

4.4 EQUATORIAL GUINEA

Introduction

Equatorial Guinea occupies 28 050 km²; it has a population of 304 000 (1983 census) and a mean population density of 10.8 persons/km². It comprises a mainland enclave, Rio Muni, bounded by Gabon in the south and east, Cameroon in the north, and the Atlantic Ocean in the west, and several islands. These are the island of Bioko (Fernando Poo) in the Bight of Biafra (3°12'-3°47'N/8°25'-8°56'E); the oceanic island of Annobon (Pagalu) (1°25'S/5°36'E), 645 km SW of Bioko at the end of the same SW-NE volcanic ridge; and several offshore islands including Corisco or Mandyi (0°55'N/9°19'E) and the Elobey Islands (0°59'N/9°36'E).

The mainland territory has a coastline 265 km long with three major indentations; the estuary of the Campo (Ntem) River on the northern border, the estuary of the Mbini (San Benito) River in the centre, and the estuary of the Muni River on the southern border. The enclave extends from 0°56'- 2°22'N and from 9°24'-11°24'E. In the south the beaches are backed by low cliffs and there is a narrow coastal plain, some 15-20 km wide, which rises steeply to the peaks of a range of coastal mountains, with a high point of 1200 m asl at Mt. Mitra (1°21'N/9°59'E) in the south. The land falls again, immediately to the east of the mountains, but then rises steadily to a dissected plateau over 500 m asl, which covers most of the interior. The highest point, 1500 m asl at Mt. Fijelvingue, is reached on the central seaward face of this plateau (1°49'N/10°26'E). The plateau, which forms an extension of the Monts du Cristal in Gabon, is dissected by the trenches of the three main rivers, the Temboni which enters the Muni Estuary, the Mbini in the centre and the Campo in the north.

The volcanic island of Bioko is 67 km long, has a maximum width of 40 km and an area of 213 060 ha. It rises to high points of 3106 m asl at the Peak of Santa Isabel (3°35'N/8°47'E) in the north, and 2662 m asl on the rim of the great Caldera of San Carlos (3°21'N/8°37'E) in the south. Here the internal crater walls fall steeply for 1680 m to a plateau floor at an elevation of 982 m asl. There are two crater lakes in the Gran Caldera range, Lakes Claret and Loreto. Not far to the north, Mt. Biao (3°26'N/8°46'E) rises to 2009 m asl, with another lake in its crater, 1938 m asl. Slopes are steep all around Bioko and the narrow beaches are mostly backed by little cliffs, some 20 m high.

AnnobOn Island is also volcanic, comprising a jumble of volcanic cones, the central high point being 655 m asl at Mt. Santa Mina. It is 6.5 km long, covers 1700 ha, and supports a lumbering and fishing industry. The rectangular offshore island of Corisco o Mandyi has an area of some 1500 km. It is 5 km long and reaches a maximum width of 4 km with no prominent high points, but because of the very high rainfall, c. 3600 mm/yr, it has numerous small streams, the largest of which are the Rio Gueliba, 1.5 km long in the northwest, the Arroyo Mbandya, 1 km long in the west, and the Rio Lembue, 2.5 km long in the south. The islands of Elobey and Elobi are much smaller, measuring 2000x1000 m and 800x200 m respectively.

Climate

The Rio Muni enclave enjoys an equatorial climate, but with enhanced precipitation levels during February-June and September-December. Along the coast, rainfall is higher in the south than in the north, with an extra wet pocket centred on the Rio Muni Estuary. Mean annual falls are always in excess of 3000 mm at the coast, but approach 4000 mm towards the southern border and at Calatrava (1°06'N/9°28'E) on the north side of the Rio Muni Estuary, annual receipts are often over 4500 mm. Precipitation declines progressively on passing inland and is 1800 mm/yr at the eastern border. Mean annual temperatures are close to 26°C with little annual variation, and relative humidity is always high ranging from 80-94%.

Rainfall over Bioko is very variable because of the relief, with the highest recordings being made on the slopes of the Gran Caldera Range in the south of the island where the SW monsoon is intercepted. Annual receipts of 11 430 mm (450 inches) have been recorded at the town of Ureka (3°17'N/8°32'E), which thus ranks among the three wettest places known in the world. The skies over the island are almost always overcast and mean annual temperatures around the coast are close to 25°C, with absolute maxima and minima of 34°C and 17°C.

Wetlands

Because of the intensity of the rainfall several hundred minor streams, 1-2 km long, reach the coast, and at their mouths there are usually small mangrove stands. However, the coast of Rio Muni, being of high relief and subject to high wave energy, is not conducive to the accumulation of sediment. The extensive development of mangroves is therefore confined to the three major estuaries.

Mangroves stands begin 1 km up the estuary of the Campo River, and extend inland for a distance of 15 km, in belts 500-2500 m wide. Here tidal forests have an area of 1800 ha. To the south a small (150 ha) block of mangroves occurs at the mouth of the Mbia River, which enters the sea at 2°04'N and yet farther south, at 1°56'N, another small tidal swamp occurs at the mouth of the Ecuco (Ekuko) River. This extends upstream for 8 km, past the confluence of the Ue and Utonde Rivers, and covers about 1000 ha. At a point 1°43'N/9°43'E, just inland of the coast, a non-tidal swamp occurs on the Boara River, covering 700 ha.

In the Mbini Estuary (1°35'N), mangroves are best developed on the south bank tributaries, the Mangala and Mitambo Rivers. Again, the mangrove stands begin some 1.5-2.0 km inland of the estuary mouth, and extend upstream for over 20 km. They occur in four major blocks. The first occupies a crescent on the south bank, with an estuary frontage of 12 km, and depths of 2.5 km. The second reaches 10 km, down the Mitambo River, in a belt up to 5.5 km wide. Small scattered stands occur on the north bank, opposite these major blocks. The third important block extends upstream from the mouth of the Mitambo River, on both banks of the estuary for 6 km, and the fourth block extends perpendicularly away from the estuary, oriented due N-S, up two tributaries which enter opposite each other 20 km from the sea. The northern tributary is the Ngabe River but the southern stream is unnamed. Shortly above this double confluence, the Mbini ceases to be tidal, and its course is riven with rapids. In total there are approximately 5300 ha of tidal forest on the Mbini Estuary.

A small patch of mangroves, covering 85 ha, occurs at the mouth of the little Nano River on the north side of Cape San Juan, the most westerly point in Rio Muni. Here the mangroves grow on a sandy substratum, and are on the lee shore of the cape. On the stretch of coast between this point and the Muni Estuary small mangrove stands occur at the mouths of the Udinga (1°08'N) and Mbindo (1°07'N) Rivers.

The Muni Estuary is the combined estuary of several rivers, the most important being the Congu, Mitong and Temboni (Utamboni, Mtemboni). The estuary is 2 km wide over much of its length, and mangroves extend from just inside the mouth to the head of the estuary, 17 km inland, and also up the tributary rivers. They reach 13 km up the Utamboni River, 8 km up the Mitong and 12.5 km up the Congue River. There are about 6500 ha of tidal forest on the estuary, and some extensive patches of freshwater swamp forest behind this. Freshwater swamps are best developed in the southernmost extremity of Rio Muni, between the Miteinele River, itself a tributary of the Utamboni River, and the head of the Muni Estuary. Along the former stream, and to the north of it, there are some 800 ha of palm-

pandan and freshwater tree swamps. Inland in Rio Muni, there are several small isolated permanent swamps on the interior plateau, e.g. those situated at 1°12'N/10°54'E near the village of Nkoro (620 m asp; 1°35'N/11°11'E near the village of Anzem (612 m asp; and 2°16'N/10°44'E near the village of Ngoa in a bend of the Campo River (340 m asp. Each of these occupies about 300 ha.

There is little coastal plain on Bioko. Streams tumble down deep ravines to the sea, but in the SE, the River Muchuchumano has formed a small swampy delta (1.5x1 km) in the Bay of Conception (3°23'N/8°47'E). Another swampy area occurs 5 km to the NE at Punta Caracas. Mangroves occur at these places, and at several other sites including the Bay of San Carlos on the west coast. Inland are the three crater lakes previously mentioned.

There is a chain of small lakes (Lakes Bodungiie, Ucati and Abela) on the Lembue River in the centre of the island of Corisco o Mandyi, and mangroves occur at the mouths of most, if not all of the little streams there. The largest patch covers 24 ha at the mouth of the Lembue River near the town of Gobe. Small strips of swampy woodland occur inland on some of the small streams. There are no important wetlands on the island of AnnobOn.

Wetland Flora

All the typical West African tidal forest species have been collected on the coast of Rio Muni. *Rhizophora racemosa* and *Avicennia africana* dominate the more seaward areas with *Acrostichum aureum*, *Laguncularia racemosa*, and *Rhizophora harrisonii* in brackish to freshwater sites, and *Caesalpinia bonduc*, *Carapa procera*, *Conocarpus erecta*, *Dalbergia ecastaphylluni*, *Dodonaea viscosa*, *Drepanocarpus lunatus*, *Laguncularia racemosa*, *Ormocarpum verrucosum* and *Ternstroemia africana* in less frequently inundated zones on the dry fringes.

Sea grasses occur on the mudflats prior to their colonisation by *Rhizophora racemosa*, which is almost always the seaward pioneer. The height of the canopy rises in passing landwards from the seaward face, until a zone of mature *Rhizophora* forest is reached. Here the canopy may be more than 30 m high. This high mangrove forest occupies belts up to 500 m wide in the Muni Estuary.

Hibiscus tiliaceus often appears on sandy banks along rivers, in brackish sites, where it forms dense groves, sometimes with *Avicennia africana* as an associate. Both *Avicennia africana* and *Rhizophora mangle* extend into

freshwater tidal swamps. There is virtually no understorey in the mangrove forests, but *Acrostichum aureum* occurs in clearings in the upper tidal reaches, and may fill them with dense vegetation up to 2 m high. *Schizolegnia ensifolia* is another terrestrial fern found in the less deeply flooded parts of mangrove swamps. The epiflora of the mangroves is well developed in the Muni Estuary and is quite prolific on Bioko, where *Nephrolepis biserrata* and *Platyserium stemaria* are common epiphytic ferns and *Bulbophyllum falcipetalum*, *Cyrtorchis aschersonii*, *Genyorchis punzila*, *Polystachya* sp., and *Tridactyle anthoinaniaca* are epiphytic orchids. However, *Nephrolepis biserrata* grows terrestrially in the mangroves of Bioko, its fronds reaching 2 m in height.

Chrysobalanus sp., *Cynometra mannii*, *Crudia klainei*, *Manilkara obovata*, *Phoenix reclinata* and *Oxystignia mannii* occur on levees and in the wet fringes of tidal swamps in Rio Muni, in transitions to littoral forest. In transitions to palm swamps, which back much of the mangrove forest around the Muni Estuary, *Rhizophora mangle*, and sometimes *R. harrisonii*, occurs with *Pandanus candelabrum*, *Phoenix reclinata* and *Raphia palmipinus*. These swamps grade, upstream and inland, into pure *Raphia* palm swamps, with *R. regalis* and *R. laurentii*, which are often rendered impenetrable by the development of spiny climbing palms belonging to the genera *Ancistrophyllum* and *Erenzospatha*. In their turn the palm swamps grade into freshwater swamp forests.

The flora of permanent and seasonally inundated forests, including gallery forests, is rich, and varies from place to place. The commonest species include *Albizia zygia*, *Alstonia boonei*, *Anopyxis klaineana*, *Anthocleista liebrechtsiana*, *A. nobilis*, *Anthothona pynaertii*, *Anubias affinis*, *Baikaea insignis*, *Berlinia grandiflora*, *B. sapinii*, *Berteria laurentii*, *Bridelia ripicola*, *Carapa procera*, *Ceiba thoningii*, *Chrysobalanus atocorensis*, *Coelocaryon botryoides*, *Coffea congensis*, *Cola attiensis*, *Dacryodes edulis*, *Dialium pachyphyllum*, *Dichaetanthera africana*, *D. strigosa*, *Dichostenuna glaucescens*, *Elaeis guineensis*, *Entandrophragma palustre*, *Eriocoelum microspermum*, *Ficus mucoso*, *Gambeya africana*, *Garcinia smeathnzannii*, *Gilbertiodendron dewevrei*, *Gluema ivorensis*, *Guibourtia demeusei*, *Hymenocardia heudelotii*, *Irvingia grandiflora*, *Lasiodiscus marmoratus*, *L. mannii*, *Mallotus oppositifolius*, *Mimusops warneckei*, *Mitragyna ciliata*, *Nauclea diderrichii*, *N. pobeguini*, *Octolobus heteromus*, *Oubanguia africana*, *Paramacrolobium coeruleum*, *Parinari glabra*, *Pseudospondias microcarpa*, *Pycnanthus marchalianus*, *Raphia hookeri*, *R. laurentii*, *Sersalia palustre*, *Spondiathus preussii*, *Sterculia bequaertii*, *Symphonia globulifera*, *Synsepalum dulcificum*, *Uapaca guineensis*, *U. heudelotii*, *Uvaria laurentii*, *Uvariadendron mayumbense*, *Wildenzaniodoxa laurentii*, *Ventilago africana*, *Voacanga thouarsii* and

Xylopia staudtii. *Cyrtospernza senegalense* and *Marantochloa* spp. are common in the understory adjacent to clearings or under a broken canopy, together with several terrestrial ferns including *Adiantum vogellii*, *Asplenium diplazisorum* A. *variabile*, *Bolbitis auriculata*, *Diplazium proliferum*, *Lonchitis currori*, *Lygodium microphyllum*, *Nephrolepis biserrata*, *Pteris tnilbraedii*, *P. marginata* and *Tectaria angelicifolia*.

Lianes, including *Artabotrys* spp., *Ancistrophyllum secundiflorum*, *Donella welwitschii*, *Ereinospatha haullevilleana* and *Landolphia* spp. are locally abundant, and the well developed epiflora is dominated by ferns and orchids. Common species include *Lomariopsis palustris*, *Platynerium angolense*, *P. stemaria*, *Nephrolepis biserrata*, *Selaginella* spp., and *Trichomanes erosum*.

Calm shady pools may be covered by *Azolla africana*, *Lonna paucicosta*, *Pistia stratiotes* and *Salvinia nymphellula*, but these species also occur on the backwaters of some rivers. *Ceratopteris cornuta* and *Impatiens irvingii* grow in the water around the banks of ponds, lakes and slow flowing rivers, with *Impatiens gossweileri*, *hians*, *niamniamensis* and *Lycopodium cernuum* at higher drier levels. *Cyathea manniana* occurs in swampy depressions and may be found around forest pools and along streams. *Nymphaea* spp. are dominant on quiet waters open to the sunlight and in these situations *Ceratophyllum demersum* and species of *Najas* and *Potamogeton* form dense submerged beds.

Wetland Fauna

Fishes: The fish fauna of the swamps and rivers has not been reported, but it includes most of the widespread West African species of *Alestes*, *Auchenoglanis*, *Bagrus*, *Barbus*, *Channa*, *Chrysichthys*, *Citharinus*, *Clarias*, *Distichodus*, *Eutropius*, *Gnathonemus*, *Henzichromis*, *Hepsetus*, *Heterobranchus*, *Hydrocynus*, *Labeo*, *Marcusenius*, *Mormyrus*, *Mormyrops*, *Polypterus*, *Schilbe*, *Synodontis*, *Tetraodon* and *Tilapia*.

Reptiles: *Crocodylus cataphractus*, *C. niloticus* and *Varanus niloticus* occur in the upstream swamps throughout Rio Muni, together with species of *Pelomedusa* and *Pelusios*. Among the snakes *Boulengerina annulata*, *Naja melanoleuca*, *Natriciteres olivacea*, *Philothainnus irregularis*, and *Python sebae* are widespread aquatic or semi-aquatic species, while *Dasypeltis fasciata*, *Dendroaspis jamesonii*, *Philothaninus senzivariegatus*, *Thelotornis kirtlandii* and *Thrasops occidentalis* are arboreal in swamp and flooded gallery forests.

Birds: The avifauna includes several species which prey upon squirrels

and monkeys, e.g. *Hieraaetus spilogaster*, *Stephanoaetus coronatus* and *Urotriorchis macrourus*, also numerous piscivorous species such as *Ceryle rudis*, *Haliaeetus vocifer*, *Larus fuscus*, *Megaceryle maxima*, *Pandion haliaetus*, *Pelecanus onocrotalus*, *Rynchops flavirostris* and *Scotopelia peli*. There are also ducks, geese, herons, ibises, storks, egrets and bitterns. Other species, including several weavers, are abundant in the palm and pandan swamps.

Mammals: Small mammals found in the wetlands include *Aonyx capensis* (including the mangroves), *Atilax paludinosus*, *Atherurus africanus* (gallery forests), *Genetta tigrina* (palm swamps), *Herpestes ichneumon*, *H. naso* (temporarily inundated forests), *H. sanguineus* (gallery forest), *Lutra maculicollis*, *Otomys* cf. *angoniensis*, *Potamogale velox*, *Thryonomys gregorianus* and *Viverra civetta* (gallery forests). Larger mammals resident in the wetlands, or which visit them regularly, include *Cephalophus callipygus*, *C. dorsalis*, *C. leucogaster*, *C. monticola*, *C. nigrifrons*, *C. sylvicultor*, *Felis aurata*, *Hyemoschus aquaticus*, *Loxodonta africana cyclotis*, *Manis tetradactyla*, *Panthera pardus*, *Phacochoerus aethiopicus*, *Potamochoerus porcus*, *Syncerus caffer nanus*, *Tragelaphus scriptus*, *T. spekei* and *Trichechus senegalensis* (mangrove estuaries and large rivers). *Gorilla gorilla* and *Pan troglodytes* are thought to visit flooded forests along rivers in the interior.

Arboreal mammals in the wetlands include *Anornalurus beecroftii*, *A. derbianus*, *A. pusillus*, *Aonyx capensis*, *Cercocebus albigena albigena*, *Cercopithecus cephus cephus*, *Colobus polykornos satanas*, *Dendrohyrax arboreus* (gallery forests), *Epixerus ebii*, *Funisciurus lemniscatus*, *F. pyrrhopus* (including mangroves), *Galago demidovii*, *Heliosciurus rufobrachium*, *Idiurus macrotis*, *Miopithecus talapoin* (including mangroves), *Myosciurus punzilio*, *Nandinia binotata* (gallery forests), *Paraxerus poensis*, *Poiana richardsoni*, *Protoxerus stangeri* and *Zenkerella insignis*.

Species in Bioko include *Anornalurus beecroftii*, *A. derbianus*, *Atherurus africanus*, *Cercopithecus lhoestii insularis*, *C. pogonias*, *Cephalophus monticola*, *C. ogilbyi*, *Cercocebus torquatus*, *Colobus badius*, *C. pennanti*, *C. polykomos satanas*, *Dendrohyrax arboreus*, *Funisciurus leucogenys*, *Galago demidovii*, *Genetta tigrina*, *Manis tricuspis*, *Miopithecus talapoin* (introduced), *Myosciurus punzilio*, *Nandinia binotata*, *Paraxerus poensis*, *Poiana richardsoni* and *Protoxerus stangeri*.

Human Impact & Utilisation: Rio Muni reverted to a subsistence economy after achieving independence, but there have been attempts to revive lumbering and plantation farming. However, the country has few

interior wetlands, and those it does have are little disturbed. At the coast, the mangroves also have suffered little degradation. Traditionally they have been exploited for firewood and building materials.

Conservation Status: No part of the country is protected. It appears that the reserves created under the colonial administration prior to 1970 have been abandoned.