



The State of the Environment in

Somalia

A Desk Study

United Nations Environment Programme



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A NOTE ON DATA SOURCES, NOMENCLATURE AND MAPS

This Desk Study used the term “Somalia” to describe the official, internationally recognized country. “Somaliland” and “Puntland”, although self-declared states, are not currently recognized by the international community. Note, however, that the designation of geographical entities in this report does not imply the expression of any opinion whatsoever on the part of the publisher or the participating organizations concerning the legal status of any country, territory or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The term “Somali” is used equally to denote the people of this country as well as the predominant language spoken.

It is not uncommon to discover several permutations of the spelling of a place name, establishment or feature in Somalia. Every effort has been made in this Desk Study to be consistent with such spellings but, again, attention is drawn to the fact that these should not be taken as the definitive description.

Because Somalia has been in a state of instability since the fall of the regime of Mohamed Siyad Barre in January 1991 – and, actually, to a considerable degree since the outbreak of civil war in the late 1980s – the lack of functioning government institutions has meant that statistics tend to be unreliable or non-existent. Despite best efforts to verify data, statistics cited in the text or tables should be viewed with caution.

Executive Summary

The Indian Ocean Tsunami of 26 December 2004 affected part of Somalia, with most of the damage experienced in the north-east along a 650 km coastline stretching from Xafuun in the Bari region, to Garacad in the Mudug region. About 44,000 people are believed to have been affected by the tsunami.

As part of its response to the Indian Ocean tsunami, the United Nations Environment Programme (UNEP) conducted a short study on tsunami-affected areas of Somalia in February 2005 to identify possible environmental impacts of this natural disaster which might have posed a threat to human health and livelihoods. Two main issues of concern were highlighted:

- the possible existence of tsunami-related hazardous and other waste that might pose a health hazard to the population and a threat to the environment; and
- the lack of up-to-date information on the state of the environment in Somalia, including lack of accurate data on the impact of the tsunami on the people.

Following the release of these preliminary findings during UNEP's Governing Council (20 February 2005), UNEP was requested by the Somalia Transitional Federal Government to conduct a detailed Desk Study on the state of the environment in Somalia. It is against this background that this Desk Study has been prepared.

Findings of the Desk Study indicate that not much information is available with regard to many aspects of natural resources management, although there is still sufficient evidence to highlight a number of concerns over recent and current patterns of natural resources use. On the one hand Somalia is experiencing significant environmental problems, including deforestation, overfishing, overgrazing and soil erosion, while on the other it lacks both human and financial resources as well as a political structure and stability sufficient to allow these issues to be addressed at even the most basic level.

These problems have been compounded by a series of droughts over much of the country. Large numbers of people have died as a result of drought and starvation, and many livelihoods have been undermined as livestock herds succumbed to drought and food shortages. Heavy rains and flooding typically follow periods of drought, only adding to the burden which people may have already experienced.

The study makes three key overall recommendations that should form the centre of the recovery programme in Somalia:

- strengthening environmental governance to ensure the sustainable management of the country's natural resource base;
- conducting environmental assessments to guide the setting of priorities for environmental recovery, resource management and development planning; and
- revitalising environmental co-operation with neighbouring countries and within the region, in order to support peace building, enhance important environmental initiatives, and share knowledge and information.

In addition, the study recommends specific interventions for immediate action. They include:

- proper management of waste, including effective containment and/or clean-up of all remaining stocks of pesticides in the country;
- institutional development and strengthening;

- control of soil erosion;
- fisheries management including taking measures against illegal fishing by foreign vessels;
- improved and controlled charcoal production;
- conducting field-based environmental assessments to inform future decision making; and
- improving national disaster preparedness and response capacity.

Recommended interventions for medium-term action include:

- reclaiming the protected area network;
- protection of marine resources;
- sustainable management of forest and woodland resources; and
- development of an adequate policy and legal framework for environmental management.

Rebuilding Somalia will take time and a huge, concerted and sustained effort by the international community as well the country itself. The formation of a Transitional Federal Government, and its installation in Somalia in June 2005, offer the first glimmer of hope that the situation might be improved.

Introduction

Somalia occupies much of the 'Horn of Africa', so it has long coasts on both the Gulf of Aden and the Indian Ocean. It is a large, relatively flat country, with an arid or semi-arid climate and prone to severe droughts and floods. Its ten million or so people mostly support themselves through nomadic pastoralism and agriculture. They are among the poorest in the world, and although too few data are available to allow the country to be ranked relative to others according to the Human Development Index (HDI), it is believed to score very poorly on all HDI indicators.

This is very largely the result of internal conflict, which began in the late 1980s and intensified following the fall of the Siyad Barre government in 1991. There has been no functioning national government since then, leaving the country open to fragmentation among competing local interest groups, and its natural resources vulnerable to theft by foreign interests and over-exploitation by local ones. There is a self-declared state calling itself "Somaliland" in the north-west, and a self-declared autonomous region calling itself "Puntland" in the north-east, while various warlords in "Jubbaland" continue to vie for control over Mogadishu and the southern regions. Meanwhile, Somalia's rich fishery resources are being systematically looted by unlicensed foreign-flagged fishing boats, and its forests stripped for export-oriented charcoal production.

Steps towards repairing Somalia began with a National Reconciliation Conference, hosted by the Government of Kenya in 2002 under the auspices of the Inter-governmental Authority on Development (IGAD). This resulted in a 275-member parliament being selected, which elected a speaker in September 2004 and President



UN Emergency Relief Coordinator, Jan Egland during a 3 day trip to raise awareness on Somalia's problems, Wajid, Somalia. © R. Sigheti/AFP/Getty Images

Abdullahi Yusuf Ahmed in mid-October 2004, to lead a new Transitional Federal Government (TFG). Insecurity delayed the TFG's entry to Somalia until June 2005, when a base was established at Jowhar, north of Mogadishu.

Meanwhile, the Indian Ocean tsunami of 26 December 2004 killed about 300 and affected the livelihoods of some 44,000 people along the north-eastern coastline in "Puntland", particularly in the Hafun (Xaafun), Iskshuban, Bandarbeyla and Jerriban areas. As part of an overall response to the tsunami by the United Nations Environment Programme (UNEP), a desk study assessment of its impacts in Somalia was prepared early in 2005. Preliminary findings were presented to UNEP's Governing Council on 22 February 2005 (UNEP, 2005), highlighting two main issues of concern:

- the possible existence of tsunami-related hazardous and other waste that might pose a health hazard to the population and a threat to the environment; and
- the lack of up-to-date information on the state of the environment in Somalia, including lack of accurate data on the impact of the tsunami on the people.

Other issues that have come to light following the tsunami are salinization of fresh water resources – rendering them unfit for human or animal consumption – while some areas have experienced considerable deposition of sand and debris.

Following the release of these preliminary findings, UNEP was requested by the Somalia TFG to send a fact-finding mission to the country to investigate the alleged existence of tsunami-related hazardous waste, and in addition, to conduct a more detailed and extensive desk study on the state of the environment in Somalia. This resulted in a UN inter-agency technical fact-finding mission led by the UNDP Humanitarian/Resident Coordinator, and comprised of experts from UNEP, FAO and WHO. The mission visited three key populated coastal locations stretching over 500 kilometers during the period of 25-29 May 2005, at Hafun, Bandarbeyla and Eyl. The immediate objective was to establish whether there have been any associated risks to human health and the environment from any combinations of hazardous waste and the tsunami. The findings pointed to the need for a more comprehensive assessment of the natural environment of Somalia, including further investigations on hazardous waste.

In further response to the request by the Somalia TFG, this report is an attempt by UNEP to review the state of the environment in Somalia after so many years of conflict, as well the recent tsunami which clearly affected certain parts of the country more than others.

This Desk Study can also be used as a first step to integrate the environmental agenda in the Somalia recovery and development process and as such, the report aims to help to trigger political support to environmental governance in Somalia and thereby contribute to the nation building process.

Country Context

Geographical features

Location

Somalia is Africa's easternmost country, and is bordered by Kenya to the south, Ethiopia to the west, Djibouti to the north-west, the gulf of Aden to the north, and the Indian Ocean to the east. It has a land area of 637,540 km², and a coastline of 3,300 km, the longest of any African country, 1,300 km of which is on the Gulf of Aden and the other 2,000 km on the Indian Ocean. The country stretches for almost 1,550 km from north to south between latitudes 12°00'N and 1°37'S, and 1,095 km from west to east between longitudes 41°00' and 51°21'E (see Somalia: General map).

Physical features

Somalia is underlain by rocks dating from pre-Cambrian to recent times. The north is severely affected by faults and fractures. Pre-Cambrian rock and sandy limestone from the Cretaceous and Jurassic periods constitute the main sources of sandy soil that occur widely throughout Somalia (Herlocker et al, 1997). In the north, a maritime plain (the *guban*) parallels the Gulf coast, varying in width from about 12 km in the west to as little as 2 km in the east. The *guban* is scrub-covered and crossed by broad shallow watercourses that flow only in the wet season, when the vegetation is quickly renewed and provides important grazing for nomad livestock.



A young Somali girl takes care of her family's sheep, Jowhar, North of Mogadishu. © Simon Maina/AFP/Getty Images

Somalia is for the most part a flat country, but there is rugged country in the southern and central regions and inland from the *guban* are the precipitous north-facing cliffs of the Karkaar range, which extends from the north-western border with Ethiopia to the tip of the Horn. These are the highest mountains in Somalia, up to 2,000 m high and peaking at 2,407 m with Shimer Berris in Sanaag region (EC/IUCN, 1993). To the south, they descend to an elevated plateau devoid of perennial rivers. This region of broken terrain, shallow valleys and usually dry watercourses is known as the Ogo. The eastern part of the Ogo gently slopes towards the Indian Ocean and, in Central Somalia, constitutes the Mudug plain. An important feature of this region is the Nugaal valley which has an extensive network of seasonal watercourses. The western part of the same plateau is crossed by numerous valleys and dry watercourses. This plateau again slopes gently southwards and merges with the *Haud*, a broad undulating area that is some of the best grazing land for nomads, despite a lack of rainfall for more than half the year. Enhancing the value of the *Haud* are natural depressions which become temporary lakes and ponds during the rains. South-western Somalia is dominated by the country's two permanent rivers, the Shabeelle and the Jubba, and favourable rainfall and soil conditions make this riverine area a fertile agricultural zone and the centre of the country's largest sedentary population.

The coastline consists of a series of sandy beaches interrupted at intervals by rocky cliffs, some of which protrude into the ocean. With a total area of 35,000-40,000 km² (UNEP, 1984), the continental shelf is generally narrow, rarely exceeding 15 km in breadth, but drops off sharply into deep water. Only between Ras Asir and Ras Hafun on the north-east coast does the shelf extend to almost 80 km in some places.

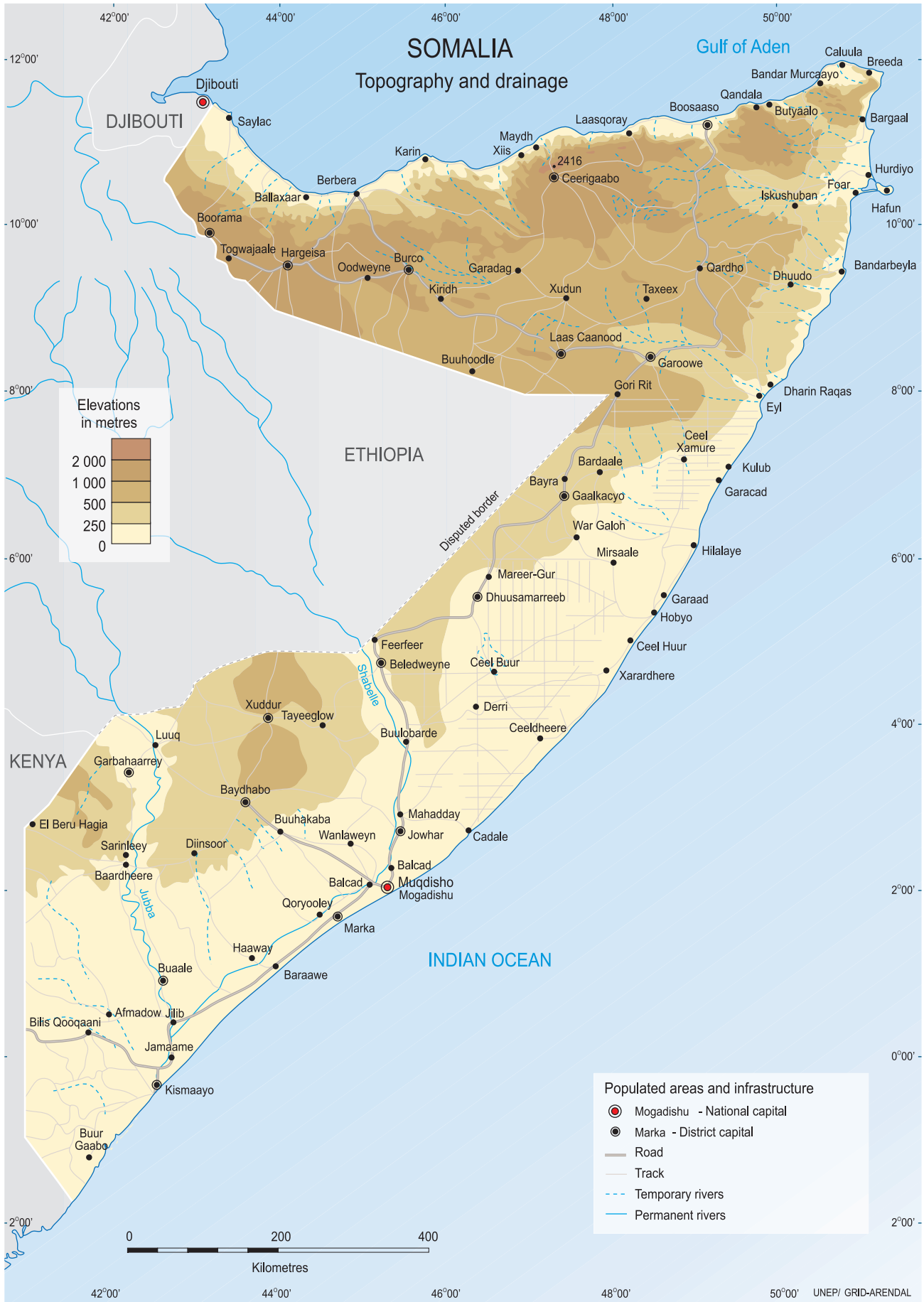
Climate

The climate varies among locations between tropical and sub-tropical, and between arid and semi-arid. Temperatures inland average 28°C, but may be as low as 0°C in the mountain areas and as high as 47°C along the coast. The average annual rainfall is about 280 mm, although this can reach 500 mm in some areas, such as the western Ogo highlands (Hughes and Hughes, 1992), and precipitation is generally both negligible and erratic, with seasonal totals being highly variable. Droughts occur every 2-3 years and are often followed by devastating floods, particularly in the south where the Shabeelle and Jubba are vulnerable to heavy rains in the Ethiopian highlands. Between 1961 and 2004, 18 floods were recorded in Somalia, killing 2,671 people and directly affecting the lives of almost 1.8 million. In the same period, there were 12 droughts that killed 19,671 people and affected almost four million (Columbia University, 2005).

Erratic and unreliable as they are, there are seasonal patterns of rainfall that are strongly influenced by the Inter-Tropical Convergence Zone (ITCZ), the north-south movement of which results in two dry seasons and two wet seasons each year. The *Jilaal*, from January to March, is the harshest dry season and results from dry north-easterly winds sweeping down from the Arabian Peninsula. This is followed by the *Gu* rainy season from April to June, then the *Hagaa* dry season from July to September, during which sea breezes from the Indian Ocean help cool at least the southern parts of the country. The cycle is completed by the *Deyr*, a short and unreliable wet season in October and November. The coastal region in the south around Mogadishu and Kismayo has an additional rainy season, the *Xagaaye*, in July and August, during which there may be isolated showers. Livestock husbandry and farming are adapted to this climatic regime, with herds being concentrated around water sources in the *Jilaal*, but driven to pastures deep in the interior during the *Gu*, when rain-fed agriculture also becomes briefly possible (see map Somalia: Topography and drainage).

Cultural features

The Cushitic peoples of the Somali coast in the Horn of Africa have an ancient history. Archaeological evidence indicates their presence in this region by 100 A.D., and possibly earlier. By the 7th century A.D., they began to mingle with Arab and Persian traders who had settled along the coast. Interactions of this nature over the following centuries led to the emergence of a Somali people bound by common traditions, a single language, the Islamic faith, and a clan-based social and political system.



Source: UNHCR Somalia Atlas 2005

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Somali elders at a ceremony. Credit: G. Farmer

A strict, and respected, lineage underpins Somali society with divisions defined along clan and sub-clan lines (UNDP, 2001; see Box 1). Within each clan, there are many sub-clans and sub-subclans. There are six major clan-families. Four of these are predominantly pastoral – the Dir, Daarood, Isaaq and Hawiye – together representing about 70 per cent of the population, while the remaining two (the Digil and Rahanwayn) are agricultural and comprise about 20 per cent of the population. Other Somalis include castes such as the Tumal, Yibr, Yahar, Midgan and Eyle. The non-ethnic Somali population includes the urban and coastal people, the Reer Hamar/Banadir and Barwanese people of mixed Arab, Persian, Pakistani, Portuguese and Somali heritage, the Bantu riverine agriculturalists, Swahili-speaking Bajuni fishing communities, and Arabs of Yemen, Oman and Zanzibar descent.

Today, about 60 per cent of all Somalis are nomadic or semi-nomadic pastoralists who raise cattle, camels, sheep and goats. Less than one-quarter of the population are settled farmers, most of who live in the fertile agricultural zone sandwiched between the country's two main rivers in the south. The remainder of the population is urban based, the main centres being Mogadishu, Hargeisa, Burco, Berbera, Bosasso, Garowe, Galkaiyo, Kismayo and Baidoa (see Boxes 1 and 2, and map Somalia: Traditional deegan (ecological) classification).

Political history

Colonialism in the eastern Horn of Africa did not penetrate Somalia as deeply as it did other parts of Africa but did have the effect of imposing an alien political structure, the central state, on a society with a highly decentralized, stateless political tradition (UNDP, 1998). The Somali Republic (1960-1991) gained its independence on 1 July 1960 through a merger of the Somaliland Protectorate, which had been under British rule from

Box 1. The Somali clan-based social system

Lineage identity or clannism is a central organising force in Somali society and is more significant in contemporary stateless Somalia than in previous decades. In the period of state collapse, clannism has proved to be both divisive and a destructive tool in the hands of political leaders as well as a vital source of group protection, social security and customary law in the absence of the state. Clan identity in Somalia is very fluid. Each Somali can trace their genealogy over 30 generations, giving Somalis membership in many sub-clans. Which level in one's lineage is mobilized as one's 'clan' depends entirely on the issue at hand.

Clannism exists with a range of other cross-cutting affiliations – professional associations as well as regional, class, factional, gender and religious movements (including the Islamist *Al-Ittihad* organization), some of which are described below.

The **council of clan elders**, for example, is the dominant institution in most locales expected to provide wisdom and build consensus among clan ranks in matters of clan interest especially in times of crisis. In Somali society all married men can claim to be elders and speak in clan assemblies (*shir*) earning Somalia a reputation as a 'pastoral democracy'. Elders' councils are not institutionalized and often they react more than they act

The main **religion** is Islam with almost the entire population being Sunni Muslims. Islamic values provide hope and solidarity to cope with the harsh conditions prevalent in the country. They have also been used to build trusted institutions, both commercial and juridical. The most visible sign of the latter are the Islamic courts based on *shari'a* law. They are widely appreciated by local communities and dispense justice in zones where customary law fails to maintain law and order. Radical Islam, organized as *Al-Ittihad* in Somalia, is a growing trend, with a presence throughout the country. However, even within the *Al-Ittihad* movement, there are numerous splits along clan lines.

Networks of functional **professional associations** (made up of non-governmental organizations (NGOs), professionals in education, health and other fields) serve as bridges across clan and factional conflicts promoting human development, reconciliation and good governance. On several occasions women's groups have successfully managed to place pressure on militia to release kidnapping victims or cease fighting. But they have also been at the forefront of mobilization of clannism for armed conflict.

Source: UNDP, 1998

February 1884 until 26 June 1960, and Italian Somaliland where the colonial administration relinquished control on 1 July 1960. The northern area previously known as Italian Somaliland was therefore independent as "Somaliland" for five days before being integrated within the Somali Republic. This fact later served as the principal legal justification for the right to secede that was claimed by "Somaliland" in May 1991.

Territorial skirmishes with Kenya, Djibouti and Ethiopia occurred during the 1970s in particular, but these were eclipsed in intensity by fighting amongst the various groups within Somalia which began in the late 1980s. President Mohamed Siyad Barre came to power in 1969 and ruled Somalia until January 1991, when clan-based warlords overthrew the government before turning on each other. Since that time, much of the country has been under the control of various warlords and armed gangs, with many areas both urban and rural experiencing fierce fighting (EU/IUCN, 1993). The situation in the capital and largest city, Mogadishu, remains chaotic. It has been heavily bombarded and thousands of civilians were killed in an outbreak of violence in November 1991. With the destruction of the country's infrastructure millions of people have faced famine. Annex 1 provides a summary chronology of major events in Somalia from 1869 to 2005.

A two-year reconciliation process resulted in October 2004 in the formation of a transitional parliament known as the Transitional Federal Assembly. A Transitional President, Mr Abdullah Yusuf Ahmed, was elected by the Assembly and a Transitional Federal Government (TFG) was formed shortly thereafter. In December 2004, Mr Ali Mohamed Gedi was approved by the Transitional Federal Assembly as Prime Minister. Continuing insecurity prevented the full scale establishment of government in Somalia itself, and until June 2005 all Somali officials

Box 2. The Somali Traditional ecological classification system, *deegaan*

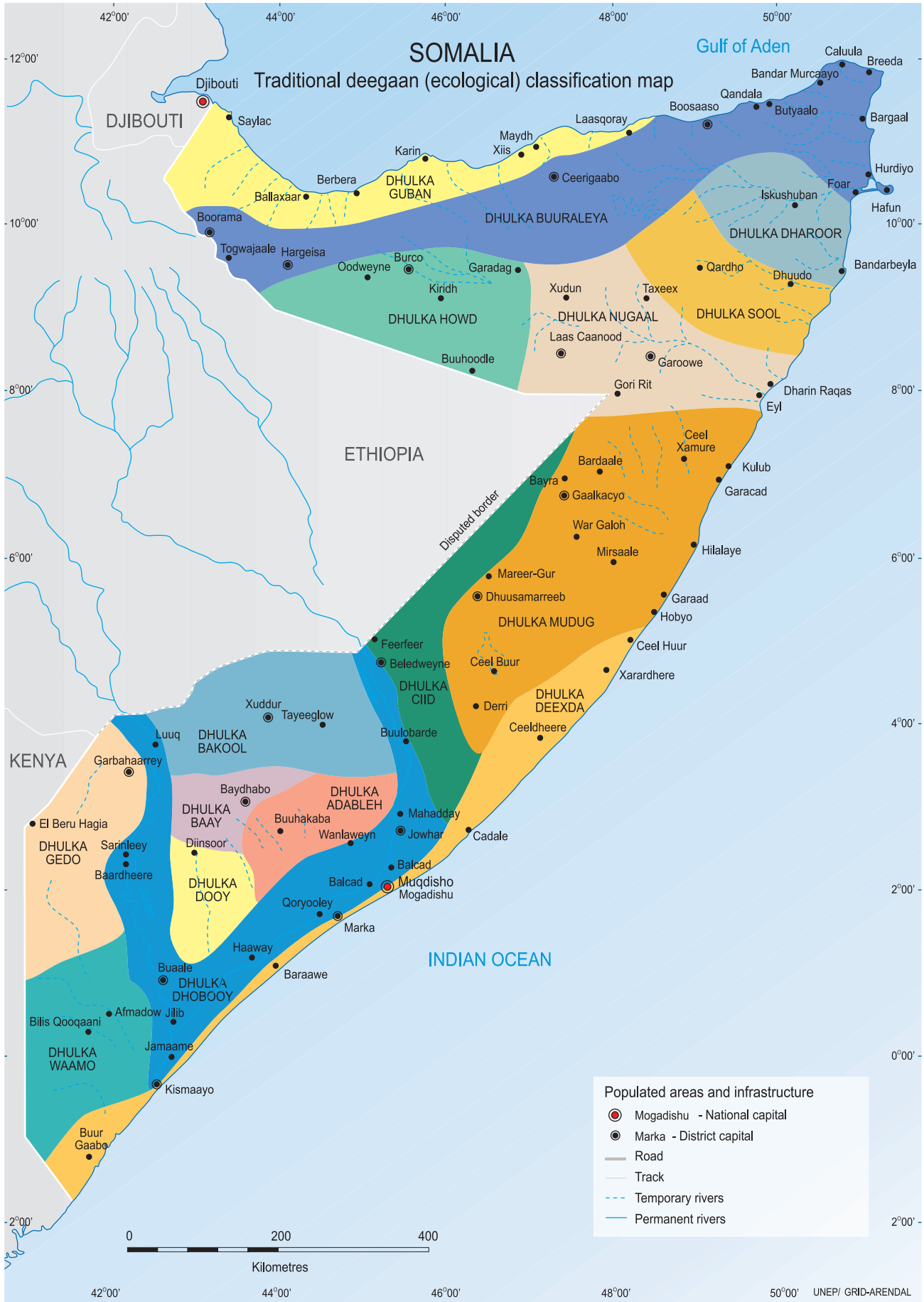
The Somali people, especially the nomads, who live in close contact with the environment have an extended knowledge of plant-animal-fundamentals (Barkhadle, 1993). Most plants and animals have a local name and their phenology, distribution and ecological zones are known: the use of virtually every plant within the grazing zone – the *deegaan*, which might range from 200 km² to 2,000 km² – is known. Under the traditional system of ecological classification, 16 categories are recognized, as follows (Barkhadle, 1993):

- Guban* – “burnt area” in Somalia language – land (*Dhulka Guban*)
- Buraha* – mountain – land (*Dhulka Buuraley*)
- Howd* – bush or thicket – land (*Dhulka Howd*)
- Daror* – large plain – land (*Dhulka Dharoor*)
- Sol* – a highland area – land (*Dhulka Sool*)
- Nugal* – a specific valley – land (*Dhulka Nugaal*)
- Mudug* – much of central Somalia – land (*Dhulka Mudug*)
- lid* – named after the yicib plant – land (*Dhulka Ciid*)
- Deh* – without high shrubs or trees – land (*Dhulka Deexda*)
- Doboy* – clay – land (*Dhulka Dhobooy*)
- Bakol* – an area where *Commiphora* trees dominate – land (*Dhulka Bakool*)
- Gedo* – land only suitable for animal (especially camel) grazing) – land (*Dhulka Gedo*)
- Bay* – the area which receives the highest rainfall – land (*Dhulka Baay*)
- Adable* – flat area with small mountains – land (*Dhulka Adableh*)
- Doy* – between the two banks of the Jubba and Shabeelle rivers – land (*Dhulka Dooy*)
- Wamo* – land lying between Badhaadhe and Kismayo and from Kismayo to the Kenyan border – land (*Dhulka Waamo*)

based in Nairobi, Kenya. The full cabinet returned to Somalia in June 2005 to begin the difficult process of national reconciliation and reconstruction.

Three teams were established, of which the first comprised 30 members of government led by the Prime Minister and left for Mogadishu in February 2005. Smaller groups from this team were then deployed to other regions in the south and central Somalia with the intention of establishing the TFG’s presence there and to start dialogue with the people. A second group of ministers was tasked with the physical relocation of the members of parliament and the delegates who participated in the peace process, while a third team, which remained in Nairobi, assessed the challenges and obstacles to the relocation process and prepared the agenda, strategies and an action plan for the installation of the government inside Somalia. For administrative purposes, Somalia is divided into the 18 regions or *gobollada* (singular *gobolka*) of Awdal, Bakool, Banaadir, Bari, Bay, Galguduud, Gedo, Hiran, Jubbada Dhexe, Jubbada Hoose, Mudug, Nugaal, Sanaag, Shabeellaha Dhexe, Shabeellaha Hoose, Sool, Togdheer, and Woqooyi Galbeed.

Despite the existence of a new government, a proliferation of competing administrations, factions and militias remain, all of which strive to assert their own authority (UNHCR, 2005a). Hence there is the self-declared state calling itself “Somaliland” in the north-west, the self-declared autonomous region calling itself “Puntland” in the north-east, and the continuing warlordism in “Jubbaland” in and around Mogadishu in the south. Neither “Somaliland” nor “Puntland” has been recognized by the international community, but it is only in these two



Source: Barkhadle A.M.I 1993

Not drawn to scale

THE MAP DOES NOT IMPLY THE EXPRESSION OF ANY OPINION ON THE PART OF UNEP CONCERNING THE LEGAL STATUS OF ANY

areas that fighting has been more or less brought under control, and where there is any indication that the economy and peoples' livelihoods have started to pick up.

Population and economy

The last official census of Somalia was in 1975, when 3.2 million people were counted, and this number was estimated to have grown to 9.5 million by 2002 (UN, 2002). With an average population density of about 15 people per square kilometre, this is a sparsely populated country in which 75 per cent of the people have lived historically in rural areas. Population growth was estimated at 4.1 per cent per year for 1975-1980 and 3.1 per cent per year for 1995-2000, while some urban centres such as Mogadishu showed growth at a rate of 10 per cent a year (UN, 1998). As a result of this urbanization process, it is possible that a majority of Somalis now live in towns, albeit often in squalid and dangerous conditions. There is also a substantial diaspora of Somalis living abroad, and their remittance payments are an important source of funds for many Somalis inside the country.

The collapse of the government in 1991 led to one of the fastest and largest population displacements ever recorded on the African continent. At the peak of this crisis, more than 800,000 Somalis were thought to have fled to neighbouring countries (UNHCR, 2003). The number of refugees has since declined and continues to do so, as more and more people are undergoing voluntary repatriation, particularly to "Somaliland" and "Puntland". Sizeable numbers of Somali refugees, however, remain in several neighbouring countries: at the end of 2004, the UN High Commissioner for Refugees noted that there were almost 390,000 Somali refugees (UNHCR, 2005b), many still in exile in Kenya, Yemen, Ethiopia and Djibouti, with a sizeable number also living further a field.

The enduring conflict also resulted in an estimated 370,000 internally displaced people, who remain a serious humanitarian concern (UNHCR, 2005a). Inadequate protection and meagre levels of humanitarian assistance place a severe strain on the coping mechanisms of these people, the hosting communities and local authorities. Somalia also has a large number of destitute people, including nomads who lost their livestock as a result of drought and who now live in camps, relying on food aid. Widespread famine in 1992-1993, caused by war and drought, resulted in one of the largest UN humanitarian and peacekeeping operation in history.

As the economy has virtually collapsed, many people have turned to natural resource exploitation as a means of survival. Somalia has a higher proportion of pastoralists than any other country in Africa, and nomadic pastoralism is the traditional basis for the rural economy. An almost overwhelming dependence on livestock can have its risks, however, as has become obvious during times of drought or when export markets are closed and large herds of livestock can also cause serious environmental damage. Agriculture remains the most important economic sector (see Table 1 for numbers of people involved), with livestock accounting for about 40 per cent of gross domestic product and about 65 per cent of export earnings. Nomads and semi-nomads, who are dependent upon livestock for their livelihood, make up a large portion of the population (see Table 1).

Table 1. Number of people involved in main economic activities in Somalia

Economic Activity	1987	1997 (estimate)
Agriculture	2,085,000	2,486,000
Industry	277,000	430,000
Services	534,000	847,000

Source: UN, 1998

Box 3. Vulnerability of the economy to environmental change

Somalia has always been vulnerable to frequent external and internal shocks, including changes in foreign markets and recurrent droughts. The two most important merchandise exports, livestock and bananas – are dependent on single markets – Saudi Arabia and Italy. Similarly, one internal shock that often disrupts economic activities is recurrent drought. Recurrent droughts in Somalia are symptoms of complex trends and inter-linkages that are related to population growth, dwindling capacity of a fragile ecological system, environmental degradation, weather cycles and the absence of agricultural and non-agricultural rural development. Droughts may still be far more consequential to society and development aspirations than external shocks.

Source: UNDOS, 1999

Somalia's small industrial sector, based on the processing of agricultural products, has been extensively damaged, with much of its equipment being sold as scrap metal. Livestock, hides, charcoal, and bananas are Somalia's principal exports, while sugar, sorghum, corn, fish, *qaat* (*Catha edulis*, Celastraceae, a plant with mild narcotic properties grown in the highlands of Ethiopia and Kenya), and machined goods are the chief imports. Reliable economic data, however, are scarce (see Box 3).

The overwhelming dependence on livestock became a national crisis in 2000 when Saudi Arabia placed a sudden and complete ban on all livestock imports from Somalia over concern for Rift Valley Fever, a mosquito-borne disease which can infect and kill livestock and humans. According to a joint report from the Food Security Assessment Unit and the USAID Famine Early Warning System, the ban caused substantial loss of income at the macro and household levels which in turn limited the purchase of many goods, including medicines, and accelerated the depletion of assets for many households in Somalia (UN OCHA, 2001).

Despite the conflict in many areas, Somalia's service sector has somehow managed to survive and grow. Telecommunication firms provide wireless services in most major cities and offer the lowest international call rates on the continent. In the absence of a formal banking sector, money exchange services have sprouted throughout the country, handling between US\$500 million and US\$1 billion in remittances annually (CIA, 2005). Mogadishu's main market offers a variety of goods from food to the latest electronic gadgets.

Role of natural resources

Somalia's natural resources fall into three broad categories: marine resources such as fish and salt; surface resources which include forests and forest products such as the aromatic extracts of frankincense (from *Boswellia* spp.) and myrrh (from *Commiphora* spp., both Burseraceae), as well as surface water; and subsurface resources such as rocks and minerals, fossil fuels, and groundwater. Many of them have been directly or indirectly impacted by the extended civil conflict, but competition for access to some resources has also been, and continues to be, a source of conflict in itself.

In the absence of a government, many traditional forms of natural resource management and control systems have been abandoned or are now ignored. In several instances, this has resulted in clearly unsustainable exploitation, a trend which may prove difficult to reverse. For example, parts of the north-west, and the Kismayo area, are showing signs of environmental degradation as a result of overgrazing and the uncontrolled harvesting of trees for charcoal making (UNDP, 1998).

Despite the country's long coasts, Somalis are not traditionally a fishing or fish-eating people, although some small coastal communities have in the past been engaged in subsistence fishing. Somalia has one of the world's lowest fish consumption rates in the world (Van der Elst, 1997), with just 2 per cent of protein intake coming from fish (WRI, 2003). Fishing was however strongly promoted by the government during the 1970s,

partly in response to the drought of 1973-1975, when the Coastal Development Project resettled 14,000 nomadic people from inland regions to the coast (Nur, 1998). In 1984, it was estimated that a million people lived on the Somali coast, of whom almost 10 per cent were directly or indirectly involved in artisanal fishing (Bihi, 1984). Training and equipment were provided, and numerous fisheries co-operatives established, but the fate of this initiative is now largely unknown.

Although recent data are sparse, one source reports that Somalia exported almost US\$2.5 million-worth of fish and fish products in 2000, a 464 per cent increase from 20 years earlier (WRI, 2003). Near-shore fisheries now target just a few key species, lobster and shark in particular, with much of the catch being exported. Recent observations (FAO, 2005a) suggest that better arrangements for control and processing are urgently needed since stocks of target species are being over-fished, and there is much wastage in both catching and processing. In the fisheries sector, the absence of effective policy, access arrangements, management procedures and biological reference points for monitoring has resulted in serious overexploitation of certain species (Van der Elst, 1998), and this is likely to be continuing to date.

Hundreds of fishing vessels from a variety of nations ply the waters off Somalia, most operating without any licensing agreement. Some of these vessels have even attacked local Somali fishermen and destroyed their boats and equipment (UN, 2005). Illegal fishing by foreign interests represents a loss of much-needed revenue for the new Transitional Federal Government (TFG) and the regional authorities of "Puntland" and "Somaliland" (UN, 2005).

There has been a rapid expansion in the production of charcoal in recent years, with much of it being exported to meet demand in Saudi Arabia, Yemen and the United Arab Emirates, where local forests are more strictly protected. Charcoal may today represent one of Somalia's most valuable exports: a bag of charcoal in Somalia might fetch US\$3-4, but the same bag could be sold for US\$10 in the Gulf States (EDC News, 2001). This same trade, however, has also caused open conflict between clans in Somalia, involving shoot-outs and mine laying, as well as environmental damage.

The transient rights to use resources that are so critical to nomadic pastoralism were ignored when the national land tenure regime – which favoured crop cultivation – was being developed (Unruh, 1995). Among the direct results of this action has been land degradation, resource use conflicts, a decline in pastoral production and impacts on Somali clan alliances, which in many cases serve to regulate rational natural resource access and use.

The lack of any effective government has meant that many people, both local and foreign, have engaged in many kinds of illegal and damaging activities. Despite a number of international investigations, rumours have persisted for many years concerning hazardous pollutants being dumped in Somali waters and on beaches by foreign vessels. The rampant trade in charcoal as well as unregulated off-shore fisheries are also widely reported as having a damaging impact on the country's natural assets, which can be expected to limit and restrict options for national recovery and sustainable development.

Legal and institutional framework for environmental management

Until the establishment of the Ministry of Environment and Disaster Management in 2005, Somalia lacked any central body responsible for these matters. Instead, a National Environmental Committee, with representatives from 13 Ministries/Agencies, served as the co-ordination body for environmental governance (Gudel and Mwanza, 1979). Most environmental issues, however, were referred to two organizations within the Ministry of Livestock, Forestry and Range, these being the National Range Agency and the Central Rangelands Development Project.

A key concern relating to sound environmental management relates to the adoption and effective enforcement of a suite of international, regional and national agreements which define the country's own responsibilities



Somalia's Environment Minister Mohamed Osman Maye at a press conference in Nairobi. © Tony Karumba/AFP/Getty Images

as well as those of the international community. The regulatory framework for most of Somalia is poorly developed, although the country has signed a number of important international conventions (UNEP, 1996) relating to natural resource use and management, including:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- Convention on the Conservation of Migratory Species of Wild Animals;
- Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment;
- Protocol concerning Regional Co-operation in Combating Pollution by Oil and other Harmful Substance in Cases of Emergency;
- UN Convention on the Law of the Sea;
- Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern Africa region;
- Protocol concerning Co-operation on Combating Marine Pollution in cases of Emergency in the Eastern African region; and
- Convention for the protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region (Nairobi Convention).

At the same time, however, Somalia has also signed a number of other major international and regional agreements but has so far failed to ratify these:

- Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water;
- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and other Celestial Bodies;
- African Convention on the Conservation of Nature and Natural Resources;
- Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa; and
- Treaty Establishing the African Economic Community.

While there is a clear need for a thorough revision of the country's national legislation on management of natural resources, this will require considerable effort and co-operation from all interested parties. A number of gaps in the legal system also need to be addressed, for example the lack of any reference to a national water act or adhesion to the Contracting Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (the London Convention), the latter being especially relevant to the alleged dumping of toxic and hazardous materials in Somalia during 2004 and 2005.

Other opportunities to benefit natural resource management could be based on improved regional co-operation and co-ordination. The establishment of an Indian Ocean Sanctuary for the conservation of whales, for example, and the Protocol Concerning Protected Areas and Wild Flora and Fauna in the Eastern African Region, both provide a framework for collaboration in the development of marine protected areas and species conservation programmes. Other possible legal instruments which could serve a similar purpose (but to which Somalia may not currently be a Party) include:

- the Convention on Biological Diversity;
- the Ramsar Convention;
- FAO Code of Conduct (which relates to the sustainable management of fisheries resources);
- UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks;
- the Indian Ocean Tuna Commission; and
- the Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean.

The role of non-governmental organizations

The establishment of a new government and the growth of stability in "Somaliland" and "Puntland" are not the only signs of hope in the current situation in Somalia. Boxes 4 and 5 summarize certain non-governmental initiatives exist which are proving effective in environmental resource management.

Future prospects

Somalia currently has an historic opportunity to choose a new and better path. A transitional government is becoming established and is seeking popular recognition throughout Somalia, despite the country's fragmentation with two breakaway regions and a third still plagued by conflict.

Peace and stability are absolute prerequisites for any future rebuilding and development of Somalia, and continued access to natural resources is essential to the livelihoods of the vast majority of its people. Urgent

Box 4. Local institutions take the lead in environmental management

With funding from Novib (Oxfam-Netherlands), the Resource Management Somali Network (RMSN) was founded in 1996. Its mission relates to avoiding land degradation and desertification, protecting and ensuring more sustainable use of forests, effective management and protection of biodiversity, efficient water management, and dealing with pollution problems and population pressure on natural resources. Among the actions undertaken by its members have been to:

- challenge the charcoal making industry, which included mounting a campaign aimed at raising awareness of the degradation, its causes and why it needs to be controlled;
- checking the illegal trade of wildlife;
- denouncing the ruthless exploitation of marine resources by international trawlers;
- promoting the conservation of threatened marine species and promoting sustainable use of fisheries; and
- establishing linkages with external actors.

Members of the RMSN include:

- RMSN Lower Shabeelle region
- RMSN Middle Shabeelle region
- Gedo Resource Management Organisation
- RMSN Mudug region
- Environment Education Team
- Sool Resources Management Organisation
- ASAL – ex Bari Team
- RMSN Western Sanaag region
- RMSN Golis Area
- RMSN Candlelight (Somaliland)
- RMCO (Costal areas)
- Horn Relief (Sool and Sanag)
- RMSN Buran Team
- HARDO (Hiran region)

Source: Novib, Presented at a Round Table Discussion on the Environment Situation in Somalia, UNEP Headquarters, Nairobi (June, 2005)

actions need to be taken on a number of fronts, however, including legislation, regulation, co-ordination, empowerment and wise management of natural resources. Many of the environmental issues, concerns and urgent needs highlighted in this study can be addressed through land-use planning and management, taking account of issues such as legislation and rights, forestry, water management, livelihood security and biological diversity. These are a minimum of necessary actions to be taken before more specific and focused responses can be developed and properly institutionalized.

Somalia's natural assets – its grazing and agricultural lands as well as its rich marine fisheries – are a platform on which the peoples' livelihoods might be rebuilt. Taking control of these assets and managing them productively, sustainably and equitably will, however, remain a considerable challenge for the decision-makers and population of the country. Somalia will not be able to reverse the current situation overnight. One complicating issue is the fact that a number of other countries already have vested interests in exploiting Somalia's resources, including fisheries, charcoal and livestock. Finding a solution to the current levels of over-exploitation will therefore not only depend on reaching acceptable solutions between stakeholders within the country, but also hinges on the co-operation and assistance from neighbouring states.

Box 5. Simple methods prove effective

Simple, but appropriate, methods are often the most effective means of conserving and managing natural resources – something which local non-governmental organizations or community structures are well suited to carry out, as demonstrated in the two examples highlighted below.



Simple rock dam at Awsane built in March 2005 (left) before the rains and two months later after rain (right)

Founded in 1991, Horn Relief, a Somali NGO was established to help build the capacity of up-coming grassroots groups in Somalia. It works in four main areas to form a holistic approach to community development: natural resource management, human health, animal health, and leadership development. Among its environment-related activities are:

- water conservation through the construction of water barriers such as rock walls or rock dams to slow the water flow;
- water retention through blocking water from entering the sinkholes through soil bunds;
- improving the fertility of the surrounding areas to ready them for planting trees, shrubs and grasses; and
- improving selected rangelands by diverting water from roads onto them.

Founded in 1998, the Regional Marine Conservation Organisation (RMCO) works with local communities and encourages natural resource management practices that help conserve land and marine resources. Among its activities are the following:

- public environmental awareness raising and advocacy through training, meetings and media events;
- establishment of an environmental database, keeping record of environmental hazardous wastes incidents;
- providing support to communities in resolving resource-based conflicts;
- monitoring and documenting environmental change; and
- mangrove forest conservation.



Mangrove recovery following awareness raising programmes

Source: Novib, Presented at a Round Table Discussion on the Environment Situation in Somalia, UNEP Headquarters, Nairobi (June, 2005)

HUMAN AND URBAN ENVIRONMENT

Introduction

Land ownership and land disputes are central to much of the conflict in contemporary Somalia. During the rule of the last regime (1969-1991), government tended to increase its control over land previously owned collectively by rural communities. This was accomplished through shifting land-ownership from communal to state levels through the pursuit of revenues. Sections of the 1973 Unified Civil Code abolished traditional clan and lineage rights of use and access over land and water resources (Hooglund, 1993). The 1975 Land Law nationalized all land in Somalia. This required mandatory land registration which traditional landholders resisted or were unable to fulfil, for example, by not having enough money to travel to Mogadishu to register their claims and pay the required fees (official and non-official). This has progressively limited local rights rather than encourage or support them.

As the state authorities lacked capacity to manage and control the nationalized land, however, it effectively became “no-man’s land”, with open access to its use or misuse. The effect of this law is therefore highly relevant to the ongoing scene of land and natural resource degradation. An epidemic of land grabbing began in the 1980s with well placed civilians, civil servants and government officials registering large tracts of land in their names, even though such land might have been under the management of local communities for generations (UNDP, 1998). Many of Somalia’s smallholders were quickly transformed from subsistence farmers to landless or semi-landless sharecroppers and rural wage earners.

This situation persists today, made even worse in some situations by militia groups demanding substantial parts of any crop or potential income, often not even in return for protection from other militia groups. New arrivals have also staked claim to abandoned state farms, while clans which might be more powerful than others have also taken advantage of the chaos to extend the boundaries of their own grazing lands.

Land disputes in urban areas are also a major problem. Houses abandoned by people who fled the turmoil have been occupied by squatters who will only relinquish them when paid a fee for “guarding and improving” the property (UNDP, 1998). The same applies to many institutional buildings such as schools and government offices.

Human Settlements

Prior to the 1980s, some 75 per cent of the population were thought to live in rural areas. Now, however, it is estimated that no fewer than 60 per cent of the people live in urban areas, many of them without adequate shelter (Qasim Hersi Farah, 2005). Information is sadly lacking on living conditions – education, health and sanitation, for example – in almost all urban centres, but the same report states that 85 per cent of the population live in slums or partially destroyed homes.

This shift is largely due to internal displacements on account of the civil war, but the result has been that parts of many cities and towns have become seriously overcrowded, while other areas remain unpopulated. In the absence of regulations and controls, building takes place without proper planning and consideration for any essential services, including sanitation and waste disposal. In response to the growing needs identified, the Somali Urban Development Programme, an initiative supported by the European Commission and UN-HABITAT, was launched on 5 January 2005, targeting all major cities and towns through the implementation of projects and capacity building activities in the urban development sector.

According to the UN Population Fund (UNFPA, 2004), only 24 per cent of the houses in Somalia can be considered permanent. The majority of all other buildings are constructed from wooden sticks with a mud infill. These suffer widely from termite attacks, requiring people to rebuild on a regular basis, an activity which has direct implications for the country’s wood resources.



Traditional and modern building in one compound in Hargeisa. Credit: UNDP Somalia

Settled by Arab colonists around 900 A.D., Mogadishu had become an important trade centre for the east coast of Africa by the 12th century. During the 16th century, Mogadishu was controlled by Portugal. In 1871, the city was occupied by the sultan of Zanzibar, who leased it to the Italians in 1892. In 1905, Italy purchased the city and made it the capital of its colony of Italian Somaliland. By 1914 Mogadishu's population was estimated to be approximately 12,000 people. The city was captured and occupied during World War II by British forces operating from Kenya.

Rebel forces entered the city in 1990 during Somalia's long civil war. Intense battling between clan-based rebel factions damaged many parts of Mogadishu in 1991 and 1992, and the city was again the scene of fighting after the international peace-keeping forces of UNOSOM II, which had arrived in 1992, left in 1995. Today the city lacks any form of central government and control remains in the hands of competing militias. Key services such as the airport and port facilities likewise remain under the control of vying factions. Mogadishu's population is currently estimated to comprise around 2,450,000 people (<http://www.shimbir.demon.co.uk/>; <http://en.wikipedia.org/wiki/Mogadishu>)

Kismayo, also located on the Indian Ocean coast in south-western Somalia, is the principal town and port of the Jubbada Hoose region. It was founded in 1872 by the sultan of Zanzibar, passed to Great Britain in 1887, and was held until 1924, when it was transferred to Italian control. Kismayo is today the main port for charcoal exports to the Gulf States.

Hargeisa, in north-western Somalia, is an important commercial centre and watering place for nomadic stock herders. The town is a transportation hub and has an international airport. It was taken in 1870 by Egyptian forces, then under Ottoman Turkish control, who withdrew in 1884 to fight the rebellion in the Sudan led by

Muhammad Ahmad or the Mahdi, whose forces captured Khartoum in 1885. The British later took control of Hargeisa and, in 1941, made it the capital of British Somaliland. The city is the capital of the faction which declared northern Somalia independent as “Somaliland”.

Although predominantly a ruraly-based population and culture, there are strong patterns of rural-urban migration in Somalia (Gundel, 2002). For a time during the war, this process was reversed as people fled the main towns and moved to areas where their clans originated. Consequently the population of previously small regional towns such as Belet Weyne, Galkaiyo, Baidoa, and Bossassoo rose dramatically as people fled fighting in Mogadishu, the Lower Jubba and the inter-riverine areas.



A make-shift kitchen of a nomadic family. Credit: FAO/D. Signa

Rapid urban migration has since become a particular issue in Hargeisa where the majority of returning Somali refugees from Ethiopia have chosen to settle. The concentration of businesses and aid programmes in the administrative capitals has also served to attract people from rural areas (Gundel, 2002). The same applies to Somalis returning from the diaspora – mainly an urban community primarily formed on a family and clan basis – as well as economic migrants from Bay and Bakool regions. The relative stability afforded by areas such as “Puntland” has encouraged a large influx of people who migrated from the southern areas affected by the civil unrest. This has contributed to reduce the availability of water in this dry region, where the inhospitable climate makes water a vital resource (EU, Undated).

Water and Sanitation

Water resources vary by location. In much of the north and north-east, sub-surface water is generally saline and often the only permanent source of water can be found in deep boreholes. In the south, however, water is obtained from rivers as well as shallow wells. In the tsunami-impacted part of the country, many wells in coastal areas have been clogged, or buried by sand washed in by the waves, resulting in brackish and polluted water (UNEP, 2005). Seawater may have also invaded the porous rocks contaminating the underground water with salt.

The Human Development Report for Somalia (UNDP, 2001) estimates that Somalia’s annual renewable freshwater fell from 2,500 m³ per person per year in 1950, to 980 m³ in 1990, with a prediction of 363 m³ by 2025. It is



Somali women collecting water from a deep well. Credit: UNDP Somalia

generally accepted that when this value falls below 1,000 m³ per year, water scarcity begins to hamper health, economic development, and human well-being; below 500 m³ per year it becomes life threatening.

Recent data on access to water are not available for much of the country, but it is thought that fewer than 5 per cent of the total population may have secure access to water throughout the year (UNDP, 1998). An estimated 31 per cent of the population has access to safe drinking water in the north-west, while comparable figures for the north-east

and southern part of the country are 19 per cent and 20 per cent respectively. In Mogadishu, the figure is not more than 35 per cent in the urban area and 10 per cent in rural Benadir (UNDP, 1998).

In many parts of Somalia, such as the Galgudud region and the middle regions, the nearest water source may be 70 km or further from settlement areas. Elsewhere, the water table may be very deep and not easily accessible; one may have to drill to a depth of 170-240 m before reaching water (Mardi, 2000). Accessing safe and reliable water sources is therefore a major concern in most areas, for people as well as for livestock and agriculture. During the late dry season many wells become more saline and foul, and hence cause diarrhoea and other water-related diseases.

The level of sanitation services was limited before the civil war and the coverage has certainly not increased since the early 1990s. At present, only 48 per cent of the overall population has access to improved sanitation, whereas only 20 per cent of the rural and nomadic population has access to the same service (EU, Undated).

Waste Management

With little industry, a weak economy and marginal consumerism, Somalia does not have the problem of excessive waste collection, treatment and disposal that some other countries in the region face. Some industrial sources, however, have the potential to pollute the marine environment in particular, such as the oil refinery south of Mogadishu, slaughter houses at major ports, and tanning factories at Brava and Kismayo (UNCTAD, 1998). Other forms of pollution include sewage discharge and industrial waste, silt-ing and fertilizers.



Solid waste on the banks of river Shabelle. Credit: FAO/D.Signa

Since less than half of the population live in households without adequate sanitation or waste management systems, the risks to human health from poor sanitation are real (UNEP, 2005). Human and household waste disposal sites are generally close to dwellings and water sources. There is lack of garbage collection and proliferation of plastics bags (UNEP, 2005). Seepage from waste dumping sites is also a potential contaminant of ground and surface water resources. Near human habitations, especially in Bossassoo, Berbera and Sailac, solid waste is dumped onto the shore and into the sea, causing damage to coastal and marine life (World Bank, Undated).

Another possible health hazard stems directly from on-site processing of fish on the beaches where catches are landed (FAO, 2005a). Domestic waste and discarded fish are left to rot on the beaches in the heat, often in close proximity to villages. Not only does this represent a serious health hazard, it is also a considerable waste of otherwise valuable materials which might be consumed or transformed into useful products such as fertilizers. Hygiene levels when cleaning and storing fish are also a concern (see Box 6).

Energy

Charcoal plays an important role in the energy sectors and the economies of most African countries, and Somalia is no exception. Southern Somalia is the centre of most charcoal production today, this being exported to markets in the gulf through the port of Kismayo in particular.

Somalia has long relied principally on domestic wood and charcoal as well as on imported petroleum to meet its energy needs. Electrical utilities had been state owned since 1970, when foreign-owned enterprises were

Box 6. Abandoned pesticides

An abandoned pesticide storage depot formerly belonging to the Desert Locust Control Organization for Eastern Africa is located on the escarpment above Hargeisa in north-west Somalia. Pesticides stored at the depot include Dieldrin, Heptachlor, BHC, DDT, Malathion, Fenitrothion, Mevinphos, Diazinon and Tetrachlorvinphos. The depot was damaged during an air raid in 1988 which may have resulted in some pesticides leaking into the environment (WHO, 2005). Local inhabitants are believed to have emptied large quantities of pesticides into the ground in order to re-use the storage drums. Contaminated soil was also excavated by local people for use in pest control and for resale in Hargeisa's market. In 1993, FAO commissioned an environmental assessment of the situation as there was concern that the pesticides might enter water supplies as a result of surface run-off during seasonal rains. The assessment, however, concluded that there was no hazard.

The subject was aired again in 2003 when concern was expressed over possible contamination of ground water resources, and a possibility to use the affected area for housing. A subsequent WHO investigation showed low levels of organochlorine and organophosphate exposure in all those sampled, compared with data available from the UK and USA. As emergency measures, the WHO report recommended, among other actions, reduction of the release of the chemicals from the depot through technical measures such as roofing and sealing of contaminated areas; an environmental study to determine the fate of the pesticides released from the depot; prohibition of access by site security measures such as fencing and guarding the area; and awareness raising through the development of a risk communication strategy for vulnerable groups.

The site has since been fenced, roofed and access restricted. However, nothing has been done to contain the pesticides in the face of an increasing population residing in close proximity to the depot.

Sources: WHO, 2005; IRIN, 13 May 2005, UNDP Somalia

nationalized. Throughout the country, about 80 different oil-fired thermal and diesel power plants were established, each relying on imported petroleum. With aid from Finland, new plants were constructed in the Kismayo and Baidoa areas in the mid-1980s. Attempts to harness the power of the Jubba River at the proposed Baardheere Dam had not come to fruition by early 1992.

Somalia relied on foreign donors (first the Soviet Union and then Saudi Arabia) to meet its petroleum needs. In the late 1970s, Iraq helped Somalia build a refinery at Jasiira, north-east of Baraawe, which had a capacity of 10,000 barrels a day. When the Iran-Iraq War broke out in 1980, however, deliveries were suspended, and Somalia once again required refined oil imports. As of mid-1989, Somalia's domestic requirements were again being met by this refinery, but deliveries of Iraqi crude oil were erratic. In May 1989, Somalia signed an agreement with the Industrial Export, Import and Foreign Trade Company of Romania by which the company was to construct an oil refinery in the outskirts of Mogadishu. The project was to cost US\$500 million and result in a refining capacity of 200,000 barrels per day. Given the political upheaval which followed, however, this project never materialized.

Throughout the 1980s, various international oil companies explored for oil and natural gas deposits in Somalia. In October 1991, the World Bank and the UN Development Programme announced the results of their hydrocarbon study in the countries bordering the Red Sea and the Gulf of Aden. Offshore oil explorations were conducted during the 1980s, the results showing that Somalia's continental shelf may have oil and gas reserves. Several international oil companies applied for concessions, some of which were awarded in the eastern and central parts of the Gulf of Aden coast. No reserves of economic importance were detected, and neither oil nor gas is currently being exploited (World Bank, Undated).

One apparently successful innovation was the completion of a wind energy project. Four wind turbines, each rated at 50 kilowatts, were embedded in the Mogadishu electrical grid. In 1988 these turbines produced

699,420 kilowatt hours of energy. Total electric energy produced in 1988, the latest year for which figures were available in early 1992, was 257 million kilowatt hours. Five self-contained wind energy conversion systems in rural centres were also planned, but as of May 1992 there was no information that these had been built (US Library of Congress, 1993).

Livestock and Agriculture

Pastoralism is the dominant mode of life for a large number of Somalis – both nomadic and sedentary herding of cattle, sheep, goats, and camels are carried out.



A herd of camels. Credit: UNDP Somalia

Livestock production has been the backbone of the Somali economy for centuries. It is also the most important source of cash income for the predominantly rural population, and meat, together with milk, assures 55 per cent of the calorific intake of the entire population (EU, Undated). Most recent projections estimate livestock numbers to include around 5.2 million cattle, 13.5 million sheep, 12.5 million goats and 6.2 million camels, with cattle being concentrated mainly in the south and camels in the northern part of the country.

The predominance of the nomadic rearing system – with herds moving even across borders into Kenya and Ethiopia in search of forage and water – and the almost complete absence of fixed assets, has meant that livestock production has not been as heavily impacted by the civil war as other production systems. This has also been a precautionary move against unreliable precipitation, allowing pastoralists access to different parts of the country containing quality forage and water sources, thus minimising risk in order to provide some degree of security for the household.

Compared with other nomadic livestock systems, that of Somalia is very much market-oriented. Approximately 2.5 million animals are exported each year with livestock exports (including raw hides and skins) representing about 40 per cent of gross domestic product (GDP) and 80 per cent of foreign currency earnings (World Bank, 2003). Perturbed by the export bans placed on Somalia by countries like Saudi Arabia (see above), the export of live and slaughtered animals is also hampered by the collapse of the public veterinary system and the absence of an animal health surveillance system in particular. The lack of a regulatory framework for livestock exports may also be a weakening factor in this trade, as much is controlled by individuals (see Table 2).

Overstocking, overgrazing, declining fertility of pastures, disease outbreaks and unpredictable rainfall are among the perils and risks that livestock owners have to face. Southern Somalia's environment has suffered less from the livestock pressure of nomadic pastoralists than the northern parts of the country, but agricultural development and southward expansion of the cattle industry are now placing severe pressure on many of the region's remaining wild habitats (Simonetta, 1988) (see Box 7).

Migration of pastoralists and their herds from eastern Ethiopia (especially the Shinnile zone) to north-western Somalia (Adwal) since late 2002 has exerted pressure on grazing land in these areas (USAID/FEWS, 2003). The numbers of livestock are reported to be exceeding the carrying capacity, and could cause overgrazing and outbreaks of disease.

Livestock exports – especially for sheep – normally increase sharply during January and February, coinciding with the Hajj (USAID/FEWS, 2003). This, however, also places stress on localized grazing and watering points near main ports, as well as fuelling conflict over access rights.

Table 2. Number of livestock

	1988	1997 (estimate)
Camels	6,841,000	6,100,000
Cattle	4,983,000	5,200,000
Goats	20,550,000	12,500,000
Sheep	14,304,000	13,500,000
Horses/Mules/Donkeys	49,000	46,000

Source: UN, 1998

The 1973 Land Reform Act was formulated to give advantage to state enterprises and mechanized agricultural schemes. Arable land had to be leased from government; pastoralists no longer had claim to land they previously depended on (Gunn, 1990). Obtaining leases to land was cumbersome and beyond the scope of most small farmers. Large estates were established – often enclosed and guarded – and pastoralists charged a fee for access to, for example, water. A 1974 law on co-operative development, originally intended to promote the vegetative recovery of grazing lands, initially established 14 co-operatives 200-300 ha in size (Unruh, 1995). More ambitious range co-operatives followed in the late 1970s, with assistance from the Northern Rangelands Development Project, all of which were further to the detriment of smaller herd owners.

Agriculture today remains the second most important production system in Somalia. In the past, agriculture contributed up to 19 per cent of GDP and accounted for some 20 per cent of employment (IUCN, 1997), but current values are not known. Crop production, however, is limited primarily by irregular and unpredictable rainfall but also to some degree by soil conditions and traditional practices. Southern Somalia's alluvial plains are the country's most fertile soils and, together with the inter-riverine area of Bay, used to account for almost 90 per cent of agricultural production.

Rainfed and irrigation cropping are practised in parts of southern Somalia, especially the Jubba and Shabeelle river valleys, while Bay and the lower Jubba and lower Shabeelle regions rainfed cropping is combined with camel and cattle keeping (IUCN, 1997). Rainfed cropping also occurs on the sandy soils of the coastal hinterland north-east of Mogadishu while only very limited crop production is possible in the northern part of

the country. Rice, maize and sesame are the main irrigated crops in the Shabeelle and Jubba riverine areas although irrigated farming has suffered from lack of irrigation management, deteriorating infrastructure and susceptibility to flooding (see Box 8).

Box 7. Livestock movements and food security

For nomadic pastoralists – who comprise 60 per cent of the Somali population – the January to March (Jilaal) dry season is considered the most difficult. During this period, herds are moved longer distances from homesteads which, in turn, reduces the supply of milk to the remaining members of the household. Heightened food stress is likely to be experienced at such time.

Maize and sorghum are the main rainfed crops grown in areas with rainfall above 450 mm per year, and cow peas are the main rainfed crop elsewhere. This farming practise, always at risk on account of erratic and generally low rainfall levels, depends on soils being allowed to return to fallow for a number of years in order to recover, and is no longer practised as widely as it once was on account of increasing population pressure and

Box 8. Causes of food insecurity in Somalia

There has been a steady decline in per person food production for years. Food aid constituted 20 per cent of all food imports from 1970 to 1974 and 5 per cent from 1980 to 1984. The difference between food produced and total food consumption (the 'food gap') changed from a surplus of 5 per cent in the former period to a deficit exceeding 30 per cent in the latter. This decline in food self-sufficiency occurred between 1960 and 1990 despite massive international investments in the rural sector and despite considerable untapped potential in the agricultural areas. Among the reasons for this decline are:

- rapid population growth, which outstripped increases in food production in the 1980s;
- rapid urbanization, which places a growing percentage of the population out of pastoral or agricultural food production;
- changes in food consumption habits among urbanized Somalis who prefer wheat, rice and pasta over locally grown maize and sorghum;
- inappropriate government policies such as price controls in the 1970s which created disincentive for farmers to produce grain crops;
- unintended impact of large-scale annual and often poorly timed delivery of food aid, which depresses prices and drives farmers out of agriculture; and
- alienation of portions of the country's most fertile irrigable land for cash cropping of bananas for export rather than grain.

The food security situation has been worsened by the civil war and statelessness. Without a government, farmers have lost access to agricultural inputs and services formerly provided by the state. The private sector has responded to a degree, but the unregulated sector has led to misuse of resources and inputs, poor quality control and the spread of drug-resistant diseases.

Source: UNDP, 1998

demand for land (IUCN, 1997). Poor management practices on rainfed cropped and fallowed land is leading to lower levels of soil fertility and soil erosion which, in turn, translates into lower productivity and increased hardship for people living in such areas.

The major cash crop is bananas whose annual exports exceeded 120,000 tonnes before the war. However, production and exports collapsed during the war and have not yet recovered. Despite some recovery in the mid-1990s, commercial farming was hard hit by the El Niño rains of 1997-1998 which destroyed an estimated 80% of the country's banana plantations, causing about 100,000 families to lose their primary source of income (EU, Undated).

Other important crops include sugar cane in rain fed and irrigated areas, sorghum in drier zones as well as corn, mangoes, sesame seeds, beans, rice and cotton. About 400,000 ha are cropped in the main season and 230,000 ha in the secondary one. The planted area changes significantly from one season to another, depending on the rainfall pattern. From 1994 to 2000, an average of 300,000 tonnes of cereals were harvested each year; a significant reduction compared to the pre-war production of 480,000 tonnes, mainly due to the reduced area under agriculture (EU, Undated).

The prolonged civil war has had some marked impacts on the manner of natural resource use and management systems, with more negative consequences being recorded in the agriculture sector compared with livestock production or fisheries. Farming communities in the south have been displaced taking with them their knowledge of fruit tree management and harvesting systems. New arrivals commonly lack experience of tree management which has resulted in considerable tracts of vegetation being cleared for charcoal or transformed into pasture. Deteriorating infrastructure such as irrigation systems, as well as reduced agricultural

inputs and disrupted technical support services, and a collapse of processing and marketing facilities, have all contributed to agricultural decline and subsequent loss of income and security for many communities. As young men have been drawn into the civil war there is also insufficient labour, with many farming households now being headed by women. Ownership of land has also become an evident issue which will need to be addressed if this sector is to recover.

Industry

The industrial sector in Somalia was never well developed, largely perhaps on account of their being no fossil fuels or minerals ready for extraction. Agricultural processing once constituted the bulk of the Somali industry sector but even this has been seriously restricted in scale and scope. Meat exportation and processing as well as fish – primarily tuna – canning were and remain the two main industrial activities, supplemented by sugar refining, oilseed processing, leather tanning and the production of cotton textiles.

Minerals only ever made a small contribution to Somalia's exports and the economy in general. Small amounts of gemstones, gypsum, salt and sepiolite (meerscham) were still being produced in 2004.

In the informal sector, charcoal production has become a significant industry in many parts of the country, with charcoal leaving by sea as well as by land. Lobster and shark processing are also important activities for certain fishing communities, with processing and shipment being done largely by individuals who construct freezing and storage facilities and then arrange onward freight. These industries are generally not co-ordinated and operate primarily under individual interests.

Transport and Telecommunications

Somalia's transportation system is poorly developed and often in poor state of repair. At independence, Somalia inherited only a few paved roads in the more populated areas in the south and north-west, four undeveloped ports equipped only with lighterage facilities, and a handful of usable airstrips. During the next three decades, some improvement was made with the help of substantial foreign aid. By 1990 all-weather roads connected most of the important towns and linked the northern and southern parts of the country. Three ports had been substantially improved, eight airports had paved runways, and a regular domestic air service was also available. The deteriorating security situation in the early 1990s, however, put an end to further investments and necessary maintenance.

In 1988, the total expenditure for transportation and communications was US\$57.8 million. Nearly 55 per cent of this amount was for new infrastructure; 28 per cent was for rehabilitation and maintenance of existing infrastructure. This activity must be understood in the context of the ongoing civil war in Somalia; much of the infrastructure particularly bridges in the north, had either deteriorated or been destroyed as a result of the fighting. There has been no systematic study of the infrastructural costs of the civil war.

In 1990, Somalia had more than 21,000 km of roads, of which about 2,600 km were paved all weather roads, 2,900 km were gravel, and the remainder were improved earth. The country's principal highway was a 1,200 km two-lane paved road that ran from Kismayo in the south through Mogadishu to Hargeisa in the north. North of Mogadishu, this route ran inland, roughly paralleling the border with Ethiopia; a 100 km spur extended to the Gulf of Aden at Berbera. By early 1992 much of this road, especially the northern part between Hargeisa and Berbera, was unsafe due to land mines. Somalia's 1988 plan provided for another connection from this main route to Bossassoo on the Gulf of Aden. Somalia had only one paved road that extended from north of Mogadishu to Ethiopia; all other links to neighbouring countries were dirt trails impassable in rainy weather (US Library of Congress, 1993).

Mogadishu International Airport was the nation's principal airfield, but this facility has remained closed since the departure of UNOSOM II in 1995.

Shipping

Maritime transport has long played an important role in Somalia, with most exports and imports being made via the sea. Four ports handled almost all of Somalia's foreign trade: Berbera and Bossassoo on the Gulf of Aden, and Mogadishu and Kismayo being deepwater ports protected by breakwaters on the Indian Ocean.

Mogadishu has traditionally been the principal port of entry for most general cargo but the port is now rarely used as different factions continue to struggle for management of the facility. The port is also in need of dredging to be able to accommodate the larger vessels which once docked there. Berbera has tended to receive general cargo for the northern part of the country and handles much of the nation's livestock exports. It is also an important seaport access point for Ethiopia. Bossassoo is also used for livestock export as well as fisheries products and incense. Kismayo's main function was the export of bananas and meat, the latter being processed and packed at the port.

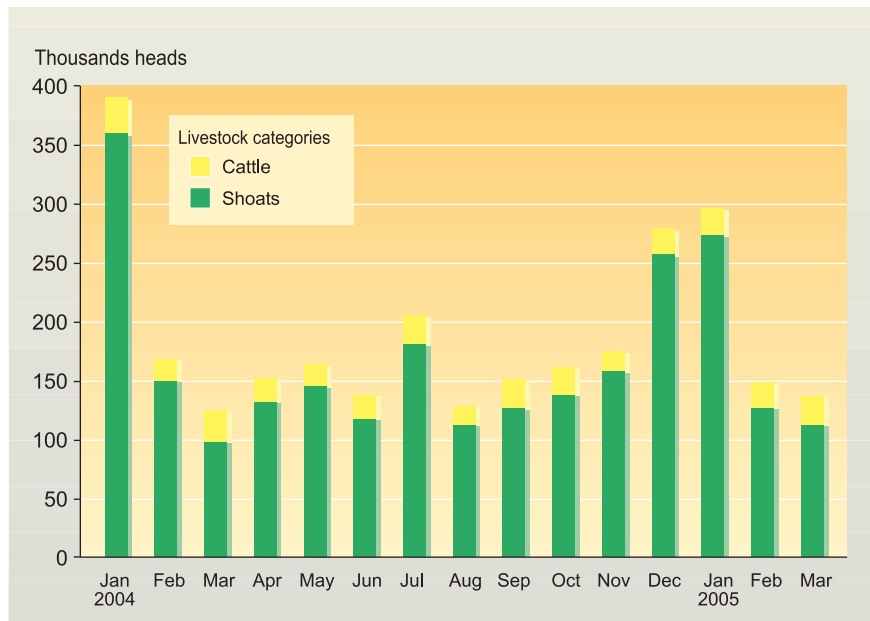
The world's main transport route for hydrocarbons passes through the Gulf of Aden – 590 million tons of oil a year (UNEP, 1987) – and the frequency of tanker movements poses a constant threat of oil spillages. Somalia has no national capacity to deal with an oil pollution incident of any magnitude, which is a concern given the ecological importance of marine and coastal ecosystems in the region (World Bank, Undated) (see Figure 1).

The closest clean-up equipment is located at the IMO Regional Response Centre in Djibouti for the Gulf of Aden region (UNCTAD, 1998). This facility, however, is awaiting re-activation (World Bank, Undated).



Boats in the port of Bossassoo. Credit: G. Farmer

Figure 1. Livestock exports from Somalia, Ports Berbera and Bossaso.



Source: FAO Food Security Analysis Unit Somalia 2005

The absence of surveillance means that tankers routinely discharge oily ballast off the Somali coastline: annual discharges were once estimated at 33,000 tonnes (UNEP, 1982). Tar balls are regularly found on certain sections of the Somali coastline, above all high-energy beaches in the western sector (World Bank, undated). Sewage and solid waste discharge from marine vessels is another unregulated activity (see Box 9).

Natural Disasters

Drought has been the single most devastating and recurrent natural disaster to affect this country in recent decades. Severe droughts interrupted by devastating floods occur frequently resulting in large-scale starvation and the death of thousands of people and their livestock. As recent as March 2004, an estimated 200,000

Box 9. Alleged dumping of hazardous waste

Since the early 1990s, reports have been circulating in Somalia and the international media regarding the dumping of hazardous waste along the coastline of Somalia, including regular sightings of suspected containers. Assessment missions were undertaken by international organizations in 1992 as well as in 1997 but no hazardous waste was found.

Following an increase of reported sightings after the December 2004 tsunami, UNEP, through its Joint UNEP/OCHA Environment Unit, and in co-operation with the International Maritime Organization (IMO), International Atomic Energy Association (IAEA), the UN Development Programme (UNDP) and World Health Organization (WHO), has been investigating these reports with no results to support the presence of hazardous waste.

A UN technical fact-finding mission visited the “Puntland” region of Somalia from 25-29 May 2005, to investigate allegations of toxic waste hazards uncovered by the tsunami. The mission visited three key populated coastal locations at Hafun, Bandarbeyla and Eyl, a region stretching over 500m in length. No traces of toxic waste were found, but the UN added that “the urgent need remained for a more comprehensive assessment of the natural environment of Somalia, which would include further investigations of alleged toxic waste sites on land, and dumping of toxic waste at sea”.

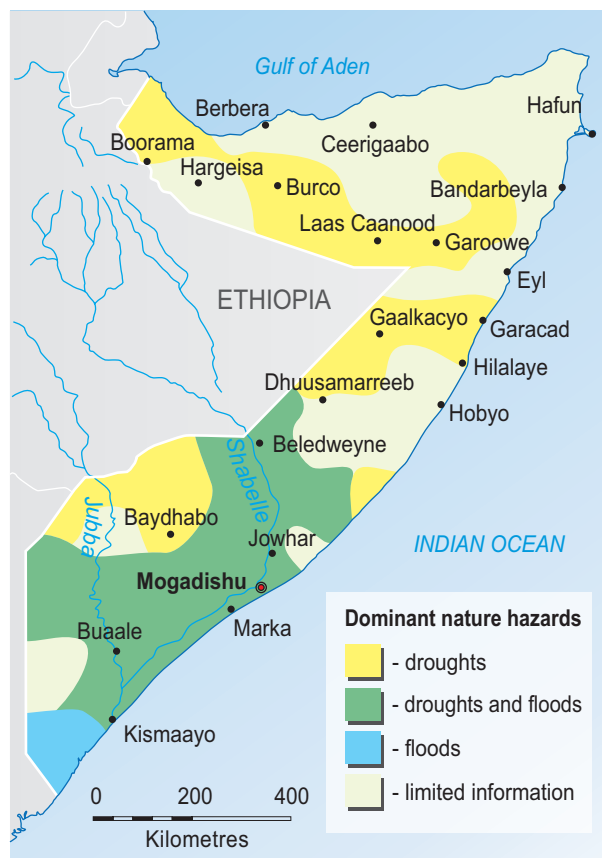
Main source: UN Press release 7 October 2005 (UN Mission to “Puntland” on Toxic Waste in the Coastal Areas of Somalia)

pastoralists in the northern and central regions were threatened by drought considered to be the worst in 30 years (UN OCHA, 2004). By mid-2005, the UN reported that 500,000 people remain in a state of humanitarian emergency or livelihood crisis in drought-affected areas (UN, 2005). Despite the good Deyr rains of 2004-2005, which improved water availability and pasture, recovery is slow as pastoralists have been unable to fully benefit from the improved conditions due to significantly reduced herd sizes, excessive debts and widespread destitution. Recovery is also hampered by recurrent instability which limits access to markets, grazing and other resources (see Figure 2).

Recent flooding in the Jubba and Shabeelle regions has caused cereal production to fall to its lowest post-war level. Flooding has continued in the Gu rainy season in the Hiran and Middle Shabeelle regions where the situation was described as “precarious”, with several thousand households being forced to flee their riverine villages (UN, 2005).

Coastal areas of Somalia, particularly in “Puntland”, suffered damage and the loss of several hundred lives as a result of the December 2004 Indian Ocean tsunami. The tsunami came at a time when many parts of the country were beginning to recover from four years of consecutive drought and periodic flooding (UNEP, 2005). Apart from loss of life, the livelihoods of some 44,000 people are thought to have been affected, through loss of housing, loss of fishing materials (and associated revenues) and the need for relocation in some instances following salinization of coastal fresh water sources. Coastal infrastructure such as roads was also damaged (see map Somalia: Impacts of the 26 December 2004 tsunami).

Figure 2. Natural disaster risk distribution in Somalia.



Source: Center For Hazards and Risk Research at the Columbia University 2005 (<http://www.ldeo.columbia.edu/chrr>)



A Somali child rescues a kitten who was stuck on the roof of a flooded house in Fagan in the lower Juba river area, southwest of Mogadishu. © JEAN-MARC BOUJU/AFP/Getty Images

The desert locust plagues of 1986-1989 and 1996-1998 serve as examples of how agricultural pests and diseases can easily spread across borders and cause emergencies. Although Somalia has been spared from this experience in recent years, there is still a threat of outbreaks in the region, with attention focussing on the Chad/Sudan border and the Eritrean Red Sea coast (FAO, 2005b).

Environmental vulnerability is likely to intensify in Somalia with repeated droughts and flooding, in particular. Changing climatic conditions, combined with growing pressure on the land and for specific coastal resources, will only worsen this situation, in a country which currently lacks the capacity to prepare for, prevent and ultimately deal with disaster-related events (see Table 3).

Displaced people

Migration is at the heart of Somali nomadic culture, a culture characterized by a subsistence economy, a trading mentality and nomadism, a traditional and well-established form of livestock keeping attuned to the region's climate.

During the period of British colonialism, an early Somali diaspora emerged as seamen from British Somaliland worked in the Merchant Navy and settled in ports such as Cardiff and London, UK (Gundel, 2002). This was followed during the 1970s when Somalia became a major labour exporter to the oil producing countries and once again after independence, by others who had lost their assets. Several hundreds of thousands of people left seeking better employment than they could find in Somalia.

Not all population movements, however, were so voluntary in nature. The Ogaden war of 1977-1978 provoked a massive refugee movement, forcing thousands of ethnic Somalis from the Ethiopian Ogaden region into Somalia. By 1981, these refugees constituted perhaps as much as 40 per cent of the population of Somalia.



Source: UNHCR Somalia Atlas 2005, UNDP Somalia, Tsunami Interagency Assessment Mission 2005, Tsunami Research Centre of the University of Southern California 2005
 THE MAP DOES NOT IMPLY THE EXPRESSION OF ANY OPINION ON THE PART OF UNEP CONCERNING THE LEGAL STATUS OF ANY

Table 3. Recent natural disasters in Somalia

Disaster	Date	Number of people killed	Number of people affected
Drought	December 1964		700,000
	1974	19,000	230,000
	1987	600	500,000
	January 2000		650,000
	June 2001		1,100,000
	December 2001		500,000
	2004		200,000
Flood	November 1961	200	
	October 1997	2,311	1,230,000
	July 2000		220,000
Epidemic	March 1985	1,262	
	October 1997	500	
	January 1986	1,307	
	February 1998	248	
	April 2000	390	
Wave/Surge (tsunami)	December 2004	298	44,000
Famine	March 1999		375,000

Source: EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net. Université catholique de Louvain, Brussels, Belgium. May 2005.

Additional Ogaden refugees as well as Ethiopian Oromos joined this group of refugees from 1984 to 1991. By 1987, one in six persons in Somalia was registered as a refugee (Gundel, 2002).

The eruption of the civil war in 1988 was another period of mass population movement, when more than 600,000 people fled from Somalia to Ethiopia. Further escalation of the conflict produced a refugee flow of more than one million people from southern Somalia to neighbouring and distant countries. Refugees continued to leave southern Somalia in large numbers until 1995. Since then there has been a decline in refugee flows from Somalia and a gradual process of repatriation and re-integration has been taking place, with people resettling in "Somaliland" and "Puntland" in particular. By 2004, UNHCR had recorded the voluntary repatriation of some 476,000 refugees (UNHCR, 2005a). At the same time, however, a quarter of a million Somali refugees remain in camps in Kenya, Ethiopia, Djibouti, Yemen and other neighbouring countries. Hundreds of thousands of other Somali refugees are scattered across the globe.

In addition to this massive human upheaval to neighbouring countries, there is also a significant population of internally displaced people in Somalia. The largest war-related internal displacements from central and southern Somalia took place between 1991 and 1993, initially on account of the war, but also because of drought and food scarcity. In September 1992 there were estimated to be between 556,000 and 636,000 'visible' displaced people in camps of which 50 per cent were in Mogadishu (Gundel, 2002). The overall trend since 1993 has been one of diminishing internal displacement as the war subsided and people either returned to their homes or resettled in different regions. But the vagaries of climate and economic hardship are now the main causes of population movement. In 2000, there were estimated to be 300,000 internally displaced including 40,000-50,000 newly displaced in 1999. Internally displaced persons constitute more than 60 per cent of those Somalis considered to be 'food insecure' (Gundel, 2002).

NATURAL RESOURCES

Introduction

On land and offshore, Somalia possesses important and some unusual biological resources within its varied biogeographic zones. At the same time, however, it is not well-endowed with an abundance of natural resources which means that particular care needs to be taken in their management. This, unfortunately, has not always been the case and there is a dismal history of resource over-exploitation for personal or clan-based gains. Massive hunting in the early part of the 1990s depleted virtually all of the once great herds of wild animals: today, similar activities are destroying much of the country's forest resources and seriously impacting several different components of Somalia's rich marine fisheries.

The country's infrastructure was poorly developed at independence and it has had little time of stability, security and directed assistance to establish a favourable framework for natural resource management. This seems all the more important in this country where the vast majority of the people – at least directly in rural areas – depend upon the environment for their livelihoods. The legacy of exploitation only worsened during the country's civil war, as communities and clans vied with one another for access to grazing lands, watering holes and access to lucrative fisheries.

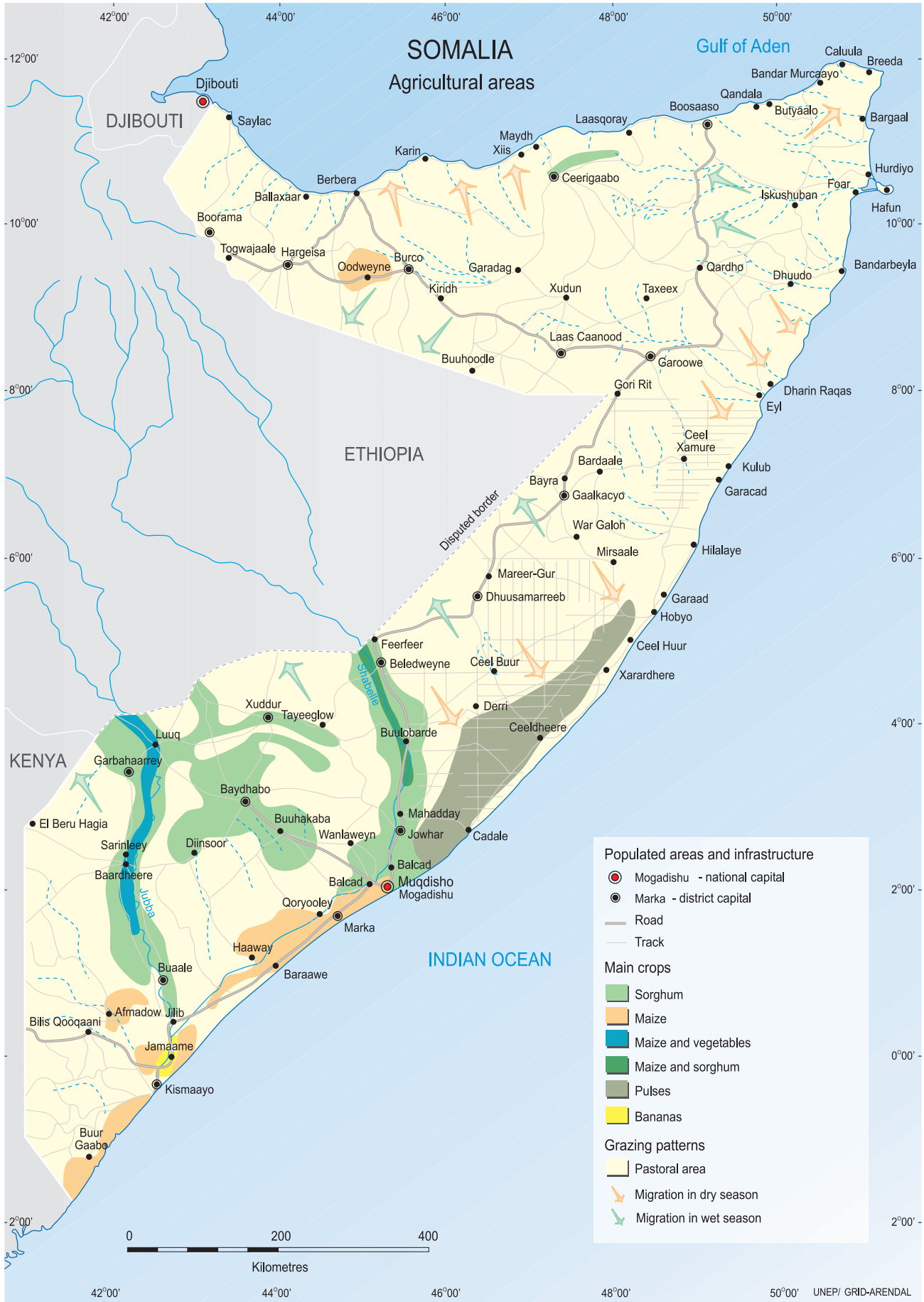
Known issues of particular concern are an almost complete breakdown of legislative and traditional controls governing use and access to natural resources; deforestation near, but no longer exclusive to, populated areas; overfishing of selectively targeted offshore and nearshore marine species; desertification and soil erosion; inadequate water supplies and periodic drought; an inadequate and dysfunctional system of protected areas; an urban environment in disarray; and the effects of political and economic mismanagement of land tenure (EC/IUCN, 1993). Many of these problems actually stem from or have been aggravated by the prolonged civil strife which Somalia continues to experience on some of its territory.

Environmental management issues featured in some of the country's earlier development plans but the first targeted initiative was launched in 1996 when the World Conservation Union (IUCN) began the Somali Natural Resources Management Programme. This was designed to promote sustainable use of natural resources use, and through it the country began to address specific environmental issues, including fuel-wood conservation, fisheries management, marine conservation and land-use planning. Physical coverage of all of the country was incomplete due to security concerns, but by the time the programme ended in 2000 a number of key management issues had been identified which may allow the core of a comprehensive and integrated management system to be formulated. The future of any such system, however, must fully address the needs of the people in Somalia whose current livelihoods are so heavily dependent on a diminishing and deteriorating natural resource base.

Land

Having access to land is a concern of a sizeable part of the population in this country where pastoralism is an established way of life. Estimates vary, but from 46-56 per cent of Somalia's land area can be considered permanent pasture. About 14 per cent of the country is classified as forest, while another 13 per cent is thought to be suitable for cultivation, arid, semi-desert conditions making much of the country relatively unproductive. In most areas, the barren coastal lowland strip – which is widest in the south — is abruptly succeeded by a rise to the interior plateau which averages around 900 metres in height and stretches toward the northern and western highlands. Only two main rivers – the Jubba and Shabeelle – occur, both of which are in the south.

Relatively high rainfall in the highlands around Hargeisa has raised the organic content in the sandy calcareous soils characteristic of the northern plains, allowing some dry farming to be practised. South of Hargeisa



Source: UNHCR Somalia Atlas 2005, Food Security Analysis Unit FAO 2004

THE MAP DOES NOT IMPLY THE EXPRESSION OF ANY OPINION ON THE PART OF UNEP CONCERNING THE LEGAL STATUS OF ANY

begins the *Haud*, whose red calcareous soils continue into the Ethiopian Ogaden. This soil supports vegetation ideal for camel grazing. To the east of the *Haud* is the Mudug plain, leading to the Indian Ocean coast; this region, too, supports a pastoral economy. The area between the Jubba and Shabeelle rivers has soils varying from reddish to dark clays, with some alluvial deposits and fine black soil. This is the area of plantation agriculture and subsistence agropastoralism (www.somalinet.com/library).

Practices concerning land rights vary from rural to urban areas and even within the latter in some parts of the country. In precolonial times, traditional claims and interclan bargaining were used to establish land rights. A small market for land, especially in the plantation areas of the south, developed in the colonial period and into the first decade of independence. However, the socialist regime which took control of the country from 1969-1991 sought to block land sales and tried to lease all privately owned land to co-operatives as concessions. Despite the government's efforts, a *de facto* land market developed in urban areas, while in the rural areas, the traditional rights of clans were maintained.

The Siyad Barre regime also took action regarding the water system. In northern Somalia from 1988-1991, the government destroyed almost all pumping systems in municipal areas controlled by the Somali National Movement (SNM). Failing that, equipment was either stolen or vandalized. In rural areas, the government poisoned the wells by either inserting animal carcasses or engine blocks and car batteries that leaked oil and acid. As a result, northern Somalis had to rely on older gravity water systems, use poor quality water, or buy water. Following the declaration of independence by "Somaliland" in the north in May 1991, the secessionist government began ongoing efforts to reconstruct the water system.

In the south, from the late 1980s onward, the water situation in the towns tended to resemble that of the north, largely as a result of war damage and chaos. Few pumping systems were operational in early 1992. Conditions in rural areas varied. Many villages had at least one borehole from which poor quality water could be obtained in buckets; pumps generally were non-functioning. Somalis who lived near the Jubba or Shabeelle rivers obtained their water directly from the river (www.somalinet.com) (see Box 10).

Forests and Woodlands

The vegetation in Somalia is predominantly dry deciduous bushland and thicket dominated by species of *Acacia* and *Commiphora*, with semi-desert grasslands and deciduous shrubland in the north and along much of the coast. In general, the vegetation becomes more dense towards the south – much of the north-eastern part of the country is devoid of trees (see Box 11).

Forest growth in general is limited due to poor soils and low rainfall. Closed forest cover occupies only about 2.4 per cent of the country (IUCN, 1992) but, if the *Juniperus* forests and evergreen tracts in the mountains in the north are included, the total forest coverage would probably amount to around 14 per cent (90,000 km²) of the land (see Box 12).

Virtually all of the tropical floodplain forest that once existed along the Shabeelle River has been cleared for smallholder agriculture together with sugar and banana plantations, except for a small patch set aside as a reserve at Balcad by the Somali Ecological Society. Aerial photographs in 1960, 1983-1984 and 1987 reveal a drastic acceleration of forest clearance in the Jubba valley as well, likely encouraged by irrigation and drainage schemes. Only the poorly accessible Middle Jubba, with its predominantly saline, alkaline, impermeable soils, has retained significant areas of relict floodplain forest. Compared with the surrounding woodland and bush, these floodplain forests are floristically rich and are notable for their diversity of specialized birds and animals (Madgwick, 1989).

A number of mangrove stands have been reported, the best areas being between Saada Din Island and Saba Wanak, in the estuaries of three watercourses which reach the sea west of Bossassoo, and in the three estuaries just north of the Kenyan border (Hughes and Hughes, 1992). These and other stands, however, have been

Box 10. Land ownership and land disputes in Somalia

Land ownership and land disputes are central to much of the conflict in contemporary Somalia. The pastoral lands have always been a common good – pasture is claimed by clans and not individuals so land conflicts in the pastoral setting are usually matters of power struggles between two clans. In cases where one clan gains an upper hand, neighbouring clans can be pushed out of prime pasture land and lose access to their own wells. Agricultural land has traditionally been allocated to households by village elders. Although not technically ‘owned’, this land is passed from one generation to the next and could be rented or sold.

In the 1970s, a modern land tenure law was passed decreeing that land titles be acquired from the state which ‘owned’ all the land in order to claim usufructuary rights. At the same time riverine farmland which had been held by Bantu and other farming communities for over a century was rapidly rising in value, thanks to major irrigation projects and the revival of the banana export business in the 1980s. Consequently, an epidemic of land grabbing began in the 1980s. Civil servants, well-connected businessmen and other Somalis with access to the Ministry of Agriculture began to register large tracts of land in their name, even though the land had been historically farmed by villages. Few smallholder farmers could afford to register their land as that required expensive trips to Mogadishu and bribes to civil servants. Even then, individuals that were more powerful could obtain titles to the same tract of land and pay for the backing of police to ensure that their title was seen as the legitimate one. At the same time, the state expropriated tens of thousands of hectares of prime riverine land from farming communities, offering them no compensation (since technically the unregistered land was unclaimed) for the establishment of internationally financed state farms. Within a decade many of Somali’s smallholders were transformed from subsistence farmers to landless or semi-landless sharecroppers and rural wage labourers. This episode of land grabbing by both the state and private speculators sowed the seeds for endemic land conflicts in later years and depressed many of the riverine agricultural communities.

The civil war and state collapse accelerated this struggle for land, replacing title deeds with semi-automatic weapons as the instrument of choice for appropriating land from weaker groups. As during the 1980s, land grabbing in the 1990s did not involve militia and their kinsmen taking up agriculture themselves, which is seen as a low-status occupation. Instead it involved laying claims to the fruits of the harvest of the farmers. In parts of the riverine zones, smallholder farmers were subjected to coerced sharecropping by militia overlords who may or may not have provided security in return for 50 per cent of the harvest. In other instances militias have been used by powerful landowners to force villages to supply labour to their farms or plantations, with or without pay. On abandoned state farms, newcomers have staked claims to plots without regard to the fact that the land had been expropriated from the villagers. Clans that were more powerful also pushed their herds into pasture land of weaker groups, grazing their livestock on villagers’ ripening crops.

Not all relations between militia and local communities were so hostile. In some instances armed newcomers agreed to settle land disputes in order to secure better relations with residents. There is evidence that some militia settled and married into local communities suggesting the possibility, in some areas, of gradual normalization. In other cases, individuals who have lost valuable land or houses have had to request relatives in other clans to look after property, sharing their rent or harvest profits in the process.

Unravelling the thousands of land and property disputes emanating from the collapse of the State has been at or near the centre of nearly every peace process since 1991 and will be a major hurdle in reconciliation efforts.

Source: UNDP, 1998

seriously ravaged for firewood and construction timber. Some have been completely denuded and are now salt marsh ecosystems. Overall the regenerative capacity of the mangrove ecosystems may have declined in recent decades – a state which will almost certainly affect the capacity of these areas to function as breeding and nursery sites for near and offshore fish, crustaceans and molluscs, but one which also now affords less protection to the coastline. An assessment should be carried out of the extent of damage to mangroves and other coastal vegetation (UNEP, 2005) so that responsible actions can be undertaken.

Much of the country – around 60 per cent – is covered by sparse savannah woodlands. Forests and woodlands are important resources on account of the fact that wood is the main source of household energy and construction materials for the bulk of the population, but charcoal – and certain other wood products – are also important for the revenue they provide. Important native forest exports include frankincense from *Boswellia* species growing in the north-east, *Commiphora*, which produces myrrh, in the south-west, gum Arabic from *Acacia* spp, and *Cordeauxia edulis* (now thought to be endangered) which produces *yicib* nuts in the central regions (UNEP, 1984). In 1985 Somalia was the world's largest source of incense, and produced over 2,000 tonnes. Forestry has usually accounted for about 2.5 per cent of GDP. Frankincense used to be Somalia's 4th largest foreign currency export earner with an annual production of 12,000 tonnes. Due to their value, *Boswellia* are highly prized trees with tree tenure systems. Although not cut for charcoal or other uses, their natural regeneration is threatened by over-grazing (EC/IUCN, 1997).

On the basis of a study made on wood-based energy dynamics in Somalia, the charcoal output of north-east Somalia in 1996 alone was estimated to be in the order of 4.8 million sacks, each weighing 25-30kg, 80 per cent of which were exported. Producing such a volume required cutting about 2.1 million *Acacia nilotica* trees. At an average density of 60 trees per hectare, this translates into a deforestation rate of 35,000 hectares of land a year. Such a rate of deforestation would have cleared 170,000 hectares of land during the last five years of the 1990s alone, when the area witnessed a massive outflow of charcoal for export (WSP, 2001) (see Box 13).



Somali women carrying wood. Credit: UNDP Somalia

Box 11. Degrading lands

Rangeland degradation and the formation of sand dunes now affects considerable parts of the country. Dregne (1982) concludes that all rangelands are degraded while a World Bank (1987) survey found Somalia's northern ranges to be the most seriously (as much as 50 per cent) degraded owing to their steep topography, large numbers of livestock and proximity to ports for livestock export. Over much of the country, areas around water holes or wells are all degraded.

Box 12. Mist forests of northern Somalia

The mist forests of the Goolis mountains of "Somaliland" are the only true forest areas of Somalia and are important centres of biological diversity and species endemism. On account of their biological richness, mist forests – so called because of their ability to remove moisture from the air as it blows in from the coast and rises above the plateaux – are also important resources for pastoralists during dry seasons and periods of drought.

Gacaan Libax, a highland area reaching 1,719 m asl in north-western Somalia, hosts one of the largest and most intact mist forest areas in Somalia. Local people are well aware of the importance of these forests to their livelihoods, especially for the grazing and water resources they provide. The loss of traditional grazing lands to private livestock enclosures, as well as an increased number of livestock and the lack of law enforcement combine to now force people to demand more and more from these forests.

As a result, soil erosion is becoming more evident as over-grazing and deforestation take place. To avoid conflicts from developing, opportunities like this provide an ideal setting for the development of community-based land management plans.

The lucrative charcoal trade raises many concerns for the country's remaining forests. Yusuf (1997) estimated that 30,000 tonnes of charcoal were being exported by ship to the Arabian Peninsula, particularly the United Arab Emirates. Many species are felled to produce charcoal but *Acacia bussei*, a slow-growing hardwood is the preferred species. Usually a scattered species, it was formerly found growing in high densities in the plateau areas of Sanaag, Sool, Bari, Togdheer, Woqooyi Galbeed, Bay and Bakool – all regions where charcoal production was very high at one stage (EC/IUCN, 1997). Reports from north-western Somalia reveal that Somali charcoal producers now produce charcoal in Ethiopia, both for internal consumption as well as for export (EC/IUCN, 1997).

Vegetation cover is also important in this country and region in terms of stabilising soils, preventing erosion and encouraging ground water absorption. This is especially important in areas which endure high levels of grazing since apart from direct grazing pressure, movement of livestock over barren or fragile soils easily leads to erosion or compaction of the surface soils.

Box 13. Trade in black gold

Charcoal plays an important role in both the energy sectors and economies of many African countries, and Somalia is no exception. Charcoal making provides a considerable amount of employment in rural areas but the scale of this operation has escalated to such an extent that environmental degradation has now been reported from most parts of the country.

Most charcoal is today made in southern Somalia – more than 80 per cent of trees used are *Acacia* species. The growth rates of these trees – even if some reforestation was taking place, which is not the case – is not fast enough to replace felled trees, so there is a constant net loss of vegetation cover. The destruction of trees for charcoal production is also leading to conflict over these resources as many trees provide dry season forage for camels, cattle, sheep and goats, but heavy grazing pressure itself is also a reason for lack of regeneration.

While fuelwood and charcoal are the main energy sources for most rural and urban dwellers, respectively, it is the foreign demand which primarily drives the scale of charcoal production today in Somalia. A prohibition was passed in 1969 preventing the export of charcoal and firewood, in order to protect trees. In 1993, however, export oriented charcoal production was restarted in the Bari and Sarang regions (at least) for export to the United Arab Emirates.

In the period 1980-1984 charcoal consumption in Mogadishu alone was thought to range from 32,000 to 45,000 tonnes per annum, while consumption for the remainder of the country was estimated at 30,000 to 35,000 tonnes. Estimated annual inflow of charcoal to Hargeisa was 65,000 tonnes in 1999, with per capita charcoal consumption estimated at 206kg, with a mean daily household consumption rate of 4.2kg. All charcoal consumed in Mogadishu and other main urban centres comes from sources several hundreds of kilometres away, all former nearer sources having been long depleted.

The relations between charcoal producers and local communities are complex. In many cases, producers are actual members of the community, but in some cases outsiders have taken control of forest resources, production and sale of charcoal. Many conflicts have arisen and casualties recorded over this business. Although producers may be aware of traditional rules and regulations governing harvesting of whole trees, branches or dead wood, violations of such rules are now widespread – many people having no alternative option as a source of livelihood.

Most charcoal is produced in kilns, of which two kinds are used in Somalia: a pit/trench type which is used mainly in Middle Shabelle and a vertical mound type, most commonly seen in the Bari and Sarang areas. A 1997 report concluded that “charcoal production in Somalia is inefficient”, with recovery rates from these kilns only at around 10-15 per cent (IUCN, 1997b). Higher recovery rates – 25-30 per cent – were recorded from skilled charcoal producers using kilns in “Somaliland” in another review (IUCN, 1999b). Even the tree harvesting practices have been noted as wasteful, with as much as 15 per cent of tree materials being lost.

Traditionally the supply of charcoal to main towns in Somalia was managed by Charcoal Co-operatives and the market structure for charcoal was reportedly well managed.

Based on: Agrosphere (2004), Bird and Shepherd (1989), IUCN (1997b, 1999a,b)

At least 151 plants in Somalia have known medicinal values (IUCN, 1997a), but the limited data available is insufficient to describe the status of these resources or the degree to which rural communities, in particular, rely on these or manage them in some way or another (see Box 14).

Freshwater Resources

Somalia is to a large degree an arid or semi-arid country where rainfall is periodic and irregular. Water scarcity has been one of the main traditional sources of social conflict in Somalia. Traditionally such conflicts arise when local supplies are diminishing, particularly during dry periods of the year or during a drought. Nomads are commonly embroiled in water access negotiations at such times. Another source of tension, however, occurs when a new group of consumers moves into a new area – perhaps following displacement of agriculturalists by pastoralists who may lack the experience of former management systems and practices (see Box 15).

Extensive, permanent swamps and floodplains occur on the Shabelle river, while additional swamps about the Jubba river, the two large perennial rivers which rise across the border in Ethiopia and flow across the southern part of Somalia to reach the Indian Ocean. These two rivers are important sources of water for people and livestock, as well as irrigation – the area lying between the two rivers being the country's main agricultural zone. Temporary watercourses, known as lachs or laks, drain the south-east sloping plateau of north-eastern Kenya into southern Somalia, the main ones being Lach Awaro, Lach Bogal and Lach Dheere (Hughes and Hughes, 1992). Cisterns (*Berkads*) are another source of surface water for at least a few months of the year, these being pans or dams whose bottoms and sides are cemented and covered to ensure that water is not lost to evaporation and seepage (Amuyunzu, 1997). Underground aquifers are also widely exploited, either through boreholes, shallow wells or at natural springs.

Box 15. Repairing damage – securing the future

On 7 June 2005 a newly rehabilitated Duduble (China) canal was inaugurated in Jowhar, Middle Shabelle Region. This project is expected to benefit 50,000 people by allowing them access and control over the River Shabelle for irrigation purposes, to avoid perennial flooding and to boost revenue potential. The canal was first constructed in the early 1980s but had fallen into serious disrepair during the time of the civil war, through silting and physical destruction of infrastructure and equipment. As a result, with heavy rains falling in the Ethiopian highlands, large tracts of the Middle Shabelle would flood, displacing thousands of people, destroying their homes and crops.

Source: UNDP/WFP, 2005

Box 14. Frankincense

Frankincense was traditionally a major export activity, especially from the northern part of the country, but today this sector is in a state of neglect. Under the Barre government, state support to frankincense producers facilitated certain aspects of production and export trade but this same state control destroyed private trading networks leaving behind a vacuum when the government collapsed. Now, since production and export is no longer regulated, there are concerns over the scale at which trees are being “milked”.

Source: Somaliland Centre for Peace and Development, 1999

In 1987 – the latest figures available – agriculture accounted for 97 per cent of all freshwater withdrawals, primarily the irrigation programmes of southern Somalia (WRI, 2003). At the same time, however, this figure corresponded with a withdrawal rate of only 8 per cent of the country's actual renewable water resources. Neglect and abandonment of many of these schemes, however, has likely meant a significant decline in the amount of freshwater being extracted for agriculture. Data from 1999 suggest that less than 19 per cent of cropland in Somalia was irrigated at this time (WRI, 2003).

A National Conservation Strategy for Somalia (Government of Somalia/IUCN, 1990) states that the country has adequate water resources to supply the population and sustain its major activities, but the difficulty is its distribution. Currently there are no dams on the Shabelle river although an off-stream storage exists at Jowhar (200 million m³). A future reservoir has been

proposed upstream as well as a hydropower dam on the Jubba river. In a country with a high dependency on water, the control of the dams could be a likely source of conflict. In addition, large dams can be associated with a number of negative social, economic and environmental effects (UNEP, 2003).

Freshwater fisheries are primarily a subsistence activity practised by Bantu people along the rivers in southern Somalia. Freshwater fish catches were estimated at 400 tonnes in 1990 (EC/IUCN, 1993), but more recent figures suggest that this catch had halved by 2000 (WRI, 2003). There is some potential for commercial fishing which was carried out by at least one fishing co-operative prior to the civil war. With the breakdown of irrigation infrastructure and persistent water logging, it can be assumed that fish stocks are at high levels and thus offer renewed economic potential. However economic sustainability will be dependant on continued ecological sustainability of the fishery.

Marine and Coastal Environment

The Somali maritime zone is one of the largest in the western Indian Ocean and has one of the most important large marine ecosystems – the Somali Current Marine Ecosystem – in the Indian Ocean (Fielding and Mann, 1999). A prominent feature of this ecosystem is a seasonal upwelling which gives rise to high levels of biological productivity which in turn sustains rich fishing grounds, most notably in the northern area between Ras Asir and Ras Mabber (TRAFFIC, 1997).

Somalia has both fringing reefs and patches of coral reefs along the Gulf of Aden coast as well as in the south near the Kenyan border. Few studies have been conducted on these reefs but one off the northern coast east of Berbera highlighted extensive coral bleaching, with some reefs suffering almost total mortality (Schleyer and Baldwin, 1999). The Red Sea coral reefs off the coasts of Djibouti, Eritrea and Somalia, however, are reportedly in good, often pristine condition with 30-50 per cent live coral cover and the richest diversity of coral and other reef species in the entire Indian Ocean (Pilcher and Alsuhaibany, 2000).

Southern Somalia also has numerous small islands north of the Kenyan border. The Banjuni islands and the mainland southern coast are home to the only two ethnic groups – Bajuni and Rermanyo – who have a tradition of fishing in Somalia (Lovatelli, 1996).

Surveys carried out in the 1970s estimated that the potential yield of marine fishery resources could range between 380,000 tonnes and 500,000 tonnes per annum (Hacksonsens, 1983). More conservative estimates, however, suggest that the annual catch potential is likely to lie between 180,000 tonnes and 200,000 tonnes per annum (Van der Elst, 1997). Small pelagic species such as sardine, anchovy and scad likely make up much of the catch but tuna, shark and other species are also actively sought.

Overfishing has been noted in a number of sectors, primarily offshore – where trawlers from many nations ply the waters untroubled by any national maritime force – but also inshore, particularly with regards the shark and lobster fisheries, both of which are of considerable importance in terms of the revenue they provide. While commercial fishing in the past focused primarily on crustaceans and fish (Stromme, 1987), artisanal fishing of shark species now centres mainly on the production of dried shark meat and fins for export, and local use of shark liver oil for maintenance of *dhow*s – traditional fishing craft (TRAFFIC, 1997). In addition to uncontrolled exploitation of marine resources, the sea bottom is also being damaged by heavy trawls (World Bank, Undated). According to one report (FAO, 1995), there is no knowledge of the extent to which illegal fishing – much of which takes place at night – is having off the Somali coastline. A more recent report from FAO (FAO, 2005b) noted that this practise continues to date.

Artisanal fishing has a long tradition with some coastal communities, although historically this has been carried out at a relatively low level and focused on a relatively narrow band of species. Following the drought of 1973-1974 the government resettled large numbers of nomadic herdsmen along the coast and trained them as fishermen. The Somali National Development Plan attached high priority to the fishery sector, aiming for an

annual growth of 23 per cent per annum (Nur, 1998). Twenty-one fishing co-operatives were established and a large number of vessels purchased or donated through foreign assistance: an estimated US\$100 million was spent from 1987-1990 to assist with the development of the artisanal fishery (Van der Elst, 1997). Other development assistance followed with an associated increase in both the number of fishermen as well as improved catch methods, all of which have combined today – in the complete absence of any regulatory mechanisms – to place a number of species under threat.



Fishing waste on shore. Credit: FAO/D. Signa

The lobster fishery is one such fishery showing undisputable signs of overexploitation, driven by strong markets in several Middle Eastern countries, Dubai in particular. A variety of lobsters of the genus *Panulirus* are found along the coastline as well as two deep water lobsters of the genus *Puerulus* which are fished at depths of 150-400 m by trawlers. Some reports mention a deepwater crustacean fishery of 1,000-2,000 tonnes per annum (Everett and Kelleher, 1998) but there is no information on the species composition of this catch mainly as deep water trawling has always been carried out by foreign vessels which submit no catch and effort data (Fielding and Mann, 1999).

Since 1990 the lobster fishery has become the single most important fishery along Somalia's east coast. A significant increase has been reported on the number of people engaged in this activity while associated investments have also been made by traders, supplying freezer trucks, boats, outboard engines, fuel and fishing gear. Fielding and Mann (1999) report an increasing trend to fish lobster throughout the year, in contrast with former practices which resulted in a seven month closed season during the monsoons. No control is currently exercised on the amount, size or reproductive condition of lobsters caught – every lobster caught is retained.



Crabs eating finless shark abandoned on shore. Credit: FAO/D. Signa

Sharks and rays also represent an important part of Somalia's artisanal fishery (TRAFFIC, 1997), with highest catches being reported from the north coast and the southern portions of the east coast. It has been estimated that sharks comprise 40 per cent of the artisanal landings in the south-eastern coastal area (TRAFFIC, 1997). The main species landed include the hammerhead (*Sphyrna* spp.) and mako (*Isurus* spp.) sharks (Stromme, 1987). At least 10 other species occur in the nearshore waters (Remmerswaal, 1996 cited in TRAFFIC, 1997).



Drying shark fins on the shore of Somalia. Credit: FAO/D. Signa

Trade in shark products is dominated by the trade in fins and to a much lesser extent dried and/or salted shark meat. Fins are exported primarily to Dubai, sometimes via Djibouti, and then re-exported to Asia for consumption in soup (TRAFFIC, 1997). While export figures for shark fins are largely unavailable, one report notes the export of 10,530 kg of fins from Bossasso between January and July 1996 (Anon, 1996). A rough estimate of the yearly shark catch was 6,700 tonnes (but this does not account for all deep sea vessels operating in Somali waters as there are no data on these vessels) which is not thought to be a significant threat to shark populations in Somali waters (TRAFFIC, 1997). Other reports, however, remark on



Lobster, commonly fished in Somali waters. Credit: G. Farmer

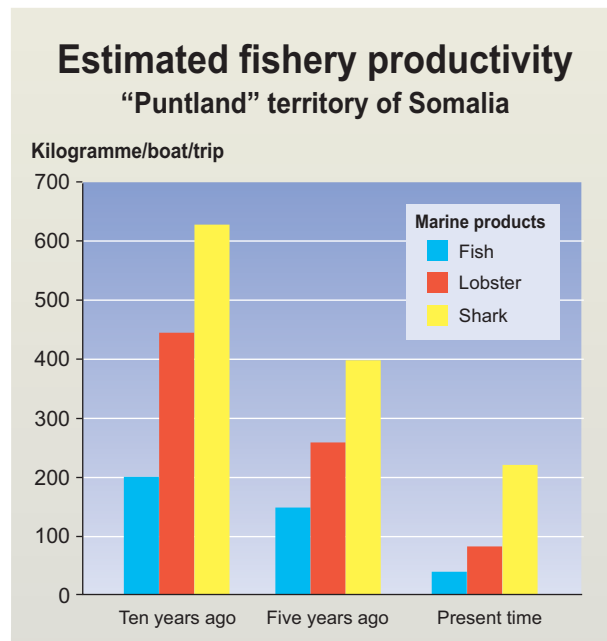
overfishing of sharks in the north-east region so, as with the lobster fishery, action should be taken to halt the overfishing and promote fisheries management in the area.

In “Puntland” at least, there has been a significant decrease in the catches of the three main fishery types in the past 10 years (FAO, 2005b). This is possibly due to the continuous and unsustainable offshore fisheries, but is also linked with the indiscriminate exploitation of lobster and shark resources by artisanal fishermen. A number of the once abundant shark species (saw, hammerhead, white and mako), have totally disappeared in some areas while the average sizes of some other shark species landed have decreased over the past five years. The same scenario has been reported to be the case for lobsters, with 80 per cent of the original stock now believed to have been lost (FAO, 2005b). Post-harvest losses of fish and shark catches along the “Puntland” coast are estimated at 60 per cent and 70 per cent, respectively.

A related threat to the coastal environment, in “Puntland” at least” is the presence of discarded lobster traps. According to a recent survey, local fishermen reported that wire lobster traps corrode easily and have an average life span of approximately 20 days, following which they are commonly dumped at sea (FAO, 2005b). Thousands of such traps can be discarded each year which may represent a potential environmental threat from heavy metals since the traps are constructed using galvanized wire mesh web and lead welding (see Figure 3).

The protracted civil strife in Somalia has disrupted all aspects of the fishing industry. The capacity to control foreign incursions into the exclusive economic zone (EEZ) of the Somali region does not exist, which leaves the door open for foreign vessels to exploit these resources. At the same time, the complete lack of any regulatory

Figure 3. Estimated average yield/boat/trip of fishermen in “Puntland” over the past 10 years



Source: FAO 2005

mechanisms or structures to prevent a crash of certain species provides an invitation for anyone to engage in what still remains a lucrative business opportunity at a small scale.

Adding to these pressures to some degree was the impact of the December 2004 tsunami along approximately 650 kilometres of the coastline, primarily in the stretch between Hafun and Garacad. Initial reports of leakage of possible toxic wastes from drums along part of this stretch of coast would appear to be unsubstantiated (see also Box 9). Waste pollution – mainly from coastal communities – however, has been cited in a number of reports (e.g. FAO, 2005a; UNDP, 1998), with wastes ranging from discarded batteries to household wastes and animal carcasses. An estimated 1.5 million people live in coastal areas. Most coastal municipalities do not have capacity to handle the quantities of sewage and solid waste generated. Sewage treatment plants are few in number and are generally poorly maintained (Pilcher and Alsuhaibany, 2000) (see Box 16).

Mineral resources

Somalia’s mineral sector has traditionally played only a small role in the country’s overall economy – in 1988 it represented just 0.3 per cent of total GDP. While the local geology suggests the presence of valuable mineral deposits, as of 1992, however, only a few significant sites had been located. Somalia in particular has some large uranium deposits in the Galguduud and Bay regions, and in 1984 work began to develop them. Significant iron ore deposits have also been recorded in the Bay region.

Other rocks and minerals are known to exist and available for exploitation include tin in the Majiyahan-Dhalan area (south of Boosaaso-Ceelayo coastal strip), sepiolites from Ceel Bur, and quartz, granite, marble, limestone and gypsum in different parts of the country. These natural resources include primary raw materials for various kinds of industry, for example, manufacturing cement, prefabricated walls, roofing materials, floor, wall tiles and aggregates.

Existence of good petroleum indicators has been known for a while, and recent data highly encourage the exploration potential of the country (Hersi, 2000).

Box 16. Decentralization of ‘fisheries enforcement’ to the community level: a response to the absence of organized government

In a potentially hostile area lacking a national fisheries administration, community empowerment has filled an institutional vacuum. The driving forces behind community empowerment in fishery enforcement stem from:

- recognition of the basic property rights problem of an open access fishery and its unlikely resolution in the current socio-economic and political context; and
- the precarious state of the fisheries resources, especially lobster and shark.

Somali coastal communities have taken enforcement action against illegal fishing. Two prosecutions have been undertaken under Islamic Shari’ah law generating in excess of US\$1 million which was reportedly given to the villages apprehending the offending vessels (rather than for use to increase surveillance capacity). The international publicity resulting from such prosecutions may act as a deterrent against continued illegal fishing and ensure compliance by foreign vessels, either with or without a dubious license.

Challenges facing coastal fishing communities include:

- lack of physical enforcement capacity;
- logistics to gather evidence;
- lack of procedural code for boarding and prosecutions; and
- presence of armed guards on foreign fishing vessels.

Source: UNCTAD, 1998

Biological diversity

Arid and semi-arid conditions have persisted in the Somali region throughout the long-term climatic fluctuations that have affected much of the African continent (Simonetta, 1988). As a result, this region has been an evolutionary centre of fauna and flora adapted to these conditions. Ruthless overexploitation, however, has meant that many of the country’s wildlife species are now endangered or rare, while key ecosystems have been seriously degraded.

Early explorers, hunters and colonial officials travelling through Somalia during the late 1800s reported on the astonishing abundance and diversity of wildlife – Somalia at the time had a reputation of being one of the best wildlife havens in Africa. This, however, is no longer the case. Even as recently as the mid-1980s, the status of wildlife in Somalia was reported as being sparse and scattered due to a combination of livestock grazing and illegal hunting (IUCN/UNEP, 1986). Now only small remnant pockets of wildlife exist, with many species approaching extinction. Some, such as the elephant (*Loxodonta africana*), black rhino (*Diceros bicornis*) lion (*Panthera leo*) and Swayne’s hartebeest (*Alcelaphus buselaphus swaynei*) have been wiped out from most of the country, while the wild ass (*Equus asinus somalicus*) – which once occurred here in their thousands, have been reduced to just a few dozen (Sommerlatte and Umar, 2000). Environmental problems such as desertification due to the loss of forests and pastures, soil erosion and the formation of sand dunes are increasingly exacerbated by drought and increased pressure from human and livestock populations.

Among the country’s mammals there are 22 species of antelope, of which 14 are considered to be threatened. Seriously reduced numbers have been noted of the following species: the beisa oryx (*Oryx gazella*

beisa), formerly widespread, but now reduced by poaching to a mere 1,000-1,200; the hirola (*Beatragus hunteri*), which occurs only in the Lake Dere region along the Kenyan border; the beira (*Dorcatragus megalotis*), which is restricted to the northern mountains and whose numbers have decreased because of drought; the dibatag (*Ammodorcas clarkei*), found along the central coastal region, threatened by drought, overgrazing and poaching; Soemmerring's gazelle (*Gazella soemmerringi*) and Speke's gazelle (*Gazella spekei*), both of which are still widespread but greatly reduced in numbers; and Pelzeln's gazelle (*Gazella dorcas pelzelni*), which is found along the northern coastal zone (IUCN, 1990).

Elephants, belonging to what may be a distinct small subspecies *Loxodonta africana orleansi*, still survive in the south, but poaching is extensive and their numbers have fallen below 6,000. The black rhinoceros has been poached almost to extinction, although it might survive in the Lag Badana area at the southernmost tip of the country. The cheetah (*Acinonyx jubatus*), giraffe (*Giraffa camelopardalis*), Grevy's zebra (*Equus grevyi*) and three rare species of gerbil are also reduced to numbers considered critical. The Abyssinian genet (*Genetta abyssinica*) might occur in the north, and the rare golden-rumped elephant shrew (*Rhynchocyon chrysopygus*) might occur in coastal forest in the extreme south, but their status and conservation requirements are not known (IUCN, 1990).

Ten species of bird are threatened in Somalia, of which two are critically endangered. The Somali thrush (*Turdus ludoviciae*) occurs only in mountain-top woodlands in northern Somalia. It was considered to be locally common in 1979, most notably in Daloh Forest Reserve, but its population is known to be in decline as its habitat (juniper woodland) has been cleared. The bulo burti boubou (*Laniarius liberatus*) is known only from an individual caught in Acacia scrub in 1988, 140 km inland on the Shabeelle river in central Somalia. Although subsequent searches were carried out in 1989 and 1990 no further sightings were made. This, however,



Biodiversity in Somalia. Credit: G. Farmer

Table 4. Rare and endangered bird species

Species	Threat Category
Socotra Cormorant <i>Phalacrocorax nigrogularis</i>	Vulnerable
Lappet-faced Vulture <i>Torgos tracheliotus</i>	Vulnerable
Lesser Kestrel <i>Falco naumanni</i>	Vulnerable
Madagascar Pratincole <i>Glareola ocularis</i>	Vulnerable
Ash's Lark <i>Mirafra ashi</i>	Endangered
Archer's Lark <i>Heteromirafra archeri</i>	Vulnerable
Bulo Burti Boubou <i>Laniarius liberatus</i>	Critical
Somali Thrush <i>Turdus ludoviciae</i>	Critical
Basra Reed-warbler <i>Acrocephalus griseldis</i>	Endangered
Warsangli Linnet <i>Carduelis johannis</i>	Endangered

Source: BirdLife International

is likely to be a result of the difficulty of accessing this region due to security concerns. Any remaining population may be tiny (BirdLife International, 2004) (see Table 4).

Three endemic species are found on the coastal grass plains – the lesser hoopoe (*Alaemon hamertonii*), Obbia lark (*Calandrella obbiensis*) and Ash's lark (*Mirafra ashi*). Four endemic bird areas are recognized – the Central Somali coast, East African coastal forests, the Jubba and Shabeelle valleys and the North Somali mountains (BirdLife International, 2004). A further 24 important bird areas have also been identified.

Somalia is the most important country for bustards in the northern hemisphere, with restricted populations of Heuglin's bustard (*Neotis heuglini*), Hartlaub's bustard (*Eupodotis hartlaubi*), and the little brown bustard (*E. humilis*). Larger species, namely the Arabian bustard (*Ardeotis arabs*) and Denham's bustard (*Neotis denhami*), a declining species, are heavily hunted (IUCN, 1990).

Despite its harsh physical environment, Somalia is home to some 3,028 species of higher plants, of which 17 are known to be threatened (WRI, 2003). Somalia is considered a centre of floral endemism (White, 1983) and of the known species 700 (17 per cent) are endemic – a feature only surpassed by the South African floral region. Endangered flora include *Euphorbia cameroni* and *Whitesloanea crassa*, rare succulent scrubs found only in the northern mountains, *Wissmania carinensis*, the Bankoale palm, found in small numbers in the north-east, and *Cordeauxia edulis*, the Yaheb (*yicib*) nut bush, which survives near Adawalif. This last species is under severe threat because its highly prized edible nuts are often collected, preventing regeneration (IUCN/EC, 1993). As with the fauna, however, large concentrations of livestock together with the felling of trees for charcoal and firewood have had a profound impact on species composition, ground cover and the structure of vegetation (Sommerlatte and Umar, 2000). Grazing pressure and soil erosion are now a serious problem and, together with periodic droughts, have had a devastating effect on the vegetation and soils.

Somalia has the most extensive and least spoiled coastline in Africa. Important coral reefs, seabird colonies and turtle nesting beaches are currently unprotected. At the end of the last century there were believed to be large dugong populations and extensive seagrass beds in nearshore waters. Important seabird nesting sites include Mait island, Zeila island and islets off Mogadishu.

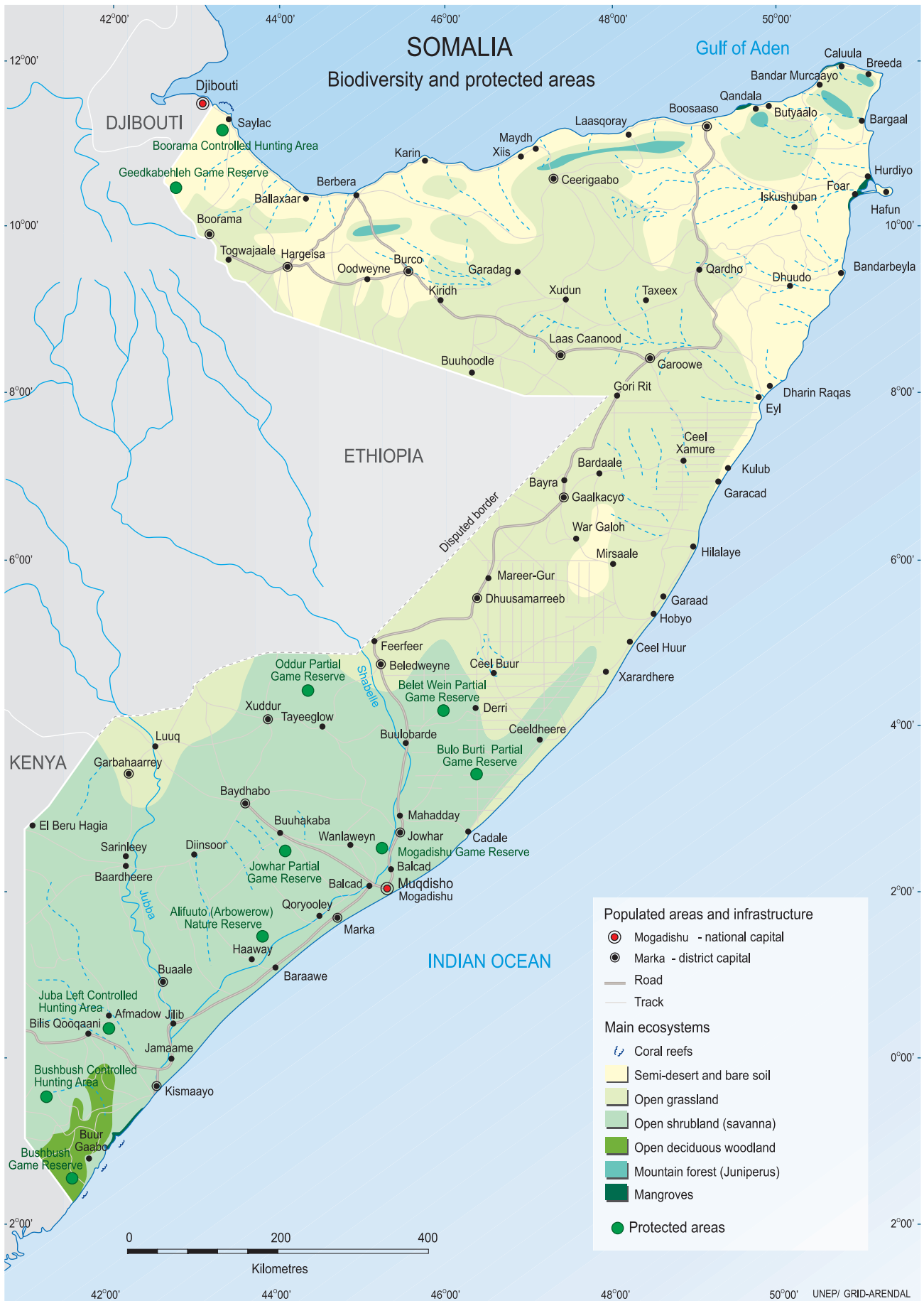


Lesser Hornbill in Eyl, Somalia. Credit: G. Farmer

Thousands of green turtles (*Chelonia mydas*) used to nest annually along the eastern coast (IUCN, 1990), but the status of this population is not known. Four other species of marine turtle – loggerhead (*Caretta caretta*), hawksbill (*Eretmochelys imbricata*), olive ridley (*Lepidochelys olivacea*) and leatherback (*Dermochelys coriacea*) – are known from Somali waters but there is no knowledge of these species nesting. The main threat to turtles is from opportunistic harvest of green turtles which includes direct harpooning, incidental gill net entrapment and capture of nesting females (Schleyer and Baldwin, 1999). Eggs are also collected during the southwest monsoon season occasionally by fishermen but also by nomadic herdsman who maintain temporary shelters and animal pens on certain beaches.

Small cetaceans are abundant in the waters off Somalia. The impact of the coastal fisheries on dolphin and porpoise populations is not known, and it is unclear whether conservation action is needed (see map Somalia: Biodiversity and protected areas).

Many of these species and their habitats are threatened by drought, security problems, overgrazing, deforestation, and poaching. Other less obvious species which are also endangered can expect to receive even less attention: two of the country's 223 reptile species and three of its 331 species of fish are known to be threatened, for example (WRI, 2003). With no protected area system and woefully inadequate legislation and enforcement, over-use of natural resources continues and the country's critical sites are being impoverished rapidly. Hunting of most species of large mammal has been intense, leading to catastrophic declines in population; the long-term survival of several species seems unlikely. Somalia has ratified the CITES Convention (see Legislation), but few if any practical measures are being taken to ensure due implementation.



Source: IUCN-EEC 1992, UNHCR Somalia Atlas 2005, EC Joint Research Centre Global Land Cover 2000, UNEP-WCMC 2005

THE MAP DOES NOT IMPLY THE EXPRESSION OF ANY OPINION ON THE PART OF UNEP CONCERNING THE LEGAL STATUS OF ANY

Protected Areas

Latest reports (WRI, 2003) show that there are 14 protected areas in total, but only one exceeds 100,000 hectares. Eleven wildlife areas have been declared since 1970 but only two are thought to be functional (IUCN/UNEP, 1986). Less than one per cent of the country is included in protected areas, much of this being occupied by the Lag Badana National Park. In reality, however, there has been no formal protection offered to any of these sites since at least the early 1990s. With such an incomplete network of protected areas – terrestrial and marine – there are serious grounds for concern over the long-term prospects for biodiversity conservation and to any form on development based on sustainable use of resources.

The most important sites in need of protection are Zeila, Las Anod-Taleh-El Chebet (already proposed as a national park), Ras Hajun-Ras Gubah, El Nammure, Hobyo, Haradere-Awale, Jowhar-Warshek, Harqan-Dalandoole, and Lack Dere (also proposed for national park status) (IUCN, 1990). Two mountain sites of particular interest are Goan Libaax and the Daalo forest, the latter which has some *Juniperus* forest.

Priority wetlands in need of protection include Jowhar-Warshek, Har Yiblame, Eji-Oobale, Awdghegle-Gandershe, Arbowerow, the Boja swamps, Angole Farbiddu (which includes riverine forest) and lake Radidi (IUCN, 1990). Since Somalia is not a Party to the Ramsar Convention, no wetlands of international importance have been declared under it.

Overall, if key representative examples of this country's natural heritage are to be preserved, a massive increase in public awareness is needed, coupled with appropriate solutions being found that will enable and encourage traditional range and land management systems to be used and perhaps further refined. Rural communities especially must be involved in decisions relating to future intended development and management of any existing or intended protected area systems (see Table 5).

Hunting wild animals for meat has never been widely practised in Somalia, although certain species were hunted prior to the enactment of the 1969 Law of Fauna (Hunting) and Forest Conservation for their skins and as trophies (UNEP, 1984). During the 1960s, approximately 60,000 gazelle skins, 250,000 dik dik skins, 18,000 kg of ivory and between 3,000 and 5,000 live monkeys were exported.

Table 5. Protected areas of Somalia

Name	Type of Reserve	Size (ha)	Year Established
Bushbush	Game	334,000	1969
Geedkabeleh	Game	10,360	1969
Mandera	Game	-	1969
Mogadishu	Game	-	1969
Alifuuto (Arbowerow)	Nature	180000	-
Balcad	Nature	200	1985
Belet Wein	Partial game	-	1969
Bulo Burti	Partial game	-	1969
Jowhar	Partial game	-	1969
Oddur	Partial game	-	1969

Source: UNEP, 2003

RECOMMENDATIONS

Introduction

An accounting of the specific unmet needs of Somalia and its people – even the most urgent, priority issues – would likely form an extensive list. Addressing such a list, even if it could be done given the lack of so much baseline information, would likely be a daunting task, especially for those agencies which might be in a position to assist Somalia in tackling some of the main environmental challenges it faces.

It would be wrong, however, to ignore some of the issues identified in this desk study, even if some of the data sets on which it is based are not as reliable or current as one would normally expect. An attempt has therefore been made below to identify some of the key priorities and pressing needs, drawn primarily from sources listed and consulted during the compilation of the desk study. Any expectation that the following recommendations might be put into effect, however, hinges entirely on a sustained period of peace and stability and the gradual redevelopment of a consensus-based and effective government structure. Equally, for many of these recommendations to be put into effect, good relations need to be forged with neighbouring countries.

The key priorities in Somalia's nation-building process include deepening the peace process, increasing stability, broadening reconciliation, deepening reconstruction and development efforts, and to begin reversing regression from the Millennium Development Goals. In addition, immediate steps must be taken to ensure more sustainable management of Somalia's environmental assets.

Specific Recommendations

Overview

This study identifies three key overall recommendations that should form the centre of the environmental recovery programmes in Somalia:

- a) Strengthen environmental governance to ensure the sustainable management of the country's natural resource base. This includes developing and enhancing conservation programmes for strategic natural resources, promoting equity in resource utilization, conducting resource assessments to establish the health of resources and their sustainable levels of utilization, and the participation of all stakeholders in making decisions about resource management actions that affect them.
- b) Carry out environmental assessments to guide the setting of priorities for environmental recovery, resource management and development planning.
- c) Revitalize environmental co-operation with neighbouring countries and within the region, the objective being to support peace building, enhance important environmental initiatives, and share information and knowledge.

Interventions for Immediate Action

The following interventions are recommended for immediate action.

WASTE MANAGEMENT

As a matter of priority, effective containment and/or clean up needs to be carried out for all remaining pesticide stocks in the country. Specifically, the Ayaha site in Hargeisa requires urgent attention, including appropriate treatment of the affected area, rendering it safe for local communities to remain in the area.

A study of the solid waste situation in key urban areas needs to be undertaken, and appropriate recommendations made and implemented to address this issue.

Relevant Somali institutions should be assisted to develop their capacity in hazardous waste management, including monitoring, containment, handling and clean-up.

A comprehensive investigation should be conducted of the alleged existence of toxic waste dumps on land, and the dumping of toxic waste at sea.

INSTITUTIONAL DEVELOPMENT AND STRENGTHENING

The Transitional Federal Government and other sub-national authorities should be encouraged and enabled to develop, rebuild and strengthen the necessary institutions that will help to ensure good environmental governance. This should include technical assistance, capacity building, provision of equipment and materials, and other required forms of support.

Somali institutions should be assisted to build and strengthen partnerships with international and local civil society organizations in order to create an enabling environment for the latter to contribute to safeguarding the country's natural assets.

To this end, direct support should be given to Civil Society Organizations and other environmental groups active in Somalia to enable them undertake environmental activities in Somalia.

SOIL EROSION CONTROL

Greater emphasis must be given to improved land-use planning, the establishment of range resource management plans and the control of soil erosion.

Community participation is fundamental in the control of soil erosion since grazing controls have to be established in certain areas to allow affected rangelands to recover from overgrazing.

FISHERIES MANAGEMENT

Measures against illegal fishing by foreign vessels are urgently needed, including the ability to be able to patrol these waters safely and effectively.

In order to avert a possible collapse of the fishery off the Somali coast, fisheries management plans should be developed for sustained fisheries development. This needs to be based on a comprehensive assessment and evaluation of pelagic and demersal stocks.

A review is needed of the catch, processing and export management process to regulate over-fishing and improve the processing efficiency and retail value for marketable products.

ENERGY/CHARCOAL PRODUCTION

Charcoal production should be placed under strict control of a single appropriate agency, with capacity built to control illegal production and enforce regulations.

Efforts should be made to reduce losses during the charcoal production cycle, i.e. cutting of wood, kiln construction and increasing overall recovery – from 15-30 per cent.

Promote alternative fuels and encourage the use of fuel-efficient stoves and improved cooking practices, with particular focus on urban centres where kerosene could provide a viable alternative.

Existing solar stove pilot projects in rural areas should be expanded, with appropriate introduction and training programmes.

ENVIRONMENTAL ASSESSMENT

A detailed, participatory and field-based assessment of the natural environment in Somalia should be conducted to establish its health, the pressures it is facing, and what needs to be done to counter these pressures.

DISASTER PREPAREDNESS AND RESPONSE

There is a need to develop an early warning system or systems to help identify potential threats to the environment and people's livelihoods. The same opportunity should be used to raise awareness of the importance of wise management of natural resources as a means of reducing risk to disasters.

An oil spill response contingency plan needs to be developed and implemented, in collaboration with other countries in the region.

Capacity building, including institutional development and strengthening, for natural and anthropogenic disaster management needs to be instituted.

Interventions for Medium-term Action

The following recommendations require action in the medium-term.

RECLAIM THE PROTECTED AREA NETWORK

There is an urgent need to re-assess the nature and structure of the country's protected area network and provide training to develop national capability in conservation. Emphasis should be placed on reinforcing communal, clan or other traditional means of resource management.

In critical areas, management plans should be drawn up with the local communities to enable them to participate in the management of protected areas in a more sustainable manner.

A feasibility study should be carried out on the need for, and possibility of, establishing marine protected areas, some of which should at least focus on providing sanctuary to breeding stocks of threatened species.

PROTECTION OF MARINE RESOURCES

Specific fisheries (freshwater and marine) policies need to be developed, based on strict adherence to the obligations of the coastal states in the Law of the Sea Convention.

In the marine ecosystem, priority attention should be given to protecting the coral reefs, islands and mangroves that stretch from Mogadishu south to the coastal border with Kenya. Other historical areas in central and north Somalia where mangroves have suffered total degradation because of overexploitation should be reforested, e.g. at Gara'ad, Bandarbeyla, Hafun and Garduush in the Indian Ocean, and Las Qoreh, Elayo, Dhaga'an, and Habo in the Gulf of Aden.

SUSTAINABLE MANAGEMENT OF FOREST AND WOODLAND RESOURCES

An urgent inventory should be carried out of Somalia's timber resources. Community mobilization should be promoted to ensure acceptance and local responsibility for the management of forest and woodland resources.

Forest conservation teams should be established under the appropriate ministry, especially for areas where charcoal production is threatening land productivity.

At the regional level, existing laws governing trade and export of charcoal should be respected. Stricter enforcement is needed on charcoal exports.

Special protection should be accorded to the country's remaining mist forests due to their intrinsic value and uniqueness.

Sustainable management of economic plant resources such as the Yaheb nut bush should be encouraged and maintained through participatory community-based natural resources management techniques and approaches.

DEVELOPMENT OF AN ADEQUATE POLICY AND LEGAL FRAMEWORK

An overall policy and legal framework for natural resource management – which has broad acceptance – needs to be developed and implemented.

The people of Somalia need to be assisted to develop adequate policies that will guide the sustainable use of their natural resource base. A review of existing policies and laws needs to be conducted in the following key sectors: fisheries, forestry rangelands, water, livestock, agriculture, and biodiversity conservation.

Following this, and using a consultative and participatory process, new policies and laws should be developed where they do not exist, and existing ones updated. However, even before the establishment of a new legal framework, making use of existing laws to protect and help ensure wise management of natural resources and fragile ecosystems would be a reasonable stop-gap measure.

Supportive mechanisms for institutional capacities, and policy implementation and monitoring need to be established and strengthened in order to control abuses and illegal practices at the relevant levels of administration.

The country also needs support to put in place mechanisms to implement multilateral environmental agreements to which it is signatory.

REFERENCES

- Agrosphere, 2004. Impact Study on Deforestation, Charcoal Burning and Environmental Degradation in Jamana District, Somalia. Agrosphere, Nairobi, Kenya.
- Amuyunzu, C., 1997. A Natural Resources Monitoring and Evaluation System for Somalia. IUCN East Africa Programme, Nairobi, Kenya.
- Anonymous, 1996. Improvement of Livestock Export Marketing in the North East Region of Somalia: Report and Recommendations. September 1996. European Commission, Somalia Unit, Nairobi, Kenya.
- Barkhadle, A.M.I., 1993. The Somali Traditional "Deegaan" Ecological Classification System. *Ivista di Agricoltura Subtropicale e Tropicale* 87 (1). Istituto Agronomico per l'Oltremare, Firenze, Italy.
- Bihi, A. I., 1984. Somalia National Report. In: Socio-economic Activities that may have an Impact on the Marine and Coastal Environment of the East African region: National Reports. UNEP Regional Seas Reports and Studies No. 51. UNEP, Nairobi, Kenya.
- Bird, N.M. and Shepherd, G., 1989. Charcoal in Somalia: A Woodfuel Inventory in the Bay Region of Somalia. National Range Agency, Somalia.
- BirdLife International, 2004. <http://www.birdlife.org/datazone/> (accessed 12 May 2005).
- CIA, 2005. World Fact Book. <http://reference.allrefer.com/world/countries/somalia/economy.html> (accessed 12 November 2005).
- Columbia University, 2005. Somalia Natural Disaster Profile. Centre for Hazards and Risks Research, Columbia University, USA. www.ideo.columbia.edu/chrr/research/profiles/somalia.html (accessed 14 July 2005).
- Dregne, H. E., 1982. Desertification of Aridlands. Howard Academic Publishers, N.Y.
- EU, Undated. EC Strategy for the Implementation of Special Aid to Somalia: An Assessment of the Political and Social Situation. <http://www.delken.cec.eu.int/>
- EC/IUCN, 1993. Environmental Synopsis of Somalia. EC, Brussels and IUCN, Gland Switzerland.
- EC/IUCN, 1997. Strategic Framework for Sustainable Natural Resources Management in Somalia. Somali Natural Resources Management Programme. IUCN Eastern Africa Programme. Nairobi Kenya.
- EDC NEWS, 2001. Somalia: Fanning the Flames of Conflict – the Case of Charcoal. www.edcnews.se/research/somaliacharcoal.html (accessed 14 July 2005).
- Everett, G.V. and Kelleher, K., 1998. Approaches to Marine Fisheries Governance in Somalia: Annex II, Sectoral Report on Fisheries. FAO TCP/SOM/6713: 40pp.
- FAO, 1995. Towards a Strategy for Agricultural Development in Somalia, from Relief, Rehabilitation and Reconstruction to Development. FAO, Rome.
- FAO, 2005a. Field Report: Second Assessment Mission. Project OSRO/SOM/501/NOR, OSRO/SOM/503/ITA, OSRO/SOM/505/CHA, 18 May-6 June 2005. FAO Somalia Programme.
- FAO, 2005b. Desert Locust Bulletin No. 323, September 2005. FAO, Rome, Italy.
- Fielding, P.J. and Mann, B.Q., 1999. The Somali Inshore Lobster Resource. A Survey of the Lobster Fishery of the North Eastern Region (Puntland) between Foar and Eyl during November 1998. IUCN Eastern Africa Programme, Nairobi.
- Government of Somalia/IUCN, 1990. National Conservation Strategy for Somalia. Government of Somalia/IUCN. 37pp.
- Gudel, H. and Mwanza, P., 1979. Mission Report. Mogadishu, Somalia.
- Gundel, 2002. The Migration-Development Nexus: Somalia Case Study. In *International Migration* Vol. 40 (5) SI 2/2002. Blackwell Publishers, UK.

- Gunn, S., 1990. Somalia. In: Powelson, J.P. and Sock, R. (Eds) *The Peasant Betrayed: Agriculture and Land Reform in the Third World*. The Cato Institute, Washington, D.C., USA.
- Haaksonsen, J.M., 1983. Somalia's fisheries case study. In *FAO Secretariat of the expert consultation on strategies for fisheries development with particular reference to small-scale fisheries*. FAO Fish Rep No 295, 16-37.
- Herlocker, D., Forber, A. and Douthwaite R., 1997. *Renewable Natural Resources and Production Systems: Issues and Priorities*. IUCN, Nairobi, Kenya.
- Hersi Osman Salad, 2000. *Exploring Somalia's Natural Resources – A Geological Perspective*. Proceedings of a Conference on *Rebirth of the Somali State-Policy Options and Programme Opportunities for Canada*. Ottawa, 2000.
- Hooglund, E., 1993. *Government and Politics*. In: Metz, H.C. (Ed) *Somalia: A Country Study*. Fourth Edition. Library of Congress, Federal Research Division, Washington, D.C.
- Hughes, R.H. and Hughes, J.S., 1992. *A Directory of African Wetlands*. IUCN Gland, Switzerland; WCMC, Cambridge, UK; and UNEP, Nairobi, Kenya.
- IUCN, 1992. *Protected Areas of the World: Afrotropics*. IUCN, Gland, Switzerland, and WCMC, Cambridge, UK.
- IUCN/UNEP, 1986. *Review of the Protected Areas System in the Afrotropical Realm*. IUCN, Gland, Switzerland. 259pp.
- IUCN, 1990. *Biodiversity in Sub-Saharan Africa and its Islands: Conservation, Management and Sustainable Use*. Stuart, S.N. and Adams, R.J. (Eds). IUCN, Gland, Switzerland. 242pp.
- IUCN, 1997a. *Strategic Framework for Sustainable Natural Resource Management in Somalia*. IUCN Eastern Africa Programme, Nairobi.
- IUCN, 1997b. *Wood-based Energy Dynamics in Somalia*. IUCN Eastern Africa Programme, Nairobi, Kenya.
- IUCN, 1999a. *Means for Promoting better Tree Management through Support to Charcoal Co-operatives in North-western Somalia*. IUCN Eastern Africa Office, Nairobi, Kenya.
- IUCN, 1999b. *Improved Stove Commercialisation, Assessment of Charcoal Production Methods and Promotion of Renewable Energy Technologies in Somaliland and Northern Somalia*. IUCN Eastern Africa Office, Nairobi, Kenya.
- Lovatelli, A., 1996. *EC Rehabilitation Programme for Somalia – Artisanal Fisheries: Final Report*. European Commission Somalia Unit, Nairobi, Kenya. 226pp.
- Madgwick, J., 1989. *Somalia's Threatened Forests*. *Oryx* 23:2. 6pp.
- Mardi, A.A., 2000. *Somalia Association of Health Care Development and the Fight against Illiteracy. Report of a Feasibility Study Mission: Summarised Social Situation in Galgudud Region and Parts of Hiran Region*.
- Nur, A.H., 1998. *Somalia putting heavy emphasis on its fisheries*. *World Fisheries* 37 No 10, pp2-3.
- Pilcher, N. and Alsuhaibany, A., 2000. *Regional Status of Coral Reefs in the Red Sea and Gulf of Aden*. In Wilkinson, C. *Status of Coral Reefs of the World: 2000*. Australian Institute of Marine Science and Global Coral Reef Monitoring Network, Townsville.
- Qasim Hersi Farah, (2005). *Presentation by the Permanent Secretary of the Ministry of the Environment and Disaster Management to the 20th session of the UN-HABITAT Governing Council meeting, 5 April 2005, Nairobi, Kenya*. (www.unhabitat.org/mediacentre/unhsp_gc20_03.asp).
- Schleyer, M.H. and Baldwin, R., 1999. *Biodiversity Assessment of the Northern Somali Coast East of Berbera*. IUCN Eastern Africa Programme, Nairobi.
- Simonetta, A.M., 1988. In: *Antelopes: Global Survey and regional Action Plans Part I East and North-east Africa*. IUCN, Gland, Switzerland.



- Somaliland Centre for Peace and Development, 1999. *Rebuilding from the Ruins: A Self Portrait of Somaliland*. Somaliland Centre for Peace and Development/War-torn Societies project, Hargeisa.
- Sommerlatte, M. and Umar, A., 2000. *An Ecological Assessment of the Coastal Plains of North-western Somalia (Somaliland)*. IUCN Eastern African Programme, Nairobi, Kenya.
- Stromme, T., 1987. Annex IV–Sectoral Report on Marine Resources. In: *Coastal and Marine Environmental Problems of Somalia*. UNEP Regional Seas Reports and Studies No. 84, Annexes. UNEP, Nairobi, Kenya.
- TRAFFIC, 1997. *The Trade in Sharks and Shark Products in the Western Indian and South-east Atlantic Ocean*. TRAFFIC East and Southern Africa.
- UN, 1998. *African Statistical Yearbook IV: East Africa*. United Nations.
- UN, 2002. *World Population Prospects: the 2002 Revision*. United Nations.
- UN, 2005. *Report of the Secretary-General on the Situation in Somalia*. S/2005/392. United Nations Security Council.
- UN OCHA, 2001. *Horn of Africa IRIN-HOA Weekly Round-up 24, 10-16 February 2001*. (Somalia: Livestock Ban Bites Hard). www.cidi.org/humanitarian/irin/hafrica/01a/ixl6.html
- UN OCHA, 2004. *Somali: Hundreds of Thousands Threatened by Drought*, UN OCHA/IRIN, Nairobi, Kenya. www.cidi.org/disaster/04a/ixl22.html (accessed 18 July 2005).
- UNCTAD, 1998. *The Protection and Sustainable Development of Somalia Marine Environment and Coastal Area Integrated Marine Enforcement and Compliance Project SOM/97/012*. Smart Consulting Services, Canada.
- UNDOS, 1999. *The Macro Economy of Somalia. A Conceptual Overview*. United Nations Development Office for Somalia (UNDOS). Nairobi, Kenya
- UNDP, 1998. *Human Development Report Somalia 1998*. United Nations Development Programme, Nairobi, Kenya.
- UNDP, 2001. *Human Development Report Somalia 2001*. United Nations Development Programme, Nairobi, Kenya.
- UNDP/WFP, 2005. *Prime Minister Inaugurates US\$1 million rehabilitated canal to benefit 50,000 in Middle Shabelle Region*. Press Release. www.unsomalia.net/reports_Publications/ (viewed 18 July 2005). <http://www.so.undp.org/pressreleases/Jowhar%20press%20release.pdf>
- UNEP, 1982. *Environmental Problems of the East African Region*. UNEP Regional Seas Reports and Studies, 12. UNEP, Nairobi, Kenya.
- UNEP, 1984. *Marine and coastal conservation in the East African Region*. UNEP Regional Seas Reports and Studies No. 50.
- UNEP, 1987. *Coastal and Marine Environmental Problems of Somalia*. UNEP Regional Seas Reports and Studies, 84. UNEP, Nairobi, Kenya.
- UNEP, 1996. *Register of International Treaties and other Agreements in the Field of Environment 1996*. United Nations Environment Programme (UNEP). Nairobi, Kenya.
- UNEP, 2003. *Somalia: Post-conflict Environmental Assessment. Draft Country Profile*. UNEP, Geneva, Switzerland.
- UNEP, 2005. *After the Tsunami. Rapid Environmental Assessment*. UNEP Asian Tsunami Task Force. UNEP, Nairobi, Kenya.
- UNHCR, 2003. *Country Operations Plan, Somalia*. UNHCR, Geneva, Switzerland.
- UNHCR, 2005a. *Global Appeal*. UNHCR, Geneva, Switzerland.
- UNHCR, 2005b, 2004 *Global Refugee Trends. Overview of Refugee Populations, New Arrivals, Durable Solutions, Asylum Seekers, Stateless and Other Persons of Concern to UNHCR*. UNHCR, Geneva, Switzerland.

Unruh, J. D., 1995. The Relationship between Indigenous Pastoralist Resource Tenure and State Tenure in Somalia. *GeoJournal* 36(1): 19-26.

USAID/FEWS, 2003. Famine Early Warning System Network. www.fews.net/centers/ (consulted 18 July 2005).

US Library of Congress, 1993. Somalia Country Study. US Federal research Division, Library of Congress, Call Number DT401.5.S68 1993.

Van der Elst, R., 1997. Development of Artisanal Marine Fishery Monitoring: Methods and Tools. IUCN Eastern Africa Programme, Nairobi.

White, F., 1983. *The Vegetation of Africa*. UNESCO, Paris, France.

WHO, 2005. WHO Mission Report on Pesticide Incident in Hargeisa, Somalia 6-16 October 2003. World Health Organization, Regional Office for the Eastern Mediterranean.

World Bank, Undated. Country Report Somalia. World Bank, Washington, D.C., USA. 19pp.

World Bank, 1987. Agricultural Sector Survey, Somalia. World Bank, Washington, D.C. USA.

World Bank, 2003. Country Re-engagement Note. United Nations Development Programme/World Bank, Somalia.

World Bank, 2005. Conflict in Somalia: Drivers and Dynamics. World Bank, Washington, D.C., USA.

WRI, 2003. EarthTrends Country Profile. <http://earthtrends.wri.org> (accessed 12 May 2005).

WSP, 2001. Rebuilding Somalia: Issues and possibilities for Puntland. WSP Somali Programme.

Yusuf, 1997. In: UNCTAD, 1998. The Protection and Sustainable Development of Somalia Marine Environment and Coastal Area Integrated Marine Enforcement and Compliance Project SOM/97/012. Smart Consulting Services. Canada.

ANNEX I Chronology of Key Political Events in Somalia

- 1869 Opening of the Suez Canal, which increased European involvement and interests in the Horn of Africa.
- 1897 Colonial partition of Somali-inhabited territories between the United Kingdom, France, Italy and Ethiopia.
- 1936 Italian occupation of Ethiopia and the first time that Somalis in Ethiopia come under one administration with Italian Somaliland.
- 1943 Creation of the Somali Youth Club which, in 1947, changed its name to the Somali Youth League adopting nationalist goals of unification of all Somali territories, independence from colonial rule, and opposition to clannism.
- 1948 Withdrawal of Britain from Ogaden and the re-integration of the region into Ethiopia.
- 1960 Independence of Somaliland from Britain. Independence of Somalia and unification of the British and ex-Italian Somali protectorates.
- 1961 Presidential election in which Aden Abdulle Osman becomes the first elected President of the Somali Republic.
- 1967 Abdirasheed Ali Sharmarke is elected President and Mohamed Ibrahim Egal is appointed Prime Minister.
- 1969 President Abdirasheed Ali Sharmarke assassinated by one of his bodyguards.
- 1969 *Coup d'état* in Somalia. Major General Mohamed Siyad Barre takes over as Chairman of the Supreme Revolutionary Council (SRC).
- 1970 Barre declares Somalia a socialist state and embarks on a range of socialist economic programmes.
- 1974 Somali-Soviet friendship treaty signed and a Soviet naval base established in Berbera. Substantial military aid received from the Soviet Union allowed Somalia to establish one of the largest armies in sub-Saharan Africa.
- 1977 Following months of clashes between the Ethiopian army and the Western Somali Liberation Front, Somali troops invade the Ogaden region of Ethiopia.
- 1978 Siyad Barre announces withdrawal of all Somali armed forces from the Ogaden after a disastrous defeat by the Soviet and Cuban-backed Ethiopian army. A month later, a group of military officers (mainly Mijerteen) attempt a *coup d'état* that fails.
- 1980 Diplomatic links to the US strengthened, including a package of economic and military aid in return for US access to Berbera Port for use by its Rapid Deployment Joint Task Force.
- 1982 Barre government announces liberalization of the agricultural sector as part of a process of dismantling some socialist policies, under pressure from western donors.
- 1988 Faced with a cut-off of Ethiopian military assistance, SNM units launch a major offensive and temporarily occupy the provincial capitals of Burao and Hargeisa. The Somali army reacts by destroying Hargeisa, killing thousands of civilians and creating a refugee crisis in the north. Barre government comes under growing international criticism for human rights abuses. Most foreign aid is frozen.
- 1990 Publication of the 'Manifesto' signed by 114 business people, religious and former political figures, calling for dialogue and political reform. Many of the Manifesto signees are imprisoned. Faced by multiple liberation fronts, Barre's forces lose control of most of the countryside. Growing loss of control of Mogadishu; by late 1990 most internationals evacuate.
- 1991 Barre and his remaining forces flee the capital to Kismayo. Unites Somali Congress (USC) and its supporters claim control of Mogadishu. Hundreds of thousands of Somalis are internally displaced. Only the northern sections of the country are spared from the looting and fighting.

- 1991 SNM declares independence for the Somaliland Republic. Fighting over Mogadishu kills thousands of people and creates the conditions for a major famine in the south. Most of the centre of the city is destroyed and the city is divided by the Green Line.
- 1992 Famine rages throughout much of southern Somalia for most of the year, peaking in June-July. Militia battles are increasingly over control of the food relief itself.
- 1992 Security Council Resolution 733 establishes an embargo on all delivery of weapons and military equipment to Somalia.
- 1992 UNOSOM I (UN Operation in Somalia) is established. Mohamed Sahnoun is appointed Special Representative to the UN Secretary-General and attempts to broker a peace. A small Pakistani UN peacekeeping unit is deployed to the Mogadishu airport over the summer but is unable to control the airport from militias.
- 1992 US President George Bush announces 'Operation Provide Relief' a massive airlift of food aid to zones of famine in southern Somalia using US military aircraft, but no peacekeeping forces. The operation reaches some populations, but distribution of aid goes uncontrolled and attracts militia and looting. The famine continues, and by October peaks in the Jubba valley.
- 1992 'Operation Restore Hope' a US-led, UN-sanctioned multinational peacekeeping force is announced. 30,000 UNITAF troops land in Somalia taking control of sea ports, airports, and major roads and provide security for relief operations. This dramatic move quickly ends the famine in southern Somalia and freezes militia conflicts. General Aideed who sharply opposed proposals for UN peacekeeping in the past, changes policies and welcomes the intervention.
- 1993 UN convenes 15 factions to negotiate a comprehensive national reconciliation agreement in Addis-Ababa. It calls for disarmament and establishes a process for the creation of a transitional national council as well as regional and district councils. UN Security Council establishes UNOSOM II (Resolution 814) giving the UN operation a broad peace enforcement mandate that includes disarmament and support of the re-establishment of a Somali state.
- 1993 Mohamed Ibrahim Egal is elected as President of "Somaliland" by the 'Guurti' (assembly of elders) at the Boroma Conference. This meeting ends a year of fighting in the north-west following the collapse of the SNM and enduring clan rivalries. The accord provides an institutional framework for the new authority of "Somaliland".
- 1993 General Aideed accuses UNSOM of anti-SNA bias; tensions mount between UNOSOM and the SNA in Mogadishu. 24 UNOSOM Pakistani troops killed in an ambush by General Aideed's supporters. UN armed retaliation against SNA installations and a campaign to arrest Aideed. Heavy clashes and bombardments lead to high civilian casualties and create mounting international criticism of the UN mission. Efforts to capture Aideed fail. UNOSOM tries to build local-level administration in districts throughout the country, and sponsors regional-level peace processes – with scattered success. In a military operation in south Mogadishu, a fire fight leads to the deaths of 18 US special forces soldiers and hundreds of Somalis. Uncontrolled youths drag US bodies through the streets of Mogadishu scenes broadcast on international media. Four days later President Clinton announces that all US troops will pull out by the end of March 1994.
- 1994 A peace agreement is signed in Mogadishu between Hirab clans (mostly Haber Gidir and Abgaal). Though Aideed and Mahdi remain political rivals fighting between their clan ceases. This agreement brings back some normalization in a divided city. Armed clashes break out in Kismayo between SPM and SPM/SNA. The Absame militia and most of the Absame population are driven out of the town.

- 1994 UNOSOM seeks to broker a deal between what it perceives to be the strongest factions/militias in the country. The first such effort occurs in Nairobi. Following these talks, a new agenda for national reconciliation is agreed to by Aideed and Ali Mahdi as leaders of the two main political groupings. The accords, however, are never implemented. US military forces complete their withdrawal from Somalia.
- 1994 Lower Jubba Peace Conference leads to a peace agreement signed by General Morgan and SNA representative, Osman Atto. However General Morgan's real adversaries in Lower Jubba, the Absame clan do not take part, making the peace accord still born.
- 1995 Siyad Barre dies in exile in Nigeria. General Aideed declares a government, but at the same time, his faction splits. His former financial backer Osman Atto declares he is Chairman of the SNA. Aideed's self-declared government is not recognized internationally and is unable to administer the portion of the city it claims to control.
- 1995 UNOSOM II mission withdraws from Somalia after not receiving any requests for extensions from any Somali factions, humanitarian agencies or NGOs. The UN establishes the Political Office for Somalia (UNPOS) in order to monitor the developments in and around Somalia. UNPOS is based in Nairobi.
- 1995 General Aideed's forces occupy Baidoa, displacing much of the population of Baidoa town. This move leads to the creation of the Rahanweyn Resistance Army which begins to launch guerrilla attacks on Haber-Gedir and Rahanweyn allied to them.
- 1996 Fighting breaks out between the forces of General Aideed and Osman Atto in south Mogadishu. General Aideed dies of gunshot wounds sustained in a neighbourhood battle. His son, Hussein Aideed, takes over his 'presidency'.
- 1997 Leaders of the SSA and Osman Atto meet in Sodere, Ethiopia and sign an agreement to seek a comprehensive peace settlement and establishment of a new government of Somalia. However tensions within Ali Mahdi's Abgal clan worsen, leading to armed conflict in north Mogadishu.
- 1997 President Egal of "Somaliland" is re-instated for an additional term of two years. A new constitution is adopted giving him major leverage in all decisions. Ethiopian forces attack Al-Ittihad strongholds in Gedo region. Leaders of 30 factions sign a peace accord in Cairo. Like past accords, it is not implemented, but it solidifies a growing alliance between two former adversaries Ali Mahdi and Hussein Aideed.
- 1998 A Saudi ban on Somali livestock due to perceived threat of disease (Rift Valley fever) severely affects Somaliland. Leaders in the north-east agree to form "Puntland".
- 1999 Rahanweyn Resistance Army recaptures Bay and Bakol from occupying forces and installs its own administration. Food security situation improves. Increased access for aid agencies.
- 2000 On the initiative of the Djibouti government and IGAD, the Somali National Peace Conference is convened in Arta, Djibouti.
- 2000 The Transitional National Assembly is formed in Arta with 245 representatives. Elected President, Mr. Abdulkassim Salat Hassan, addresses UN Millennium Summit in New York. The Somali flag is raised at UN headquarters. Somalia is represented by the TFG at the IGAD summit.
- 2001 Somalia, represented by the TFG, attends the OAU summit in Tripoli. Somalia Reconciliation and Restoration council, comprising faction leaders opposed to the TFG is formed in Awasa, Ethiopia. Terrorist attacks on New York and Washington. Somalia named as a state where 'terrorists' may find safe haven.
- 2002 A group of warlords declare autonomy for six districts in south-western Somalia. A reconciliation conference starts in Eldoret, Kenya, under IGAD, with participation of many Somali leaders and their representatives. 'Somaliland' refuses to participate in the peace process. Participating parties sign a declaration on cessation of hostilities and the structures and principles of the Somali national reconciliation process.

- 2003 Security Council extends for another six months the mandate of a panel of experts to investigate violations of the arms embargo for Somalia to allow further investigation and refinement of its recommendations. The report found evidence that weapons equipment, militia training and financial support is being given regularly by neighbouring states and others to Somali factions and that the factions have purchased weapons on the open market.
- 2003 Kenya's government announces a ban on flights to and from Somalia in June, citing concerns for possible terrorist related activities. As a result of the ban, UN and European Community Humanitarian Organization flight operations for Somalia based in Nairobi were grounded, being lifted again on 5 July.
- 2004 Somali MPs elected Abdullahi Yusuf, President of "Puntland", to be the next President. Because of the chaotic situation in Mogadishu, the election was held in a sports centre in Nairobi, Kenya (October) Yusuf's Transitional Federal Government marks the 14th attempt to re-establish government in Somalia since 1991.
- 2004 On December 26, one of the deadliest natural disasters in modern history, the Indian Ocean earthquake, struck off the north-western coast of Sumatra. The earthquake and subsequent tsunami reportedly killed more than 200,000 people around the rim of the Indian Ocean. Somalia's east coast was affected. About 298 people were reportedly killed and some 44,000 people thought to have been directly affected.
- 2004 Somalia's Transitional Federal Government in Nairobi tried to get help from African Union peace-keeping troops to help pacify Somalia for a government to survive and have power. The proposal proved highly controversial.
- 2005 Somalia Transitional Federal Government relocated to Mogadishu in June. President Yusuf returned to Somalia on 1 July, basing his government temporarily in Jowhar, 90km north of the capital, Mogadishu, which remains too dangerous.

ACRONYMS AND ABBREVIATIONS

asl	above sea level
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization (of the United Nations)
GDP	Gross Domestic Product
ha	hectare
IGAD	Inter-governmental Authority for Development
ITCZ	Inter Tropical Convergence Zone
IUCN	The World Conservation Union
kg	kilogramme
km	kilometre
km ²	square kilometre
m	metre
NGO	non-governmental organization
RMSN	Resource Management Somali Network
TFG	Transitional Federal Government
UN	United Nations
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNOSOM	UN Operation in Somalia
WHO	World Health Organization



