capacity of the raiders.

Predation is another problem that causes conflicts between pastoralists and wildlife at Enduiment WMA. Leopard, lion and hyena are the most predator species. Livestock species eaten include cows, goats, sheep and donkeys. Information on number of donkeys killed were not given. Predation is severe during dry seasons when most of the prey species have migrated to other areas.

Table 1. Number of Livestock killed/eaten by predators at Enduiment WMA

Village name	Predator	Year	Cows (Number)	Goats and sheep (Number)
Sinya		2002	Not Available	Not available
Kitenden	Leopard	2002	-	350
	Lion	2002	10	-
	Hyena	2002	25	-
Lerangwa	Hyena	2002	10	30
	Leopard	2002	-	50
Olmolog	Hyena	2002	-	360
	Leopard	2002	-	60
Elerai	Leopard	2002	-	40
	Hyena	2002	20	-

As far as village members could remember, an elephant killed one person in 1983 at Lerangwa. One person and other four people were injured by the same wildlife species in 1984 and between 1995 and 2000 respectively. At Kitenden the last death incidences were reported in 1997 when one person was killed by an elephant and another one by the buffalo. However, injuries caused by elephants and buffalo at Kitenden are regular and on average three cases are reported every year. One injury by a buffalo was reported in 2002 at Olmolog. An elephant killed one person in 2001 and another person was injured by the same animal species in 2002 at Elerai.

Disease transmission from wildlife to livestock was also mentioned as an outstanding problem. The diseases that were mentioned to cause threat include East Cost Fever (ECF), Foot and Mouth Disease (F&MD), Malignant Catarrh Fever (MCF), Anthrax, Contagious Bovine Pleuro-Pneumonia (CBPP), Brucelosis, Tuberculosis and Mange.

(MCF); a fatal disease to cattle is transmitted by calving wildebeest. Although pastoralists escape the animals during calving by retreating into the highlands, they still feel that the situation excludes them temporarily from rangelands, which would have otherwise been used freely and effectively. ECF is a tick-borne disease that is not transmitted directly to cattle, but the ticks which carry the casual protozoa become abundant when the wild animals migrate into this area. Mange is a skin disease that is believed to be transmitted to goats by gazelles.

2.4 Sociological Analysis

2.4.1 Population characteristics

Population, both quantitatively and qualitatively, has profound influence in the development process. Population increases lead to increased pressure on natural resources and the manner these resources are used will very depend on the diversity of interests of the population in question. In the proposed Wildlife Management Areas the

influence of the human population is significant in terms of population size and ethnic composition.

2.4.1.1 Ethnic composition

Although data on population density in the specific villages is lacking, areas inhabited by Maasai exhibited lower population densities and narrower ethnic diversity than areas permanently settled agricultural societies. In the Enduimet WMA Wamaasai constitute the majority of the population. In villages such as Sinya and Elerai these constitute more than 98% of the population. The remaining 2% constituted other ethnic groups who are employees such as teachers, health officers or rangers or those who settled after retiring from government service. Table 2 shows the ethnic composition of Sinya, Elerai, Olmolog, Lerangwa, and Kitenden in Enduimet WMA

Table 2: Ethnic composition in the five villages in Enduimet WMA

Name of Village	Ethnic Composition
Sinya	Wamaasai (98%); others Wameru, Wachaga, Wamakonde,
Elerai	Wamaasai (90%); others Wachaga, Wanyiramba, Wasandawe, Wapare,
Olmolog	Wamaasai, Wazaramo, Wasafwa, Wabena, Wambulu, Warangi, Wachaga, Wapare, Wanyakyusa, Wanyamwezi
Lerangwa	Wamaasai, Waarusha, Wachaga, Wameru, Warangi
Kitenden	Wamaasai, Wachaga, Wasafwa, Wameru

Villages such as Olmolog, Lerangwa, Kitenden, and Irkaswa are slightly more heterogeneous due to the presence of a few business operators who are not Maasai. Nevertheless, those who are non-Maasai do not exceed more than 10% of the population partly because of the predominance of livestock keeping giving little room for other economic activities to take place. The introduction of crop cultivation in such areas for example, is likely to foment conflict than facilitating the development of either. With ethnically mixed communities also leads to different local agendas, land use systems, cultures and languages.

2.4.1.2 Migration patterns

Migration, defined as a permanent change in residence, is an active population process in Enduimet WMA. Migration can either be emigration or immigration. There are various causes for both processes. With emigration, people move out of an area primarily due to push factors such as drought, conflicts, declining soil fertility for agricultural societies or inadequate pasture for livestock keepers, among others. In predominantly Maasai societies, for example, there are reports of a number of younger members of the community, the “Morani” who have moved out of their respective communities due to lack of moneymaking opportunities. These “Morani” are now to be found in large urban centers such as Dar es Salaam, Dodoma, or Mwanza where they are working as night watchmen. Other Maasai have moved to other areas including Kenya due to lack pasture or water or both. It was reported however that these Maasai do not migrate permanently;

instead they divide the herd and let some members of the family remain behind. This is often taken as an insurance against the unpredictable weather. However migration does not appear to be a dynamic process since 75% of Enduimet respondents report to be born in the same meaning they have not moved to new areas. Table 3 shows where respondents were born.

Table 3: Distribution of respondents according to where born

Where born	Frequency	Per cent
Same village	104	75.4
Same ward different village	10	7.2
Same district different ward	6	4.3
Same region different district	7	5.1
Different region	11	8.0
TOTAL	138	100

While the same emigrants become immigrants at the destination, such people move into an area primarily due to pull factors. Pull factors constitute the opposite of those listed above as push factors. Hence pull factors can be reliable rain, peaceful co-existence, better soil fertility, employment opportunities, better infrastructure, and even marriage. In the case of marriage, women are more likely to move than men. For instance, within the Enduimet WMA, 95% of those who moved were women against 5% of men showing that the Maasai society is a patriarchal. Generally speaking, poor villages have tended to “drive” away residents compared to rich or villages with the necessary infrastructure such as water, education, and roads. Table 4 shows the pull factors as reported by residents in Enduimet WMA.

Table 4: Factors influencing movement into an area

Pull/push factor	Frequency	Percent
Villagization	8	8.6
Farming	27	29.1
Livestock keeping	16	17.2
Good climate	3	3.2
Employment	7	7.6
Business	3	3.2
Marriage	15	16.1
Follow relatives	9	9.7
Government decision	1	1.1
Sickness	1	1.1
Tribal conflicts	1	1.1
Livestock theft	1	1.1
Divorce	1	1.1
TOTAL	93	100

From the table, it can be seen that there are many reasons why people move to new areas. These have to do with individual decision-making such as marriage, sickness, employment; or government decisions such as the 1974 Ujamaa village policy requiring rural residents to move to planned villages. Also, communities may have influence on individuals such as tribal conflicts, livestock theft, following relatives etc.

2.4.2 Institutions and natural resources in Enduimet WMA

Much has been written on the role of institutions in the management of natural resources (Wily, 1995; Kemf, 1994; Pimbert and Pretty, 1995, Shackleton and Campbell, 2001). These institutions can be traditional or modern and in many cases they act together. The former refers to locally developed structures that create rules and regulations that govern ownership and access to resources. These traditional management systems are firmly steeped in webs of ownership rights and rights of access. The use of taboos in the management of natural resources is a very good example of this. On the other hand, modern institutions refer to systems of governance initiated from outside the communities. This will include the village government whose members are elected and including the village environmental management committee.

The post-colonial era in many African countries resulted in parallel or dual local authority systems consisting of the traditional authorities on one hand, and the government established structures on the other. In general, the colonial and post independent political processes have eroded the powers of traditional leaders (Shackleton and Campbell, 2001). For some authors, traditional institutions are losing their viability in face of pressures from both within and outside their own society, and some questioned whether traditional institutions can prevail in contemporary contexts (Brandon and Wells, 1992)

2.4.2.1 Traditional institutions in Enduimet WMA

2.4.6.1.1 Ritual sites

In order to gauge whether traditional institutions still play a vital role in natural resource management, a question on whether some of the natural resources are used for rituals was asked. Several categories of natural resources were mentioned as playing a key role in rituals. This in turn is very instrumental in the conservation of that particular resource. Natural resources that are used for ritual purposes include forests and singletree species such as *Ficus* spp, mountain/hill tops particularly those, which have a forest cover, rivers, elephant tasks, inter alia.

Within the Enduimet WMA, mountains or hilltops are very much in use as ritual sites. In fact, even the name Enduimet refers to a hilltop on the eastern side of the division, which has been used as a ritual site for many years. Another hill, which is used for the same purpose, is Oldonyo Lengai, which is still an active volcano. Such areas are used for initiation rites or “jando” and “praying” for rain. In conservation terms, these areas are characterized by minimal human activity in terms of exploiting natural resources from

these sites. Enduimet hill that is reported to have a small crater at the top with water all year round is used for ritual purposes for all villages along the Elerai to Kitenden road. These villages include Elerai, Olmolog, Lerangwa, and Kitenden. It is reported that trees are to be used for ritual purpose, as would be case in other WMAs.

2.4.6.1.2 *Taboos*

Taboos are reported to exist in Enduimet WMA. There is more congruence of taboos than it is the case with ritual sites in the six villages so visited. For this reason, it may not be necessary to disaggregate them into constituent villages. In general many of these taboos relate to animals and, in a few cases, plants. Animals or plants that are used for ritual purposes are necessarily declared taboo in the respective communities. In the context of conservation, animals or plants falling under taboos are not utilized in any way, in which case they become conserved in the process. This strategy appears to be more effective in protecting natural resources than the institution of secular by-laws handed down from the village or government authorities. One of the reasons why Wamaasai have been able to co-exist with wildlife is precisely because it is a taboo for a Maasai to eat game meat.

There are prohibitions against women and/or children eating certain parts of an animal or bird such as the tongue, gizzards, or for pregnant women eating meat from an animal that has died due to pregnancy complications. For the Maasai, it is also a taboo for them to eat fish, birds, and vegetables.

2.4.6.2 *Modern institutions*

Modern institutions in the context of this report include the political institutions currently in force and represent the existing government structure. These institutions include village governments, community based organizations, Authorized Associations, courts, police, among others. All these are in one way or another involved in natural resource use and conservation.

2.4.3 *Village governments*

A legally recognized village government that is constituted of twenty-five members administers all villages in Tanzania. The village government has several committees including one responsible for the conservation of natural resources or, “Kamati ya Hifadhi ya Mazingira”. Other committees are Finance and Planning, and Social Services Committee. All villages have village government offices of varying sizes and quality. Generally speaking, Sinya has better office facilities than any of the other villages, followed by Olmolog. The other villages have only wooden shacks and were too small even to hold meetings. As to whether the respondents are satisfied with their respective village governments 76.8% said yes. One explanation for this response is probably due to the transparency in village government funds since 63% report that the village leadership does present the annual income and expenditure report to the village assembly. The gender balance in all villages was very much in favor of men. Table 5 shows the composition of the village governments by gender in Enduimet WMA.

Table 5: Composition of the village government in Enduimet WMA

Name of village	Male members	Female members	Total
Sinya	21	4	25
Elerai	20	5	25
Olmolog	19	6	25
Lerangwa	19	6	25
Kitenden	19	6	25
Total	98	27	125

In terms of institutional development towards meeting the requirements for forming a Wildlife Management Area, village governments have formulated their own by-laws and carried out land use planning. All villages in the Enduimet WMA had already produced their own by-laws, which were forwarded to the district authorities for expert advice and approval. To date, these by-laws have not been returned to the respective village governments. With the exception of Olmolog that has a women's Community Based Organization that was to be assisted by the District Council in getting dairy cows and goats through the loan scheme. Enduimet WMA is yet to form the Authorized Association.

2.4.4 Capacity building

In order to take up the new challenges the village governments must undergo the necessary training. To this effect therefore different members (and even non-members) of the village government have received training in various areas. Areas include conservation, land use planning undertaken by CORDS and Monduli District staff, land policy by African Wildlife Foundation, which also facilitated the training of game scouts, tour guides, and even areas of record keeping. As for the game scouts they have undergone three month training in Songea.

As a reflection of efforts of different government and non-governmental organizations towards capacity building, the idea of WMA is not new to them. Table 6 shows the response categories of what the residents understand by WMA.

Table 6: What residents understand by WMA

What WMA is about	Frequency	Percent
Participation	56	45.9
Benefit sharing	31	25.5
Resource conservation	28	23.0
Others	7	5.6

From the data, it appears that over 94% of the respondents feel that WMA is about participation, benefit sharing, and resource conservation, while the remaining 5.6 percent feel it is a combination of the above three. This shows that the residents have been exposed to the idea mainly through the training they have received from government and

non-governmental organizations. Over ninety-six percent of the respondents say that they like the idea of WMA even though still 27.4% suggest that more education is needed.

2.4.5 Conflict and conflict management

2.4.5.1 Nature of conflicts in Enduimet Wildlife Management Area

2.4.5.1.1 Drivers of conflicts

Conflict in the sociological sense is defined as the social interaction process wherein two or more individuals or groups seek consciously either to block one another in reaching a goal or to injure, defeat, or even annihilate one another; often viewed as a particularly severe form of competition, although the latter is more normatively regulated and, by definition, cannot involve the use of force or violence (Hoult, 1977). Conflict in this sense does not necessarily imply outright violence; it includes tension, hostility, competition, and disagreement over goals and values. With respect to natural resource use, there are two interrelated drivers of conflicts, namely, population growth and economic activities.

(a) Population pressure

As more people require space and resources on this planet, more rules and regulations are required to supervise individual use of the earth's scarce resources (Weeks, 1978). Individuals thus lose freedom in the process. Conflicts ensue when resources become scarce. Resources, in the broad sense are things or services used to produce goods, which include land, labour, capital, and is expanded to things that people desire such as wealth, power, and prestige which are always considered scarce, that is, the demand for them exceeds the supply. The more unequal the distribution of scarce resources in a system, the greater will be the conflict of interest between dominant and subordinate segments in a system (Turner, 1978).

(b) Economic activities

Economic activities constitute the second major type of drivers of conflicts in relation to the use of natural resources. In all WMAs there are significant economic activities that have a bearing on conflicts. The only difference is the level and intensity of conflicts within these areas that are directly related to the nature of economic activities undertaken by the residents and those from outside.

(c) Legal provisions

Legal provisions within a particular resource base define the rights, responsibilities, and limits to a certain resource. The legal provisions also include a definition of boundaries that may fall into three types, namely, geographical, socio-cultural, and biological. Geographical boundaries here include village boundaries that define the sovereignty of each village or boundaries of a particular resource within a village such as farms, woodlots, etc.

Socio-cultural boundaries here define social groupings without reference to geographical location. This may include clan-based resources which may even transcend village boundaries due to intermarriages. Socio-cultural boundaries may also define who can access

to a certain resource, for instance, access to ritual areas may be off limit to male members of the community or only to elders with specific qualifications.

Biological boundaries, on the other hand, define what biological resources can be exploited and what cannot. Certain tree species such as *Ficus* spp. are designated for certain ritual purposes whereas others may be designated for other uses. All these three types of boundaries are often well defined, with full legitimacy though not necessarily in writing. Fluid boundaries are potentially a source of conflict.

Legal provisions also spell out the rights of different members of the society to different kinds of resources as well the responsibilities to such resources within the stipulated boundaries. The latter includes management issues as for example in case of fires. To enable communities address these management issues, it is necessary to develop by-laws and have appropriate institutions to manage these resources. Such legal provisions must be well understood by all members of the community if conflicts are to be avoided.

(d) Shift in the value system

Conflicts in natural resource use management depict, inter alia, an intergenerational dimension. There has been a shift in the value system based on age difference. The young generation view natural resources differently from the older generation. Evidence from the three sites showed clearly this shift. The younger generation may not respect the ritual forests for a number of reasons. First, youths have simply lost their roots together with the traditions. Rituals done in the forests are seen by some as a thing of the past or simply “mila zimepitwa na wakati” meaning, traditions that are outdated. Second, the youth may just cut trees from sacred forests as an act of open rebellion to the elders who are seen as unjustifiably controlling resources that the younger members of the society may not have. Thirdly, The younger generation is more likely to be committed Christians or Muslims and therefore, to them, sacred forests are just like any other forest where one can freely cut poles for construction purposes among other uses. This is bringing in tense moments between the elders and the youths as the latter is seen to be disrespectful of the cherished traditions. Finally, the temptation to make that extra shilling drives many youths to areas that may be traditionally out of bounds. This temptation is often the result of the scarcity of tree products for example, which can only be obtained from sacred forests.

(e) Changes in government policy

Policy changes that are often pronounced and implemented without the consultation and due regard to the stakeholders such as local communities can easily foment conflict. A common-pool forest can be changed into a National Park to preserve certain rare plants or animals or village land can be alienated for national interests without comprehensive consultations with the local users of the resource

(f) Poverty

Poverty is one of the most important drivers of conflict in the natural resource use sector. Communities living in proximity to natural resources (forests and wildlife) will continue to rely (legally or illegally) on them for their livelihood and for economic survival (Kaboggoza, 2000). Thus efforts by the forestry staff to prevent local residents from charcoal making or harvesting other forest products is seen as a threat to their social and economic well-being.

(g) Ignorance

Ignorance here refers both to the local community or government officials. The local communities may not understand the concept of natural resource use within the context of national interests/programmes/agendas. In fact many farmers may consider all forests near them as open access. The government officials on the other hand may also be ignorant of the realities at the local level. The officials need to understand the community perspective if they are to work together with communities.

Against this background many of the conflicts in Enduimet WMA are rooted in land. Sinya has disputes with their main investor; Kibo Safaris over the definition of the license permit that they claim allows only photography but the investor has been hunting as well. Since hunting entails getting permits from the Wildlife Division, the disputes also spill over to the Division and villagers have a sense of powerlessness over the wildlife issue. This is particularly the case when those with permits arrogantly ignores the village government saying that he has the permit from Dar es Salaam and that the village has no say over it.

Villages that appear to have significant conflicts over land are Kitenden and the neighboring Irkaswa, and Lerangwa. While Kitenden have conflicts over the wildlife corridor with Irkaswa, the latter is also deeply divided over the land that is in the corridor. According to respondents in Irkaswa, one camp which constitutes the “indigenous” fully support the idea of retaining the corridor. The other camp consists of Waarusha who are reported to be recent immigrants and therefore have no land. Faced with the problem land, the latter camp decided to invade the corridor without the permission of the village government. The conflict has led some invaders being jailed and hence fomenting hostility between the two camps.

Conflicts over land again involve Kitenden and Lerangwa but this time both villages are in conflict with one of the neighbouring settlers who claims that the two villages have encroached into his 5,500-acre farm. The villagers on the other hand claim that the Late Julius Nyerere gave the piece of land to them during the era of anti capitalism sentiments in the seventies. The remaining two villages do not have significant conflicts; those that exist relate to farm boundaries. Table 7 gives a summary of the main types of conflicts in the Enduimet WMA.

Table 7: A summary of major types of conflicts in Enduimet WMA

Village	Type of conflict
Sinya	Village versus investor who was given permit for photo-tourism but has been found to hunt too
Elerai	-
Olmolog	Conflicts between residents on farm boundaries
Lerangwa	Conflict between retired village officials who were taken to court as individuals over land which the settler claims to be his
Kitenden	Conflict with Irkaswa over land in the wildlife corridor

2.4.6 Conflict resolution mechanisms

There are four different ways these conflicts can be resolved, namely, using traditional institutions such as the use of traditional leaders or elders, the village government, the use the

ward based conflict reconciliation councils (Mabaraza ya Usuluhishi ya Kata), finally, the court system. The respective village governments resolve many of the minor land disputes such as those at Olmolog. More difficult cases are handled by the courts. The major disadvantage with the courts is that they are only found at the district headquarters. Traditional institutions and councils are not as active as the courts and village governments. In all villages, councils have been dissolved and were to be reconstituted later.

2.4.7 Social Facilities

For purposes of gauging the level of development of each village, efforts were made to establish the level of infrastructure development. This involved obtaining data on educational and medical facilities, water supply, and any other facilities such as village government offices, police post, etc. None of the villages in the Enduimet WMA has a police post no court building.

3.4.7.1 Educational facilities

For educational facilities, information was obtained on the number primary and secondary schools, the student enrollment, number of teachers, desks, classrooms, and an indication of pass rates as an indicator of the quality of the school. However, for villages in Enduimet WMA, only primary schools are available. For this reason, data was collected from either the village officials or the head teacher of the respective primary school. Table 8 gives a summary of the number of pupils and teachers by gender from each school in Enduimet WMA

Table 8: A summary of the number of pupils and teachers in Enduimet WMA

Name of School	Number of Pupils			Number of Teachers		
	<i>Boys</i>	<i>Girls</i>	<i>Total</i>	<i>Men</i>	<i>Women</i>	<i>Total</i>
Sinya	211	101	312	5	-	5
Elerai	102	96	198	5	1	6
Olmolog	204	169	373	2	3	5
Lerangwa	190	159	349	2	5	7
Kitenden	136	81	217	4	2	6

From the table it is important to note that the total number of pupils is much lower than expected. Reasons for this are several; first, there are many school age children who are enrolled. Parents would rather not register children preferring to let them look after their livestock. Second, there is a remarkably high rate of truancy among the Maasai children. Again, reasons for the high truancy include taking care of livestock, or migrating to other areas with their parents in search of pasture or water. Third female pupils sometimes get married at fairly early age. In some villages such as Lerangwa, drop out rates are reported to be 50%. Due to these reasons, absenteeism in some schools is very high and the school authorities may not even have accurate data on enrollment.

There are other problems facing the educational sector in these villages. Schools have inadequate classrooms for example Lerangwa registered only 54 instead of 90 for lack of

classroom space. Inadequate staff houses for teachers means some teachers have to live in very poor living conditions. Even those that are present are of poor quality. In addition some schools have inadequate desks. The number of teachers in each school is equally lower than expected. Due to the difficult living conditions in some of these villages, teachers are reluctant to work in these areas. This situation is also reflected in the dismal pass rates for many of these schools.

3.4.7.2 Medical facilities

Medical facilities in the five villages are also largely inadequate. In terms of buildings, each dispensary normally has several rooms serving different purposes such as examination room, injection room, drug dispensing room, and clinic. For Sinya, the dispensary building has only two rooms. Due to inadequate space, these dispensaries do not admit patients even though sometimes it may become necessary to let the patient rest for a while.

All dispensaries were furnished with at least three medical staff headed by a Clinical Officer or assistant clinical officer, as is the case with Sinya. These dispensaries have a monthly allocation of one yellow kit under the essential drugs program that is largely inadequate. The kit contains only the essential drugs and these can only last half a month.

As can be seen from the following table, many of the diseases afflicting the village residents have a direct bearing on poor sanitation. Water appears to be the major factor in poor sanitation as water supply is a major problem in many villages. Table 9 shows the top five diseases for those below and above five years of age.

Table 9: The top five diseases for the below and above five years of age in Enduimet WMA

Village Name	Patients under five years	Patients above five years
Sinya	<ol style="list-style-type: none"> 1. Malaria 2. Pneumonia 3. Eye infections 4. Diarrhea 5. Ear infection 	<ol style="list-style-type: none"> 1. Malaria 2. Pneumonia 3. P.I.D. 4. STDs 5. Minor surgical
Elerai	-	-
Olmolog	<ol style="list-style-type: none"> 1. Diarrhea 2. Pneumonia 3. Worms 4. Dysentery 5. Skin diseases 	<ol style="list-style-type: none"> 1. Pneumonia 2. Eye infection 3. Diarrhea 4. Minor surgical 5. Skin diseases
Lerangwa	<ol style="list-style-type: none"> 1. ARI 2. Pneumonia 3. Malaria 4. Diarrhea 5. Skin diseases 	<ol style="list-style-type: none"> 1. ARI 2. Malaria 3. Minor surgical 4. PID 5. Worms
Kitenden	<ol style="list-style-type: none"> 1. ARI 2. Pneumonia 3. Diarrhea 4. Eye infection 5. Malaria 	<ol style="list-style-type: none"> 1. ARI 2. Pneumonia 3. Eye infection 4. Worms 5. Diarrhea

In general there are two categories of health problems, those arising due to poor sanitation that includes diseases such as diarrhea, dysentery, ear and eye infections, and worms. There are those that are due to poverty leading to being scantily dressed during cold weather; these include Acute Respiratory Infections and pneumonia. Problems such as worms could be the result of poor hygiene or due to drinking milk that is not boiled and partially cooked meat. Minor surgical is due to cuts or wounds the majority of which being the consequence of frequent fights. Elerai village has no dispensary of its own. They have to get medical attention from Olmolog.

3.4.7.3 Water supply

Water appears to be a major problem in Enduimet WMA both in terms of quantity and quality. The health problems discussed above are testimony to this observation. The intensity of the problem varies according to seasons. Generally it is severe during the dry season. The worst hit is Elerai which, during the dry season, they must fetch water from Olmolog which is 8km away or Simba river some 12km away. For the latter source, they are often forced to wait for lifts on the main road to Sanya Juu. Occasionally, the settler nearest to them does sometimes fetch water for them using a water browser. According to residents of Elerai, the cause for the water problems is said to be agricultural encroachment by the former settler workers who have now increased in number to the detriment of the catchment areas. If the problem persists, the residents report, they may have to abandon the village and move elsewhere.

Other villages have problems of their own too. For villages such as Olmolog, Lerangwa, and Kitenden, the biggest complaint is that elephants often destroy the water pipes at water intakes of these respective villages. It is claimed, for example, that when elephants see water from a leaking water pipe they usually uproot the pipe to get water and thus stopping the water flow to the village in the process. Villages in the lowlands such as Sinya face more acute water problems since water from the mountains does not reach them. They are forced to rely on ponds and shallow wells. Due to the contractual agreement with Kibo Safaris, Sinya has been able to establish more reliable water even though it is saline.

3. BASELINE DATA FOR ENDUIMET PILOT WMA

3.1 Economic Baseline Data

S e c t i o n B

**Table B1: ENDUIMET WMA: Village Level Population Main Occupations and Other Economic Activities:
February 2003**

VILLAGE	Population Size			Main Occupations				Existing Type of Businesses							
	<i>No. of House-holds</i>	<i>Total Popul.</i>	<i>Able bodied persons (labour supply)</i>	<i>Agric.</i>	<i>Lives-tock</i>	<i>Busi-ness</i>	<i>Civil Serva-nts</i>	<i>Shops</i>	<i>Kiosks</i>	<i>Butchers</i>	<i>Tailors</i>	<i>Black-Smith</i>	<i>Photo</i>	<i>Hunt-ing</i>	<i>Beer Shops (Bars)</i>
1. ELERAI	40	2,300	1,840	✓	✓	-	-	-	✓	-	-	-	✓	NA	✓
2. KITENDEN	676	3,380	2,704	✓	✓	-	-	-	✓	-	-	-	✓	NA	✓
3. LERANGWA	477	2299	1153	✓	✓	✓	-	✓	✓	✓	-	-	✓	NA	✓
4. OLMOLOG	786	3928	2357	✓	✓	-	-	✓	✓	✓	✓	✓	✓	NA	✓
5. SINYA	355	2144	1286	-	✓	-	-	✓	✓	-	-	-	✓	NA	✓

NA = Not applicable.

Table B2: ENDUIMET WMA: Sources of Income and their Expenditure as of December 2002, February 2003

VILLAGE	Major Sources of Income % age							Annual Village Expenditures Activities					Number of Tax Payers
	Tax Retention	Agriculture	Tourism		Villagers Contribution	Others	Total (Mill Tshs)	Construction			School Fees	Other	
			Hunting	Photo				Schools	Water	Road			
1. ELERAI													158
2. KITENDEN													100
3. LERANGWA	140,000/=	-	-	830,000	822,000	78,000	1.870	✓	✓	-	-	✓ ¹	233
4. OLMOLOG	89,000	-	-	2,530,000	1,000,000	100,000	3.719	✓	✓	-	-	✓ ²	238
5. SINYA	⁴	-	-	30 mill.	-	-	30.0	✓	✓	-	-	✓ ³	-

¹ tax retention, each taxpayer contributes 4,000/= per annum (in this case only 140 tax payers contributed i.e. 65%)

² Latrine construction & desk repairs

³ Maintenance of milling machine

⁴ tax retention not given yet!

**Table B3: ENDUIMET WMA: Productivity of Economic Activities
February 2003**

		MAIZE (Bags/acre)	BEANS (Bags/acre)	WHEAT (Bags/acre)
1.	ELERAI	7	4	20
2.	KITENDEN	8	5	15
3.	LERANGWA	10	7	10
4.	OLMOLOG	10	4	10
5.	SINYA	-	-	-

**Table B4: ENDUIMET WMA: Costs Associated with Accessing Basic Services
February 2003**

		HEALTH	WATER	ENERGY	PRIMARY SCHOOL
1.	ELERAI	FREE ¹	FREE	FREE	FREE
2.	KITENDEN	10,000/= ² yr	FREE	FREE ³	FREE
3.	LERANGWA	10,000/= ² yr	1,000/= /yr	FREE	FREE
4.	OLMOLOG	10,000/= ² yr	10,000/= ⁴ yr	FREE	FREE
5.	SINYA	FREE	FREE	FREE	FREE

¹ Dispensary 8 kilometres away.

² Starting July 2003. Presently 'free' in public/government dispensaries.

³ Woodlots established by individuals, groups and village.

⁴ To be instituted later in 2003

⁵ villagers contribute to building classrooms & teachers living quarters.

**Table B5(a): ENDUIMET WMA: Village Perceptions on Wealth Status
February 2003**

VILLAGE	COMPOSITION BETWEEN FARMERS & LIVESTOCK KEEPERS		PROPORTION OF PEOPLE IN WEALTH CATEGORIES					
			Farmers			Livestock Keepers		
	Farmers	Livestock Keepers (%)	Rich (%)	Middle Income (%)	Poor (%)	Rich (%)	Middle Income (%)	Poor (%)
1. ELERAI	-	100	-	-	-	5	75	20
2. KITENDEN ¹	-	100	-	-	-	3	15	82
3. LERANGWA	95	5	15	50	35	10	40	50
4. OLMOLOG	70	30	10	40	50	10%	30	60
5. SINYA	-	100	-	-	-	10	20	70

¹ These are Agro-pastoralists.

Table B5(b): ENDUIMET WMA: Criteria for Wealth Categorisation¹

S/N	Village	Farming			Livestock ³		
		<i>Rich</i>	<i>Middle</i>	<i>Poor</i>	<i>Rich</i>	<i>Middle</i>	<i>Poor</i>
1.	Elerai ²	-	-	-	>100	30-100	<30
2.	Kitenden ²	-	-	-	>100	30-100	<30
3.	Lerangwa	>20 acres	5-20 acrs	<5 acres	>100	30-100	<30
4.	Olmolog	>20 acres	5-20 acres	<5 acres	>100	40-100	<40
5.	Sinya	> -	-	-	>1000	100-1000	<100

¹ Derived at the PRA meetings

² Wealth ranking done according to livestock holdings, though these are agro-pastoralists.

³ measured in cattle.

Table B6: ENDUIMET WMA: Land Tenure Regimes, February 2003

VILLAGE	TENURE REGIME & COST							
	Customary (Inheritance)	Village Govt Allocation	Cost/Acre	Private Property Mkt transaction	Cost/Acre	Rent	Cost/Acre	Borrow
1. ELERAI	✓	✓	✓	NA	NA	NA	NA	NA
2. KITENDEN	✓	✓	-	✓	✓	✓	✓	✓
3. LERANGWA	✓	✓	2,000/=	NA	-	✓	✓	NA
4. OLMOLOG	✓	✓	-	NA	-		200,00/=	NA
5. SINYA	✓	✓	-	NA	-	NA	-	NA

Note: NA = Not applicable.

¹ Illegally done between locals and newcomers private arrangement.

Table B7: ENDUIMET WMA: Progress in Preparation for WMA, February 2003

VILLAGE	Land Use Plans	By-law enactment	Training of Village Game Scouts (number)	Establishment of AA
1. ELERAI	✓	✓	✓	X
2. KITENDEN	✓	✓	✓	X
3. LERANGWA	✓	✓	✓	X
4. OLMOLOG	✓	✓	✓	X
5. SINYA	✓	✓	✓	X

Note:

✓ = done

x = not yet

Table B8: ENDUIMET WMA: Existing land Use, February 2003

VILLAGE	AGRIC.	LIVESTOCK	SETTLEMENT	WILDLIFE	FISHING
1.ELERAI	✓	✓	✓	✓	X
2.KITENDEN	✓	✓	✓	✓	X
3.LERANGWA	✓	✓	✓	✓	X
4.OLMOLOG	✓	✓ 70/2% ¹	✓ (10%)	✓ 70/2%	X
5.SINYA	✓	✓ 40%	✓ (10%)	✓ 50%	✓

Note: determination of proportions allocated for each use was not possible by villagers, this data was not available.

¹Livestock and wildlife share the same allocation of 70%.

Table B9: ENDUIMET WMA: Indicative Potential Economic Opportunities, February 2003

VILLAGE	FARMING		TOURISM				
	Food Crops	Cash Crops	Photography	Hunting	Cultural Bomas	Handcrafts	Camp Sites
1. ELERAI	*	*	***	***	**	**	*
2. KITENDEN	*	*	***	**	**	**	**
3. LERANGWA	*	*	***	*	**	**	***
4. OLMOLOG	*	*	***	*	**	**	***
5. SINYA	NA	NA	***	**	**	**	***

NA = Data not collected (not in sample)
 Note: *** High potential
 ** Medium potential
 * Low potential.

Table B10: ENDUIMET WMA: Livestock Size, February 2003

VILLAGE	CATTLE	GOATS	SHEEP	DONKEYS	CHICKEN	PIGS
1. ELERAI	NA	NA	NA	NA	NA	NA
2. KITENDEN	NA	NA	NA	NA	NA	NA
3. LERANGWA	NA	NA	NA	NA	NA	NA
4. OLMOLOG	9,834	7,825	3,250	90	NA	8
5. SINYA						

NA = Data not available.

S e c t i o n C

Table C1: Survey Sample Villages

S/N	Village	Number of Respondents	Proportion to Total (%)	Remarks
1.	Sinya	21	15.2	Irkaswa and Tingatinga were not visited. Elerai did not have good Response
2.	Kitendeni	30	21.7	
3.	Lerangw'a	27	19.6	
4.	Olmolog	57	41.3	
5.	Elerai	3	2.2	
	TOTAL	138	100.00	

Table C2: Sample Profile and Characteristics

S/N		Mode	Mean	Minimum	Maximum	Std Deviation	Remarks
1.	Age (years)	50	42.5	22	81	12.38	The big Variations between Mean and Mode exhibit the existence of extreme values. In this case the Mode is preferred.
2.	House hold size	6	9.9	1	37	6.6	
3.	Value of house	30,000	133,356.0	10,000	2,000,000	25,981.0	
4.	Value of land (Tshs.)	300,000	391,526	25,000	6,300,000	709,233.0	
5.	Value of cattle	120,000	128,126.0	12,000.00	1,200,000.	113,615.00	
6.	Value of Goat	20,000	21,420.00	15,000.00	20,000.0	31,503.00	
7.	Maize acreage	1	1.6	0.5	10	1.64	
8.	Involvement in village collective activities (times last year)	2	40.0	0.0	360	66.3	
9.	Number of village meetings called (last year)	4	9.0	0.0	156	17.0	

Table C3: Level of Education of Household Head

S/N	Level	% Age of Respondents	Remarks
1.	None	54.3	The proportion of people without formal education is staggeringly high at 54%. This has implications on the ability and readiness of these people to grasp developments in the wider society.
2.	Primary incomplete	9.4	
3.	Primary complete	29.0	
4.	Secondary incomplete	4.3	
5.	Secondary complete	2.2	
6.	Diploma		
	n = 138	100	

Table C4: Occupation of head of Household

S/N	Occupation	% age of Respondents	Remarks
1.	Farmer	81.2	The high proportion of farmers in these communities is a major transformation from being only pastoralists. They are now more seentary as before and they do diversity their economics and social risk now.
2.	Permanent employment	0.7	
3.	Livestock keeper	18.1	
	n = 138	100	

Table C5: Place of Birth of head of Household

S/N	Place	%age of Respondents	Remarks
1.	Within village	75.43	Most of the respondents were born within their localities i.e. 75.4% while most of others moved from other villages within same region.
2.	Same ward different village	7.2	
3.	Same district different ward	4.3	
4.	Same region different district	5.1	
5.	Different region	8.1	
	N = 138	100	

Table C6: Period of Immigration

S/N	Period	%age of Immigrants	Remarks
1.	1949-1961	15.2	Pre-independence
2.	1962-1973	21.2	Pre-villagisation
3.	1973-1983	24.2	Post-villagisation
4.	1984-1994	30.3	Structural Adjustment Period
5.	1995-2000	9.0	Wildlife Policy Formulation Period (Pre-WMA)
	n = 33	100	

Table C7: Reasons for Immigration

S/N	Reason	%age of Immigrants	Remarks
1.	Villagization	9.09	The search for farm land and pastores seem to lead the pack of reasons for moving. Marriage also is found to be an important reason for the movement of women in to these localities.
2.	Farming land	33.30	
3.	Grazing land	21.21	
4.	Employment	12.12	
5.	Peace and harmony	6.06	
6.	Business	3.03	
7.	Marriage	12.12	
8.	Water availability	3.03	
9.	Education	3.03	
	n = 33	100	

Table C8: Reason for Out-migration

S/N	Reason	% of Outmigrants	Remarks
1.	Land scarcity	47.4	While there are people who in-migrate into these localities, there are those who out-migrate also. The main reasons for doing so are mainly in search for land for farming and grazing and also marriage and running away from drought conditions.
2.	Grazing land scarcity	7.9	
3.	Drought	13.2	
4.	Marriage	21.1	
5.	No peace	5.2	
6.	Transferred	5.2	
	n = 38	100	

Table C9: Sources of Water

S/N	Source	Wet season (%age of Respondents)	Dry Season (%age of Respondents)	Remarks
1.	Village Kiosk	15.5	16.9	Periods and spring do dry up during the dry season hence forcing people to rely more on rivers and streams
2.	Own source	0.5	0.6	
3.	Village well	50.8	55.0	
4.	Rivers and streams	16.0	21.3	
5.	Ponds and dams	12.3	6.3	
6.	Spring	4.8	-	
		100 n = 138	100 n = 110	

Table C10: Amount paid for Water

S/N	Amount paid	Village Kiosk n = 11 (%age)	Village Well N = 44 (%age)	Remarks
1.	No payment	18.2	38.6	In Sinya livestock keepers buy diesel for pumping water for their cattle hence the hefty cost of up to Tshs 100,000
2.	Between Tshs 5 – 500 per bucket	36.4	61.4	
3.	Between Tshs 100,000 per year	45.5	-	
		100	100	

Table C11: Time Spent Collecting Water¹

S/N	Amount of Time Use	Village Kiosk n = 29 (%)	Village Well n = 96 (%)	Remarks
1.	0-15 minutes	37.9	12.5	Time spend collecting water from rivers and streams takes more than 1 hour. This is expected not to change due to distance being the major contributing factor.
2.	30 minutes	34.5	34.4	
3.	60 minutes	13.8	25.0	
4.	More than 60 minutes	13.8	28.1	
		100	100	

¹ Note that this includes walking, queuing time.

Table C12: Time Spent Queuing for Water

S/N	Amount of Time Use	Village Kiosk		Village Well		Remarks
		<i>Wet season</i>	<i>Dry season</i>	<i>Wet Season</i>	<i>Dry Season</i>	
1.	0-15 minutes	75.0	40.0	49.4	26.6	Waiting time increase in dry season especially for village well compared to village kiosk
2.	16-30 minutes	10.7	36.0	31.5	25.3	
3.	31-60 minutes	10.7	12.0	11.2	24.1	
4.	More than 60 minutes	3.6	12.0	7.9	24.1	
		100	100	100	100	

Table C13: Sanitation Situation: Toilet Use

S/N	Type of Facility	Proportion of Respondents (%)	Remarks
1.	No facility	29.7	Although about 70% of the respondents do have a pit latrine and use it, about 30% do not have any sort of latrine and do not use one!
2.	Pit latrine	69.6	
3.	VIP latrine	0.7	
		100	n = 138

Table C14: Domestic Waste Disposal

S/N	Method	Proportion of Respondents (%)	Remarks
1.	Dumping in neighbourhood	13.8	Waste disposal method mostly practiced is burning and burying within compound. Empirical observation revealed the situation to reflect the responses.
2.	Burning in compound	69.6	
3.	Burying with compound	8.7	
4.	Indiscriminate disposal	8.0	
	n = 138	100	

Table C15: Source of Energy for Cooking

S/N	Source Type	Proportion of Respondents (%)	Remarks
1.	Firewood	90.1	Firewood is the most important source of energy for cooking in villages making up the Enduimet Pilot WMA
2.	Charcoal	6.6	
3.	Kerosene	3.3	
	n = 138	100	

Table C16: Natural Resources Used

S/N	Type of Natural Resource	Proportion of Respondents (%)	Remarks
1.	Building poles	91	Almost all the respondents use building poles, medicinal plants, grazing grass and firewood. Pottery soil is used by few 6%) as well as game meat.
2.	Thatching grass	86	
3.	Game meat	15	
4.	Medicinal Plants	86	
5.	Pottery soil	6	
6.	Grazing Grass	89	
7.	Firewood	80	
	n = 138	100	

Table C17: Frequency of Use of Natural Resources Used

S/N	Frequency	Building Poles n=109(%)	Thatching Grass n=112(%)	Game Meat n=22(%)	Medicinal Plants n=94 (%)	Pottery soil n=6%	Grazing grass n=126(%)	Firewood n=126(%)	Remarks
1.	Daily	-	1.8	4.5	16.0	-	98.4	93.9	Frequency of use varies with nature of resource , technology progress and need.
2.	Weekly	0.9	0.9	4.5	31.9	16.7	1.6	4.3	
3.	Monthly	0.9	1.8	45.5	35.1	16.7	-	1.7	
4.	Annually	98.2	95.5	45.5	17.0	66.7	-	-	
		100	100	100	100	100	100	100	

Table C18: Current Availability of the Natural Resources Used

S/N	Availability status	Building Poles n=126 (%)	Thatching Grass n=117 (%)	Game meat n=120 (%)	Medicinal Plants n=114 (%)	Pottery Soil n=8 (%)	Grazing Grass n=125 (%)	Firewood n=118 (%)	Remarks
1.	Low	22.2	11.1	70.0	3.5	12.5	8.8	12.7	Most of the resources are still available at a considerable level except game meat!
2.	Medium	23.8	23.9	20.0	23.7	25.0	23.2	16.1	
3.	Plenty	54.0	65.0	10.0	72.8	62.5	68.0	71.2	
		100	100	100	100	100	100	100	

Table C19: Earnings Last Season from Economic Activities (Main Occupations)

S/N		Proportion of Respondents(%)	Remarks
1.	Less than Tshs 30,000/month	80	80% of respondents earn an average of less than a dollar a day from their main economic activities (i.e. not including other income generating activities (IGAs))
2.	More than Tshs 30,000/month	20	
	n = 110	100	

Table C20: Engagement in Productive Activities

S/N	Activity	Wet/Rainy Season n=307 (%)	Dry Season n=242 (%)	Remarks
1.	Cash crop farming	17.6	7.4	Food crop farming and livestock keeping are the main productive activities in both seasons
2.	Food crop production	35.5	26.9	
3.	Small business	4.9	10.3	
4.	Wage employment	0.3	1.2	
5.	VegeTable Cfarming	0.3	0.8	
6.	Livestock keeping	40.4	52.9	
7.	Handcraft business	0.7	-	
8.	Dairy business	0.3	-	
9.	Driver	-	0.4	
		100	100	

Table C21: Potential Productive Activities Anticipated due to WMA Establishment

S/N	Activity	Proportion of Respondents (%)	Remarks
1.	Cash crop farming	1.8	Handcraft business leads the potential productive activities list followed by tourism business which included hunting, photographic tourism and ecotourism. Many people 18% have high expectation on availability of wage employment.
2.	Food crop production	8.1	
3.	Small business	9.9	
4.	Wage employment	18.0	
5.	VegeTable Cfarming	5.4	
6.	Handcrafts for sale	35.1	
7.	Game meat business	0.9	
8.	Tourist business	20.7	

Table C22(a): Transfers into the Households (Remittance)

S/N	Status	Proportion of Respondents %	Remarks
1.	Yes, do receive financial assistance from relatives and friends living out of the village	44.0	A significant number of households receive financial transfers at an average of Tshs 75,000/= per year or Tshs 20,000/= mode distribution a year.
2.	No, we do not	56.00	
	n = 84	100	

Table C22(b): Earnings from IGAs other than the Main Occupational Economic Activity

S/N	Status	Proportion of Respondents %	Remarks
1.	Earnings from IGAs such as small businesses, casual labour etc, per annum	60,000.00	About 16% of the respondents earned about US \$0.017 per day last season.
	n = 22	100	

Table C23: Wealth Status of Households (Mean, Mode)

S/N	Asset	n	Mean Value	Mode Value	Min	Max	Std Deviation	Remarks
1.	House (Tshs)	130	133,356.4	30,000	10,000	2,000,000	251,981.0	Mean wealth for the Enduiment WMA villages' households is approximated at Tshs 666,252.0 while Modal wealth is estimated at Tshs 470,875.0 for each household.
2.	Hoes (Ths)	118	4,595.5	2,000	2,000	10,000	1,139.02	
3.	Bicycle (Tshs)	28	56,375	60,000	35,000	70,000	8,880.0	
4.	Plough (Tshs)	56	54,708	70,000	2,000	170,000	26,010.9	
5.	Land (Tshs)	99	391,526	300,000	25,000	6,300,000	709,233.5	
6.	Radio	99	19,627.9	7,000	3,000	70,000	14,649.7	
7.	Furniture	37	6,063.5	1,875.0	800	41,666	74,67.9	
			666,252.3	470,875				

Table C24: Livestock Prices/Values (mean, Modes)

S/N	Type of Livestock	n	Mean value	Modal value	Remarks
1.	Cattle	109	128,126.0	120,000	No great variation in livestock prices in the general area
2.	Sheep	111	16,925.8	15,000	
3.	Goat	114	21,419.8	20,000	
4.	Donkey	40	41,125.0	40,000	

Table C25: Farm Sizes and Harvests amounts Mean (Productivity)

S/N	Crop	Short Rains			Long Rains			Remarks
		Acres Planted	Bags Harvested	Bags/ Acre	Acres Planted	Bags Harvested	Bags/ Acre	
1.	Maize	1.6	11.3	7	2	14.3	7.15	Productivity is higher for the long rains period
2.	Beans	2.0	6.2	3.1	2.2	10.2	4.6	

Table C26: Building Materials Used for Houses: Walls

S/N	Type of Material	Proportion of Respondents (%)	Remarks
1.	Cement Blocks	3.6	The majority of the walls are built using mud and poles which is the typical Masai kind of structure. These were found in all the visited areas. In Lerangwa, more wooden walls were found.
2.	Burnt Bricks	7	
3.	Mud and poles	70.8	
4.	Sheet metal	1.5	
5.	Wood	22.6	
6.	Lime and stone	0.7	
	n = 137	100	

Table C27: Building Materials Used for Flooring

S/N	Type of Material	Proportion of Respondents (%)	Remarks
1.	Cement and Sand	11.7	The majority use clay compacted for flooring
2.	Earth/Clay	88.3	
	n=137	100	

Table C28: Building Materials used for Roofing

S/N	Type of Material	Proportion of Respondents(%)	Remarks
1.	Thatching grass	39.0	Many more houses are being roofed using corrugated iron. These include houses built using cement blocks, burnt bricks and wooden walls.
2.	Mud, poles and grass	27.9	
3.	Mud and straw	0.7	
4.	Corrugated iron	32.4	

Table C29: Respondent Credit Use

S/N	Status	Proportion of Respondents (%)	Remarks
1.	Borrowed	38.0	Not many people borrowed money. For those who did, they did it in order to meet ordinary needs short falls and investment in productive activities at a lesser extent.
2.	Not borrowed	62.0	
	n = 97	100	

Table C30: Source of Credit

S/N	Source	Proportion of Respondents (%)	Remarks
1.	Family members	34.1	It should be noted here that there are no formal lending institutions involved. 83% of all borrowers got their money from family and friends. Most of this money was repaid within 6 months (79.5%) the rest was paid with one year.
2.	Friend	48.8	
3.	Money lender	4.9	
4.	Don't remember	12.2	
	n = 97	100	

Table C31: level of Understanding of WMA Concept

S/N	Meaning	Proportion of Respondents (%)	Remarks
1.	Community participation	46.0	The level of understanding of the WMA concept is still low. Most people seemed to be aware of community involvement but not clear in which way:
2.	Benefit sharing	27.4	
3.	Resource conservation	25.0	
4.	Follow WMA guidelines and regulations	1.6	
	n = 124	100	

Table C32: Opinions for Improvement of WMA Implementation Success

S/N	Opinion	Proportion of Respondents (%)	Remarks
1.	Villagers' involvement	11.6	Villagers' involvement in transparent manner was one of the major points discussed with respect to leadership. Full participation and control of the process in collective manner was deemed to be highly desirable for the success of WMA the capacity building plea.
2.	Educating villagers	28.5	
3.	Fence area with wild animals	5.3	
4.	Change leadership	3.2	
5.	Other	51.4	
	n=95	100	

3.2 Ecological Baseline Data

Table D1: Wildlife species and their status at ENDUIMET WMA

S/N	English Name	Scientific Name	Abundance				Habitat Type	Movement	
			VA	A	F	VF		M	N/M
1	Wildebeest	<i>Connochates taurinus</i>	X				Grassland	X	
2	Zebra	<i>Eguus burchelli</i>	X				Grassland/ woodland	X	
3	T. gazelle	<i>Gazella thomsoni</i>		X			Grassland	X	
4	G. gazelle	<i>Gazella grantii</i>		X			Grassland	X	
5	Eland	<i>Tragelaphus oryx</i>					Grassland/woodland	X	
6	Elephant	<i>Loxodonta africana</i>					Forest/woodland	X	
7	Oryx	<i>Oryx gazella callotis</i>				X	Grassland/woodland	X	
8	G. Kudu	<i>Tragelaphus strepsiceros</i>				X	Woodland	X	X
9	Cheetah	<i>Acinonyx jubatus</i>				X	Grassland	X	X
10	Impala	<i>Aepyceros melampus</i>	X				Woodland		X
11	Bushbuck	<i>Tragelaphus scriptus</i>				X	Forest/woodland		X
12	Hippopotamus	<i>Hippopotamus amphibius</i>				X	Riverine		X
13	Dikdik	<i>Madoqua kirkii</i>				X	Woodland		X
14	Lion	<i>Panthera leo</i>				X	Grassland/woodland		
15	Serval Cat	<i>Leptailurus serval</i>				X	Grassland/woodland		X
16	Pangolin	<i>Manis temminckii</i>				X	Woodland	??	??
17	Cape Hare	<i>Lepus capensis</i>				X	Grassland/woodland		X
18	Buffalo	<i>Syncerus caffer</i>		X			Grassland/woodland		X
19	Gerenuk	<i>Litocranius walleri</i>				X	Woodland		X
20	Wild dog	<i>Lycaon pictus</i>				X	Woodland	X	
21	Hyena	<i>Crocuta crocuta</i>		X			Grassland/woodland		X
22	S. Jackal					X	Grassland/woodland		X
23	Giraffe	<i>Giraffa camelopardalis</i>		X			Woodland	X	X
24	V. Monkey	<i>Cercopithecus aethiops</i>	X				Woodland/Forest		X
25	Y. Baboon	<i>Papio cynocephalus</i>		X			Grassland/woodland		X
26	Warthog	<i>Phacochoerus aethiopicus</i>				X	Grassland/woodland		X
27	Hartebeest	<i>Alcelaphus buselaphus cokii</i>				X	Grassland/woodland		X
28	Black and White Colobus	??				X	Forest		X
29	Porcupine	<i>Hystrix galeata</i>				X	Forest/woodland		X
30	Kilimanjaro blue Monkey	<i>Kibonotensis cornberg</i>				X			X
31	Leopard	<i>Panthera pardus</i>		X			Forest/woodland		X

Key: VA- Very abundant, A- Abundant, F-Few, VF-Very Few, M-Migrant, NM-Non-migrant.

Table D2: Bird species recorded at ENDUIMET WMA between 06/02/ and 10/02/2003

S/N	Common name	Scientific name	Movement		Habitat
			M	R	
1.	Ostrich	<i>Struthio camelus</i>		X	Grassland
2.	Scarlet-chested Sunbird	<i>Nectarinia senegalensis</i>		X	Woodland
3.	Red-billed Quelea	<i>Quelea quelea</i>		X	Grassland
4.	Kori Bustard	<i>Ardeotis denhami</i>		X	Grassland
5.	Crowned Plover	<i>Vanellus coronatus</i>		X	Grassland
6.	Secretary Bird	<i>Sagittarius serpentarius</i>		X	Grassland
7.	Lilac-breasted Roller	<i>Coracias caudata</i>		X	Woodland
8.	White Stork	<i>Ciconia ciconia</i>	X		Grassland
9.	Abdim's Stork	<i>Ciconia abdimii</i>	X		Grassland
10.	Ring-necked Dove	<i>Streptopelia capicola</i>		X	Forest/woodland
11.	Superb Starling	<i>Lamprotornis superbus</i>		X	Grassland/woodland
12.	Stonechat	<i>Saxicola torquata</i>		X	Grassland
13.	Tambourine Dove	<i>Turtur tympanistria</i>		X	Forest/woodland
14.	Augur Buzzard	<i>Buteo augur</i>		X	Open woodland
15.	Hildebrandt's Francolin	<i>Francolin hildebrandti</i>		X	Grassland/woodland
16.	Helmeted Guineafowl	<i>Numida meleagris</i>			Grassland/woodland
17.	Red-eyed Dove	<i>Streptopelia semitorquatus</i>		X	Grassland/woodland
18.	White-browed Coucal	<i>Centropus superciliosus</i>			Forest/woodland
19.	Speckled Mousebird	<i>Colius striatus</i>			Forest
20.	Yellow-vented Bulbul	<i>Pycnonotus barbatus</i>		X	Forest

APPENDICES

Appendix 1: Photographs Showing Monitoring Vegetation Plots and PRA Meetings



Photograph 1: Researchers enjoying the magnificent natural beauty with some leaders at Elerai village prior to PRA meeting.



Photograph 2: Vegetation monitoring plot at Elerai village in the proposed Enduimet pilot WMA (S 02^o 54.646' E 037^o 02.990')



Photograph 3: An intact riverine forest at Lerangwa forest in the proposed Enduimet pilot WMA



Photograph 4: Researcher awaiting villagers for the PRA meeting at Lerangwa.

Appendix 2: Itinerary and People Consulted

DATE	ACTIVITY	PLACE
24-31/01/2003	Literature search, preparation of data collection instruments	Arusha/Dar-es-Salaam/Morogoro
2/02/2003	Travelling	Dar to Arusha
3-4/02/2003	Consultations	Arusha
5/02/2003	Travelling and District Consultations <ul style="list-style-type: none"> - Meet District Game Officer - Meet District Executive Officer - Travel to Namanga 	Arusha to Monduli
6/02/2003	Travel to Sinya Interviews/discussions/field work Travel to Sanya Juu	Sinya/Sanya Juu
7/02/2003	Interviews/discussions/field work	Kitenden
7/02/2003	Discussion	Irkaswa
8/02/2003	Interviews/discussions/field work	Lerangwa
9/02/2003	Interviews/discussions/field work	Olmolog
10/02/2003	Interviews/discussions/field work	Elerai
11/02/2003	Travelling to Kiteto and District Consultations <ul style="list-style-type: none"> - Meet District Game Officer - Meet District Natural Resources Officer 	Kiteto
12/02/2003	Interviews/discussions/field work	Irkiu-shibor
13/02/2003	Interviews/discussions/field work	Makami
14/02/2003	Interviews/discussions/field work	Ndedo
16/02/2003	Travelling to Babati	Kiteto to Babati
17/02/2003	District Consultations <ul style="list-style-type: none"> - Meet District Natural Resources Officer - Meet District Game Officer (Acting) - Meet District Executive Director and District Council Chairman - Meet District Commissioner - Meet LAMP Development Advisor - Meet Divisional Executive Officer Interview/Discussion/field work	Babati/ Magugu/Magara
18/02/2003	Interviews/discussions/field work	Mayoka
19/02/2003	Interviews/discussions/field work	Mwada
19 /02/2003	Interviews/discussions/field work	Sangaiwe
20/02/2003	Interviews/discussions/field work	Vilima Vitatu

21/02/2003	Interviews/discussion/field work and travel to Karatu	Minjingu
22/02/2003	Travel to Ngorongoro - Meet the Chief Conservator of Ngorongoro Conservation Area Authority Travel to Loliondo	Karatu/Ngorongoro/Loliondo
23/02/2003	District Consultations - Meet District Game Officer - Meet Mrs Tina Timan	Loliondo
24/02/2003	Interviews/discussions/field work	Arash
25/02/2003	Interviews/discussions/field work	Losoit/Maaloni
25/02/2003	Interviews/discussions/field work	Olorien/Magaiduru
26/02/2003	Interviews/discussions/field work	Soitsambu
27/02/2003	Interviews/discussions/field work Travel Seronera	Ololosokwan/Seronera
28/02/2003	Discussions at Frankfurt Zoological Society (Dr Bonner) Discussions with Chief Veterinary Officer of Serengeti National Park Travel to Mugumu, Serengeti District - Meet District Executive Director, District Natural Resources Officer, Game officer, Planning Officer, and Lands Officers - Set up appointments with villages	Ngorongoro-Serengeti
1/03/2003	Interviews/discussions/field work	Robanda
2/03/2003	Interviews/discussions/field work	Nyichoka
3/03/2003	Interviews/discussions/field work	Nyakitono
4/03/2003	Interviews/discussions/field work	Natta-Mbiso
5/02/2003	Debriefing Serengeti District officials Travel to Tarime - Meet District Commissioner, District Planning Officer, and District Game Officer	Mugumu/Tarime
6/03/2003	Interviews/discussions/field work	Gibaso
7/03/2003	Visit Mrito but unable to work due to hostile environment and decide to debrief District authorities in Tarime Travel to Mwanza	Mrito/Tarime
8/03/2003	Hold interviews with Pasiansi	Mwanza

	Principal	
9/03/2003	Travel to Karatu via Seronera	Karatu
10/03/2003	Travel to Arusha <ul style="list-style-type: none"> - Meet Manyara National Park Chief Warden - Fix appointment with TANAPA Director General 	Arusha
11/03/2003	<ul style="list-style-type: none"> - Meet Acting Director General of TANAPA, Director, Resource Conservation and Ecological Monitoring - Meet Director General, Tanzania Wildlife Research Institute 	
12/03/2003	Traveling to Dar es Salaam, Morogoro, and Ngorongoro for data analysis and report writing	

Appendix 3: List of respondents

S/N	NAME	WMA	VILLAGE
1.	Ngotok	Enduiment	Elerai
2.	Vincent Ole Nasale	Enduiment	Elerai
3.	Mwosingo Lushiru	Enduiment	Elerai
4.	Yohane Mitashehe	Enduiment	Elerai
5.	Kulila Olenasale	Enduiment	Elerai
6.	Langango Mitashiye	Enduiment	Elerai
7.	Olapan Simel	Enduiment	Elerai
8.	Nashiye Lenasale	Enduiment	Elerai
9.	Melita Tolet	Enduiment	Elerai
10.	Kikoloni Msanga	Enduiment	Elerai
11.	Naikurukuru Lemetasheye	Enduiment	Elerai
12.	John Manguru	Enduiment	Elerai
13.	Helena Lemolai	Enduiment	Elerai
14.	Nortetain Laiwiyiriri	Enduiment	Elerai
15.	Sereti Laitayo	Enduiment	Elerai
16.	Kidiri Guruguru	Enduiment	Elerai
17.	Lampala Olendi	Enduiment	Elerai
18.	Saibulu Lendi	Enduiment	Elerai
19.	Kidri Oleanasaley	Enduiment	Elerai
20.	Papati Ng'Wasela	Enduiment	Elerai
21.	Nongota Loopesi	Enduiment	Elerai
22.	Saimon Olenasalei	Enduiment	Elerai
23.	Konulu Joines	Enduiment	Elerai
24.	Nangepa Midinyi	Enduiment	Elerai
25.	Songono Olemitasheye	Enduiment	Elerai
26.	Parsanga Koleka	Enduiment	Elerai
27.	Karanga Nasari	Enduiment	Elerai
28.	Tobiko Koyeyo	Enduiment	Elerai
29.	Mary Vincent	Enduiment	Elerai
30.	Miding'le Lekao	Enduiment	Elerai
31.	Ewadi James	Enduiment	Kitendeni
32.	Sakimoa	Enduiment	Kitendeni
33.	Lasaru Sanare	Enduiment	Kitendeni
34.	Peria	Enduiment	Kitendeni
35.	Mwingeti	Enduiment	Kitendeni
36.	Olekisiok Lembeno	Enduiment	Kitendeni
37.	Ndolos	Enduiment	Kitendeni
38.	Saruni	Enduiment	Kitendeni
39.	Olekeleno	Enduiment	Kitendeni
40.	Logala	Enduiment	Kitendeni
41.	Lucas Lazalo	Enduiment	Kitendeni
42.	Mayon Olemuruwa	Enduiment	Kitendeni
43.	Kitemi Ketikay	Enduiment	Kitendeni
44.	Paniani ;Lekunoni	Enduiment	Kitendeni
45.	Daniel Cosmas	Enduiment	Kitendeni

S/N	NAME	WMA	VILLAGE
46.	Nicolaus Olemurda	Enduiment	Kitendeni
47.	Tayeye Miseyeki	Enduiment	Kitendeni
48.	Isaya Salonike	Enduiment	Kitendeni
49.	Dismas Makay	Enduiment	Kitendeni
50.	Nadepo Luka	Enduiment	Kitendeni
51.	Mussa Laiza	Enduiment	Kitendeni
52.	Saitoti Olembalai	Enduiment	Kitendeni
53.	Lapaine Hukuu	Enduiment	Kitendeni
54.	Joseph Peter	Enduiment	Kitendeni
55.	Kitasho Simeli	Enduiment	Kitendeni
56.	Komolo	Enduiment	Kitendeni
57.	Lusiana Palme	Enduiment	Kitendeni
58.	Ndoipo Kumli	Enduiment	Kitendeni
59.	Benjamin Matra	Enduiment	Kitendeni
60.	Eva Saitoti	Enduiment	Kitendeni
61.	Mathayo Moleli	Enduiment	Lerangwa
62.	Samson Elias Molel	Enduiment	Lerangwa
63.	William Elias	Enduiment	Lerangwa
64.	Mongela Koti	Enduiment	Lerangwa
65.	Patrice Bosko	Enduiment	Lerangwa
66.	Kivuyo Saitole	Enduiment	Lerangwa
67.	Milishi Lekio	Enduiment	Lerangwa
68.	Libelatusi Msaki	Enduiment	Lerangwa
69.	Olgediene Lamgishwe	Enduiment	Lerangwa
70.	Syokino Mbamai	Enduiment	Lerangwa
71.	Parmoya Namuti	Enduiment	Lerangwa
72.	Wilson Nathan	Enduiment	Lerangwa
73.	Zakayo Losipa	Enduiment	Lerangwa
74.	Jacob Lise	Enduiment	Lerangwa
75.	Kutu Lemorishiyo	Enduiment	Lerangwa
76.	Memusy	Enduiment	Lerangwa
77.	John Tangira Silayo	Enduiment	Lerangwa
78.	Letion Solana	Enduiment	Lerangwa
79.	Pashna Olesiato	Enduiment	Lerangwa
80.	Mepukor Losipo	Enduiment	Lerangwa
81.	Lais Lekileza	Enduiment	Lerangwa
82.	Owodo	Enduiment	Lerangwa
83.	Joseph Lekio	Enduiment	Lerangwa
84.	Lembris Kefas	Enduiment	Lerangwa
85.	Elias Semumbowe	Enduiment	Lerangwa
86.	Obed Molel	Enduiment	Lerangwa
87.	Sinati Koleka	Enduiment	Olmolog
88.	Talaya Wilesabuli	Enduiment	Olmolog
89.	Rubeng Mmary	Enduiment	Olmolog
90.	Kitoitoi Lemaroni	Enduiment	Olmolog
91.	Aldapashi Kipululi	Enduiment	Olmolog
92.	Joseph Simeli	Enduiment	Olmolog

S/N	NAME	WMA	VILLAGE
93.	Mironyi Noondirieni	Enduiment	Olmolog
94.	Endey Sabore	Enduiment	Olmolog
95.	Ngaiyai Koreka	Enduiment	Olmolog
96.	Ngalikoi	Enduiment	Olmolog
97.	Saimon Kiserian	Enduiment	Olmolog
98.	Kadogo Kiseria	Enduiment	Olmolog
99.	Edwad Supaya	Enduiment	Olmolog
100.	Isaya Ndel	Enduiment	Olmolog
101.	John Mwakitalu	Enduiment	Olmolog
102.	Koros Sendwi	Enduiment	Olmolog
103.	Loibangute	Enduiment	Olmolog
104.	Kilembo	Enduiment	Olmolog
105.	Valelian Hipolite	Enduiment	Olmolog
106.	Lorgo Lesariko	Enduiment	Olmolog
107.	Benedict Melubo	Enduiment	Olmolog
108.	Godfrey Miliya	Enduiment	Olmolog
109.	Daishiwamwi Munuo	Enduiment	Olmolog
110.	Miliara Koileli	Enduiment	Olmolog
111.	Salehe Othman	Enduiment	Olmolog
112.	Lekina	Enduiment	Olmolog
113.	Juma Kitwana	Enduiment	Olmolog
114.	Sitonike Mkunguy	Enduiment	Olmolog
115.	John Silayo	Enduiment	Olmolog
116.	Jumanne Abdallah	Enduiment	Olmolog
117.	Mokko Lobbo	Enduiment	Sinya
118.	Atuma Sagita	Enduiment	Sinya
119.	Molloime	Enduiment	Sinya
120.	Kashinyo Modosiko	Enduiment	Sinya
121.	Ngenge Kashikwe Ri	Enduiment	Sinya
122.	Lelebereti Langasha	Enduiment	Sinya
123.	Sasaika Mengasha	Enduiment	Sinya
124.	Salashi Tembeshi	Enduiment	Sinya
125.	Leseyo Lalaini	Enduiment	Sinya
126.	Milia Lekedoki	Enduiment	Sinya
127.	Mepukoli Walengelani	Enduiment	Sinya
128.	Melio Manja	Enduiment	Sinya
129.	Remula Mshao	Enduiment	Sinya
130.	Leboiset Lesayo	Enduiment	Sinya
131.	Titu Kidiri	Enduiment	Sinya
132.	Ndinaiyai	Enduiment	Sinya
133.	Tia Olonyoli	Enduiment	Sinya
134.	Ngalika Malai	Enduiment	Sinya
135.	Ngula Looline	Enduiment	Sinya
136.	Ley Oleteloki	Enduiment	Sinya
137.	L Mshao	Enduiment	Sinya