Impact of Civil War on Natural Resources: A Case Study for Somaliland

March 2006

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Financed by:

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ACRONOYMS AND ABBREVIATIONS

ADRA	Adventist Development & Relief Agency
APD	Academy for Peace and Development
CBPP	Contagious bovine pleuro-pneumonia
CLHE	Candlelight for Health, Education & Environment
DLCO-EA	Desert Locust Control Organization for East Africa
EEZ	Exclusive Economic Zone
FEWS	Famine early warning systems
FAO	Food and Agriculture Organization
GNP	Gross National Product
HHs	Households
IDPs	Internally displaced persons
ILO	International Labour Organization
IUCN	World Conservation Union
LC	Letter of Credit
MoA	Ministry of Agriculture
MoL	Ministry of Livestock
MoPD&E	Ministry of Pastoral Development & Environment
MPA	Marine Protected Areas
NERAD	National Environmental Research and Disaster Preparedness Commission
NGO	Non governmental organization
NRA	National Range Agency
NWADP	North West Agricultural Development Project
PENHA	Pastoral & Environmental Network for the Horn of Africa
RVF	Rift Valley Fever
SNM	Somali National Movement
UAE	United Arab Emirates
UNDP	United Nations Development Programme
WFP	World Food Programme

ACKNOWLEDGEMENT

The case study team wishes to thank all those who have willingly availed their time and made valuable contribution in the compilation of this study. These include government officials, representatives of INGOs, LNGOs and individuals from all walks of life.

The team also wishes to thank FAO Regional Office for the Near East (RNE) for financing the case study under the technical guidance of Mr. M. M. Mirreh, the FAO Regional Range Management and Fodder Crop Production Officer.

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1. EXECUTVE SUMMARY

This report on the nature and extent of the civil war impact on the natural resources of Somaliland (ex-Northwest Somalia) attempts to expose the picture of the natural resources before and aftermath the civil war. The civil war (1988 – 1990) and the subsequent civil strife (1994-1997) had a serious effect on both terrestrial and marine resources of Somaliland and an impoverishing effect - in fact to the point of destitution - on the communities living in the study area.

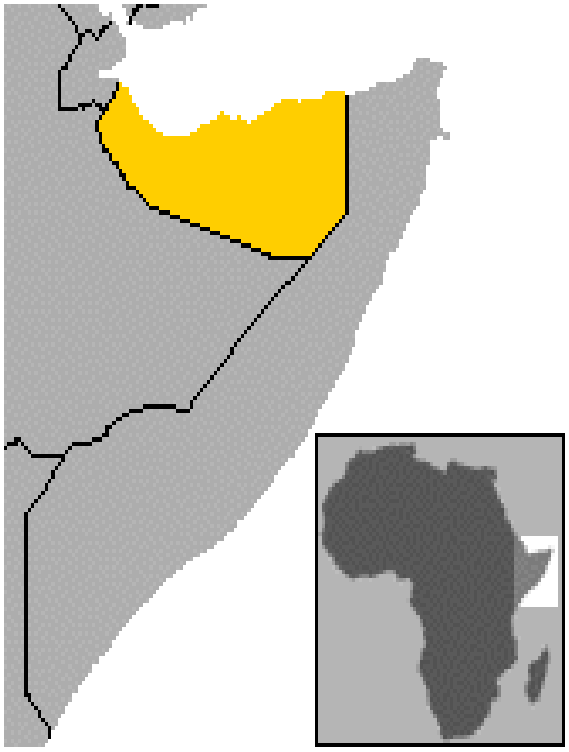

Figure 1: Location of the Study Areas

Livestock and crop production were drastically lowered; the range environment and rainfed land became degraded. Uncontrolled hunting has contributed to the demise of much of the remaining wildlife.

The effects of the civil war on rainfed and flood irrigated farmers was enormous. Farmer lost practically all their farm equipment and machinery, tools, homes and household items and stored grain. Their masonry in-ground water reservoirs (*Berkad*) were either destroyed or suffered disrepair due to lack of maintenance. The earthen water reservoirs lost their storage capacity due to sedimentation processes. Soil conservation structures in the farms broke up and were leveled by runoff. Recovery was delayed and is only partial. Post civil war emergency assistance was very small, sources of credit were hard to find. Because of the loss of tillage machinery the cost of hiring the few available tractors became costly. Animal traction was also available with difficulty.

Recovery was made difficult, to those able to grow crops, because of low value of the cereal grains, i.e. sorghum and maize. Sorghum is grown now as fodder for livestock during the dry season. As a result many people drifted to the main towns.

The war had aggravated the degradation of the rangelands. The latter resulted in highly reduced family livestock herd sizes. Post war absence of range management resulted in the proliferation of private range enclosures. The enclosures often restrict the movement of people and livestock in their seasonal movement and block access to water sources and encourage the clearing of land without any improvements. The latter together with charcoal production which increased, at a vast pace and overgrazing has depleted vegetative cover to a large extent resulting in the diminishing of livestock herd sizes, movement of young people to towns or to charcoal production.

The end of the war meant weakened range management institutions. The breakdown of law and order coupled with shrinkage of range and forest resources also resulted in conflicts over the ownership or use of these resources between stockmen, farmers and charcoal producers.
Animal health services have been severely affected by the civil war. The institutions concerned are weak. Delivery of drugs and treatment are done by people with questionable veterinary skills. The laboratory for the

diagnosis of animal diseases has disappeared. Livestock exports to Saudi Arabia have been banned due to Rift Valley Fever (RVF) affecting pastoralists' income as well as those who traded in their marketing, export and the hard currency earnings of the country.

The relict forests of the evergreen belt in high Golis Ridge are in danger of disappearing totally as the trees are being used for timber, shelter and telephone/electric poles. This phenomenon is more pronounced in Daalo/Al-Madow mountain range in Sanag Region.

The once thriving fishing industry has deteriorated into a 'free for all' equally accessible to the world's fishing fleets. Vessels from various countries have continuously fished in the Somali waters in an unreported and unregulated manner. This has had far reaching consequences and may already have had a disastrous effect on the sustainable management of the marine environment.

Reports on toxic waste dumping in the territorial waters of Somalia/land have been recurring over the past decade or so. Chemical contamination has also affected some areas in the major urban centers, most notably the war destroyed Ex-Desert Locust Control Organization for East Africa (DLCO-EA) centre in Hargeisa that resulted in the leakage of more than 80,000 litres of chemicals suspected to be pesticides, poured into the ground and the drums used by the returnees for water storage. The defunct SAM-2 missile site near Berbera is also reported to have environmental and health hazards.

The purpose of the study is to assess the impact of the civil war on the natural resources of Somaliland (Northwest Somalia) with particular emphasis on natural biodiversity, land use, pastoral communities and the socio-economic structure of the rural and pastoral communities and overall economic impact as well. It also aims to gauge the effects on the production systems and the state of the national institutions responsible and the existing policies, rules and regulations related to those sectors.

The above mentioned topics have been thoroughly discussed thematically in the report. In each sector, the report gives an overview of the past situation and subsequently the impact of the war.

Finally the report closes with general and specific recommendations as to the ways of mitigating the on-going environmental degradation processes and shrinkage of the natural resource base which could lead to loss of biodiversity and accelerated depletion of the natural resources – given the current rate of progression.

2. INTRODUCTION

The geographic coverage of this study is the present day Somaliland (formerly North West Somalia). Somaliland was formerly known as the Somaliland Protectorate under the British rule from 1884 until June, 26th 1960 when Somaliland got its independence from Britain. This independence was short-lived as the new republic merged few days later (July 1 1960) with the former Italian Somalia to form the Somali Republic. The merger did not work according to the aspirations of the people, and the strain led to a civil war which dragged from 1980s to the demise of the Somali Republic. In 1991, the people of Somaliland held a congress in which it was decided to withdraw from the Union with Somalia and to reinstate its sovereignty. Somaliland has been peaceful, stable, with a functioning national government for over a decade, but the country remains unrecognized in the international arena.

Successive regional conferences in 1993 and 1997 helped the restoration of peace and stability in a basically democratic multi-party government system with own constitution. Decentralization acquired a mandate but a little progress is so far made. The Somaliland government has to a certain extent succeeded

in establishing a functioning administration, in promotion of internal security and stability and creation of a positive environment for social, economic reconstruction and development at large.

With a population of approximately 3.5 million over which more than 55%[1] is either nomadic or semi-nomadic, Somaliland has a bicameral legislature, the elected parliament (Lower House) and the Guurti (the Upper House).
Despite its moderate success in maintaining security and governance, Somaliland has a long way to go in creating a system that can improve economic, social, political and environmental conditions and thus improve the quality of life for the majority of Somalilanders.

Somaliland's traditional communal management system has been disrupted by the cumulative impact of ecological exploitation by the resource users and decades of armed conflict. This, along with droughts has affected the coping mechanisms and down-graded the quality of life for Somalilanders. The war-scarred economy is gradually improving, but Somaliland remains among the poorest countries in the world. More than half of Somalilanders are pastoral nomads who depend on herding livestock in a harsh semi-arid environment. The volatility of the world livestock market and export bans have adversely affected the livelihoods of many Somalilanders.

Prolonged conflicts, a harsh climate, absence of a recognized government, and unreliable markets have resulted in a huge loss of pastoralists' livestock. Consequently, Somaliland witnessed an urban migration of nomads with limited prospects for employment. As the refugees who fled the wars returned to their homeland, Somaliland struggles to stimulate significant job growth. Fresh returnees as well as older returnees lack alternative job skills, education, and thus face a grim economic future. The rapid influx of returnees, without a sufficient and stable employment sector, has rendered large number of Somalilanders vulnerable to economic uncertainties. In addition, the ban on livestock export in 1998-1999 and again from September 2000 till now had resulted not only in the loss of millions of potential dollars from livestock sales, but many millions of dollars in potential export levies and port revenues, as well[2].

As a result of the war, the environment of the country has suffered and became degraded to alarming levels. Due to weak government to effectively establish and maintain control, together with the absence of community awareness, people have turned to all kind of illegal and damaging activities. A good example of this phenomenon is the wanton destruction of Acacia forests for charcoal production and poaching the remaining wild game for leather and meat. The issue of charcoal production as a wood based fuel energy has been identified as an urgent issue due to its substantial contribution in decreasing the country's woody biomass. The impact of selective harvesting of specific trees has resulted in severe environmental disaster.

This study is an attempt to document the impact of the civil war on the natural resources of the country and the way forward to mitigate the effects of the ongoing onslaught on the environment.

2.1. **Objectives of the Study**

The general objectives of the study are:

- To assess the impact of the civil war on natural resources of North-West Somalia (Somaliland) with particular emphasis on:

1 *http://www.somalilandgov.com/cprofile.htm*
2 *Cindy F. Holleman, The Socio-economic Implications of the Livestock ban in Somaliland, FEWS NET/Somalia, 2002.*

- Natural biodiversity (vegetation, domestic and wild life)
- Land use (contribution to land use conflicts)
- Pastoral communities
- Socio- economic structure of the rural and urban communities and overall economic impact as well.
- Trade barrier and illegal trade of natural biodiversity

- To gauge the effects of war on livestock production such as, farming systems, range, forestry and wild life management.
- The state of the national institutions responsible and the existing policies, rules and regulations related to those sectors.
- To Recommend and suggest practical measures and interventions related to the ways and means of reducing or alleviating the effects of the civil war on the natural resources.

2.2. **Methodology**

The study has been carried out by a multidisciplinary team of experts in two phases of a desk study and field visits. The assessment of the war impacts on the natural resource was not, by itself, an easy task in a country where almost all past records have either been looted or destroyed.

During the desk study phase, discussions and consultations were made with the Ministry of Pastoral Development and Environment (MPD&E), Ministry of Agriculture (MoA); Ministry of Water and Mineral Resources; National Environmental Research and Disaster Preparedness (NERAD); Ministry of Livestock; and a number of INGOs and local organizations viz. Pastoral and Environmental Network for Horn of Africa (PENHA) and the Academy for Peace and Development (APD) etc. In addition, previous published works in the area under discussion was reviewed and studied.

Formal meetings with district authorities and community elders, individual and group interviews with the various natural resource users (pastoralists, agriculturalists, and fishing communities) in the areas visited were also conducted.

3.0. GEOGRAPHY OF THE STUDY AREA

3.1. Topography

The study area under discussion is the present day Somaliland which is situated on the eastern Horn of Africa between the 08°00' and 11°30' parallel north of the Equator and between 42°30' and 49°00' meridian east of the Greenwich. It shares borders with the Republic of Djibouti to the west, Federal Republic of Ethiopia to the south, Gulf of Aden to the north and Somalia to the east. Somaliland has a coastal line to the north of the country which extends 850 km along the Gulf of Aden. The area of Somaliland is 176,120km² (68,000 sq. miles).

Topography in Somaliland is characterized mainly by the coastal plains which rise sharply to the Golis Range (a chain of mountains or succession of mountainous ridges and upland plateau reaching an altitude of over 2000m) running east-west wards. Starting from El-madow in the east towards the Ethiopian highland of Harar and partly tapering to Dhay Mountains of Afar region in the Republic of Djibouti and southern plateau sloping southeast from the highland. The range of mountains acts as the main watershed, draining towards northern

coast into the Red Sea and alluvial plains further south, providing some of the most favoured grazing for livestock. Productivity in terms of edible forage for livestock has been greatly reduced by excessive grazing over the years; the reduction in the grass cover is very notable when comparisons are made between today's cover and that described by early travelers (Swayne in 1895, Drake-Brockman in 1912 and other officers in the colonial period).

3.2. Climate

The general climate of Somaliland is hyper-arid, arid and semi-arid. Records collected for over 40 years (before 1974) for Hargeisa (the capital of Somaliland) indicate that there is the probability of rains during five months of the year but the actual amounts vary considerably. The rainy season has two peaks. The first occurs during April to June and is the more important of the two rainy seasons. This is locally known as the "*Gu*" and is of significant importance to the nomads and the agricultural communities. This rain is brought up by the south-west monsoon which blows during this period. Temperatures at this time of the year are some what above the yearly average of 21.7C^0 with the highest temperature – around 40^{o}C – occurring in the last half of June.

This rainy season is followed by a short period with less rainfall but with, more significantly, dry strong winds. These winds reach their highest velocities in July. And they have a very serious desiccating effect on vegetation and the annual crops in the agricultural areas. They are most uncomfortable for the human population as well.

A shorter rainy season, locally known as the "*Karan*" normally begins in August and is confined mainly to areas to the west of Hargeisa. The highest mean rainfall at Hargeisa could be expected during August. This second rain is most significant, not only for the recovery of crops that had been damaged by the strong and dry summer (*Haggaa*) winds, but also for the short time crops such as maize and dwarf sorghum. This period sees the cessation of the strong winds of the preceding period. During winter both the mean monthly temperature and rainfall drop, though this is associated with tremendous variations as mentioned earlier.

3.3. Soils

The soils of the country are generally immature and as a result residual soils are not common. This is due to the very active processes of soil movement by wind and water. The only areas where mature soils exist are in the Juniper forests of the Golis Range, which are confined to the very restricted area of the relict forests. These soils in the Juniper areas are acidic as in the case of the tropical areas. The processes of soil erosion and the subsequent deposition of transported material in the lower valley basins are very remarkably observable patterns. The soils to the south of Hargeisa are largely a product of this type of erosion, and are of limestone origin. The erosion processes carrying away soil from slopes and depositing it in the lower basins result in badly eroded slopes, leaving behind bare areas, devoid of vegetation cover, except where plants grow in the cracks or on soils protected under thorny cover. Further south of this area lies the red sandy soil of the "*Haud"* and the *Nugaal.*

3.4. Vegetation Zones (Forests, Woodlands and Rangelands)

a) Coastal and Sub-coastal:- This zone has excellent grass plains with scattered sand dunes and vegetation arcs here and there. The vegetation composes of *Suaeda fruticosa* (*'xudhuun'*), *Halopyrum* and *Salsola*

foetida in saline areas. The coastal zone itself includes *Balanites aegyptiaca* in the tree layer and grasses such as *lasiurus hirsutus* ('*Darif*'), *Panicum turgidum ('Dungaare'), Eleusine, Eragrostis and Tragus*[3]. The pressure on this zone has increased when Haud, Nugaal grassland plains in the south has deteriorated and traditional routes of grazing has drastically been hampered by the parceling of communal land for private purposes (enclosures)

Fig. 2: Highly degraded coastal area below the catchment of Casha Madow (Black Mountain) towards Bullaxaar.

b) Highland wood evergreen shrub: This zone covers from 4000ft – 7000ft. This zone is dominated by evergreen plants with usually the relict *Juniperus procera* ("*Dayib*"). Little remains of its kind in a strip of land along the ridge and inaccessible places of the range of Golis mountains. In view of serious erosion, overgrazing and cutting has reduced the vegetation cover and replaced with undesirable *Dodonaea viscosa* (*'Heyramat'*), *Buxus hildebrandtii* ("*Dhosoq*"), *Acacia etbaica* ('*Sogsog*'), *Aloe, Euphorbia* and *Cadia*. Also present are *Sideroxylon buxifolium*, *Pistacia lentiscus* and *Dracaena ombet* and common grasses such as *Cynodon dactylon ('doomaar'),i, Eragrostis spp., Pennisetum villosum, Themeda triandra ('daba shabeel')* and *Eleusine africana ('garagaro').* The main grass species in this zone is also dwindling. Gullies have spread and reaching the top. It is not uncommon to see the exposed root system of some of the species e.g. *Acokanthera schimperi* ("*Waabey*") as a result of soil erosion The extensive erosion has lead *Acacia etbaica* to replace evergreen trees and shrubs and the micro-biological species left in the accessible cavities and niches within the top of the escarpments.

Fig. 3: Gully erosion threatening previous rehabilitation works done before the civil war. Bookh Valley, east of Gacan Libaax

Fig. 4: Exposed root system of Acokanthera schimperi. Over 2m of soil is lost to water erosion. (Gacan Libaax)

3 *Somalia: Towards a Livestock Sector Strategy. Final Report. FAO, World Bank, EU Mission in Kenya, Report No. 04/001 IC-SOM, 2004*

c) *Acacia Bussei* Open Woodland: - The mean annual rainfall in this zone is generally between 200-300 mm. The area is usually described as open woodland, but much of the tree component is now dead except in the vegetation arcs where run-off from interspersed bare areas has been retained there by enabling grass and trees to survive. Extensive "*bans*" (treeless plains) are a feature of this zone and provide some of the most favored grazing for livestock. Productivity in terms of edible and/or palatable forage for livestock has been greatly reduced by excessive grazing over the years; the reduction in the grass cover is very notable when comparisons are made between today's cover and that described by early travelers (Swayne 1895). For example, Drake-Brockman wrote in 1912 of millions of acres covered by *Chrysopogon aucheri.* However, this valuable grass has now been largely replaced by species which are less palatable and less productive. According to Hemming (1966) common *daremo* grass (*Chrysopogon aucheri*) is remaining under bushes or in vegetation arcs. Many areas are now converted into bare ground due to de-vegetation processes, long period of drought and over-grazing where the strong turbulent dust storms during *Haggaa* season *(May-September)* cause the soil to be transported. These areas are represented by wind-scoured or blowout areas where the finer particles of the topsoil have blown away, sometimes leaving residual gravel, rock, or exposed roots on the soil surface.

d) Gypsiferous Areas (Nugaal): - The vegetation in this zone is extremely varied and is controlled more by edaphic factors than by climate. Rainfall does not exceed 500 mm at elevations of above 1,400 m in the vicinity of Erigavo where *Acacia etbaica* is abundant. Lower down grass cover has been depleted by years of heavy grazing, but indications are that here as well as in the *Acacia bussei* zone, *Chrysopogon* was the dominant grass. These areas provide some of the most sought after grazing and consequently are under constant heavy pressure. The gypsiferous areas also extend south of the *Xadeed* plain into the Nugal valley at an elevation of around 800 m where there is an annual rainfall of 100 mm. In these lower and hotter habitats vegetation is much sparser, although many species are common throughout. *Chrysopogon aucheri, Sporobolus ruspolianus ('Sifaar'), S. ioclados and Dactyloctenium robecchii* are the grasses commonly found, but soil conditions and past grazing pressures determine their abundance. Woody species are becoming more common such as *Cadaba mirabilis*, *C. heterotricha ('Higlo'), Salvadora persica ('Cadey')* and in the sinking holes characteristic of anhydrite areas of *Acacia tortilis* and scattered *Ficus spp.*

e) Haud-Type Mixed Bush: - This type of vegetation lies mainly to the south of the *Acacia Bussei* belt of open woodland. It is characterized by Acacia and Commiphora species and formerly offered some of the best grazing in Somaliland due to the scarcity of permanent water. Now, however, many areas have a proliferation of "*berkeds*" (cement cisterns tanks for collecting and storing water) and the rangelands have shown a substantial deterioration.

4. LAND USE

Land use is determined by the rainfall, land suitability and capability. According to the "Soil and water conservation" by Calvin Wixon 1964, it was estimated in "The General Survey of Somaliland Protectorate, 1944-1950" that the present agricultural area in the Protectorate totaled roughly 800 square miles, 512,000 acres which is equivalent to 2076 km^2 or 207,600 hectares in which at least half of it is between Hargeisa and Borama, a part of the eastern extension of Harar plateau. The report stated that only a small portion is used for crop production. In the SOGREAH feasibility study[4], it is stated that the estimated farmland of the North West Agricultural Project (NWADP) area was 71,000 Ha in 1980 in which only 35% was then under cultivation.

4 *Northwest Agricultural Development Project, Feasibility Study and Technical Assistance. Technical Report No. 6, Range & Livestock Study, SOGREAH June 1982.*

Rainfed agriculture, which has led to the clearing of large areas of former woodland represented a farm area of 68,700 Ha of which 23,650 Ha were cultivated with sorghum and maize in 1980; while the irrigated land covered 1965 Ha.

These types of land uses have prevailed for many centuries but unfortunately it appears that the existed land use systems had been dramatically changed, mainly due to encroachments through the erection of enclosures by members of the community taking advantage of weak regulatory and control measures. According to the Ministry of Agriculture of Somaliland, land suitable for rainfed agriculture has been exhausted already. The enclosures in question would not be recognized as arable land. Expansion of the irrigated agriculture may be recognized if water resource reserves for irrigation and suitable land are available. The present enclosures are established to produce charcoal and hay. They are contributing substantially to the worsening situation of range degradation.
The Somali pastoralist employed various methods of land tenure systems. Most of them are based on communal ownership and use. Land is divided into clan territories in which demarcations are at times vague and susceptible to change. Clans both push borders and intermingle with each other in times of drought, conflict and hardship. Despite all these, communities respect clan territories when it's necessary to enter intra-clan grazing and watering areas.

Intermarriages create cross relationships among different clans and cater for cross border interactions and reciprocity. It was the inter-clan conflicts that disrupted such highly esteemed attitudes towards marriages and relationship between peoples that it used to cement. With different government policies of land allocation and use, communal ownership is not assertive any more but is open to manipulation by different forces. Consequently this has created insecurity among different land users and has a cumulative negative effect of insecurity on land ownership and use, hence the acceleration of land grabbing and the escalation of private enclosures that in turn is conflict borne[5].

The land use regulation established by the colonial administration which favoured the majority of the land users (the pastoralists) was violated, after independence, by the various national governments. The demarcation line "Meter" was extended and redrawn more than once in the northwest (NW) and pastoral grazing land was given to rich business people and to influential pastoralists and civil servants as private ranches near main towns. Land use regulations were further undermined when the then socialist military government introduced large grazing co-operatives and to the end confiscated large expanses of pastoral grazing lands, particularly in Sanag.

With the collapse of the state government, less influential pastoralists who had been ignored by the previous administrations and poor people displaced from the urban dwelling by the civil conflict now began relentless grabbing of communal land. These enclosures are marked by unbroken plant fences which have barely left any significant space between ay two villages. The effect of this land grabbing has contributed to the marginalization of pastorlists as it brought seasonal mobility to almost standstill. The pastoralist in the Guban is already unable to come to the plateau during the summer when the coastal belt is unbearably hot. Equally, those from the waterless Haud and those from the Nugal lowland have no access to the resources of the escarpment and the coastal belt at times of their need.[6]

5 *Sadia M. Ahmed et. al, Survey on the State of Pastoralism in Somaliland, PENHA/ICD, 2001*
6 *Land Tenue Policy Workshop, VETAID Hargeisa, (1997)*

5. PRODUCTION SYSTEMS

5.1. Livestock Production System

There are three types of livestock livelihood systems in the study area, which are pastoralism, agro-pastoralism and urban stall feeding in which the first two are the main ones.

Pastoral System is confined to the coastal plains, mountain valleys and the plateau over most of the country where the principal, if not the only, feed source is the rangeland grazing and browsing. This is the major livestock production system in which the stockholders and their herds are in movement and this movement follows a quite seasonal pattern which is dictated by the cycle of the precipitation. It is not pure nomadism because these people usually have fixed locations to return to a certain time of the year.

Thus, during the dry season stockholders and their livestock stay near permanent water sources. During the rain season, distances are traveled over a wide area to utilize the available grazing and browse while there is water available in the ponds, depressions and earth dams. The route followed and the time spent on is mostly uniform from year to year except where variations occur in the rainfall pattern.

Agro-pastoral System is practiced in crop producing areas of the country where there is medium to high integration of animals with crops and indigenous grass for fodder production. The cropland provides fodder for livestock feeding and according to SOGREAH studies an estimated amount of 130,000 tones of dry matter is annually produced for livestock feeding from 23,650ha of cropped area, while livestock provides the draught power and organic fertilizer to farmlands, as well as milk and meat for household consumption.

The herd composition of this system is mainly cattle and shoats. During the cropping season, only the milking animals and draught oxen is kept in the fields and the rest of the stock is taken to grazing zones and later are returned to the farmland after crop harvest.

Urban Stall Feeding System is less common and it is mostly practiced in urban centers where families keep some goats and cows to provide milk to their children and some make milk sales. There are no significant diary farms yet.

5.1.1. Livestock Population and Distribution

The most dominant production system is related to livestock rearing, engaging approximately 55% of the population. The pastoralists in the country have herd composition of sheep, goats, camels and cattle that create market opportunities. For example, cattle rearing areas are mostly localized in the western wetter zones where more crop residues are available; while shoats are found in grasslands and shrubby areas and camels in drier woody areas.

Despite being traditionally an efficient production system, livestock is now subjected to significant changes due to population increase, de-forestation processes, as well as the more inclination of pastoral communities to sedentary life and the disenchantment of youth and able-bodied family members with the pastoral lifestyles. This created an increase of competition between various land users (charcoal production, enclosures for fodders, and farming) forcing pastoralist to less productive/ marginal areas. This improper rangeland utilization has created serious confrontations which at times lead to death.

There is no much reliable information on the livestock population of the study area. The real numbers of the livestock is hardly to be obtained due to the transhumance character of the pastoral communities and the occurrence of recurrent droughts that cause substantial reduction in livestock populations.

The following annual growth rates have been assumed according to 1975 Somalia census of livestock population[7]: Goat 2.4%, Sheep 1.7%, Cattle 1.1%, Camel 1.1%

However, the above mentioned annual incremental growth rates, as based on 1975 census, do not take into consideration the deaths and the losses due to droughts as well as the effects of the accelerated environmental degradation over the past years. For example, during the recent drought (2003-2004) the cumulative death rates were roughly 60% for shoats and 80% for camels[8]. Therefore on the basis of own observations and as result of interviews, most participants in the study believe that there has not been an increase in any of the four domestic species – sheep, goat, camels and cattle in Somaliland.

Table 1.: Estimated Total Population of Livestock: 1994 – 1998 *(Million Heads)*

Year	Goat	Sheep	Camel	Cattle
1994	9,497,348	5,207,895	5,221,045	2,677,459
1995	9,725,284	5,296,429	5,278,477	2,706,911
1996	9,958,691	5,386,468	5,336,540	2,736,687
1997	10,197,699	5,478,038	5,395,242	2,766,791
1998	10,442,443	5,571,165	5,454,590	2,787,226

Source: Ministry of National Planning and Co-ordination (Department of Statistics and Research)

Table 2: Livestock Population in Various Zones of Somalia (FSAU Data) 1999:

Zone	Camel	Cattle	Sheep	Goats	Total Number
Northwest (Somaliland)	1,308,260	308,960	5,837,320	4,790,000	12,244,540
North east	1,347,700	435,890	3,448,720	7,096,180	12,328,490
Central	1,003,340	461,860	1,098,680	370,580	2,934,460
Southern	1,217,470	1,340,870	707,020	1,860,110	5,125,470
Juba Valley	1,417,460	2,061,850	741,860	2,047,800	6,268,970
Total Specie	**6,294,230**	**4,609,430**	**11,833,600**	**16,164,670**	**38,901,930**

The data in the above tables (1 & 2), prepared by the Ministry of Planning and National Coordination (Somaliland) and the FSAU can indicate the unreliability of the information available on livestock numbers in the study area. For example, the cattle population in the first table for 1998 shows 2,787,226 heads, while the second table (1999) puts the number to a mere 308,960 heads. The substantial variance is true for the camels and goats too.

5.1.2. Economic Importance of Livestock

Livestock is at the root of Somali literature and culture in rural and urban areas. Livestock industry is and was the largest single employer in terms of self-employment in the private sector and the primary source of

7 http://www.somalilandforum.com/somaliland/in_figures/livestock.htm
8 Monthly Food Security and Nutrition Report, FSAU, August 13, 2004

revenue and foreign exchange earnings prior to the livestock export embargos imposed in 1998-99 and again in mid-September 2000 by Saudi Arabia and other Arabian Peninsula states (Bahrain, Oman, Yemen and the United Arab Emirates)[9]. Livestock possession is an asset. It represents capital savings and timely well-honored husbandry which, in favorable seasons, will grow as a hedge against a wide range of uncertainties. The livestock industry is the source of tillage power to the agro-pastoralist farming communities and it provided milk which was the diet of more than 60% of the Somaliland population before the war. The export of live animals had been the economic backbone of disintegrated Somalia in which Saudi Arabia was the major importer that provided more than 90% of the foreign earnings. Berbera port handled more than 80% of the livestock export. Trade in the special breed of the Somali sheep, which is black headed and fat-tailed and which held pride of place in the export stakes, together with lesser number of camels, cattle and goats had always been a private enterprise utilizing letter of credit (LC) provided by the state commercial Banks. The peak periods of livestock exports were during the pilgrimage (*Hajj)* season. The export was flourishing but was disrupted when the Berbera port was closed at the start of the 1988 civil war.

The actual trends in livestock export before 1988 was difficult to piece together because, as stated in the two year (1988-1989) development plan of the Ministry of Planning, the regime in Mogadishu never used to publish export data by ports of exit. An ILO report however, indicates that 86.5 percent of the total livestock export values from Somalia during 1970-87 had been from North (Somaliland) i.e. from Berbera port. After the Berbera port had been closed, according to FAO reports, the smaller natural harbours of Mait, Heis, Lasqoray and Zeila were being used for livestock exports, very small in number compared to Berbera from 1988-1991.

Table 3: Somaliland: Livestock Exports from Berbera by Volume and Value 1993-1997

Year	Sheep/Goats	Cattle	Camels	Kilo-Live weight	US$ in Millions
1993	1027833	80861	14826	54401952	92.5
1994	1679035	55729	38025	70102075	119.2
1995	2683597	75047	21993	99320125	168.8
1996	2372656	64606	42828	91546600	155.6
1997	2739489	66332	51647	103880925	176.6

Source: Ministry of livestock document[10]

Table 4: Estimate of Livestock Export values from Berbera 1970-1986

Years	USD million	% Share of Somalia's export	Year	USD Millions	% Share of Somalia's export
1970	14.4	45.9	1979	68.6	61.3
1971	15	43.4	1980	97.7	73.7
1972	12.6	29.3	1981	157.1	97.1
1973	21.6	54.2	1982	140.6	75.8
1974	30.5	49.2	1983	68.2	62.7
1975	50.1	56.6	1984	22.2	40.5
1976	41.5	43.9	1985	57.1	63.1
1977	41.2	65.4	1986	53.1	60

Source: Ministry of Planning quoting IMF International Financial statistics and International Labour Organization (ILO)

9 Cindy F. Holleman, "The Socio-economic Implications of the Livestock Ban in Somaliland", (FEWS NET Somalia), 2002

10 1998-2005 export went down to negligible level due to banning of the livestock export to Arabian countries.

5.1.3. War Impact on Livestock Production and Export

The livestock sector which is the chief mainstay of the economy of the study area and is using more than 90% of country's land area which supports the livelihoods of more than 55% of the population, had been drastically affected by the civil war with regards to its feed source, health services and marketing. The war effects on the feed resource will be detailed in the range and forestry section but this section will be confined to war impact on the health and marketing issues.

Livestock in the study area is the major repository of individual and national wealth. Livestock furnished end products that include milk, meat, hides and skins and intermediate products such as manure, fuel and power for draught and transport. They thus contribute to food security and at the same time are storage of wealth that is readily usable in times of need like the crop failure and the high cost of tractor hiring periods.

This major economic sector of the country is struggling with the following effects of the long years of civil war related to the health and marketing issues:

- The regional and district veterinary institutions had lost the capacity to serve for the enhancement of livestock producers and only poorly trained para-vets took over in certain areas.
- The supply of veterinary drugs that was controlled and certified by the veterinary department fell into the hands of unqualified private people and this resulted in the appearance of resistance factor. Sale of veterinary drugs side by side with food items in kiosks and shops is a common feature in the rural areas.
- The diagnostic laboratory in Hargeisa along with vaccine cold chain is out of service
- The various veterinary clinics and animal health posts had gone out of service.
- Weak capacity in animal disease surveillance implies that the Ministry cannot readily respond to the outbreak of diseases that will affect the food security and the livelihood of the pastoral and agro-pastoral communities.
- The livestock industry is characterized by poor inspection and health control standards including the sub-standard brucella testing and haphazard trading
- Most of qualified and experienced veterinary personnel are not in the sector any longer.
- Vaccination campaigns against major epizootic diseases such as contagious bovine pleuro-pneumonia (CBPP), sheep pox, anthrax, black quarter is non existent and this is resulting in their re-emergence and death of substantial number of animal herds.
- The ecto-parasite dipping facilities have fallen into state of disrepair.
- The inspection system of animals for slaughtering is below the standards and as a consequence health risks are involved.
- The two hides and skin processing plants in Hargeisa and Burao which produced pickled skins for export and two tannery plants that produced leather for local market were all destroyed. The one in Burao is rehabilitated and run by Somali businesspeople and produces tanned skins for export.

On the other hand, the effects of the livestock export ban imposed by the traditional importing countries, most notably Saudi Arabia, would not have been as bad and damaging to the economy of the people had there not been the civil war.

In 1998 Somalia experienced the first livestock export ban. The ban was lifted in 1999 but a second one by Saudi Arabia was imposed in September 2000. Fears of Rift Valley Fever (RVF) prompted the Gulf countries to ban the import of Somali livestock. The ban has been devastating to the livestock export sector

of Somaliland and had sent the livestock value slipping back to its pre-war levels and resulting in the loss of millions of potential dollars from livestock sales, but many millions of dollars in potential export levies and port revenues, as well.

Since then much efforts has been made to lift the ban. Many NGOs and UN agencies responded by recruiting well-known investigators to exhibit the non-presence of this disease in Somalia. Tests on thousands of animals were made and the results analyzed by the best laboratories. This investigation revealed persuasively that Somali livestock was free of life-threatening diseases, including RVF[11]. However, the ban is still holding and many people believe the cause for this is political rather than health issue. The non-recognition of Somaliland and the anarchy in the south is not serving the cause any better which would have, otherwise, assisted in the lifting of the ban.

Table 5: Effect of Livestock Ban, Berbera Port

Livestock Exports from Berbera. September – December 1999 compared to 2000			
Livestock	**Sep-Dec 1999**	**Sep-Dec 2000**	**% Change**
Sheep & Goats	956,772	69,508	-93
Cattle	34,491	2,986	-91
Camels	17,212	2,005	-88
Total	**1,008,475**	**74,499**	**-92**

Sources: FSAU December-January Report, based on UNCTAD, 2000

On the basis of these findings, some agencies, most notably UNDP and FAO actively sought and strived to have the ban lifted. As a result, Government officials and livestock traders from importing countries toured and inspected livestock conditions in Somalia. During their visits to Somalia, UAE health experts inspected three abattoirs: Mogadishu (in southern Somalia); Galkaio (in the central rangelands); and Burao (in Somaliland). This has marked a new page in the livestock export and marketing since chilled meat export was started. In Burao Somali entrepreneurs have established an export-oriented abattoir and by mid October 2004, it was exporting chilled meat to United Arab Emirates (UAE).

Prior to the war, certain conditions were to be met before exportation of livestock takes place such as vaccination against epizootic diseases and placement of quarantine for 14 days. These operations used to take place at the location of departure to Berbera. A Veterinary Doctor used to examine before embarkation and issued a health certificate. Holding grounds where the condition of livestock for export was monitored and cared for before proceeding to the port of departure existed in Qool-cadey and Aroori.

5.2.0. Crop Production

The main agricultural production belt lies in the area between Hargeisa and Borama districts and in parts of Odweyne and small portion of Erigavo district below the watershed. In addition to this, horticulture is becoming a major activity all along seasonal water courses (*Toggs*) from the Golis range to the sub-coastal areas in small family holdings. Maize, sorghum and pulses are the major rainfed crops in areas where the rainfall is 300-400mm and where spate irrigation is practiced e.g. Haahi in Odweine district. These crops are always subject to unreliable rainfall. Poor management practices on rainfed cropped areas and fallow areas are causing lower soil fertility which in turn leads to decreased productivity and income. Even when harvest is good, most of production is lost through improper storage practices and protection.

The study area is characterized by two types of crop production systems namely: rainfed/flood irrigation and irrigated agriculture. The farming system is agro-pastoral where, besides crop production, they keep some herds of livestock mostly cattle and shoats.

5.2.1. Rain fed/Flood Irrigation Crop Production

Rainfed farming is the major production system in which the subsistence farmers cultivate their crops with the moisture obtained from rainwater. It is practiced in the plateau areas of Hargeisa and Awdal regions and Sheikh District, in which the major grown crops are the long term maturing sorghum, maize, and rarely millet, barley and pulses.

The flood irrigation production system is exclusively practiced in some areas in Togdheer e.g. Beer, Odweine, Haahi, Getitaley etc. Rainfall occurring in the Golis Range Mountains to the north of these areas discharges flood water to the said areas through seasonal watercourses (*Togga*). These waters are harnessed to grow crops. The agro-pastoralists in these areas grow the short term maturing sorghum variety, maize and pulses. They also harvest hay that serves as fodder for export animals.

1.1.2. Irrigated Agriculture

There are two types of irrigation in common use in the study area:

- ✓ Gravitational and
- ✓ Pumping irrigation

The gravitational irrigation is localized in the mountainous areas where the water source are the springs gushing from mountain bottoms. The water is then conveyed to the fields by the pull of the earth's gravitational field.

In pumping irrigation, the water sources are the surface aquifers of the seasonal river beds tapped through the construction of shallow wells of an average of 6-20m deep in which centrifugal pumps are used for water extraction using pipes for water conveyance to the fields.

There is no exact data available on the irrigated land area, but according to Ministry of Agriculture's estimates, there were roughly 3000 hectares of irrigated agriculture before the war (1988) with an average farm size of 1-5ha. This sector had expanded during the years of the Gulf oil boom as the Diaspora community from the Arabian Gulf had put substantial investments in orchard establishments. Even before the war, in Sanag, the easternmost region in the study area, cabbages, onions and potatoes from Erigavo were transported and sold as far as in Mogadishu markets. Such farms are now dominated by *Qat* (*Catha edulis*), an evergreen shrub, whose leaves are mostly chewed by men for its euphoric effects, and small scale cash crops production marketed in Erigavo, Burao, Bosaso and Galkaio markets. Aftermath the war, the use of *Qat* become very widespread throughout the region as a cash crop due to its high demand by both urban and rural people.

In this sector, fruit trees like oranges, mandarin, guava, mangoes, pomegranates, and papayas are grown as well as various vegetables like tomatoes, cabbage, lettuce, onions, carrots and others that give a substantial return to the producers and contributing to the improvement of the nutritional status of the consumer.

5.2.3. Impact of civil war of rainfed/flood irrigation crop production

The rainfed agricultural areas in Hargeisa and Awdal regions have long tradition of farming dating back to more than two centuries due to their proximity to Ethiopia and well as the extended and more reliable rainy seasons which continue from March to September i.e. *GU* and *Karan* rains which is the prime reason of the farmers' option to long term Sorghum.

In these areas there was an accelerating soil erosion problem and water shortages. Endeavors to address these problems were started during the British colonial period and continued till the advent of the civil war. A number of soil and water conservation programs were carried out. The most notable and, by far, the most useful programme implemented in the area was the Northwest Agricultural Development Project (NWADP) that started in 1977 and continued until it was disrupted by the civil war.

Project activities included earthen bunds to retain soil and water for the farmlands. Depending on farm size, 6-15 bunds of 1m high, 0.5m wide and 60m long were erected in the arable land. Fifteen thousand hectares were bunded, making 63% of the total cultivated areas of 23,650 hectares. The project was funded by the World Bank and its programme was based on a cost recovery system in which the beneficiary farmers were to pay 15% of the incremental benefits inherent to the project. The soil and water conservation works of the project had greatly reduced soil erosion processes.

Another major component of this project was the construction of water points for human and livestock use. A total number of 67 communal earthen reservoirs and 110 *Berkads* were constructed in the project area based on the ratio of one earthen reservoir for every 80 households and 40 households per *Berkad*.

The long years of civil strife had reversed the situation as the bunds had worn out due to lack of maintenance and presently the advancement of gully erosion is greatly reducing arable land and increasing the waste lands. Many agricultural households particularly in Borama lost their agricultural lands and are reduced to state of destitution. It could be estimated that more 70% of the bunded area had lost the soil and water retention capacity.

The said earthen dams *(Balleys)* had lost their water storage capacities due to sedimentation processes and lack of maintenance during the years of civil strife in which farmers were either refugee or had no capacity to de-silt. The *Berkads* had also suffered a similar fate or have been intentionally destroyed by Government troops so that the Somali National Movement (SNM) militias or their civilian sympathizers will have a hard time reaching the main towns that were still in the hands of the Government during their trek from their bases in Eastern Ethiopia.

Fig, 5: One of the oldest surface water reservoirs (Ballehs) dug in Somaliland highly polluted and hence health wise risky.

Farmers in the flood irrigated area of Togdheer had practiced various methods of flood recession crop production, and as early as mid fifties, improved flood water management was introduced. *Beer* which is about 15km east of Burao was the first location where spate irrigation management was started. At Beer, the colonial British administration constructed a structural weir across the Togdheer watercourse in 1956 and diverted flood water to an off-take channel that conveyed water to an agricultural scheme of 600 hectares. The floods were controlled with sluice gates fixed on the weir, the off-take channel and the conveyance canals.

The scheme which was a pilot project established in a completely pastoral region that possess manageable floods was given to 800 households who cultivated the land on cooperative basis. This scheme efficiently operated until 1988 and is currently functioning with less magnitude compared to pre-war status.

Having realized the success of *Beer* scheme, GTZ in 1967 assisted the creation of the agricultural cooperatives of Beerato, Xaaxi and Gatiitaley which lie at the deltas of the seasonal watercourse of Odweine, Daldawan and Masingo through provision of agricultural machinery inputs, and technical assistance. Though the Germans had left in 1972, these cooperatives with an area of more than 3000 hectares continued to produce crops at a surplus of their needs – only, then, to be dramatically reduced by the effects of the war. All agricultural machinery was looted and spate irrigation channels had fallen into disrepair, consequently, at the present time, less than 20% of the land is under cultivation.

Apart from the destruction of these major structures in the rainfed and spate irrigation agricultural areas, the following war impacts on the subsistence agro-pastoralist livelihoods are conspicuous.

- Farmers' tillage capacity is minimal due to the loot of the agricultural tractors and loss of animal traction which has resulted in farmers' inability to cultivate sufficient land due to the high tractor hiring cost. One tractor-hour costs $8 which means the cost of one hectare plowing will be $32. To meet that cost a farmer has to sell some of his livestock asset.
- Due to the farmers' inability of cultivating sufficient land and because of the low market price of cereals, the farmers' preference to agriculture declined making them more inclined to livestock husbandry and thus putting emphasis on fodder production through increasing the plant population of sorghum. As a result, milk sales, at present, became a major source of income for farmer households.
- As farming income had fallen short of covering the household basic needs, farmers turned to charcoal production as an alternative source of income, thus contributing to the spiraling up of deforestation and the resulting increase of soil erosion in the fragile environment.
- Farmers had lost the traditional sorghum seed varieties and at present sow whatever they get as the seed multiplication and certification system is no longer existent.
- The lack of the extension service network and research center resulted in an increase of crop pests – a contributory factor to reduction of crop yield.
- The acquired state of dependence on relief food from aid agencies which was common during the refugee days is hindering farmers' self-reliance attitudes.
- The urban drift of the young farm labor due to declining land productivity and lack of investment is another factor contributing to the reduced production scales.

5.2.4. The impact of civil war on irrigated agriculture

Similarly, the civil war had caused an extensive damage to irrigated agriculture in whereby almost all irrigation equipment (pumps and pipes), agricultural tools and implements were looted. However, the most lamenting

issue is the loss of the valuable citrus fruit trees that were either cut down or withered because of thirst. The cemented conveyance canals had deteriorated while river bank erosion had been increasing due to the loss of the protective vegetation barriers and the increase of the river flood peaked due to the decrease of the soil permeability and thinning of vegetation in the watershed areas.

The civil war had these other effects:

- ✓ The loss of credit provider institutions.
- ✓ Marketing problems due to deterioration of feeder roads.
- ✓ Lack of extension services
- ✓ Water shortage problems due to the decrease of well yield and the deterioration of cemented canals.
- ✓ Shortage of agricultural input supply (seeds, pesticides, fertilizers) due to the non-availability of registered suppliers.
- ✓ Lack of propagation nurseries for fruit trees
- ✓ Absence of plant quarantine and phyto-sanitary regulation centers that resulted in the appearance of new diseases and pests
- ✓ The inadequate capacity of Ministry of Agriculture in delivery of services, research and extension network resulted in the present poor agronomic and cultural practices.
- ✓ The farmers' destituteness resulting from the loss of their investments and assets did not enable many of them to resume their farming activities; thus causing higher scale of drifting to the urban centres.
- ✓ The dumping of fruit and vegetables from Ethiopia and Yemen into the local markets due to improper tariffs system making difficult the recovery of the irrigated farming sector. The below table shows some horticultural imports from Yemen, Somalia and Ethiopia.
- ✓ The widespread unemployment in the country, and the poor purchasing power of the consumers, is also impedance to the irrigated agriculture development.
- ✓ The misuse of pesticides and herbicides and their uncontrolled sales is causing health hazards to farmers and consumers, as there are no regulatory measures in place yet.

Table 6: Horticultural produce imported from Yemen, Somalia and Ethiopia

Year	Commodity	Quantity in kg	Source
2000	Fresh Vegetables	352,289	Ethiopia, Somalia
2001	" "	345,610	" "
2002	" "	1,445,384	" "
Jan. – May 2005	Garlic	152,840	Yemen
Jan. – May 2005	Onions	175,125	Yemen
	Total	2,471,248 Kg ~ 2,471.248 Tones	

Source: Ministry of Finance & Ministry of Commerce statistics.

5.3.0. Range

The rangelands of Somaliland constitute one of the most valuable natural resources of the country and cover 80% of the land area. Although range management has been known in Somaliland for the past 50 years, yet it is only very recent that its importance is recognized. No steps appear to have been taken to issue a range policy declaration to provide a foundation for the development of the sector. It may be mentioned however, that a forestry and range law has been released as part of the environmental conservation and protection which provided for the protection, management and conservation of the rangelands[12].

12 Somaliland Range Policy (2001)

The British colonial administration, established the Department of Natural Resources (DNR) covering agriculture, livestock, forests, wildlife and rangeland conservation and protection. This institution carried out many interventions in forestry, wildlife and rangeland conservation and protection, including recruitment and training of forest guards and range guards, and establishment of range grazing reserves, as well as formulation of forest conservation and protection act.

Establishment of enclosures in communal land for private use started when the colonial administration decided to encourage dry farming as a complementary source of livelihood to livestock rearing in Somaliland. The British colonial administration was selective and careful as to areas for farming and areas to be reserved for pastoral grazing and use. They were also very strict as to the size of land issued to each farmer (200yds x 200yds). In the Northwest, the 'Meter' was drawn to demarcate farming from non-farming areas while in Sanag, isolated plots of bare land were given to interested individuals for them to reclaim[13].

5.3.1. War Impact on Rangelands

Somaliland experienced massive devastation in all aspects of life, including loss of human lives, socio-economic destruction and unsustainable use of the natural resources.
As a result of the war, the region has experienced a major human migration and displacement. The war-induced migration has triggered the displacement of over

800,000 people, half of them (400,000) ending up in Ethiopia's Aware district refugee camps (Harta-sheikh, Kam Abokor, Rabaso and Daror).

Also during the civil war period and the subsequent rise of state of anarchy, all national legislations on the rangeland conservation, protection and enforcement ceased to function.

The most challenging issue during the years of conflict and after is the interruption of the traditional movements of pastoralists with their flocks. Because of the hostility, the areas where the presence of the government was stronger/pronounced became 'no-go-zones' for pastoralists, as they were afraid of being killed or robbed of their livestock. As a result, this had caused the concentration of pastoralists into confined areas for extended periods of time, putting pressure on the limited resources and not allowing the rangelands to recover. The areas most affected by this trend are the *Ogo* and *Haud* ecological zones, particularly areas starting from the foothills of the Golis Range and extending southward to the Ethio-Somali border. Moreover, clan politicization in the region, whereby some of the major clans supported the government while others were allied with the Somali National Movement (SNM) had sparked conflicts among different clans, thus restricting the livestock migration from one place to another. This and many other factors had contributed to the deterioration of rangeland health in the country.

Rangeland resource competition started with establishment of private enclosures in the communal rangeland, especially the potential rangeland. The widespread emergence of enclosures as a subsequence of breakdown of law and order is one of the most serious problems that face the communities in the study area. Fodder enclosures are a new phenomenon that emerged in the last 20 years. They are created by those who are disillusioned with nomadic movement and decided to keep some of their milking stock in enclosures close to towns in order to market the milk and meat. The income generated from fodder and the sale of milk is sometimes used to support those of the family members still out with the rest of the stock.

13 Land Tenure Policy Workshop, VETAID Somaliland (July 1997)

In view of this setting, the enclosure is considered an ideal compliment to the purely nomadic life and some members of the same family divide their time between these modes of life. It also provides a base to the older members of the family like grandparents who cannot cope either with the harsh conditions of nomadic life, such as constant migration and other routine chores or could not afford the high cost of living in the town. From the point of view of these people, an enclosure is the better of the two worlds – with the benefits of both. However enclosures are a major problem to the pastoralists movement because they enclose the best grazing areas and block the routes to the main grazing areas in the *Haud* or the areas around the permanent water points.

Nomadic stock herding can sustain the life of a family as long as there is sufficient grazing and a good number of livestock to herd and the required number and calibre of manpower to do the herding. When either of those drops below a critical level, the family can no longer depend on this mode of life. They have to abandon and seek some other form of lifestyle. They would then flock to the urban centres. However this is not the sole factor that makes them drift to the cities. Love of individual liberty and a crop failure also leads to the same situation. Pastoralist intending to take their children to schools but unable to maintain them in the town also turn to enclosures. Pastoralists far enough from towns in areas where school facilities are unavailable may establish enclosures solely to attain a home from which the children can easily reach a town or a village school.

Fig. 6: Young nomad waiting to collect water from a cistern (Berked). He is a student but droughts generally affect his education because he has to migrate with the family to where they can get pasture and water.

rcoal producers, a new type of private enclosures emerged. Unlike fodder enclosures, these are woodland enclosures, reserved by their 'operators' for charcoal production. They either produce charcoal themselves or sell the trees, both alive or whatever dead wood remaining in the enclosures to charcoal producers.

The woodland resource competition has pushed the pastoralist to a state of near hopelessness because they were forced to destroy the remaining trees for charcoal production at the expense of their livestock. The following case was cited in a study carried out by the Ministry of Pastoral Development and Environment in collaboration with Candlelight: "In the course of the survey, the team met with two families who were keeping their livestock in a part of their enclosures, while charcoal production activities were going on in another part of the enclosures. They 'sold' the trees in the later part to charcoal traders! When inquired why they were selling the trees in the expense of their livestock, they remarked *that livestock production system is no longer sustainable and they were trying to supplement their income with the proceeds from the charcoal. Besides, the reasoned, when they move from this place, other charcoal producers will not spare the trees, and thus maximum benefit should be extracted from the land – even if the process is detrimental to the environment and their well-being".*[14]

14 Sugulle A. Jama and Omer, Abdikarim Aden
"Case Study: Impact of Charcoal Production on Environment and the Socio-economy of Pastoral communities and Environment of Somaliland. Candlelight for Health, Education & Environment, 2003, pp. 18

The obstruction of the pastoralists from water routes to the main grazing plains and valleys became a recipe for insecurity and conflicts which are usually on the rise during the dry periods. The plight of the pastoral society became more pronounced in the last drought period (2001-2004) because the nomadic social and traditional grazing system was disrupted. The result was migration to main towns, trespassing of enclosures, often sparking insecurity and conflicts between the nomadic community, agro-pastoralists, enclosure operators and farmers. The rights of access and use of natural resources towards these production systems can contribute to local level conflicts as well as national and regional disputes. Conflicts lead to a break-down in management systems governing the access and use of natural resources, and consequently result in degradation and depletion of the natural resources.

The huge expansion of enclosures forced the unsettled, moving pastoralists to graze their herds in an ever-shrinking land of marginal quality because the best grassland, valleys and watersheds have been taken away. So the gradual transformation of the land from communal pastoral land to individual ownership is increasing progressively and is done without acquisition of title deeds or any other document despite the existence of the law that specifies classification of land and prohibition of land grapping as well as adverse exploitation. In the last two decades this type of land use system has increased ten folds and is ever on the increase.

The need for special comprehensive study on this system is extremely urgent and justifiable.

Fig. 7: Village in the Haud red soil. With the exception of few dying acacia trees, the areas is denuded of cover (trees, shrubs and grasses)

Fig. 8: Hay trucking to Berbera port for feeding livestock for export

Fig. 9: Droughts are becoming more common and hard-hitting as a result of environmental degradation and hence dependence of communities on food aid.

Fig. 10: Typical village in the Haud area. Note all shelter materials are prepared from trees and shrubs. The most affected species are Vernonia cineraocens ('hiil') and Andropogon kelleri ('Duur').

5.4. Forestry

During the early 1950s, the first endeavor of forestry programme began in some parts of the country largely in response to concern over the extent of soil erosion that was evident in the area and the subsequent desire to implement conservation work.

This became instrumental to the establishment of the Forestry Department in 1952. The main achievements of Forestry Department were the creation of several forest reserves over an area of approximately 200km^2. Six Somali staff had received forestry training in Cyprus, Sudan and Tanzania. Unfortunately, such efforts initiated in the past to manage and protect these reserves have largely failed due to lack of resource commitment to establish and strengthen a functional administrative system. Thus the state of northern forest reserve was largely subjected to serious over-exploitation at the time forestry activities continued at a very low pace through out 1960's and early 1970's – largely confined to amenity tree planting for urban and other micro demonstrational reforestation programs using food for work (FFW). The tree lined avenues of the major towns of the country is a clear indication to early work. The country has no significant forest plantations except limited trial sites of Gacan Libaax and Daallo respectively.

In 1976 the Ex-government of Somalia has created the National Range Agency (NRA) under the Ministry of Livestock, Forestry and Range to carry out development conservation and management of the renewable resource base in general, and range forestry and wildlife in particular. Some of the laws enacted in this period to protect the pastoral environment included the Fauna and Flora Conservation Law in 1969 which banned the exportation of charcoal, followed by the Wildlife Act of 1971, which outlawed the hunting of game and export of game hides. And in 1979 the Range Act was enacted to provide guidelines for national management of range recovery. In view of the importance of forestry, all forestry resource development, conservation and management were administrated by the department of forestry of NRA which placed major emphasis on promoting forest resource and initiating countrywide programmes of reforestation and conservation of natural forest.

During that period reforestation programmes were much dependent to a great extent on donor assisted projects. However, the NRA regional and district offices have had forestry activities built into their annual plan and their budgets. These activities which were small scale in nature continued to be financed by NRA and partly by food for work under WFP program. Among these activities were development and management of tree nurseries, reforestation programmes and tree planting activities such as plantations, shelter belts, windbreaks, village shade trees. Although these activities have achieved certain success in some areas, their real impact compared with the magnitude of the forestry resource and the increasing rate of deforestation is negligible.

Endeavors made by NRA with regard to nurseries have done well in keeping such nurseries operational despite the fact that these are operating far below capacity with hardly any out planting being undertaken.

5.4.1. Civil war impact on forests

The woodland forest had been for long time used for: firewood, charcoal production, poles for traditional huts, farm and livestock stall fencing, crafting of food utensils, grinding pots, traditional sticks, disinfectant for milk containers, medicinal, lime production etc.

Having all these uses, there was at least some control on the scale of use before the war. Unfortunately due to the breakdown of the central and regional authorities, the forest resources of the country had been greatly

misused, and according to UNDP, in Somalia, deforestation would have reduced forest cover significantly to as low as 10% over the last decade and thus:

- The charcoal production had reached unprecedented levels.
- Large woodland areas had been cleared for cultivation in marginal areas.
- Establishment of private enclosures has been intensified.
- The remnant *Juniperus procera* forest of Sanag Mountains had been indiscriminately cut and exported to Bosaso, Galkaio and other towns for use as telephone/electric poles as well as for building purposes.
- The agro-pastoralists had cut down trees at the vicinity of their farms claiming Quella Quella birds that damage sorghum take shelter in the trees.
- The falling apart of the pre-war institutions and the poor capacity of the newly created institutions further worsened the situation.
- The fragmentation of the natural resource management ministries took its part in aggravating the situation. Ministry of Agriculture, Ministry of Livestock, Ministry of Pastoral Development and the National Environmental Research and Drought Preparedness Commission (NERAD) are in competition rather than in collaboration to a common end.

Fig. 11: Typical view of Montana forest at Gacan Libaax in Sahil Region

Fig. 12: Cypressus spp. introduced to Daallo mountain during the British colonial period are still thriving – despite of logging activities

5.4.2. Gums

For thousands of years, northern Somalia (now Somaliland and the northeastern region) has been supplying the world different types of gums and resins. It has also been the world's largest producer of the premier two varieties of frankincense (*Boswellia carterii and Boswellia frereana*) locally known as *Beyo* and *Maydi* respectively. These biblical commodities have been filling with pleasant smells, when burned, in the Mosques, Churches, Synagogues, temples and homes for thousands of years.

Boswellia carteri also grows in small quantities in Yemen and Oman. The other type of frankincense (*B. Frereana*) is native only to Northern Somalia, and attempts made to introduce elsewhere ended in failure. These gums come from the mountainous areas of Sanag and Bari regions.
Also the market sector using essential oils is increasing and can be summarized as:

- Perfumes/fragrances and flavors
- Medicine
- Cosmetics/ body care
- Soap/detergent
- Incense/Aromatherapy.

Myrrh (C*ommiphora myrrha*) and opoponax (*Commiphora guidottii chiov*) better known as low-grade myrrh, are found in dry inland locations from the north to the extreme south of Somalia, as well as across the borders

in Ethiopia and Kenya. Unlike *Beyo* and *Maydi*, the Commiphora trees that produce Myrrh and Opoponax are common property, not individually owned and are predominantly exploited by nomadic herdsmen as a subsidiary source of income. In all cases the harvesting and collection is done by pastoralists.

Frankincense production was a small lucrative business before the war. Prior to the war the frankincense trade was state-controlled, but both the trade and its regulatory mechanisms were disrupted during the civil war. Somali gum collectors, who are predominantly nomads, are exploited by the existing merchant chain. The merchants buy gums from collectors at throwaway prices during the harvest period when the gum is plentiful. The collectors are at disadvantage, as in most of the cases the harvest time coincides with the dry season when the nomads can earn the least income from their livestock.

Prior to the civil conflict and during the Barre regime, frankincense stands were nationalized and production and exporting were controlled by the State. The government had lucrative trade agreements with China, France and Germany. Frankincense reportedly sought US$ 6/kilo for mixed raw un-cleaned and un-graded frankincense or both varieties.

Since the collapse of the Somalia State, Saudi Arabia has emerged as a major transshipment point to international markets for most high grade Somali frankincense (*beyo*), myrrh and opoponax gums. The loss of gum trading agreements with China, France and Germany, loss of direct gum shipping access to Saudi Arabia (livestock bans) and emergence of the later as the main international transshipment point for high grades of gum have all contributed to marginalization of Somali traders as regards to direct access to mainstream international markets[15].

5.4.3. Escalation of Charcoal Production

In the past three decades, the rate of deforestation, in response to rising demand for charcoal, wood for construction and thorn fencing, has put severe pressure on the remaining acacia woodland. Biomass is the main and, indeed, the only traditional source of energy for Somaliland population. Charcoal is the principal energy producing fuel commonly used in urban areas for cooking, space heating, whereas firewood is commonly used in rural settlements.

This energy is generated from Acacia species that predominantly grow in all over the the study area particularly *Acacia bussei* which mainly common in the plateau zones where annual rainfall ranges between 150-300mm. Acacia species also have other economical and environmental values. The most important of all is *Galool* (*Acacia bussei*) which is selectively harvested and reduced to remnant forest batches in the country. There is also a gap between consumption and annual increment (regeneration of forests); added to this the country is arid, and normally it takes 25-30 years for an acacia tree to be good enough to produce 3-4 bags of charcoal. (Awale, 2003)
Charcoal production business increased from minimal where several persons using donkeys or camels supplied 4-10 sacks of charcoal each month to the small towns to a large scale proportion where as high as 93,000 sacks per month was supplied to Hargeisa town alone in 2003 according to the Ministry of Pastoral Development and Environment of Somaliland (MPD&E) case study[16] published in 2004.

15 McCarthy, Gerry et.al, *Somali Private Sector Appraisal and Recommendations*, May 2005, International Finance Cooperation & the World Bank

16 Ministry of Pastoral Development and Environment (MPD&E), Somaliland. *Case Study, Impact of Charcoal Production on Environment and On the Socio-economy of Pastoral Communities of Somaliland*, Hargeisa 2004 (Funded by Novib, through Candlelight, Hargeisa).

The Somaliland authorities are commendable for recognizing exportation of charcoal as an illicit trade, for it adversely affects the livelihood of the bulk of the population in the country who derive their livelihood from pastoral production. In most parts of the country, with the exception of parts of Sanag and Sool, which have been a disputed territory between Somaliland and the Puntland State of Somalia for nearly a decade, Somaliland authorities have to a great extent succeeded in prohibiting charcoal export from ports under its jurisdiction. However, large areas in eastern *Sanag and Sool* have been subjected to large-scale commercial exploitation of charcoal. The most recent (February 2006) alarming development is the engagement of hundreds of Ethiopian refugees recruited from Bosaso, to cut and burn trees for charcoal production for local consumption and export. From the proceeds of these activities the refugees will be enabled to board unsafe boats for a minimum fare of $ 40 to take them across the Gulf of Aden to Yemen. The most affected area is the stretch between Badhan and Dhahar where an estimated 60-70 truckloads of charcoal are produced from the area on daily basis[17].

In a study conducted by Horn Relief, more than 1200 trucks of charcoal are produced and exported every month from the Sool plateau to feed the markets of Bosaso, Las Anod, Erigavo, Garowe and Galkaio, which is equivalent to approximately 400,000 trees cut a month. The villages, which currently still export massive quantities of charcoal for national consumption are: Dhahar, Barago-qol and Wardheer located on the Sool plateau. Dahar still exports 20 trucks a day and Barago-qol still exports 10 trucks a day.[18] With the dwindling of *Acacia bussei* trees in areas of the Somaliland, many charcoal producers extended their production grounds to the neighboring Region V of Ethiopia. By February 2003, over 15,000 bags of charcoal burned across the border were transported to Hargeisa. Along the western border with Djibouti, small quantities of charcoal are smuggled on camel backs and on trucks returning to Djibouti. (MoPD&E, 2003)

The exploitation of rangelands for charcoal production is on the rise whereby the local consumption is even too taxing for an arid country like Somaliland. The cutting of trees for charcoal is no longer poor man's business but became highly lucrative business. It is not uncommon lately to see charcoal burners using motor driven saws in the place of the old nomadic axe (*gudumo*).

Trees are not the only victims during the process of preparing charcoal. The various shrub and herb layers in the vicinity of the kilns are harvested and used for the initial ignition. This results in the clearing and baring large areas of the vegetation cover and exposing the surface to the rain drops' splash thus contributing to the acceleration of the erosion processes and its cumulative effect on water retention of soil. Worse than this, myriads of insects and other living organisms are destroyed in the process.

Attempts to reduce charcoal consumption as well as diversification of energy sources were made by few organizations most notably Candlelight which has launched in December 2004 the production of energy efficient mud stoves (*Jiko*) that could reduce charcoal consumption by 40%. Earlier, in 1997-98, the World Conservation UNION (IUCN), and lately the Agricultural Development Organization, a local NGO based in Hargeisa, carried out trainings on the production of ceramic stoves *(jiko)*. Adventist Development and Relief Agency (ADRA) trained local artisans in the production of solar stoves. One or two local enterprises have also attempted the introduction of liquefied petroleum gas (LPG), but are constrained by infrastructural, logistical problems which have had an impact on the affordability of the commodity, as well as the communities' scanty knowledge about LPG[19].

17 BBC Somali Service news item (4 February, 2006), reported by Ahmed Kismayu, BBC reporter in Puntland.

18 Horn Relief, *Environmental Assessment on the Gebi Valley and the Sool Plateau Sanaag region, 2006*

19 Duale, Omer, H. and Magan, Abdillahi H.: *Case StudyAlternative Source of Energy and Reduction of Dependence on Charcoal in Somaliland, Candlelight Hargeisa, (November 2005)*

Fig. 13: An Acacia bussei tree cut for charcoal production

Fig. 14: Stacking of wood before kilning

Fig. 15: Kilning process in progress

Figure 16: Training of artisans on the production of energy saving stoves

The major impact of the civil war is the alarming rate of reduction in the wooded areas of the country due to the increase of charcoal and firewood production that is attributed to the following:-

- Severe economic pressures pushed communities to sacrifice their environment for short-term survival.
- The livestock export ban and the agricultural income reduction made charcoal and wood production an alternative source of income for rural areas.
- The increase of population in urban centers had increased the demand for charcoal.
- Absence of proper forest and woodland management and protection due to the poor capacity of the concerned ministries;
- Lack of affordable alternative source of energy
- Low efficiency of charcoal production kilns whereby more than 40% of the dry wood material is wasted.

5.5.0. Wildlife

The region has been known to be rich in biodiversity with 200 bird and animal species unfound else-where. According to literature going back to the 19th century, most of Somalilands' area was teeming with wide variety of wildlife. There is mention of elephants and rhinoceros around Mandera between Hargeisa and Berbera (Swayne, 1895). Large mammals with several endemic species were concentrated on diverse habitats of the country. These included lions, elephants, Gazelles, Somali Wild Ass, *Dorcatragus Megalotis ('Beyrac')*, *Ammodorcus clarkie* ('dib-tag'), *Gazella soemmeringi*, Oryx *(Oryx gazella)* and so forth. Traditionally, hunting the wildlife for subsistence and economic gain was an uncommon practice and indeed was regarded as the task of the inferiors.

Predators (lions, leopard, cheetah, hyena etc) were controlled by bonfire, which was a common defense mechanism against them before the acquisition of the gun. Pastoralists burned large patches of forest or woodland in places ridden with predators in order to drive them out. However, long before the civil war, some major mammals such as elephants, giraffe etc disappeared whilst the lion, Oryx, *Alcelaphus buselaphus swaynei ('Siig')* and The Somali Wild Ass populations declined significantly and was no longer present in areas where they used to populate.

Reports indicate that lions were very common in the country. Now they only arrive occasionally from Ethiopia and return due to absence of suitable habitats. For some mammals however, positive trend can be reported. This concerns baboons and warthogs, after the decline of their natural enemies such as the lion and the fact that they are religiously or culturally tabooed. Because of the increase in their number on one hand and the decline of wild fruits and grazing abundance on the other, these animals – baboons in particular – have become aggressive in posing havoc and destruction on farmlands. However, it has been reported that the population, gazelles and gerenuks are slowly recovering in some areas particularly in the coastal and sub-coastal zones. A small herd (less than a dozen) of the Somali Wild Ass (*Equus asinus somalicus*), alerted by the IUCN as critically endangered, has been sighted in August 2005, in the mountainous area of Badhaadho to the south of the coastal Shalaw village and north of Hol-hol in western Sanag. This presumably is one of the last refuge of this endemic animal. Wild populations have declined for a number of reasons: For one thing, local people hunt them for food and for use in traditional medicine. (Some people believe the animals' fat is an effective treatment of tuberculosis). Hunting and drought has taken a greater toll in recent years, as political unrest in the area has allowed better access to automatic weapons. Other problems include increase of human populations and the expansion of agriculture. More and more, wild assess are competing with domestic livestock for limited grazing grounds and water sources. And as the wild and domestic animals come into contact, there is more and more interbreeding – another serious threat to the Somali Wild Ass.[20]

Fig. 17: Somali Wild Ass

Fig. 18: A remnant herd of horses grazing Bancade plain, Sool

20 *Deegaankeenna (Our Environment) Newsletter, Volume 5, Issue 25, Candlelight NGO – Hargeysa, Somaliland*

The following table shows the status of some of the mammals and their status. Some of them have become extinct long before the civil war, while the others have shown a very dramatic drop in numbers as a result of the conflict:

Somali name	**Scientific name**	**Likely status**
Cawl	*Gazzella soemmeringi*	Uncommon
Calakud	*Oreotragus oreotrugus*	Rare
Godir	*Tragelaphus strepsiceros*	Extinct
Biciid	*Oryx gazelle*	Rare
Libaax	*Panther leo*	Extinct
Siig	*Alcelaphus buselaphus swaynei*	Extinct
Shabeel	*Panthera panthrus*	Rare
Gorayo	*Struthio (camelus)molybdophanes*	Rare
Garanuug	*Geranuk*	Uncommon
Gumburi	*Equus asinus somalicus*	Rare
Dibtaag	*ammodorcus clarkia*	Extinct
Beyrac	*Dorcatragus megalotis*	Rare

The relative peace and stability in Somaliland has reduced the intensity of the killings compared to the civil war years, although the myriads of charcoal producers, who spend most of their time in the woodlands, are an apparent threat to the remaining wildlife, hunting them for meat. Likewise, the number of horses in the country has been on the decline since the turn of the last century. The warrior Mullah, Sayid Mohammed Abdulla Hassan and his dervishes, used to deploy over thousands of horses during his long struggle with the British authorities (1895-1920).

In East Africa, the European thoroughbred horses brought from the British Isles succumbed to a host of African diseases and as a result, settlers soon cross-bred imported horses with the hardy, sure-footed Somali ponies and started what was to become a substantial herd of resilient country bred horses, adapted to conditions prevailing in East Africa[21].

The decline of the importance of the Somali pony in the Somali culture is a main contributing factor to the drastic reduction in its population. Also competition for fodder resources, exacerbated by the progressing environmental degradation, and establishment of enclosures on prime rangelands for private use has led to the reduction of the free grazing areas available for horses, games and other undomesticated animals to the extent that some enclosure operators either out-rightly killed or maimed the animal by cutting the hamstring, making it unable to move. The most revealing example is the fate of a herd of twenty horses which used to live in Ga'an Libah forest reserve before the outbreak of the war. Abundant fodder was always available for the herd; unfortunately the war has interrupted the grazing management system of the mountain area. Ultimately, the herd was decimated as a result mistreatment and lack of proper care. The lives of some of these animals were terminated as a result of the above mentioned cruel treatment in the hands of the agro-pastoralists living at the vicinity of the Mountain.

5.6.0. Fisheries

The once thriving Somali fishing industry has deteriorated into a 'free for all' equally accessible to the world's fishing fleets. For over a decade, hundreds of vessels from various countries have continuously fished in

21 http://hiddentrails.com/africa/kenya/history-horses.htm

Somali waters in an unreported and unregulated manner. This has had far reaching consequences and may already have had a disastrous effect on the sustainable management of Somali marine environment[22].

With comparatively long coast line Somaliland embraces great diversity and abundance of marine resources. The country possesses rich fishing grounds along its northern coast, which could potentially support a developing fishing industry and contribute to the national food security and socio-economic wealth. The maximum potential catch that could be harvested from Somaliland's marine resources is estimated to be between 90,000-120,000 metric tons a year, but currently less than 5% of that quantity is harvested[23]. However, lack of effective management undermines sustainable exploitation, in particular for shark and lobster fisheries, and threatens endangered species (e.g. turtles).

Despite its economic potentiality and diversity, the people of Somaliland seem to prefer livestock meat and the majority does not eat or even saw fish before. The popularization of fish as a diet is largely constrained by a lack or scarcity of infrastructural inputs (cold storage, ice making machines etc), awareness on fish consumption and outdated artesian skills. Fishing and fishery production could be a good option of development.

On September 1995, Somaliland Law on Fisheries was promulgated to deal with jurisdiction of the Somaliland maritime zone, resources management, licensing and penalties. To strengthen the Law of Fisheries, the Coastal and Marine Resource Policy of Somaliland was approved at the end of 2000. However, fishing communities along the coastline, are deeply concerned of the illegal and unregulated activities of foreign fishing vessels – a sizable number of them licensed by the Government which, paradoxically, does not have neither the means to patrol its own coastline to prevent foreign incursion into the 12 nautical mile National, Coastal Boundary, let alone the 200 mile Exclusive Economic Zone (EEZ) nor the necessary data and surveys of fishing resource densities and potentialities in the sea.

Exploitation of fish by foreign fleets, using sophisticated systems of netting and collecting has lately become more frequent. This threatens the reproductive capacity of unique and rare species.

From 1993 onwards, a major scale of illegal, unregulated and unreported (IUU) fishing operations were being done in the entire coastal areas. The operations were executed by foreigners and nationals using large sophisticated stern trawlers, and long liners that arrived from Europe, America and Far East Asia.

The unscrupulous foreigners were simply taking advantage of the confusion created by the civil war to catch whatever they wanted. Their vessels were widely reported using universally prohibited fishing gear and equipment, including nets with very small mesh sizes and sophisticated underwater lighting systems to lure fish to their traps.[24]

These vessels illegally harvest the unprotected marine resources, incurring heavy destruction on the marine ecosystem including fish spawning grounds, coral reefs, seabed grasses and killing indiscriminately endangered marine spp. such as: dugongs, sea turtles, dolphins and baby whales due to their selective fishing practices. Dredging and hauling of fishermen's gear on board their vessels is also reported. Worse than this, some of the vessels are armed in order to silence the poor fishermen's protestations.

22 *From the Report of the Panel of Experts in Somalia, Pursuant to Security Council Resolution 1474 (2003), PP. 59*
23 Ahmed H.O. Gulaid (Omane): *Feasibility Study Report on the Fishery Sector in Somaliland (April –June 2004), Current Status, Opportunities and Constraints – Discussion Paper*, UNDP Publication
24 Abdulkadir Khalif, How Illegal Fishing Feeds the Somali Piracy, Somaliland Times, Issue No. 200

The above mentioned practices are more common in the Northeast (Puntland) where fishing is richer due to the up swell of the sea in the Horn area.

5.6.1. Civil war impacts on the marine resources

The former Somali government operated a fishing fleet that employed over 30,000 people, and contributed about 2% of GNP[25]. Following the civil war of 1991, which left the entire fishing infrastructure in ruins, both artisanal and the industrial sectors had suffered a lot.

- With the collapse of the Somali government, all the fishing infrastructures such as cold storage, maintenance workshops, and most importantly the Las Korey fish factory were either looted or fell into state of disrepair resulting in the loss of livelihood for thousands of people who eked out a meager existence from the fishing sector.[26]
- The sea has become 'free- for- all'. Anyone can fish wherever and whenever he desires and there is no time frame or seasonal calendar that allows people to fish in certain periods and not to go to sea in the spawning periods of the resource. However, the most serious problem constraining sustainable harvesting of marine resources is lack of investment and growing evidence of significant 'poaching' by foreign commercial fishing fleets inside the 12 nautical mile territorial range of the coast exploited by artisan fisheries..
- Chemicals, industrial refuse or even nuclear wastes are reported to be dumped in some parts of the coast of Somalia. Allegations of waste dumping by European companies have existed for years because they found more cheap to dump wastes in the Somali waters, costing as little as $ 2.5 a ton where disposal costs in Europe are something like $ 250 per ton.[27]

The illegal fishing on the territorial waters of the region has also contributed to the disappointment of the efforts of an enterprising Somali community from the Diaspora who has established a fish factory in Las Qoray. The $1.8m investment is currently lying idle. Although part of the failure of the scheme can be attributed to managerial problems, it is reported that the length and breadth of the coastline is crowded by fishermen from Yemen working for newly established fish factories on the coast of Yemen who are extending their fishing grounds to coasts of Somaliland. The higher prices paid by these marauding fishermen to local artisanal fishermen has a wooing effect on the later; thus contributing to the reduction of fish catches during the peak fishing period from September to March.

The absence of fishing records is another challenge. With its very long coastline and rich upwelling system, the region embraces a great variety and abundance of potentially harvestable living marine resources. The general lack of data on the extent of on-going fishing activities in local waters, in terms of annual catch and fishery methods being used remains a problem for any serious marine resource management.

6.0. WAR IMPACT ON URBAN ENVIRONMENT

The negative impact of the civil war is not limited to the rural environment, but the urban areas had also their share of the destruction. The most noticeable change is the vanishing of the indigenous forests in and around the major towns, most notably Hargeisa, Borama, Berbera and Erigavo. As some of these towns

25 Yearly Fisheries & Marine Transport Report, 1987/88, Ministry of Fisheries & Marine Transport, Somalia Republic

26

27 *www.benadir-watch.com/2005%20News/0318_Munye_dumping_waste.pdf, Waste Dumping off Somali Coast May Have Links with Mafia, Somali War Lords. Alisha Ryu*

and many others were scenes of ferocious battles, both native and introduced amenity trees were lost in the cross bombardments. Following are some of the major environmental issues of great concern in the urban centres:

6.1. Environmental contamination of Ayaha Valley, Hargeysa

During the Somalia civil war of 1988-1990, the Desert Locust Control Organization for East Africa (DLCO-EA) center, situated 4km down-hill and South of Hargeisa city was extensively bombed and destroyed. The center was a storage site for various chemicals used to control migratory locusts in the region. It is estimated that more than 80,000 litres of these chemicals suspected to be pesticides were poured into the ground and the drums used by the returnees for water storage or building houses.[28] According to a UNDP assessment report conducted by Kenya Plant Health Inspectorate Service (KEPHIS), it is believed that most of these pesticides are persistent with strong evidence of environmental contamination and are a risk to upcoming residential areas and the city of Hargeisa.

The report concludes there is high concentration of organo-chlorines pesticides such as Lindane, Heptachlor, Aldrin, Dieldrin and DDT detected in the soil samples which indicate high contamination that can be classified as an example of a catastrophy of mass proportion.

More than a decade later, with 7,000 returnee families (2,000 people) living in the area, the land is heavily contaminated and poses a risk to the settlers as well as the upcoming residential areas and the city of Hargeisa. Over the years, several samples of the soil and water in the Ayaha Valley have been taken by various organizations, but no measures have been taken to address the issue of contamination, until now[29].

The KEPHIS report went on to say that the pesticides are “persistent chemicals which can last in the environment for a long time and can cause acute chronic diseases which can damage the nervous system in human beings. Some may eventually cause cancer.” Deformities in maternity cases and high abortion rates have been reported in the area. The report categorically warns about the risk entailed in settling near the ex-DLCO compound until the entire area is cleansed and rendered free of chemicals.

Further recommendations remarked that a fence be built around the area to keep off both humans and livestock from entering the area and to relocate the people living around the contaminated compound and downstream. In addition, the compound should be roofed to prevent rainfall washing the chemicals downstream. The roof should be sufficiently strong by being fortified with a waterproof concrete slab. The recommendations further suggest that a proper clean-up of the area was described as “essential” and further, an analysis and monitoring of blood and/or breast milk from residents was seen as necessary to ascertain the health of residents living in the Valley.

6.2. Berbera Missiles Storage Site

In the coastal town of Berbera, a defunct missile site formerly managed and run by the Somali National Air Force had two underground tanks that are believed to contain Fumicnitric Acid and TONKA fuel. This was the supply of fuel for the 92 unarmed SAM-2 Missiles that were stored on the site. The warheads of these and the armed missiles that were on the launchers have been destroyed by the Danish De-mining Group,

28 Rhonest Ntayia and James Kinyua, *Environmental Contamination of Ayaha Valley, Hargeysa, Somaliland*. A KEPHIS/UNDP Project, 2003

29 *http://www.somalilandnet.com/, Apr 28 2004*

but according to John Dingley, UN Mine Action Chief Technical Advisor, the problem of the fuel still remains. He believes that 'this problem is well outside the scope of the Mine Action programme and requires experts on toxic waste disposal. There is potential for massive environmental damage and loss of life should these tanks rupture or be tampered with'[30].

6.3. Depletion of Urban Forest Stands

The most damaging phenomenon is the keeping of domestic animals primarily goats and secondarily camels and cattle in the towns. One main reason for this is the falling of household economy which urged owners to keep such domestic animals at hand for their milk either to sell or for feeding their children. The absence of control and protection mechanism gives the residents a free license to indiscriminately cut trees for fencing, firewood and poles. It is not unfamiliar to see in the Sha'ab area of Hargeisa herds of camels browsing the remaining acacia forest and spineless cactus *(Opuntia fiscus indica)* while the residents cut the very trees within their compounds for fencing and firewood. This phenomenon is exacerbated by the presence of thousands of internally displaced persons (IDPs) who depend on these remnant trees for shelter material. It also became habitual for some members of the business community to cut trees in front of their buildings on the pretext of discouraging squatters establishing petty businesses such as teashops and kiosks under the trees. There is no government mechanism to protect these trees from abuse and cutting.[31]

6.4. Denudation of Batalaale *Conocarpus lancifolius* Plantation

Batalaale plantation was established in late 1945, to serve as a windbreak and to stimulate the weather of Berbera during the hot summer days and for its aesthetic value as well. This was a good start initiated by J.J. Lorry, the forester of the Department of Natural Resources (DNR). Before the afforestation programme was started, the area was dominated by (*Suaeda fruticosa*) and other salt tolerant bushes and shrubs. A wide scale planting of date palm and *Conocarpus lancifolius* was carried out during the period 1945-1950 with an impressive output of 12,000 trees (raised in the local nursery of Berbera). This was following by another large scale planting of *Concarpus lancifolius*from1975-78. Moreover numerous shallow wells were dug for watering the trees.

After the collapse of Siad Barre's regime many returnees who previously fled from Berbera or surrounding villages settled near the plantation and started cutting the trees for shelter materials and firewood and building materials. The habit of keeping camels and shoats by some residents and indiscriminately lopping trees in order to feed the animals had its detrimental effect on the micro forest of Batalaale and thus makes any effort to reverse the trend almost impossible. There is now a small reforestation trial site surrounded with wire fencing to ward off the browsers. Interestingly, the area is now being colonized by *Prosopis juliflora*

6.5. Garbage and Solid Waste materials

With the increase in urban population, the inadequacy of municipal services and the low environmental awareness of communities, the major towns in Somaliland are heavily littered with waste materials. The most pervasive sight is the plastic bags which are, in local parlance called "Hargeisa flowers" because they pop up everywhere in and around the city. Somaliland passed in January 2005 a law banning the importation of plastic bags, which its Information Minister, H.E. Abdillahi M. Duale, called it, in addition to its environmental problem, an "eyesore"; the law has not appeared to put much of a dent in the problem. Paradoxically there

30 John Dingley. *Briefing Note on Berbera Missile Site Toxic Fuel Tanks, 4th August 2003*

31 *Awale Ahmed I,, The Vanishing Trees of Hargeysa. An article from Deegaankeenna "Our Environment" Newletter by Candlelight NGO, Hargeysa, Somaliland, Issue Paper nº 24, October 2005*

is a plastic factory producing these bags in Hargeisa. In the rural areas, the bags are contributing to the vulnerability of the pastoral and agro-pastoral communities as they are a cause of death for a substantial number of their livestock who are driven by hunger to devour them.

6.6. Invasion of Honey Mesquite (*Prosopis juliflora)*

Interestingly, while the indigenous trees are dwindling as a result of over-exploitation, Honey Mesquite *(Prosopis juliflora)* has been aggressively establishing itself every where. The Somali name is *'Garanwaa'*, literally meaning *the Unknown* was probably coined by returnees from the Ethiopian refugee camps, when they noticed, on return, this unknown, quick-spreading invader tree which annexed large areas within the towns, their surroundings and farmlands.[32]

Prosopis juliflora and *Prosopis chilensis* were first introduced in Somaliland as early as 1950 in Bulahar town (135 km north of Hargeisa) at the Gulf of Aden coast by a British officer called Mr. Dawson for use as a windbreak for a date palm plantation project. It was noted that *P. juliflora* adapted well in the area, while *P. chilensis* had shown a very poor result under such harsh environmental conditions.

However, the plant was a prime choice for some development organizations involved in the support of the ethnic Somali refugees displaced by the 1977 Ethio-Somali war – better known as the Ogaden War, for re-afforestation programmes. The impressive growth of the plant was a major incentive for its introduction. FAO was instrumental in the distribution of the seeds through other organizations as noted by a FAO program officer for Somalia during a discussion in August 2005. In late 1980s, the plant was also extensively propagated in the permanent and temporary trees nurseries in the Regions of Togdheer, Sahil, Hargeisa and Awdal. However, with the exception of the above mentioned refugee camps, the plant was unheard of in the other parts of the country till the outbreak of the civil war (1988). However, it is worth noting that there were few 'pioneer' trees found in Hargeisa, which were planted in the late sixties' whose source can be traced to the Bulahar plant community mentioned above. These few 'pioneer' trees have luxuriant shades and are still sturdy and healthy looking.

From 1985 to 1987, the Overseas Education Fund (OEF), an American NGO in collaboration with the National Range Agency (NRA) had extensively distributed and supervised the planting of *Prosopis* in the refugee camps of Agabar, Laas Dhuure. The GTZ carried out the same activity in Biyo-xidheenka, Sabacad and Daray-Macaan in 1987 and 1988 respectively.

As reported by residents at Bio-xidheenka abandoned refugee camp at the eastern periphery of Hargeisa, the seeds stored in the temporary nurseries within those camps were ransacked by humans then unknowingly dispersed in the camps where they germinated extensively and thus the high concentration of *Prosopis* within former refugee camp sites.

32 Ahmed Ibrahim Awale & Ahmed Jama Sugule*: Invasion of Prosopis juliflora in Somaliland: Challenges and Opportunities. Candlelight NGO, Hargeysa, Somaliland. 2006*

Fig. 19. A honey mesquite (*Prosopis Juliflora) bush crowding an alley in Hargeysa*

7. CONCLUSION

The civil war and subsequent anarchy has had wrought a deleterious ecological change in the study area. There are clear indications that the loss of bio-diversity due to ecological and anthropogenic factors has reached unprecedented levels. This considerable deterioration of the 'exceptionally high degree of endemism' which characterized the region is an immense loss for all human beings. Even before the war, the area has attracted little conservation efforts by the international community and what has occurred has been too little and too late with no long term planning and involvement. As a result a habitat degradation and uncontrolled hunting, 71 species are threatened (IUCN, 1992) of which 20 (28.8%) are mammals[33].

The breakdown of governance had resulted not only in making the natural resource management systems non-existent, but also made possible the emergence of a state of uncontrollable human greed where resources are misused or over-exploited, urging some to make the most out of everything available as a 'short cut to richness'.

The traditional self-regulation also failed to protect pastoral common land ownership from private ownership. This created a sense of helplessness among different communities that led to constant conflicts and loss of lives. The most lamentable thing is the on going destruction of the rangelands where more than half of the population of Somaliland eked out a meagre livelihood through livestock production. The once resilient, proud, resourceful and self-sufficient communities are reduced to destitution. This resulted in continuous drift of rural communities to urban areas and the formation of ever-expanding settlements and internally displaced persons (IDPs) thronging the towns with little prospects for employment and decent life. The diminishing herd sizes, the continuation of livestock ban and the adoption of some of the urban diets, lifestyles and habits, most notably *Qat* addiction, has urged many pastoralists to turn to charcoal production as a copping strategy to supplement their income. With the current rate of deforestation, it can be claimed that the pastoral mode of living in its traditional form is on its way to obliteration as condition in there are becoming unbearable year after year. Although Somaliland is blessed with rich marine resources, its population utilizes very limited seafood. As a predominately pastoral society, their staple diet is mainly meat and milk supplemented with cereals. The civil war has worsened the situation of fisheries in the country. Not only did it disrupt all aspects of the fishing industry in the country, but also paved the way for other nations to illegally exploit the national sea resource. Given the dwindling livestock numbers and the rising urban populations, corresponded with the increasing meat price, the planners should thereon turn their attention to the developing of fishing sector

33 Malte Sommerlatte and Abdi Umar, *An Ecological Assessment of the Coastal Plains of North Western Somalia (Somaliland)*, IUCN, 2000

and the protection of the territorial waters from illegal fishing.
Somaliland has been in existence now over a decade, maintaining a semblance of peace and stability, and had established the structures of a democratic state and its institutions. However, the state of non-recognition by any government is simply denying her access to much needed resources from the international community for its socio-political development, as well as for the protection and conservation of its environment.

The situation of the natural resources in the country will continue to deteriorate further in the foreseeable future unless a concerted effort is taken by the Somaliland administration and the international community, to mitigate this deleterious and unhealthy trend, which will lead to the heightening of the poverty levels not only in the study area but also in the region as a whole.

8.0. SUGGESTIONS AND RECOMMENDATIONS FOR CONSERVATION OF NATURAL RESOURCES

8.1. General Recommendations

Somaliland appears to be countering chronic problems related to mismanagement of the natural resources and decline on the production systems during the past 18 years. This was due to the cumulative effects of civil war, recurrent droughts, severe economic situation and the low capacity of the post-war institutions that are unable to enforce rules and regulations designed for proper management of resources and their wise utilization.
To mitigate the on-going environmental degradation processes and improve the production systems of the different economic sub sectors, it is recommended that the following measures and issues be taken into consideration and addressed holistically or sector-wise:

1. A comprehensive land suitability and capability survey is highly essential to be carried out in the country in the near future in order to get the land classifications that could determine the land use pattern of the country. This will provide the essential information for land use management.
2. The institutions that are involved in the management of natural resources are fragmented in the sense that they do not collaborate. The five Ministries: Agriculture; Livestock; Pastoral Development and Environment; National Environmental Research and Disaster Preparedness (NERAD) and Ministry of water and Mineral Resources often compete rather than cooperate for the management of the natural resources. The mandates and responsibilities of each had not been clearly defined for them and this bureaucracy had resulted in duplication of efforts. Thus to mitigate further deterioration of the state of the natural resources, it is recommended that these ministries should explore mechanisms for better coordination as well as review of their different mandates.
3. A rural development coordination body with its own steering committee and a secretariat be established. The body will consist of the national institutions, the local and international NGOs, the UN agencies engaged in the natural resources management. To make this possible it is essential to take into consideration the lessons learned from recent past coordination bodies in the natural resource management sector which had failed to serve the purpose mostly due to low commitment from the heads of concerned ministries.
4. Most of the professionals in the natural resource management sector have either been lost in the war, switched to other professions or have left the country. The remaining low number is ill-paid, lacking motivation and refreshment trainings. They are not in pace with the latest developments in the science of natural resources management. It is a high time that a new blood has to be injected into these sectors. Inclusion of a human resource development component in the budgets of development organizations,

aiming at building the capacities of the staff of the Ministries concerned as well as funding scholarships in the areas of rural development and natural resource management is recommended.

5. Environmental databases should be established in Somaliland, as a matter of urgency. Such databases should contain information on land use, natural resources, soil, water, vegetation, forests, charcoal and firewood/alternative energy, and livestock data as well which can be accessed by government institutions, local and INGOs and UN agencies for planning and setting up of development strategies and plans .

6. Monitoring of livestock feed resources is a more relevant indicator for pastoralists than crop production. The livelihood food security of pastorals relies not only on forage production but on access to forage. Adequate production of the later does not guarantee that all pastorals have livestock feed entitlements. Pastoralists' entitlement to feed resource is determined by other factors such as land tenure, infrastructure, border conflicts, etc. The case of water is very similar to that of forage. Government institutions, community-based organizations, NGOs, etc. could intervene to improve pastoralists' access to their key resources. Hence, effective interventions with the aim of promoting, protecting and providing pastoralists entitlements ought to be embarked.

8.2. Specific Recommendations

1.1.1. Agro-pastoral production systems

The following recommendations are made to reduce or alleviate the problems haunting the sector and hampering its progress:

- Farmers be encouraged in using animal traction for cultivation rather than depending on the expensive and less available tractors. The advantage of animal traction use is that whenever it rains the farmer will immediately plough his/her land while it takes him/her some time to get tractor causing him/her to miss number of rainy days. The other advantage of oxen plowing is that it costs less. Also improvements on the traditional ploughs are necessary in order to increase the cultivable area. Currently an area plowed in one hour by tractor takes ten hours for oxen.
- Public awareness on the consumption of local foods and improvement of their processing technique is deemed necessary in order make them easier to cook and ultimately contribute to the increase of food production.
- Agro-pastoralists be encouraged to practice agro-forestry by growing leguminous trees such as leucaena along the borders of their fields and grow crops in the middle. This will have the following advantages:
    - The trees will act as windbreak and help reduce sheet erosion
    - *Leucaena* is a nutritive feed for animals and will also increase soil fertility due to its nitrogen fixation capabilities.
    - It could also be used as firewood.
- Farmers be provided with appropriate and proper tools for rehabilitating the existed bunded areas. Rehabilitation of the old canals and construction of new ones, in the spate-irrigated areas of Togdheer will assist in boosting crop production and reduction of the food insecurity situation prevailing in the area.
- Farmers to adopt crop diversification approaches i.e. growing sorghum, sesame, cowpea, chickpea and beekeeping, rather than depending than a single crop.
- Farmers' training on proper agronomic practices be intensified on the intention of improving the technical know-how of the communities involved in farming.

- As soil erosion is a major cause of the on-going environmental degradation, mainly resulting from deforestation, poor soil permeability, unsound cultivation practices in sloppy areas and with water retention structures destroyed and the loss of grass cover due to recurrent droughts and grazing pressure, it is recommended that a comprehensive watershed management programmes be carried out in the most affected fragile rain fed areas.

Fig. 20: Rehabilitation work in Gacan Libaax: Rockdams

- Conflicts related to land use – both in the rural and urban areas – have been on the rise. Revision of the existing land tenure laws in the light of the current developments is crucial. However, even the few existing land management policies are dormant due to weak institutional capacity and/or lack of the necessary resources for implementation. Therefore, mechanisms to capacitate the concerned institutions are crucial. The supporting role of the international development partners will be critical here, especially to spearhead the mobilization of resources and the contribution of the technical know how required.
- Since climatic variances in the study area is very high and people often have to cope with long and harsh periods of little or no rain, it is vital to establish a meteorological network system which will help in the surveillance, monitoring and early warning of climatic conditions that could have an adverse impact on the livelihood situation of the communities.

Figure 21: Destitute pastoralists engaged in cash for work environmental rehabilitation activities at Harada Gubato Xil, Togdheer.

Figure 21: Communal range reserve showing improvement of shrub and herb layers after a resting period of six months.

1.1.2. Irrigated Agriculture

1. For the encouragement of the growth and development of irrigated farm sub-sector, a proper tariff system that could contribute to increase the local farm produce and protect it against the flooding of similar products from neighboring countries, especially Ethiopia and Yemen, should be put in place.

2. Improvement of accessibility to farming areas to upgrade and enhance marketing of farm products through rehabilitation of feeder roads and opening of new ones
3. Improvement of the availability of irrigation water by introducing more efficient irrigation techniques such as drip irrigation and constructing sand storage/ sub-surface dams across river beds.
4. Introduction of the solar and wind power for water extraction to substitute the expensive fuel operating pumps.
5. Working out ways and means of establishing light industries for preservation and processing fruit and vegetable produce.
6. There is a need for an early regulation on the use of pesticide and herbicide in the country. Equally important is the education about the persistent and unsound application of these substances and their effect on human, animal and plant life or health.
7. Placement of plant quarantine to prevent introduction and/or spread of pests and phyto-sanitary regulation.
8. Improvement of farmers' management skills through trainings.
9. Rehabilitation of cemented conveyance canals in order to reduce the loss of water through ground seepage and conduct scheme to address river bank erosion which leads to continuous loss of productive land.
10. Feasibility study on land use, water, vegetation cover and soil type in line with its productivity.

8.3.0. Pastoral Production System

To address the problems that are adversely affecting the pastoral communities and alleviate the prevailing food insecurity risks resulting from the cumulative effects of the civil war, droughts etc, the followings are recommended.

1. Establishment of an early warning system by the concerned institutions in consonance with the organizations already functional in early warning and drought monitoring.
2. The draft Land Tenure Law, which is an integration of the Natural Resources Protection & Conservation Act (04/98) and the Agricultural Land Ownership Law (No. 08/99) which were sponsored by the two ministries (Pastoral Development & Environment and the Ministry of Agriculture) ought to be legislated. The integration initiative is already jointly endorsed by the two ministries. The initiative will definitely strengthen the legal instrument at the disposal of authorities, coalesce the collaborative efforts of the two key ministries and do away with the split roles and overlapping jurisdictions of the two ministries.
3. Establishment of an extension service network which will be responsible for passing the relevant messages for a sustainable use of available feed resources.
4. Adoption of a preventive rather than curative livestock health policy by the ministry of livestock.
5. Re-establishment of veterinary laboratories, clinics and health posts.
6. Empowerment of pastoral communities through trainings, awareness raising and establishment of pastoral associations in such a way that their concerns are well-articulated and voices heard.
7. Exploration of alternative markets than the traditional ones in the Gulf and improvement of livestock marketing strategies.

8.4.0. Forests and Forest Products

To curtail the alarming deforestation rate that is currently in progress in all over the country, the following recommendations are made:

1. Awareness raising on better management of the natural resources and protection of the environment.
2. Reduction of energy wastage during charcoal production by way of improving the kilning process.
3. Promotion of the use of the energy efficient charcoal stoves which can reduce consumption by 40%[34]
4. Promotion of solar cookers and researching the development of more versatile and economic versions.
5. Introduction and popularization of the use of kerosene and liquefied petroleum gas (LPG) rather than depending on charcoal alone.
6. Studies aimed at determining the magnitude, quality and economic aspects of exploitation of local coal deposits are to be undertaken.
7. Community education on alternative energy and social marketing for the introduced alternative energy sources
8. Exemption of tax on kerosene and all energy saving appliances
9. Familiarisation of communities with current and potential uses of *Prosopis juliflora* – mainly for firewood and charcoal, other than its pods which is favored by livestock.
10. It is also crucial to implement environmental rehabilitation interventions through establishment of grazing reserves, soil erosion, control and establishment of bio-diversity reserves, soil conservation and planting programmes, This will not only create employment opportunities for the pastoral communities but will also contribute to the restoration of the environment and continuation of the pastoral system in one form or another. Full participation of communities in all stages of such interventions is also important.

Fig. 22: Rehabilitation work in progress in Gacan Libaax – A Candlelight project

11. Expansion of the few existing tree nurseries and performance of species trials on fast growing ones.
12. Any intervention that seeks to control the scale of indiscriminate tree cutting, or, rehabilitate the environment will prove difficult to implement successfully without improving the livelihoods of the community. The living condition of many families in the area is dependent on the charcoal production income. This is particularly true for the returnees from the refugee camps and the internally displaced people (IDPs). Had employment opportunities and income diversification been created for these people, the chances of curbing environmental destruction could be increased. Therefore, means of improving the livelihoods of the pastoral communities ought to be worked out. On the other hand, it would be better to create alternative income earning activities for those with agro-pastoral backgrounds such as bee keeping, poultry farming, revolving fund, agro-forestry and agro-pastoral as well as to provide them with other financial and technical assistances to improve their farming production.
13. Increase of wood supply through agro-forestry in farming areas by introducing village woodlots. The depletion of woodland resources due to charcoal production is the most serious environmental issue in the country. There is a need to prevent the indiscriminate cutting of trees and to ensure trees will be conserved on sustained yield basis.

34 *Karekezi S. & Ranja, Timothy, Renewable Energy Technologies in Africa, AFREPREN, Zed Books , (1997)*

14. Over-tapping of frankincense and Myrrh trees causes them to die. Awareness raising on the traditional tapping of tree stands on agreed rotational basis determined by the plantation co-owners is recommended in order to allow trees to recuperate.
15. The uncoordinated marketing of Somali gums causes an oversupply in the Middle East markets, particularly Saudi Arabia and United Arab Emirates (UAE), where they are transshipped to European markets, resulting in decline of the price at the collector level at which he is always in debt. Fair trade companies could be a means of cutting the long business chain by bringing in a new system whereby the collectors could get fair prices for the gums. Undoubtedly, pastoralists and poor urban dwellers will benefit by earning more income from their labor.
16. Participatory community empowerment in the form of trainings and awareness raising. This should be parallel with any government initiative towards environmental salvation and protection.
17. Diversification of pastoral economy by introducing bee-keeping, commercialization of marketable forest resources, henna (*lowsonia inermis*) and *Qasil (*ground leaves of *Zizyphus spina Christi)* etc.

8.5. Wildlife

1. The Ministry of Pastoral Development should strengthen the enforcement of wild life protection act which stipulates that game should not be killed, exported or kept as a pet.
2. Continuous surveillances should be conducted on the size and condition of existing wildlife species in the country.
3. Community awareness on the protection of the wildlife.

8.6. Fisheries

1. Regulation of foreign fishing activities, with regards to fishing methods used and type of catches. This will need resources that are outside the capacity of the Somaliland government. For the government of Somaliland to take the responsibility of regulatory services, marine environment protection, monitoring, surveillance and control of its exclusive economic zone (EEZ), the concerned ministry ought to be capacitated through trainings and infrastructural inputs.
2. Creation of marine protected areas (MPAs) and activities to conserve the reefs be carried out.
3. Community awareness raising on the consumption of fish as a means of contributing to filling the nutritional gap of communities as a result of the rising meat prices.
4. Training and material support for artesianal fisheries in order to increase production and effect sustainable utilization of the marine resources.

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