

2.7 SOMALIA

Introduction

Somalia has an area of 630 000 km², a population of 3 862 000 (1982) and thus a mean population density of 6.1 persons/km². It is bounded by Kenya, Ethiopia and Djibouti in the west, by the Gulf of Aden in the north, and by the Indian Ocean in the south and east. It stretches approximately 1550 km from north to south between latitudes 12°00'N and 1°37'S, 1095 km from west to east between longitudes 41°00' and 51°21'E, and has a coastline of 3160 km.

The coastal plain along the Gulf of Aden is narrow, mostly 5-10 km wide, but with a maximum width of 35 km near Djibouti, and non-existent in other places, e.g. between Bacaad (11°20'N/49°25'E) and Xabo (11°50'N/50°34'E) where cliffs reach 200-400 m. Along the Indian Ocean it is narrow in the north, but widens to 125 km in the south, and to 200 km in the valley of the Jubba River. Between latitudes 4 and 8°N the coastal plain is 5-10 km wide and is backed by a very steep escarpment, which rises abruptly to a plateau just over 200 m in height, and farther inland to 500 m asl. In southern Somalia there is an escarpment some 135 km inland, which rises sharply to a plateau at 550 m asl, and on this, in Bakool Province, another escarpment completely encircles a higher plateau (200x 100 km) at 1100 m. However, the highest land is in the north, parallel with the Gulf of Aden, where a mountain chain is an extension of the southern margin of the Ethiopian Rift Valley, and marks the south side of the ancient rift that is now the Gulf of Aden. Here Shimbiris Mountain (10°40'N/47°11'E) rises to 2416 m, the highest point in Somalia. Inland of this the land slopes to the southeast, to the lower plateau along the Indian Ocean.

Drainage from the northern mountains is either northwards, by a series of wadis leading to the Gulf of Aden, or southeastwards into the desert lands where a few wadis reach the Indian Ocean. Along the central Indian Ocean coast there are no watercourses and the coast is smooth and sandy, exposed to strong wave action, but in the south, the Shabeelle (Shabele) and Jubba (Genale) Rivers enter the country from Ethiopia, and have cut deep and dramatic gorges into the plateau through which they flow to the coastal plain. Here the Shabeelle turns SW and flows parallel to the coast to a confluence with the Jubba below Kamsuuma (0°08'N/42°46'E), the combined streams continuing parallel with the coast to a confluence with the Lach Dera (0°01'S/42°37'E), before reaching the sea at Jumbo (0°14'S/42°37'E). Apart from this river, no major watercourses reach the sea on the Somalian coast between the equator and 7°58'N, where the first of the northern watercourses, the Nogal, has a mouth. South of Jumbo however, three short seasonal streams reach the sea.

Climate

Somalia is hot and humid at the coast, and hot and dry in the interior. Mean annual rainfall is higher in the south (300-500 mm) than the north, but also reaches 500 mm locally in the western Ogo Highlands. In the south, temperatures tend to be rather uniform throughout the year, but with a greater diurnal range inland, and a sea breeze often moderates the temperature at the coast. In the north, temperature regimes are more extreme, this being due to increasing altitude and latitude. Temperatures regularly reach 42°C on the gulf coast in summer and fall to 0°C in the Ogo Highlands. There are two rainy seasons. The first is from March to June and the second from September to December, but either or both seasons may be shorter than this. The rains are unreliable and droughts are commonplace.

Mean annual rainfall at Berbera (10°25'N/45°02'E) on the Gulf of Aden is 59 mm and April is the wettest month with an average receipt of 10 mm. Corresponding figures for stations in the Ogo Mountains are Hargeysa (9°30'N/44°03'E) 389 mm (August-90 mm), and Erigavo (10°37'N/47°24'E) 436 mm (September-100 mm), while south of the mountains, Burao (9°30'N/45°30'E) has a mean annual receipt of 200 mm (May-60 mm) and Gardo (9°30'N/49°03'E) 96 mm (May-30 mm). Rainfall increases southwards, down the Indian Ocean coast, from a mean annual figure of 148 mm at Iddan (6°03'N/49°01'E) to 203 mm at Obbia (5°20'N/48°38'E), 401 mm at Mogadiscio (2°01'N/45°20'E) and 384 mm at Brava (1°05'N/44°02'E). In the central and southern interior, Oddur (4°10'N/43°53'E) receives 362 mm, Baidoa (3°04'N/43°48'E) receives 589 mm, Bullo Berti (3°52'N/45°40'E) on the Shebeelle River receives 329 mm, Bardera (2°21'N/ 42°20'E) on the Jubba River receives 375 mm, and Afmadu (0°32'N/42°10'E) on the Lach River receives 549 mm/yr.

Vegetation

The interior is largely covered by deciduous bushland dominated by species of *Acacia* and *Comnziphora*, while the coastal regions are grassy scrublands. The mountains support evergreen bushland at higher levels with Afro-montane vegetation about the peaks. Much of the northeastern extremity, the Horn of Africa, is devoid of trees. In general, vegetation becomes more dense towards the south.

Wetlands

There are some tidal wetlands along the Gulf of Aden, a few lagoons on the east coast, and some deep mangrove lined inlets in the south. There are extensive permanent swamps and floodplains on the Shebeelle River and some swamps on the Jubba, the two large perennial rivers

which cross the country from Ethiopia. Some fossil courses (desheks) of the Jubba exist south of Bardera which are inundated seasonally or semi-permanently during wet cycles. In addition, there is permanent water at sites in the Nogal Valley, tugs and bullehs, and there are pans, springs and pools in most of the small northern wadis discharging to the Gulf of Aden and the Indian Ocean along the Horn of Africa. Much of the interior is overlain with limestone in which there are numerous sink holes, and a small lake at Bud Bud (4°15'N/46°30'E). However, the central section of the country, between latitudes 3 and 8°N, is devoid of sizeable wetland. Many Somalian wetlands are officially protected, but in practice this implies little more than preventing the poaching of elephants and rhinoceroses. Habitat protection and conservation are neither understood nor implemented. It appears that no stand of trees that can be cut for firewood or building, is genuinely safe.

List of Wetlands Described

1. Tidal Wetlands
2. Wetlands of the Shabeelle-Jubba Rivers
3. Wetlands of the Lachs District
4. Bullehs, Tugs & Dholos
5. The Central Districts
6. Artificial Impoundments

1. Tidal Wetlands

General: A number of tidal wetlands, marshes and swamps, occur along the coast of the Gulf of Aden. These are best developed in the west between Saada Din Island (11°26'N/43°27'E) and Saba Wanak (10°33'N/44°07'E). Along this 44 km stretch of coast, no less than 27 watercourses approach the sea. A salt-marsh/swamp is more or less continuous in this sector, locally extending up to 3 km inland. Many watercourses peter out at the back of it. The wetland has developed on the alluvium brought down from the Ogo Mountains by these temporary streams. Farther eastwards, tidal wetlands occur in the bays west of Berbera (10°25'N/45°02'E) and east of Karin (10°54'N/ 45°52'E), and from Mait (11°00'N/47°07'E) to Ras Kalwein (11°07'N/47°55'E), and from Los Khoreh (11°10 'N/48°13 'E) to Bosaso (11°07 'N/49°11 'E).

On the Indian Ocean coast the principal northern sites are in the two bays on either side of Ras Xaafuun. The northern one is just south of Hurdigo (10°35'N/51°06'E), extending into the great bay of Hurdigo, and this supports a large breeding population of flamingoes. The southern one is at Ashira (10°21'N/50°57'E), at the mouth of the Wadi Dhuudo. In passing southwards down the coast, other tidal swamps occur in a small bay where

three little wadis reach the sea (9°48'N/50°51'E); in the small lagoon at Jasiira (1°57'N/45°15'E); and on the coast north of Baraawe, between latitudes 1°11' and 1°24'N. In the far south, near the Kenyan border, they occur on the coast, around the chain of 12 offshore islands, and in three estuaries (0°51'S/42°06'E; 1°04'S/41°57'E; and 1°13'S/42°06'E).

Some of these wetlands support mangroves, the best stands being in the sector between Saada Din Island and Saba Wanak, in the estuaries of three watercourses which reach the sea west of Bosaso (Bender Cassim), and in the three estuaries just north of the Kenyan border. These latter are tidal for long distances inland, the Caanoole Estuary probably for 40 km, and the Bushbush Estuary for 30 km. On the northern coasts *Avicennia marina* is the dominant species, but *Bruguiera gymnorrhiza*, *Ceriops tagal*, *Lumnitzera racemosa* and *Rhizophora mucronata* all occur on the Indian Ocean coast, and *Sonneratia alba* is reputed to occur in the southern estuaries. In addition to these species, *Phoenix reclinata* is common in tidal swamps on both coasts, but on the Gulf of Aden it occurs in association with *Tamarix nilotica* at the mouths of tugs along the Gulf of Aden, both in sites where *Avicennia* is present and in others where it is not. Often there is a seaward sward of *Suaeda fruticosa* in front of the *Phoenix* and *Tamarix* stands, and in adjacent wet dune swales on this coast, the small procumbent palm, *Hyphaene reptans*, is found. Salt-marsh vegetation in the north is similar to that described in the regional introduction for Red Sea coasts, and in the south corresponds to that described for Equatorial East Africa.

Mangroves stands are constantly ravaged for firewood and construction timber, and since this has been the practice from time immemorial, many stands have been obliterated. They have been completely cut out so that no arborescent vegetation remains, and now only salt-marshes have replaced the mangroves.

2. Wetlands of the Shabeelle-Jubba Rivers

General: These rivers each have several sources at altitudes of close to 3000 m asl in the SE Highlands of Ethiopia. They flow roughly in parallel southeastwards across that country and enter Somalia. Here they both descend below the 500 m contour into deep, dramatic, scarp-sided trenches, in which they continue to flow southeastwards to the coastal plain. The northernmost stream, the Shebeelle, soon meets a crescent shaped line of dunes, 350 km long, which deflects its flow, first southwards and then southwestwards. Thereafter it flows parallel with the coast for 450 km to a confluence with the Jubba. The entire sub-coastal valley of the Shebeelle is beset with swamps around which there are peripheral floodplains. The greatest development of this wetland begins

(1°52'N/44°47'E) below Jannaale where the river divides into two channels. Then at Qoryoole (1°45'N/44°35'E) it divides again, so that three channels traverse a swamp belt 25 km broad and 150 km long, to a point (1°09'N/43°45'E) near Haaway where the three channels reunite. In this main swamp belt there are some 300 000 ha of permanent swampland.

Permanent swamps and floodplains develop on the Jubba River almost immediately after it enters Somalia, on the floor of its deeply entrenched valley near Luuq (3°47'N/ 42°36'E). Permanent swamps are not well developed below this place, although there is a floodplain, but just south of Baardheere (2°17'N/42°18'E) there is a series of fossil river courses which are seasonally or semi-permanently flooded. These are known locally as desheks, and they occupy 6000 ha, or perhaps more. The river then flows to its confluence with the Shebeelle, above which both streams develop a common floodplain, and below which they traverse marshy land to a mangrove clad estuary at Jumba (0° 17 ' S/42°35 'E).

The wetlands on both of these rivers are extremely important to wildlife, especially that on the lower Shebeelle, and a wide spectrum of the flora cited in the regional introduction, for swamps and gallery forests of Equatorial East Africa, is present here. *Crocodylus niloticus* is still common locally and *Pelusios sinuatus* occurs in lakes and permanent pools throughout the country. Several snakes are present, the avifauna is large, and most of the small mammals cited are present. However, the two systems are under enormous pressure. This is partly because refugees from successive famines in Ethiopia have been settled in camps along the upper rivers, and partly because numerous ill-planned schemes have been proposed for the conversion of the lower wetlands. The refugees make demands upon the water resources, and on the adjacent land for cultivation (which is often abandoned after a few years), and the ill-planned schemes seem likely to go ahead if financial backers can be produced. Co-ordinated policies for management of these areas are not even devised, let alone implemented. A threat to riverine woodlands and its wildlife throughout southern Somalia comes from tsetse fly eradication campaigns involving spraying, and from other spraying campaigns to eradicate or control *Quelea*. There are also plans for the construction of reservoirs which might destroy the wetlands and their wildlife at a single stroke. None of these wetlands is effectively protected.

Some 40 km above the estuary the Jubba receives the waters of the seasonal Lach Dheere River, which with its affluents has drained the NE Kenya Plateau.

3. Wetlands of the Lachs District

General: A number of large temporary watercourses known as lachs or laks drain the SE sloping plateau of NE Kenya into southern Somalia. The principal streams are, from north to south, the Lach Awaro (Bor), Lach Bogal and Lach Dheere (Dera). Lach Bogal peters out in swamps in Kenya before reaching Somalia but the others, having drained extensive swamps in Kenya, cross the border into Somalia where, when in spate, they spread their waters over broad floodplains. Some of the channels of the Lach Awaro system produce an E-W floodplain, some 80 m asl, 55 km long and 10 km wide, with a minimum area of 33 000 ha in Somalia (0°57' - 1°09'N/41°00' - 41°31'E). This is effectively a terminal, endorheic floodplain or pan, but most of the water from the Lach Awaro passes this floodplain to the SE to enter a much larger pan created by the Lach Dheere in Somalia. This latter stream is flanked by permanent swamps where it enters Somalia at an altitude of 70 m, and on passing east this widens to a floodplain over 40 km across with an area of 228 000 ha. This includes some 6000 ha of permanent swamp at its narrow, upper, western end, and a further 5000 ha along its mid-northern margin. The pan is located south of the Awaro Pan (0°08' - 0°53'N/41°00' - 41°58'E) and is not always a single integral pan, since in drier years there may be a series of fragmented pans within this area. However, the flood waters pass through the pan and again inundate a broad area, about 50x50 km (250 000 ha) almost immediately north (1°02' - 1°31'N/41°45' - 42°20'E). From here the waters make their way through a series of channels with floodplains and swamps to a confluence with the Jubba (0°05'S/42°38'E) near Yoontoy, only about 40 km from the estuary.

About 120 km due north of these wetlands there is another large pan, 63 km in length with a maximum width of 9 km. It covers 33 000 ha (2°31' - 2°52'N/41°21' - 41°52'E) and is situated on the plateau at an elevation of 290 m among hills which rise to 345 m close by. It is fed by more than 20 small watercourses which drain the surrounding hills, and it is usually flooded for a short period every year. Direct precipitation over this pan is about 420 mm/yr.

None of these wetlands is effectively protected. Hunting pressure is extreme, and trees are cut down in large numbers. The mangroves at the mouth of the system have been decimated over the past 25 years.

4. Bullehs, Tugs & Dholos

General: A bulleh is a small endorheic depression, which holds water after rains. It may be filled by peripheral sheet run-off, but more usually by a temporary watercourse. Bullehs tend to retain soil moisture for much longer than the surrounding land and carry a characteristic vegetation, significantly richer than that of their environs. The beds of small temporary watercourses of low gradient tend to be flat, so that their waters spread widely over broad deposits of alluvium at times of flood. These watercourses are known as tugs. Often a tug ends in a flat inland delta, known as a dholo, set in the valley of a larger watercourse, or such a delta may spread over raised coral reefs along the coast. Tugs and their dholos are periodically flooded and tend to retain moisture longer than the surrounding land, and thus have floras and faunas similar to those of bullehs.

Acacia tortilis is virtually ubiquitous in tugs, dholos and bullehs, usually growing with a flat-topped habit, 6-8 m high, but occasionally reaching 20 m. It appears indifferent to the nature of the local parent rock. In gypsum areas, on inland deltas, this tree is often accompanied by *Acacia stuhlmannii* and the grass *Paspalidium desertorum* or a species of *Panicum* (*turgidunz?*). In the Nogal Valley, where water 50-100 cm sometimes stands in bullehs for considerable periods, it grows on the fringes with *Ziziphus mauritanus* bushes scattered over the more deeply inundated areas. This latter species will tolerate quite deep inundation for several weeks, or even months. *Euphorbia robecchii* is an associate of *Acacia tortilis* on some small tugs, and on larger tug floors it may grow with bushes of *Cadaba heterotricha*, *Commiphora cerasiformis*, *C. coriacea*, *C. crenulata*, *Coleus ignarius*, *Salvadora persica*, *Senra incana* and *Zygophyllum hildebrandtii* and the grasses *Sporobolus longibrachiatus*, *S. ruspolianus*, *S. somalensis* and *Tripogon subtilissimum*. On tug banks *Cadaba glandulosa*, *C. heterotricha*, *C. inirabilis*, *Ficus syconzorus*, *Maerua crassifolia* and *Salvadora persica* are common associates of *Acacia tortilis*.

In some of the large interior valleys, and on the coastal plains, tugs have been filled by alluvium and wind blown materials so that they are semi-fossil water courses. Nevertheless, they still carry the primary drainage of the area after rain, and consequently retain water for a lot longer than their surroundings, even if they do not flow at the surface. In these places *Acacia tortilis* may grow with *A. mellifera* and the grasses *Andropogon kelleri*, *Bothriochloa radicans*, *Cenchrus ciliaris*, *Chloris myriostachya*, *Chrysopogon aucheri*, *Cymbopogon divaricatus*, *Digitaria rivae*, *Enteropogon somalensis*, *Latipes senegalensis*, *Sporobolus helvolus* and *S.*

ruspolianus. These watercourses, although filled in, are conspicuous by virtue of the density and diversity of their vegetation, by contrast with that of the surrounding country.

On the coastal plains along the Gulf of Aden the tugs often flow for short periods twice a year, and there are one or two semi-perennial stretches in the larger tugs where fresh water fish occur. *Conocarpus lancifolius* often reaches 10-20 m in height, with a trunk 60-100 cm in diameter, on sandy tug beds beneath which there is always water. However, this tree is much sought after and its timber is exported to Arabia for dhow building. It also grows on large deltas over the coral shelves, where water drainage to the sea is impeded by dunes and water is retained. If tugs traverse gypsum country their water is saline, and then *Phoenix reclinata* and *Tamarix nilotica* are dominant on their banks, but *Acacia tortilis* is usually also present. Around wells, pools and springs in the coastal strip, *Hyphaene carinensis* is dominant, usually with an outer fringe of *Phoenix reclinata* and *Tamarix nilotica*, and sometimes also with *Cadaba longifolia*.

Specific sites are too numerous to list, but there are many bullehs and tugs with pools of semi-permanent water in the Nogal Valley. This temporary river has sources in the Ogo Mountains and drains ESE across southern Migiurtinia Province to reach the Indian Ocean in Negro Bay (8°00'N/50°00'E). Other tugs and bullehs are present in the Dudo and Lhut Valleys to the north, which also reach the Indian Ocean, but on the Horn of Africa. The fauna of some semi-permanent pools includes *Lutra maculicollis* and *Pelusios sinuatus*, as well as snakes and a variety of birds.

5. The Central Districts

General: A karst region covers much of the central part of the country in which no major wetlands exist, but there are numerous sink holes of various sizes and depths, and a small lake at Bud Bud (4°15'N/46°30'E), which is of some special interest because caves off it contain the endemic blind fish *Phreatichthys andruzzii*. The lake shelters *Alopochen aegyptiaca* and various other waterfowl. In this interior limestone country, shallow sink holes are fringed by *Acacia tortilis* in association with *Euphorbia robecchii* and *Comnizophora* spp., but around deep sinkholes *Celtis kraussiana* and *Ficus salicifolia* are the most important associates, or in other sites, *Acacia tortilis* grows with *Ficus glumosa*, *F. vasta* and occasionally *Capparis galeata*. In some saline dune swales along the coast *Acacia tortilis* grows with *Phoenix reclinata*, *Tamarix nilotica* and *Urochondra setulosa*. The environment of this region is not presently endangered, nor is it protected.

Towards the coast there are several large and virtually unexplored pans. These hold surface water only very occasionally, and then only for short periods.

6. Artificial Impoundments

General: There are some 240 small reservoirs constructed for watering livestock.