



FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

Office of the FAO Representative in India & Bhutan
P. O. BOX NO. 3088, 55 MAX MUELLER MARG,
NEW DELHI - 110003

TELEPHONE : 690410
TELEX : 31-62216 FAO IN

CABLES : FOODAGRI
NEW DELHI

TCP/IND/0054

5 December 1990.

*With the
Compliments
of*

George H. Axinn
FAO Representative in India & Bhutan

Dr. W.A. Rodgers
CTA
TCP/IND/0054
c/o Wildlife Institute of India
F.R.I. Campus,
P.O. New Forest
Dehra Dun 248 006.
UP

Enclosed fax from IUCN Switzerland for your kind attention.

Regards.



L'Alliance mondiale pour la nature
The World Conservation Union

Secrétariat de l'IUCN
IUCN Headquarters

ACTION COPY

FAX

To: Alan Rodgers, Wildlife Institute of India

From: Gabi Seifert/Simon Stuart, SSC Office, IUCN Switzerland

Date: 3 December 1990

Subject: Biodiversity in Sub-Saharan Africa and its Islands

Number of pages: 16

Herewith I am sending you the draft chapters on Sudan, Ethiopia and Somalia.

I hope that this will be useful for you.

With best wishes.

4 DEC 1990

FAO REPRESENTATIVE OFFICE INDIA			
	N	A	INITIALS/COMMENTS
FAOR			
PO	✓	✓	5/12
AO			

Chapter 19: Ethiopia

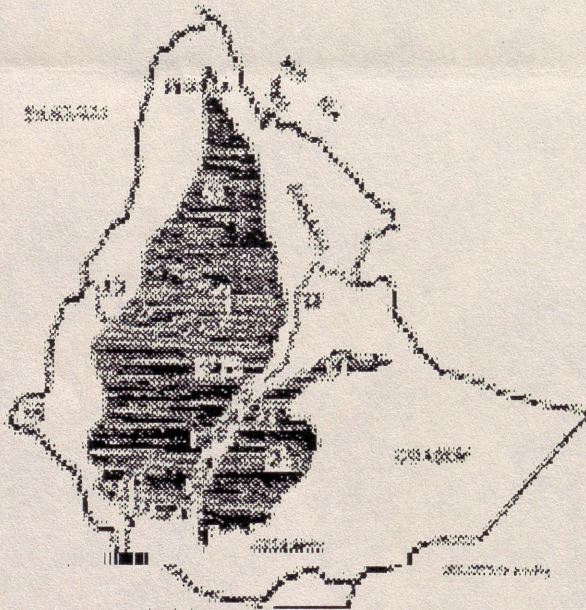
Introduction

Area: 1,023,050 km². Cultivated: 11%. Pasture: 37%. Forest/woodland: 23%.

Population (1989 data): 49,763,000. Urban: 11%. Labour force in agriculture (1980): 80%. Density: 49/km². Annual growth rate: 2.1%, increasing. Doubling time: 33 years.

Economy (1987 data): World Bank index: low-income economy. GNP/capita: US\$ 120. GNP annual growth rate: 2.0%.

Biogeographic affinities: Predominately Afromontane in the centre of the country with Afroalpine elements at the highest altitudes; Somali-Masai in the south and east and in the Rift Valley; Sudanian in the west; Sahel Regional Transition Zone in the far north.



Ethiopia (shaded area represents approximate distribution of land above 2000m). 1: Simien Mountains. 2: Bale Mountains. 3: Arssi Mountains. 4: Chercher Mountains. 5: Rift Valley. 6: Omo River. 7: Mago River. 8: Lake Chamo. 9: Lake Abaya. 10: Lake Shalla. 11: Lake Abiyatta. 12: Awash River. 13: Blue Nile. 14: Addis Ababa. 15: Gambella Salient.

Vegetation: In the highlands, montane forest (now much reduced, though most extensive in the southwest), bamboo, heath, moorland, grassland and cultivated areas; in the lowlands, mainly dry bushland and *Acacia* woodland, with semi-desert in parts of the east and north, and Sudanian woodland in the west.

Critical Sites

1. Ethiopia has many critical sites for biodiversity, and several protected areas are being managed. However, only two of these, the Simien Mountains National Park, and the Awash National Park, have been legally gazetted and other areas lack legal protection.

2. The Simien Mountains National Park represents an area of spectacular scenic beauty, as well as being of critical importance for a number of rare species. Management of the area has been hampered by the civil war.

3. The ungazetted Bale Mountains National Park contains the largest area of afro-alpine habitat in Africa. Effective conservation of the area would preserve the water catchments of three major rivers, as well as safeguarding several rare species. The Arsi Mountains to the north are also important.

4. Most other areas of montane forest in Ethiopia are currently receiving no form of protection. With the increasing immigration of people into the highland areas, better protection and management of these areas, in the context of meeting human needs, is essential if water catchments are to survive and if the extinction of many endemic species is to be prevented. Key forest protection areas are in the Sidamo, Gamo Gofa, Kefa, Ilubabor, Welega, Arsi, Shoa, Gojam, Amhara, Welo and Harerge Provinces.

5. There are important wildlife resources in the Yavello region of Sidamo Province, including five endemic bird species and a population of the endemic Ethiopian honey bee.

6. A number of important rivers flow through the lowlands, all of which lack formal legal status. These are important areas for large mammals, some of which are rare or absent in the remainder of the country: Omo and Mago National Parks, and Tama and Chew Bahar Conservation Areas.

7. All the lakes in the Rift Valley need some form of conservation measures. Lakes Abijatta and Shalla are included in the Abijatta-Shalla National Park (still ungazetted and

Chercher Mountains. In the south, in the Omo and Mago areas there are populations of topi,eland, heisa oryx, Grant's gazelle and Mongalla gazelle, and in the west at Gambella there are concentrations of topi, white-eared kob, Nile lechwe and lelwel hartebeest. In the Ogaden, antelope numbers are severely reduced, but there are scattered populations of beisa oryx, dibatag, gerenuk, Salt's dik-dik, Guenther's dik-dik, and possibly Speke's gazelle. Ethiopia deserves credit for its successful conservation programme for Swayne's hartebeest (now endemic) which number 2,400-2,700 animals, mainly in the Senkelle Reserve, with other populations in Awash and Nechisar National Parks, and Yavello Wildlife Sanctuary. Particular concern surrounds two rare and distinct subspecies, the tora hartebeest and Heuglin's gazelle, which occur in the far northern Conservation Areas of Yob, Naska, Gash Setit and Chire. These areas have suffered from warfare and severe droughts, and so the current status of these species is not known. Some antelope surveys are needed in Ethiopia as follows: the far northern reserves (see above);

for the rare beira near where Ethiopia, Somalia and Djibouti meet; for an undescribed form of red duiker recently found in the Bale Mountains; and for Speke's gazelle in the Ogaden. Captive breeding is recommended for Ethiopian populations of Swayne's hartebeest, tora hartebeest, Heuglin's gazelle and possibly the mountain nyala

4. Rodents. Six species of conservation concern occur: a gerbil *Tatera minuscula* from Sheikh Hussein in the east and the lower Omo Valley in the south; *Megadendromus nikolansi* above 3,000 m on the southern slopes of the Bale Mountains in the afro-alpine vegetation; *Praomys ruppi* in the highlands of central and southwest Ethiopia, probably not in any protected areas; the aquatic *Colomys goslingi* which is very rare in the central highlands, as well as occurring in the Zaïre basin; *Lephuromys melanonyx* in the central and south-central highlands above 3,000 m in afro-alpine vegetation; and *Muriculus imbersus* between 1,900 and 3,400 m on both sides of the Rift Valley, possibly threatened



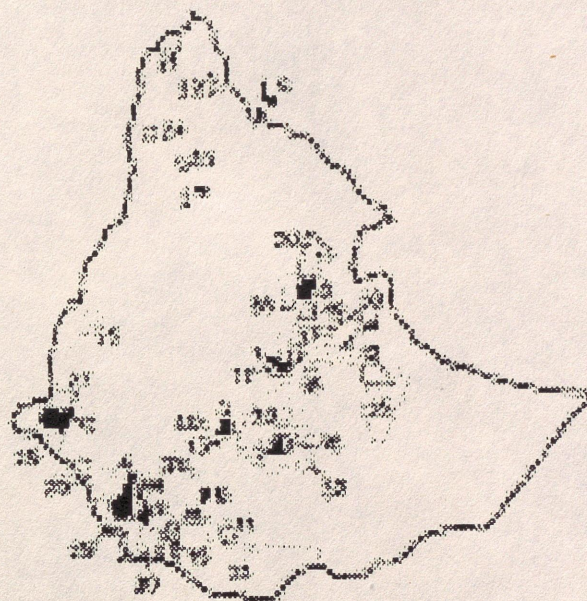
Lake Abijatta in the Rift Valley of Ethiopia (Photo: WWF/F. Vollmar).

by conversion to agricultural land. The extent to which the existing protected areas system safeguards these species is not fully known.

5. Fruit Bats. Nine species occur, including one of conservation concern: *Rousettus lanosus*, which occurs in scattered populations in montane areas in Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda, and Zaïre, and its status is very poorly known.

6. Other Mammals. The Walia ibex is only known from Ethiopia, with the only protected population occurring in the Simien Mountains National Park, hence underlining the need to rehabilitate this area. The only potentially viable population of the endemic Simien jackal (one of the world's most endangered canids) is in the Bale Mountains National Park but it is threatened by hybridisation with dogs. Important populations of the Somali wild ass survive in the Awash Valley, and parts of southern Tigray and Eritrea. Dugongs apparently still survive around the Dahlak Islands, thus emphasising the need for protection there. The rare Abyssinian genet has its distribution centred on Ethiopia, but it is so little known that it is not known whether it is a species of mountain forests, or the arid lowlands. Small numbers of Grevy's zebra occur in the south of the country and their range may be expanding there. Ethiopia is noted for its 180 civet farms, holding about 2,700 African civets, used for the production of musk, a raw material in the perfume industry. Over 1,000 tonnes are exported annually, mainly to France, and this represents a valuable source of foreign exchange earnings for Ethiopia. Illegal hunting has reduced the black rhinoceros to near extinction, and elephants now number only 6,650 animals, mainly in the lowlands of the south and west.

7. Birds. There are many bird species endemic to Ethiopia. Most of these are not currently threatened, and will be safe, providing that their habitats (mainly mountain forest and alpine moorland) are protected. Eleven species have been recorded from Ethiopia. The shoebill occurs in the proposed Gambella National Park where it depends on effective wetland conservation. The exceedingly rare northern bald ibis is still occasionally recorded wintering in the highlands from south Eritrea to near Addis Ababa; it is important that any birds encountered are not disturbed. The wattled crane occurs in wetlands in the west and south-east highlands and in the Rift Valley, and it requires conservation of its marshland habitat. The white-winged flufftail is a very little known and rarely recorded species, mainly from marshes near Addis Ababa. It is also occasionally recorded in southern Africa, and its conservation requirements are unknown throughout its range. Prince Ruspoli's turaco is endemic to montane forests in a small area of Sidamo and Bale Provinces, and is now seriously threatened by habitat

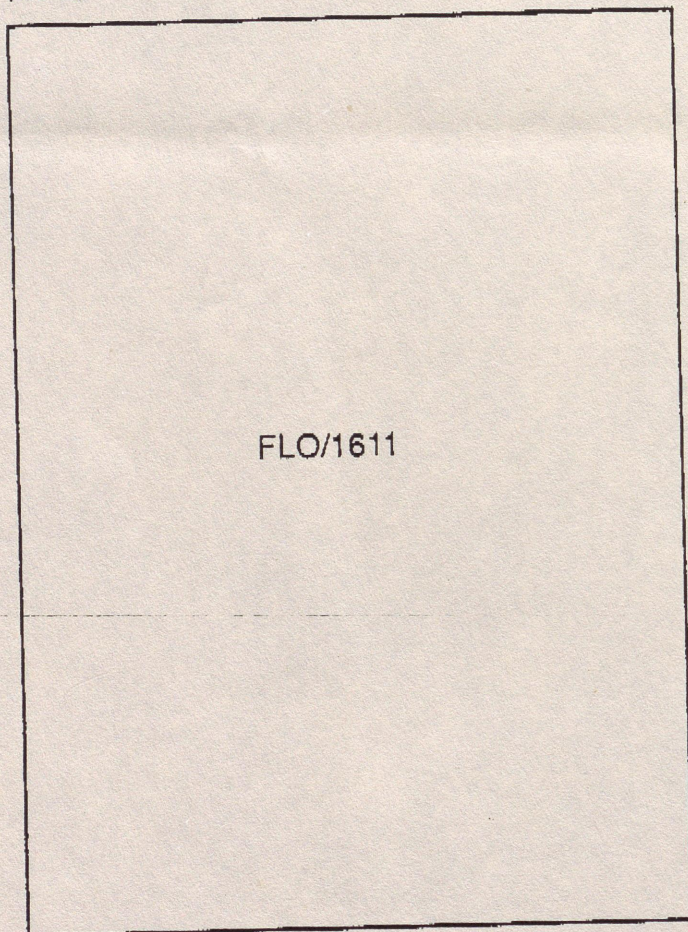


Conservation and controlled hunting areas of Ethiopia. *National parks (gazetted and proposed)* — 1: Awash (720 sq km). 2: Simien Mountains (225 sq km). 3: Abiyatta-Shalla Lakes (800 sq km). 4: Omo (3450 sq km). 5: Mago (1500 sq km). 6: Nechisar (700 sq km). 7: Bale Mountains (2200 sq km). 8: Yangudi Rassa (formerly Danakil; 2000 sq km). 9: Dahlac Marine. 10: Gambella (2000 sq km; proposed). *Wildlife Reserves and Sanctuaries* — 11: Yavello. 12: Harrar Elephant (6000 sq km). 13: Senkelle (56 sq km). 14: Tama. 15: Chew Bahar. 16: Bale. 17: Awash West. 18: Alledeghi. 19: Gowane. 20: Jijima. 21: Jijima. 22: Uba. 23: Chire. 24: Gash-setit. *Controlled Hunting Areas* — 25: Dabus Valley. 26: Akobo. 27: Jikao. 28: Tedo. 29: Omo West. 30: Murle-Kenya Border. 31: Borana. 32: Bale. 33: Arssi. 34: Tchercher and Arbagugu. 35: Harar-Wabi Shebelle. 36: Awash West. 37: Afdem. 38: Erer-Gota. 39: Maze. 40: Boyo Swamp. 41: Segan.

destruction. If the proposed Yavello Wildlife Sanctuary is extended eastwards towards Arero, it could include the habitat of this species. Two species of lark are endemic to the Sidamo Province; the Degodi lark occurs in the Neandria region and the Sidamo long-billed lark occurs in the Negele. Work is needed to assess the conservation requirements of both these species. In the area around Yavello and Moga in the proposed Yavello Wildlife Sanctuary, two endemic species occur, the white-bellied swallow and the Ethiopian bush-crow. In Shoa Province two endemic canaries occur; the yellow-throated serin in arid habitats in the east of the province, not far from Anish National Park (this species had not been recorded for nearly 100 years until 1989); and the Ankober serin in high rocky mountains near Ankober. The conservation requirements of these species are not clear. In addition, the possibly extinct Somali long-clawed lark (only known from Somalia) might occur in Ethiopia in the grasslands east of Jijiga. If it is found there, the establishment of a protected area should be considered.

The various Rift Valley lakes contain internationally important populations of greater and lesser flamingoes. Along with Somalia, Ethiopia is the most important country for bustards in the northern hemisphere, with restricted populations of Heuglin's bustard, Hartlaub's bustard and little brown bustard. Larger species, namely Arabian bustard and Denham's bustard (a declining species), are heavily hunted. Important seabird colonies exist in the Dahlak Islands, including the pink-backed pelican, red-billed tropicbird, brown booby, sooty gull, white-eyed gull, caspian tern, white-checked tern, greater crested tern, lesser crested tern and bridled tern.

8. **Reptiles.** The Nile crocodile is greatly reduced, but good populations remain in the Mago, Omo and Nechisar National Parks. Initial attempts at farming and ranching crocodiles have been begun in Ethiopia. Small populations of green and hawksbill turtles exist in waters around the Dahlak Islands. Some nesting probably takes place, but it is believed that exploitation has been heavy, since Ethiopia exports substantial quantities of bekko to Japan. The uncommon African spurred tortoise occurs in lowlands in the northern half of the country, but its conservation requirements are not fully known.



Lobelia sp. in the Bale Mountains National Park, Ethiopia, a characteristic species of high altitudes (Photo: WWF/E. Coppola/Panda Photo).

9. **Amphibians.** Thirty endemic species are recorded, ten of which are known only from a single locality. They mainly occur in the mountain forests (on both sides of the Rift Valley) though some also occur in forests in the southwest, in Rift Valley lakes, and the Omo River Delta.

Threats

1. Ethiopia's conservation efforts suffer from the serious drawback that only two of the country's protected areas are legally gazetted. The long-term future of the country's critical sites is therefore in question.

2. The proposed protected areas cover a good range of Ethiopia's natural terrestrial habitats. However, insufficient areas of forest, arid thornscrub in the Ogaden, and marine habitats are proposed for inclusion in the system, thus putting these ecosystems at great risk.

3. Protective measures in several areas have suffered because of the civil war. In several parts of the country, poaching, in particular of elephants, is out of control.

4. Habitat clearance for agriculture is destroying large areas of forest in the mountains, and of lowland woodland in the west. This is a serious threat, since no legal reserves exist to protect these habitats.

5. Overgrazing by livestock is leading to severe environmental degradation in many areas, including in the north, and in the Ogaden.

6. Rinderpest is endemic in southern Ethiopia and presents a threat to all susceptible ungulates.

Current Conservation Measures

1. Government Administration of Conservation

(a) Environmental matters come under the Ministry of Agriculture, in particular the Natural Resources Conservation and Development Main Department. Under this department, the Ethiopian Wildlife Conservation Organisation is responsible for wildlife conservation in general, and the management of national parks, wildlife reserves, sanctuaries, and controlled hunting areas. The department is also responsible for the management of forests.

2. Multi-agency Projects

(a) Development of National Conservation Strategy (Government/IUCN/ODA/UNSO/NORAD/ISF): provision of technical and financial assistance to the government for the strategy.

(b) Bale Mountains National Park development (EWCO/WWF).

(c) Wildlife survey of Nechisar National Park and assessment of conservation needs (FFPS/PTES).

3. BBA Projects

- (a) Simien conservation and sustainable development project.

4. GTZ Projects

- (a) Rehabilitation of degraded watershed areas through socially and ecologically appropriate human management techniques.

5. WCI Projects

- (a) Provision of wildlife conservation adviser to the EWCO.

- (b) Study of Simien Jackal ecology and conservation needs.

- (c) Environmental education programme.

6. WWF Projects

- (a) Conservation and environmental education on a national basis.

- (b) Provision of wildlife conservation ecologist to EWCO.

Suggested Conservation Activities

1. Principal factors which need controlling in protected areas are overgrazing and habitat clearance for agriculture. Management of protected areas should aim to integrate human and conservation needs in places where these threats are present.

2. Ungazetted protected areas need their legal status changed as a matter of urgency. The following protected areas should be gazetted: Bale Mountains National Park (important for afro-alpine habitat, antelopes, the Simien jackal and rodents), Omo and Mago National Parks (important for antelopes), Tama and Chew Bahar Conservation Areas (all species of large mammals), Abijatta-Shalla National Park (lakes and wetlands), Awash West Conservation Area, Gewane Conservation Area, Yangudi Rassa National Park (important for primates), Mille Sardo Wild Ass Reserve, Gambella National Park (antelopes, birds, wetlands with associated species) and Nechisar National Park crocodiles.

3. Rehabilitation of protected areas needs undertaking in most cases, including already-gazetted areas. The Simien Mountains National Park (primates, *Wallia ibex*, large mammals), Awash National Park (Somali wild ass, antelopes, birds), Omo and Mago National Parks, Tama and Chew Bahar Conservation Areas (large mammals), Nechisar National Park (wetlands and lakes) and the far northern Conservation Areas of Yob, Nafka, Gash Setit and Chire (antelopes, especially tora hartebeest and Heuglin's gazelle) are all in need of more resources and improved management and protection strategies. The Gambella National Park needs

further development in the context of an integrated land-use plan for the region.

4. New reserves are urgently needed to protect forest habitats, especially montane forest. Integrated rural development projects may be the best approach for many of these as immigration to the mountains has increased. Areas of this type of forest reserves are as follows: Sidamo, Omo Galla, Kefa, Ilubabor, Welega, Arsi Mountains, Shoa, Gojam, Amhara, Welo and Harerge.

5. A protected area in the Ogaden region should be established to replace the degraded Harrar Wildlife Sanctuary and should be based on integrated development, overgrazing being one of the primary problems of the region.

6. Reserves with an emphasis on large mammals are needed in Tigray and southern Eritrea, and should be established as soon as the security situation permits.

7. Anti-poaching measures need strengthening in all areas, particularly in relation to rhinos, elephants and other large mammals.

8. A Wildlife Sanctuary should be established in the Yavello region of Sidamo province (particularly important for five endemic bird species and Swayne's hartebeest).

9. Wetlands and lakes need increased protection, particularly Lakes Zwai, Tangana and Awasa and wetland areas in the Rift valley. Several species of birds are dependent on the effectiveness of such protection: see *Critical Species 7* above.

10. A marine National Park should be established in the Dhalak Islands for seabirds, turtles and dugongs, and coral reefs and mangroves.

11. More resources are needed to improve protection in the various protected areas in the Awash River Valley (see *Critical Sites 8* above).

12. Primate surveys are needed for the gelada baboon and the hamadryas baboon.

13. Surveys are needed for antelopes as follows: all species in the far northern reserves; for the beira near the Ethiopia/Somalia/Djibouti border area; for an undescribed form of red duiker in the Bale Mountains; and for Speke's gazelle in the Ogaden.

14. Captive breeding programmes should be established for Swayne's hartebeest, the tora hartebeest, Heuglin's gazelle, mountain nyala and Prince Ruspoli's Turaco.

15. Investigations are needed to identify possible solutions to the problem of hybridisation of the Simien jackal with domestic dogs.

16. Surveys are needed to assess current effective protection for a number of rodent species (*Critical Species 4* gives details).

17. A survey is needed to determine the status and conservation requirements of the Abyssinian genet.

18. The elephant population needs urgent protective measures due to high levels of illegal hunting.

19. A number of rare bird species need action as fol-

P

lows:

(i) Assessment of conservation requirements of the white-winged flufftail.

(ii) Protection of Prince Ruspoli's turaco, by extension of the proposed Yavello Wildlife Sanctuary eastwards towards Arcro in order to include its habitat and prevent further deforestation.

(iii) Assessment of the conservation requirements of the Degodi lark and the Sidamo long-clawed lark.

(iv) Assessment of the conservation requirements of endemic canaries.

(v) Survey to elucidate the status of the possibly-extinct Somali long-clawed lark.

20. Further development of credit farming and ranching is needed.

21. The conservation requirements of the African spurred tortoise should be surveyed in the northern half of the country.

Chapter 44: Somalia

Introduction

Area: 630,000 km². Cultivated: 2%. Pasture: 45%. Forest/woodland: 14%.

Population (1989 data): 8,248,000. Urban: 33%. Labour

Economy (1987 data): World Bank index: low-income economy. GNP/capita: US\$ 290. GNP annual growth rate: 2.5%.

biogeographic Somalia. It is mostly Somali Maasai with Afromontane elements in the northern mountains, and Zanzibar-Inhambane Regional Mosaic in the extreme south.

Vegetation: Predominately dry deciduous bushland and thicket, with semi-desert grassland and deciduous shrubland. There is montane some coastal semi-evergreen bushland in the south, as well as riverine forest patches on the lower Juba River.

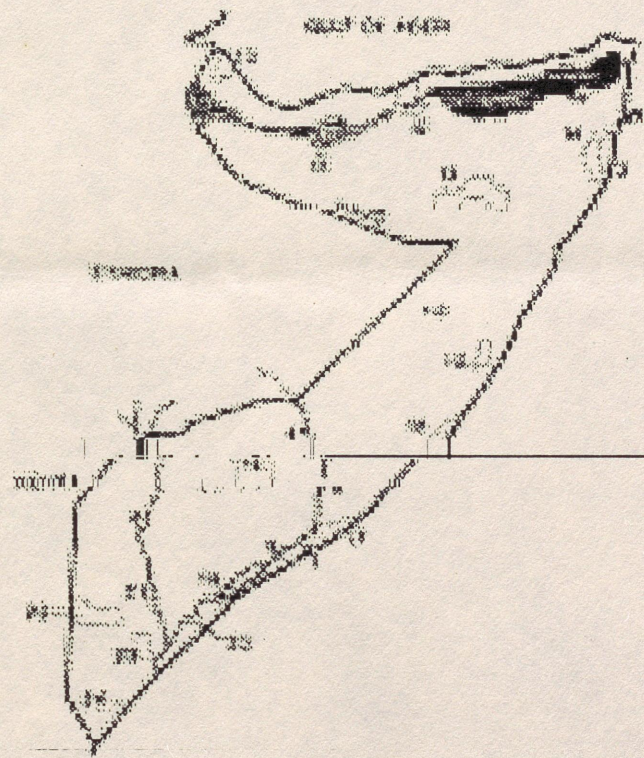
Critical Sites

1. Although Somalia possesses some important and unusual biological resources, with a high proportion of endemic species (particularly plants), the country has been severely ravaged by security problems, droughts and the consequent human disasters in recent years. There is still a lack of a protected area system, and there is neither adequate legislation nor means of enforcement to prevent the current utilisation of its natural resources. There is an urgent need to rectify this situation and to provide the training necessary to develop a national capability in conservation. The country's critical sites are being impoverished rapidly through a combination of droughts, overgrazing and excessive hunting, and there is little time left in which to act.

2. Most of Somalia is dry semi-desert and savanna. A number of important sites are... The most important are: Zeila; Las Anod-Taleh-El Chebet (which has been proposed as a national park); Ras Hajun-Ras Gubah; El Hammure; Hobyo; Haradere-Awale; Jowhar-Warshek; Harqan-Dalandoole; Lack Dere (which has been proposed as a national park); Far Wamo; and Lack Badan (also proposed as a national park). In all of these areas, protection has been totally inadequate and poaching of wildlife is generally very severe.

3. There are some areas of wetland, and more moist savanna, especially in the regions of the Shebelle and Juba Rivers. Priority sites for protected areas are Jowhar-Warshek, Har Yiblame, Eji-Oobale, Awdhegle-Gandershe, Arbowerow, Boja Swamps, Angole-Farbidu (which includes riverine forest) and Lake Radidi.

4. The mountains of northern Somalia have some unusual species communities. The two sites of greatest interest are the proposed national parks at Goan Libaax and Daalo Forest



Somalia, showing localities mentioned in the text (shaded area represents approximate boundary of northern mountainous and hilly strip). 1: Mogadishu. 2: Bender Beila. 3: Galkayu. 4: Belet Weyn. 5: Shebelle. 6: Haradere-Awale. 7: Jowhar-Warshek. 8: Harqan-Dalandoole. 9: Arbowerow. 10: Boja Swamps. 11: Angole-Farbidu. 12: Lake Dere. 13: Far Wamon. 14: Lack Badan National Park (3340 sq km). 15: Zeila. 16: Gaan Libah. 17: Ras Hajun-Ras Gubah. 18: El Hammure. 19: Hobyo. 20: Haradere-Awale. 21: Juba. 22: Harqan-Dalandoole. 23: Arbowerow. 24: Boja Swamps. 25: Angole-Farbidu. 26: Lake Dere. 27: Far Wamon. 28: Lack Badan National Park (3340 sq km).

ch includes *Juniperus* forests). The proposed boundaries of the Daalo Forest Park should be extended to include the northern coastline.

5. Somalia has the most extensive and least spoilt coastline in all of Africa. Important coral reefs, seabird colonies and turtle nesting beaches are currently unprotected. There are believed to be very large dugong populations and extensive seagrass beds. Important seabird nesting sites include Mait Island, Zeila Island, and islets off Mogadishu, but more information is needed to identify the critical sites for biodiversity in the coastal zone, and to recommend appropriate conservation action. Priority should be given to the coral reefs from Mogadishu south to the

Critical Species

1. **Plants.** About 2,000 species occur of which about 518 species are believed to be endemic. In general, the flora, especially the important succulent scrub, is threatened by desertification. Examples of threatened species include: *Furcraea cameroni*, a bush known only from the northern mountains where it is extremely rare; *Loanea crassa*, an unusual succulent also restricted to the northern mountains, where it could now be extinct; *Wissmannia carinensis*, the Bankouale palm which occurs in north-eastern Somalia in very small numbers (as well as in Djibouti and South Yemen); and *Cordeauxia edulis*, the yaheb nut bush, which survives near Adawilif (and at two sites in Ethiopia). This last species is severely threatened because its highly-prized edible nuts are usually collected, and thus no regeneration is taking place. The government is examining the utility of the species as a crop plant.

2. **Antelopes.** 22 species occur, and an additional species, *Tragelaphus hircinensis*, is now extinct. 14 species of antelope have their ranges centred on Somalia, and the country is an important refuge for international mammals over the country as a whole by poaching; the hirola (otherwise known only from a small part of Kenya) which has decreased severely and now occurs only in the Lack Dere region; the beira (almost endemic to Somalia), which is restricted to the northern mountains and has decreased because of drought; the dibate (almost endemic), which occurs in Hobyo and Haradere-Awale Rugno, and has decreased through poaching, drought and overgrazing; Soemmerring's gazelle, which is greatly reduced, although still widespread, occurring in Las Anod-Taleh-EI Chebets, Ras Hajun Ras Guba, Hobyo, Jowhar-Warshak, and south of Haradere-Awale Rugno; Peizer's gazelle (almost endemic),

which is restricted to the northern coastal zone (including the northern extension of the proposed Daalo Forest National Park), and survives in reasonable numbers; and Speke's gazelle (almost endemic), which is widespread but greatly reduced in numbers, surviving in particular in Hobyo, but also Las Anod-Taleh-EI Chebet, Ras Hajun-Ras Guba, Haradere-Awale Rugno, and Jowhar-Warshak. All four species of dikdik occur, including the endemic Piacentini's dikdik. The red duiker has been recorded from the Juba gallery forests. Somalia's remarkable antelope fauna will only survive if a comprehensive protected area system is established, and protected areas are informed

3. **Elephants and rhinos.** Elephants occur in the south and may be a distinct subspecies, *Lophoceros africana orleansi*, but poaching is essentially out of control, and the numbers have declined very rapidly to less than 6,000. Important sites are Lack Badana, Arbowerow, and Boja Swamps. The black rhinoceros has been poached almost to extinction, though it might survive in Lack Badana.

4. **Other Mammals.** The cheetah survives in certain areas, and the Somali wild ass will occur in the game locality and also further to the south. In the south, the giraffe and Grevy's zebra occur in small numbers, as far north as Haqan-Dalandoole. The rare Abyssinian genet might occur in the north, but its status and conservation requirements are not known. The rare golden-rumped elephant-shrew might occur in coastal forest in the extreme south in the Lack Badana area. Three rare species of gerbil occur: *Gerbillus alticola* is known only from northern Somalia; *Microdillus peeli* is endemic to three localities in north and central Somalia; and *Ammodillus imbellis* occurs alongside the previous species, as well as in eastern Ethiopia. Dugongs are believed to survive in good numbers along the coast their conservation requirements are unknown. The status of the Somali wild ass is not known, nor whether conservation action is needed

endemic. The Somali pigeon and Warsangli finnet are restricted to the northern mountains. The *Juniperus* forests of the proposed Daalo Forest National Park are an important locality for the latter species. Ash's lark is restricted to the coastal area north of Mogadishu, and might occur at Jowhar-Warshak. The Somali long-clawed lark occurs in the north-west of the country near Hargeisa and Buramo, but despite searches, there have been no reports for many years. The roseate tern breeds in reasonable numbers at various places along the coast. There is evidence that other species of seabird breed widely along the Somali coast, especially the white-bellied, white-throated tern, Somner's little tern, sooty

tern, and others. Both roseate and sooty terns have been found nesting on islets off Mogadishu. On Mait Island the red-billed tropicbird, masked booby, sooty tern, and brown noddy (in large numbers) have been found nesting, and on Zeila Island the brown booby, sooty gull, white-checked tern, greater crested tern, lesser crested tern and bridled tern (in large numbers) have all been recorded nesting. Along with Ethiopia, Somalia is the most important country for bustards in the northern hemisphere, with restricted populations of Heuglin's bustard, Hartlaub's bustard, and little bustard. The Arabian bustard, and Denham's bustard (a declining species), are heavily hunted.

6. **Marine Turtles.** Probably several thousand green turtles nest annually along the eastern coast, but the population and its conservation requirements are not known. It is also not known whether loggerheads, hawksbills, olive ridleys and leatherbacks breed, all of them being known from Somali waters but never having been proved to nest.

7. **Other Reptiles.** It is not known whether the Nile crocodile occurs; there have been no recent records. Similar, unconfirmed reports of the African spurred tortoise require confirmation.

8. **Amphibians.** One endemic species occurs, the frog *Lanzetta* *bergii*, known only from the Djibouti Valley in the north of the country. One frog and one treefrog are shared only with Kenya, and one toad only with Ethiopia.

Threats

1. Somalia lacks any organised protected area system to conserve its critical sites. As a result, the most important sites for conservation in the country are suffering from chronic over-grazing by livestock, and heavy hunting of large mammals. The country is undergoing serious biological impoverishment.

2. Hunting of most species of large mammal has been almost entirely destroyed by over-exploitation of populations. Protection measures for such species have been inadequate.

3. Several species, in particular of large mammals and of plants, have such small populations remaining that their long-term survival seems unlikely.

Current Conservation Measures

1. Government Administration of Conservation

(a) Terrestrial environmental matters fall primarily under the National Range Agency in the Ministry of Live-

stock, Forestry and Range. This agency is responsible for the conservation and development of range, forest and wildlife resources. It has Departments of Wildlife and Forestry.

2. Multi-agency Projects

(a) Assistance in wildlife resources management (Government/FAO/UNDP): improving wildlife management, applying benefits of conservation to local communities, developing wildlife legislation, preparing a national park management plan, and starting a crocodile utilisation scheme

(b) Forestry sector support and training (Government/FAO/UNDP): assistance in forestry and wildlife management and development of policies and legislation,

(c) Strengthening of Forestry Department (Government/FAO/FINNIDA): improvement of forestry, range and wildlife management with extensive training component.

(d) Initiating the Tropical Forestry Action Plan in Somalia (Government/FAO).

(e) Improvement of fisheries management through cooperatives and community-based fisheries (Government/FAO).

3. EEC Projects

(a) Development of national elephant action plan for Somalia.

4. GTZ Projects

(a) Reforestation and establishment of green belts around four provincial towns.

5. ODA Projects

(a) Assistance to Forest Range and Wildlife Institute: institutional management, curriculum development and support for training and education.

6. WCI Projects

(a) Somali wild ass research and conservation.

Suggested Conservation Activities

1. A protected area system, backed by appropriate legislation and supported by a management structure, should be established as soon as possible.

2. Protected areas urgently need establishing in Somalia's semi-desert and savanna regions; this is particularly important for plants (*Critical Species 1* above), the Somali wild ass, and antelope diversity and numbers (*Critical Species 2* above). Priority locations are listed in *Critical Sites 2* above.

3. Poaching needs immediate action on a nationwide basis, particularly in relation to threatened antelope species (see *Critical Species 2*), elephant and black rhino (if this last species survives in the country).

4. Wetland areas are urgently in need of improved protection and management; key locations for new reserves are listed in *Critical Sites* above.

5. The proposed National Parks at Goan Libaax and Daalo Forest (important for birds) should be established, with the boundaries of Daalo Forest National Park extended to include the northern coastline.

6. Surveys of the coastline and islands are needed in order to identify key sites and conservation priorities. Coastal reefs, seabird colonies, marine turtles and marine mammals are especially in need of surveys followed by action, particu-

larly in areas where tourism is beginning to increase and may impact marine resources such as corals and shellfish.

7. Mammal surveys are needed as follows:

(i) To assess the status and conservation requirements of the rare Abyssinian genet.

(ii) To assess the impact of coastal fisheries on dolphin and porpoise populations and to propose action if a problem exists.

8. Surveys are needed to establish the status and conservation requirements of the Nile crocodile and the African spurred tortoise.

Chapter 46: Sudan

Introduction

Area: 2,505,815 km². Cultivated: 5%. Pasture: 22%. Forest/woodland: 19%.

Population (1989 data): 24,484,000. Urban: 20%. Labour force in agriculture (1980): 71%. Density: 10/km². Annual growth rate: 2.8%, decreasing. Doubling time: 24 years.

Economy (1987 data): World Bank index: low-income economy. GNP/capita: US\$ 330. GNP annual growth rate: 2.0%.

Biogeographic affinities: Saharan in the north; Sahel Regional Transition Zone in the centre; Sudanian in the south; Somali-Masia in the southeast; Guinea-Congolian/Sudanian Regional Mosaic in the southwest; and Afromontane in the Imatong Mountains.

Vegetation: Desert and semi-desert in north; Acacia wooded grassland in the Sahel zone; Sudanian woodlands in the south; lowland forest patches along the border with Zaïre; and montane forest in the Imatong Mountains. Around the White Nile are very extensive swamps and floodplains.

Critical Sites

1. Sudan is the largest country in Africa, with some exceptional biological resources. The country has small areas of lowland rainforest in the southwest, and three game reserves protect this habitat: Bangangai, Bire Kpatuos and Mbarizunga. However, the latter two are tiny, and Bangangai Game Reserve is not currently large enough to contain viable populations of important species.

2. The most important montane forests in Sudan are in the Imatong Mountains in the extreme south. The natural forests are under threat from continued expansion of tea and forestry plantations. Other areas of montane forest exist in the south in the Didinga and Dongotona Mountains (although these have been degraded by burning), and in the proposed Boma National Park in the southeast.

3. Much of southern Sudan is savanna woodland, and it is here that most of the country's protected areas are situated. However, since the civil war began in 1983 access has been all but impossible and any estimates of the state of affairs there must be extremely tentative. It appears that all game reserves may currently be "on paper" only. The following

important reserves have been established: Southern National Park; Nimule National Park; Radom National Park; Kidepo Game Reserve (contiguous with the Kidepo National Park in Uganda); Ashana Game Reserve; and Juba Game Reserve. In addition, several very important reserves have been suggested but remain ungazetted. These are the Boma National park (which will also include montane forests, flood plains and seasonal swamps); Lantoto National Park; Boro Game Reserve and Meshra Game Reserve. The management of all these areas is believed to be at best seriously compromised by the ongoing civil war. In particular, poaching of large mammals appears to be out of control.

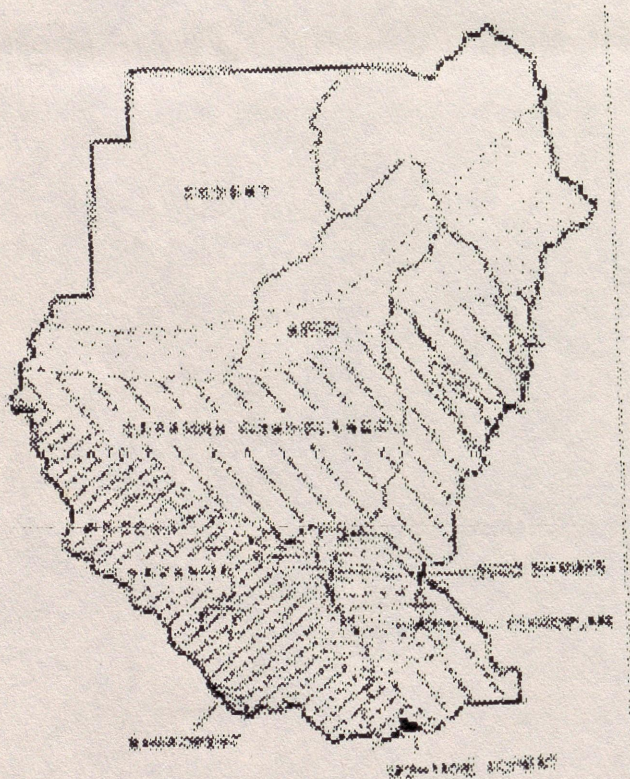
4. The Sudd Swamps along and around the White Nile represent some of the most extensive wetlands in Africa. The size of this wetland has varied enormously in the last 40 years and even with the Jonglei Canal working, will still be larger than its pre-1960 area, if Nile discharges stay at their present high levels. Extensive areas of the Sudd and associated floodplains are conserved in the Zeraf, Panyikang, Shambe, Mongalla and Badingeru Game Reserves. Additional conservation needs are the establishment of a large extension to the Shambe Game Reserve, the creation of the Badingilo Game Reserve (which will include the existing Mongalla and Badingeru Game Reserves), and the gazetting of the Meshra Game Reserve. Improved management of the Sudd Swamps, including programmes to ensure sustainable use of biological resources, is needed. The ecological effects of major development programmes, in particular the construction of the Jonglei Canal and the likely increase in oil exploration, constitute potential problems. At present, however, conservation in this region is severely hampered by the civil war within the country. One problem appears to be the accidental role of the unfinished, empty Jonglei canal acting as a game trap, which will have significant effects on some populations of large mammals.

5. The only protected area outside the south is the Dinder National Park, with the contiguous Rahad Game Reserve, and buffer-zone. This area includes a flood plain and surrounding savanna. The encroachment of the buffer-zone has destroyed much of the rainy season habitat for large mammals. The habitat has generally been degraded by illegal overgrazing, by domestic stock, and several species of large mammal are now extinct in the area. Nearby edaphic grasslands are also in need of protection. The management plan prepared by FAO should be implemented.

6. There are no protected areas in the desert and sahelian zones of Sudan, which make up half the country, nor are

hartebeest which occurs widely in most of the protected areas of the south; the tora hartebeest which is seriously threatened along the Ethiopian border, being already extinct in Dinder National Park; the tiang which is still widespread in huge numbers in the southeast, east of the Nile, especially in the proposed Boma National Park, but it is decreasing through excessive poaching; Weyn's duiker, which occurs in the far southwest; and the mongalla gazelle, of which most of the world population occurs in the southeast, east of the Nile. The gazelles of the arid and semi-arid zones are all severely depleted in numbers. With the exception of Heuglin's gazelle in Dinder National Park, none of them occur in protected areas. The dorcas gazelle occurs on both sides of the Nile; the dama, red-fronted and slender-horned only on the west, and Heuglin's and Soemmerring's only on the east. For these northern species, strict protection in the arid zone is essential. Both the dorcas and Soemmerring's gazelle would benefit from a reserve in the Red Sea Hills. For most of the remaining antelope species, the highest priority is the rehabilitation of the protected areas in the south, once hostilities cease. Emergency measures are probably needed to save the tora hartebeest along the Ethiopian border.

3. Fruit Bats. Ten species occur, including one of conservation concern: *Rousettus lanosus*, which occurs in scattered



Approximate major ecological zones of Sudan.

populations in montane areas in Sudan, Ethiopia, Kenya, Rwanda, Tanzania, Uganda, and Zaïre, where its status is very poorly known.

4. Other Mammals. The elephant was formerly abundant and widespread in the south of the country, but poaching for ivory is essentially out of control, and the total is probably now well under 30,000 animals, though there is a lack of recent information. The black rhinoceros has been poached almost to extinction, though it might still survive in the Badingeru Game Reserve and in the Aweng district, Bahr-el-Ghazal. The white rhinoceros is probably now extinct, also, through poaching. Chimpanzees occur in the far southwest of the country. Three interesting species in the Red Sea Hills are the Nubian ibex (which is seriously threatened by poaching), the Nubian wild ass and the barbary sheep (which occurs elsewhere in suitable habitats in the arid zone). The giant forest hog is restricted to the extreme southwest corner of the country and is believed to be vulnerable. Pousargue's mongoose occurs in the southwest and south of the country, as well as in neighbouring Central African Republic, Zaïre and Uganda. Its conservation requirements are not known. Three species of gerbil are endemic to western Sudan: *Gerbillus muriculus*, *G. nancillus* and *G. rosalia*.

5. Birds. Four threatened species occur, though one, the northern bald ibis is an extremely rare palaeartic migrant which appears occasionally on the Red Sea coast, and another, the Red Sea cliff swallow, is known only from one bird that was found dead at the lighthouse on Sanganeb atoll. This bird was almost certainly a migrant, and the breeding grounds of the species remain unknown. The shoebill population in the Sudd (around 5,000 birds) is the largest population of the species in Africa. The spotted ground-thrush is known from the Lotti Forest in the Imatong Mountains, where it is seriously threatened by forest clearance. The Arabian bustard and Denham's bustard occur (the northern stronghold of the latter probably being in Sudan) but are heavily hunted. At least nine species of seabird breed on the Sudanese coast, these being the brown booby, sooty gull, white-eyed gull, white-cheeked tern, greater crested tern, lesser crested tern, Saunder's little tern, bridled tern and brown noddy. There are doubtless more nesting sites to be discovered, but the most important so far are the Suakin Archipelago, and the Mukawar, Taila and Mayetib Islands.

6. Marine Turtles. Around 300 hawksbills are believed to nest annually on the Suakin Archipelago, this being a major population of the species. It might well nest elsewhere within Sudanese territory. The green turtle is known from Sudanese waters, and though it is not known to breed, it might well do so.

7. Other Reptiles. The African spurred tortoise is known

15

widely from Sudan. Its conservation requirements should be assessed, including the possibility of local reintroductions. The Nile crocodile occurs widely in the south, but is severely depleted through over-exploitation.

8. **Amphibians.** One endemic species occurs, a frog *Ptychadena schillukorum*, in the Nile Valley.

Threats

1. The management of the protected areas in the south of the country has become very difficult to maintain under conditions of civil war, and severe poaching of large mammals is taking place with some extinctions likely if the situation does not improve. Inevitably, encroachment has also occurred in some areas, particularly Juba and Kidepo.

2. Over-grazing by livestock has become a major problem in many areas, leading to severe environmental degradation.

3. The wetlands in the south are threatened by major water developments, such as the Jonglei Canal.

4. Tea and forestry projects in the Imatong Mountains constitute a threat to the largest *Acacia* forest in East Africa: they are currently not progressing owing to the civil war and alternative sites should be sought for these developments when hostilities cease.

5. The northern desert and semi desert areas and marine ecosystems are not included within the protected area system, and consequently there is little in the way of attempts to safeguard the biological resources of these areas.

6. Disease is potentially an increasing threat. Rinderpest is endemic in the south of the country and all susceptible ungulates are at risk. The risk of screw worm infection spreading from Libya is considerable in view of widespread uncontrolled domestic stock movements. If this parasite became established in Sudan, infection of Eastern Africa would surely follow.

Current Conservation Measures

1. Government Administration of Conservation

(a) Responsibility for environmental matters in Sudan is dispersed among a variety of agencies, ultimately coming under the authority of the Ministry of Agriculture and Natural Resources. The management of forests comes under the Central Forest Administration in the ministry. Marine conservation comes under the Sudanese Marine Conservation Committee.

(b) Considerable responsibilities in the Southern Region are delegated to the Regional Ministry of Wildlife Conservation, Fisheries and Tourism, which manages all the protected areas in the south. In the Northern Region, these responsibil-

ities fall to the Administration of Wildlife Conservation Forces.

2. Multi-agency Projects

(a) Fuelwood development for energy, including a forestry management component for national reserves (FAO/Netherlands Government).

(b) Conservation programme for migratory birds (Government/ICBP): assistance to the Department of Wildlife and National Parks in preparing sites and species inventories, managing reserves, and undertaking public awareness campaigns.

(c) Afforestation programme: combatting desertification through community forestry activities.

3. Netherlands Government Projects

(a) Environmental profile of Kassala Province.

4. ODA Projects

(a) Forestry research/irrigation rehabilitation: applied research and demonstration programme in Kelli irrigation scheme.

Suggested Conservation Activities

1. Management of all protected areas is in need of considerable improvement. An important feature of conservation strategies in the country will need to be sustainable use of wildlife resources, particularly in terms of controlled grazing and hunting.

2. Poaching of antelopes, elephants and rhinos is urgently in need of control. Crocodiles also need protection from over-hunting. It is very important that measures be introduced rapidly to stop Sudan continuing to be used as a base for poachers operating in neighbouring countries, and that collaboration with those countries be commenced in order to facilitate control of poaching.

3. The Banggai Game Reserve should be enlarged to permit viability of populations of important species (notably antelopes - see *Critical Species 2* above).

4. Montane forests in the Imatong Mountains in the extreme south are in need of much stricter protection against incursions by tea and forestry plantations. They are particularly important for plants and birds.

5. Additional reserves in savanna woodland habitats are needed, as is improved management of existing reserves. Key conservation sites and priority sites for reserves are listed in *Critical Sites 3* above.

6. The desert and Sahelian areas of the country urgently need protection: surveys are needed to identify priority sites, with conservation action following quickly. Reserves should be at low altitude and on both sides of the Nile. These measures are particularly important for antelopes, some species

16

of which will require specific action to ensure survival (see *Critical Species 2* above).

7. Reserves should be established in the Red Sea Hills and in the Jebel Marra and Jebel Gurgei Massifs to protect important plant species and the Nubian ibex (see *Critical Species 1* and 4 above).

8. Additional conservation areas in the Sudd swamps are needed, by considerably extending the Shambe Game Reserve, creating the Badingilo Game Reserve (which will incorporate the existing Mongalla and Badingeru reserves) and gazetting the Meshra Game Reserve. Integrated-development programmes will need to be a particular feature of this region, as the important areas for migratory birds are the swamp edges rather than its centre. *Critical Species 5* above lists birds of particular importance here.

9. The ecological effects of major irrigation projects such as the Jonglei Canal need to be monitored, and the ecological implications of any major developments, such as further irrigation or oil prospecting, should be carefully considered before work commences. The effects of drainage projects on wetlands are of particular importance.

10. The Dinder National Park and its buffer zone need extensive rehabilitation and the park should be extended to include edaphic grasslands. The management plan prepared by FAO should be implemented.

11. Marine wildlife and ecosystems appear to be in excellent condition and urgently need further study with a view to establishing conservation priorities and developing a

protection plan as soon as possible. The following action is needed in the short term, in order of priority:

(i) The proposed Sanganareb Atoll Marine National Park should be established and tourism on this site developed carefully

(ii) The proposed Port Sudan Marine National Park should be established and measures undertaken at the nearby port to control pollution.

(iii) Suakin Archipelago National Park or reserve should be established.

(iv) Mukkawar Marine National Park, incorporating Mukkawar Island, Mesharifa and Maytib Islands, the outer reefs such as Arlington and the coastal area around Mersa Inkafail, should be established.

(v) Further study of the conservation requirements of islands in the Red Sea is needed, particularly in relation to coral reefs, seabirds and marine turtles (see *Critical Species 5* and 6 above).

12. Mammals other than those already mentioned need specific conservation measures: the Nubian ibex is threatened by poaching (Red Sea Hills) and the conservation requirements of Pousargue's mongoose need to be surveyed.

13. A survey of marine turtle nesting sites is needed with a view to conservation action.

14. A survey of the status and conservation requirements of the African spurred tortoise is needed, and the possibility of re-introductions should be explored.