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1.0 INTRODUCTION

General overview

The Gambia, located between 13°N and 13°N latitude on the west coast of Africa, is about 480km in length and 50km wide at its widest westerly end facing the Atlantic Ocean, and tapers towards the east to about a width of about 30km. It has an 80km long coastline and a continental shelf area of about 4000Km² rich in marine fish resources. The estuarine areas have a dense mangrove forest (67,000 hectares, FAO/UNEP, 1996), found up to 200kms inland from the mouth of the River Gambia, which provides breeding and nursery grounds for commercial marine fish species, shrimps and other valuable aquatic organisms.

The Gambia has a total land area of about 11,300Km² with about one fifth of the surface area occupied by the River Gambia, running 680 km from the Futa Jallon highlands in the Republic of Guinea to the Atlantic Ocean dividing the country into the North and South banks. The Gambia has a sudano-sahelian climate characterised by a long dry season from November to May and a short rainy season from June to October.

According to the 1993 census, The Gambia has a population of 1,038,000 with an annual growth rate of 4.2%. With a density of 97 persons per km² The Gambia is ranked among the four most densely populated countries in Africa. The urban growth rate is estimated to be 8% annually, with the Greater Banjul Area (GBA) attaining the greatest rate, the Kanifing Municipality with an estimated population of 228,214. At present about 48.7% of the population live in the GBA and on the strip of coastal land less than 18% of the total surface area of The Gambia.

The Gambian population has more than doubled in the past twenty years and at the current growth rate, the country's population is expected to double in 17 years. The majority of the Gambian people undertake farming, fishing and horticulture as the main occupations. Trade, informal trade and the service industry are also very important due mainly to the tourism sector.

1.1 Extent of the Coastal Area

The extent of coastal zones is not usually uniform and different countries adopt different definitions. However, a common guide is how far the sea has influence on the land and the land on the sea such that coastal zones have both land and seaward boundaries. Usually the 12 nautical mile limit measured from predetermined points along the coast is the seaward limit. However, the landward boundary is variable. In The Gambia along the north and south banks the landward boundary is not uniform. For example, it is 1km from the shoreline along the Atlantic between River Alahein and a point 1km south of Cape Point. It is the same distance between Essau on the North Bank of the River and on Jinack Island north of Essau. Moving inland, that is east of the Atlantic Ocean, this distance goes as low as 0.3km north and south of the river, stopping at the Miniminiang Bolong on the north bank and Mootah Point on the south bank.

Therefore, for the purpose of this exercise The Gambia's coastal area consists of not only those

areas that border the Atlantic Ocean but also those with brackish water environments that border the River Gambia, extending 200km inland. This extent constitutes one of the areas identified as being of particular importance in The Gambia Environment Action Plan (GEAP) and in the National Biodiversity Strategy and Action Plan (NBSAP). It is an area rich in natural resources and with particularly high biodiversity of national, regional and global environmental significance, housing important nursery grounds for regional coastal and marine fisheries and breeding, nesting, feeding and refuge habitats for endangered and threatened species.

The continental shelf area of the Gambia is about 3900km² representing 14% of the total combined shelf area of Senegal and The Gambia, and it is believed to be one of the richest fishing areas in the West African subregion. In addition to its marine resources the fresh water resources include the Gambia River and its tributaries representing about 20% of the county's total area.

The fisheries sector plays an important role in the national economy contributing an estimated 5% to GDP and the Tourism sector contributing between 16-18% to the GDP according to conservative estimates. The two sectors provide both direct and indirect employment for many Gambians and non-Gambian and substantial revenues in form of taxes to municipalities and government.

The Gambia has a warm climate that is characterized by a long dry season from mid-October to early June, followed by a short rainy season from mid-June to early October. July and September are the hottest months of the year with average daytime maximum temperatures of around 30°C. During this period there are frequent rainstorms that cool everything down for a while. From December to mid-February the average daytime temperature falls to around 24°C. After February the days get steadily hotter until the rains come in June. By the coast temperatures are generally slightly lower due to cooling offshore winds. Upcountry the days are generally hotter and the nights cooler. Average rainfall per year is around 1020mm, but in the west of the country this can be much higher – up to 1700mm – while in the drier east it can be as low as 800mm. over the past 40 years there has been a slight warming in the average temperatures experienced in The Gambia and a decrease in rainfall, possibly due to global climate change.

Chapter 2: Coastal Ecosystems

Ecosystems are habitats and their assemblages of organisms in addition to any functions of such organisms and processes. Coastal Ecosystems could therefore be defined as flora and fauna on land beside Sea or Ocean. For the Gambia it is all plants and living creatures living in relation on land that borders the Atlantic Ocean and River Gambia extending 200 km inland.

The Gambia Coastal Ecosystem could be classified into: **Estuarine, Inter-tidal and Oceanic Ecosystems.**

2.1 Estuarine Ecosystem

The Estuarine ecosystem includes Coastal Terrestrial habitats, Mangrove forest, Coastal wetlands, Seagrassbeds, Sediments and Soft bottom habitats

In this habitat, diverse flora and fauna with mostly littoral species are common.

Meiofauna includes high amount of microorganisms like bacteria and protista; nematodes, annelids, larvae of oligochaetes, dense patches of copepods, coelenterates and different species of shellfish. These habitats are also important feeding grounds to a wide variety of birds particularly within river mouths.

Estuarine flora includes rich phytoplankton particularly along salt marshes and mudflats. Angiosperms particularly white mangroves (*Avicennia africana*, *A. nitida* or *A. germinans*) red mangroves (*Rhizophora harisonii*, *R. mangle* or *R. racemosa*), *laguncularia racemosa*, *concarpus erectus*. seaweed and sea grass are also common along estuarine coasts.

Estuarine Ecosystems are exporting nutrients and organic materials to outside waters through tidal circulation.

Estuarine Ecosystems provide habitat for a number of commercially or recreationally valuable fish species.

Likewise serving the needs of migratory near shore and oceanic species which require shallow, protected habitats for breeding and /or sanctuary for their young ones.

2.2 Coastal Terrestrial Habitats

The coastal terrestrial habitat that was once abundant along the Atlantic Coastline now remains small forest patches especially the northern areas of the southern bank Tanji to Bakau only the Bijilo forest park which is protected remains slightly undisturbed.

Coastal terrestrial habitats in the Gambia include some relic patches of woodland esp. towards Abuko to Mandinari, Tanji bird reserve woodland, Kachumeh and Kartong forests. These habitats also comprise of a Rhun palm zone from Dua Dula to Kartong.

Although under intensive pressure mainly due to anthropogenic activities however there still exist patches of coastal terrestrial habitats along River Gambia. These habitats comprise biologically diverse populations of trees, woody plant species, forest animals, birds, invertebrates, fungi and micro organisms all interacting in a complex system.

2.3 Mangrove Forests:

The Gambia has 81km of open Ocean Coast and about 200km of sheltered coast along the Gambia River. The sheltered coast is dominated by extensive mangrove systems (66900 hectares (15000 hectares of tall mangroves *Rhizophora* and 51900 hectares short mangroves *Avicennia* and *laguncularia*)

The mangrove ecosystem provides breeding and nursery grounds for commercial fish species, shrimps and other aquatic organisms. Mangroves are major producers of detritus through leaf shedding that contribute to off-shore productivity .

In the Gambia six main species of mangroves are found:

Avicennia Africana, *languncularia racemosa* and *Rhizophora harisonii*. *Avicennia* spp is the most salt tolerant thus found along the Atlantic coastline (Banjul and kombo Saint Mary areas as well as in lagoon areas close to the sea. The *Rhizophora* spp. Although at times expose to highly saline water and sometimes fresh water nonetheless requires brackish water therefore occupies Banks further down the river.

2.4 Coastal Wetlands:

Wetlands are areas of marsh, fen, whether peat land or water, natural or artificial, permanent or temporal, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed 6meters just over 19ft (The Gambia Biodiversity Country Study (1999))

In the Gambia, coastal wetlands include River Gambia and its estuary plus other coastal rivers. The wetlands of the Gambia range from hypersaline lagoons brackish waters to mangrove swamps, barren (or salt) reed swamp, raphia swamps and seasonally flooded grasslands.

The Gambia coastal wetlands includes

- Shallow marine waters
- Sub-tidal aquatic beds
- Rocky marine shores
- Sand/shingle beaches
- Estuarine waters
- Mangrove/tidal forest
- Brackish/saline lagoons
- Freshwater lagoons/marshes
- inter tidal mudflats
- Salt marshes
- Excavation

Economic values of coastal wetlands are acquired through the following respective activities synonymous with coastal wetlands:

- Fishing

- Tourism
- Recreation
- Oyster farming
- Salt mining
- Mineral mining
- Sand mining
- Flood control
- Palm tapping
- Fuel wood/fencing/construction

Marine Mammals such as large and small cetaceans, sirenians, rare sea otters and clawless otters are commonly destined in the coastal zones and wetlands. Mention the Ramsar sites in the Gambia

2.5 Inter - Tidal Ecosystem

The Inter -tidal Ecosystem are mainly saltmarsh Habitats and includes Shorelines, Inter-tidal zones and mangrove swamps.

There is considerable fluctuations in seasonal incidence of tidal inundation. Such areas usually experience steady salinity variations. These are mostly influenced by rainfall patterns, ground and and surface water inputs.

These habitats are frequently waterlogged, turbid and anaerobic.

Vegetation in these areas is predominantly mangrove trees, ferns, fringing palms on mudflats. The vegetation act as a buffer allowing terrestrial sediments from rivers to settle down.

It promotes accretion and further habitat development.

Habours complex community of animals especially invertebrates, numerous species of birds, insects and lizards.

Roots of the trees provide a secure substrate for shrimps, bivalves and amphibians.

Muddy bottom suitable for a large number of burrowers (crabs, mulluscs and worms)

Fish and other filter feeder find shelter in the crannes between roots of vegetation in the inter-tidal/salt marsh ecosystems.

2.6 Oceanic Ecosystem

The Gambia Oceanic Ecosystems are habitats that range from continental shelf to deep sea areas. It includes Rocky shores/hard bottom habitats, pelagic habitats, Seagrassbeds and upwelling areas.

2.6.1 Rocky shore and hard bottom

Rocky shores in the Gambia can be characterized into well define cells along the Gambian coastline.

The coastline along the Atlantic Coast of the Gambia comprises of rocky shores from Bakau Cape Point, Sun wing Hotel to Fajara,(NAWEC water tanks) and from the seashore of Tranquil to Brufut Sheraton Hotel.

These rocky coasts were once deposited by the action of high energy flow of water from the hinterland towards the open ocean where it discharges detritus and gravel.

Boulders of varying rock sizes can be seen as depositional layers forming a continuous belt of rock and gravel sequences from boulder deposited during the highest energy flow of the river to pebbles of various sizes deposited during the lowest energy flow.

These areas usually consist of bivalves, gastropods, echinoids, crabs, sea bivalves, red snapper, seaweed and micro-organisms.

Economic Values

The red snapper fish has economic value within the local fish market.

The cliffs have prevailed several episodes of rain and erosion while protecting valuable property, Agricultural land and the full Biodiversity of flora and fauna.

It is an area rich in natural resources with particularly high biodiversity of national, regional and global environmental significance, housing important nursery grounds for breeding, nesting, feeding and refuge habitats for endangered and threatened species such as migratory birds, mammals(dolphins, marine turtles, West African manatee) Coastal forests provide habitat for some of the nationally rarer species of birds such as Ahanta Francolin and Western Bluebill.

The Gambia's coast is under increasing human pressure. More than 40% of the population is concentrated in 17.4% of the country's land area. This translates into growing pressure on coastal and marine resources, which are exploited for both subsistence and economic purposes.

Anthropogenic pressures arising from subsistence and small-scale economic exploitation includes sand mining, fishing, clearing of forests and mangroves for oyster harvesting, farming, fish smoking, use as fuel wood, building purposes and pastoralism.

Seagrass beds

Seagrass beds occur in both the Estuarine and Oceanic Ecosystems.

Seagrass beds occur in areas receiving significant freshwater input and also in areas characterised by oceanic salinity levels. In the former they are viewed as estuarine and shallow habitats. GESAMP Reports and Studies No 55.

Sea grass families (Potamogetonaceae and Hydrocharitaceae) are often submerged and found in shallow coastal areas particularly in estuaries and lagoons. Although seagrass has little commercial use, they play an important ecological role in providing detritus matter as nutrients and as a habitat for a large number of marine organisms, seagrass helps to stabilize the seabed by holding down sand at times of rough seas and ocean turbulence. (Mikkola, H.J., Khan, A.S. 2002 Sustainable Ocean Development).

2.6.3 Sediment/Soft-bottom habitats

The Gambia coastal protection studies report, 2000 concluded that the coastal watersheds including the River Gambia and its estuary, contributed to the sediment budget of the coast.

In the River Gambia estuary an inward sediment transport is experienced due to the gravity circulation induced by the density gradient which in turn is caused by salt water intrusion. This estuary serves as a sediment sink rather than a source of sediment for the coast. Material is transported westwards towards the river mouth from upstream, while the coastal current moves the material eastwards into the estuary.

Local streams and rivers debauching at the coast have too limited catchments to contribute any significant amount of sediment to the coast. (Delft Hydraulics, 1992).

2.7 Coastal Pelagic habitats and Upwelling areas

In the Gambia, this area is within the eastern central Atlantic fishing grounds i.e. 10°N to 20°N. It stretches over a coastline of 57km. It comprises 12 nautical miles territorial sea and 200 miles exclusive economic zone (EEZ). The coordinates of which are latitude 13°03'51"N and longitude 16°44'49"W and from there Southwest to a point the coordinates of which are latitude 13°01'21"N and longitude 16°45'19"W and from there via northerly direction to a point the coordinates of which are longitude 13°03'27"N and latitude 16°45'22"W and thereafter along the parallel of latitude 13°03'27"N

The Gambia Fisheries Act 1991.

Temperatures within this area range from 10°C to 15°C and decreasing with depth from 4 to 200m. Salinity also decreases with depth from 35.6‰ to 35.2‰. Cruise Dr Fridtjof Nansen Survey report, Pelagic Fish Resources off North West Africa 2004.

Coastal Pelagic habitats and Upwelling areas are Oceanic Ecosystems. A large variety of pelagic and demersal species inhabit this ecosystem; ranging from fishes, birds to mammals.

2.8 IMPORTANT ECOLOGICAL SITES

There are several coastal and marine habitats of high ecological importance in the Gambia. However according to a report by UNEP (1996), nine (9) sites of high ecological importances have been identified along the southern coastline. These include;

Toll Point to Cape Creek (Camaloo Corner)

A mosaic of habitat types including coastal lagoons, mangrove, saltpan, coastal scrub, grassland and fresh water ponds which form the Camaloo corner.

Oyster Creek Mangrove Swamps (to Mandinari Point)

Mangrove swamps with fringing saltpan and grassland, some relic patches of woodland

Tanji Bird Reserve

Coastal lagoons, stabilized sand dunes with woodlands, scrub and grassland components freshwater swamp, river with fringing mangrove and saltpan, dry woodland, offshore Islands with surrounding shallow reefs

Brufut Woodland

Relic patch of riverine woodland

Solifor Point

Coastal woodland/scrub, inshore reef and laterite cliffs

Tujereng Lagoons

Coastal lagoon with mangrove saltpan fringe, also stabilized sand dunes with grassland/scrub/woodland complex

River Kakina Delta – Kachuma forest:

Outflow of the River Kachuma a mosaic of lagoons, mangrove saltpan and stabilized dune vegetation, backed by a relic fringe of high coastal woodland (dominated by Rhum Palm)

Dua Dula to Kartong

Coastal forest (rhum palm zone) merging to scrub grassland in stabilized dune complex towards Kartong end

Kartong Point

Allahein River Mouth, coastal scrub/grassland on stabilized dune system, lagoon complex, river estuary and mangrove fringe. Also Folonko Crocodile pool at Kartong village with relic patch of riverine forest (more than 1 ha)

Reserves and Protected Areas	Position/Area (central coordinates)	Habitat type	Ecological and Other Important Values	
Niumi National Park	13° 31'N-16° 31'W 4,940 hectares	Coastal dune woodland, salt water marshes dominated by tamarisk and mangrove fringing. Grassland savanna on raised laterite plateau.	The fauna of the area is diverse.	
Tanbi Wetland complex	13° 26'N-16° 38'W 6,000 hectares	Coastal lagoons, mangroves, saltpan, coastal scrub, grassland, woodland,	High ecological value for avifauna, fish breeding and nursery grounds. Recorded bird species about 262 species and 66 families. Also residents are reptiles, crocodiles, manatees,	
Baobab Bolon Wetland	13° 31'N-15° 52'W 22000 hectares	Tall mangroves of the river Gambia, permanent salt marsh, bare tannes and seasonal fresh water marshes.	Relatively rich in mammalian fauna 32 species recorded.	
Tanji Bird Reserve	16° 47'W-13° 23'N 612 hectares	Marine, estuarine, freshwater, coastal scrub woodland and dry woodland savanna. Dominant species gingerbread plum (parinari macrophylla) rhunpalm (Borassusaethiopium) baobab (Adansonia digitata)	Very high avifauna (both residential and migratory). Zoological both marine and terrestrial and botanical. Bird watching.	
Bijol Islands	16° 47'W-13° 23'N 612 hectares	The only offshore Islands along the Gambian coast	The only breeding site in the country for (sterna caspia) sterna maxima and gulls surrounding waters are used by monk seals (monachus monachus) ----- sousa teuszii.	
Bijilo Forest				13
River Gambia National Park	Central River Division (589 hectares)			

Chapter 3: Species of special concern and flagship species

The large mammal fauna of the Gambia has been severely depleted over the last century, leaving only an impoverished and threatened remnant. Protection of Gambian wildlife has been afforded as early as 1901 under section 111 of the Wild Animal, Bird and Fish preservation order, the Wildlife Conservation Act (1977) repealed the 1916 Act while maintaining some of the subsidiary legislation of the earlier Act. The National Environment Management Act of 1994 the Biodiversity/Wildlife Policy Act also provides for the conservation of biodiversity and the establishment of biodiversity areas.

The Coastal strip has been subject to considerable pressure from human activity for many decades. Tourism development has altered much of the natural habitat from cape point to the South, fishing activities (notably the collection of wood for fish smoking). Land clearing for agricultural development and timber harvesting has had considerable impacts. The original primary habitat of the coastal strip was closed woodland dominated by Rhum Palm (*Borassus aethiopicum*), which has been gradually disappearing and only remnants remain.

The Gambia has a short coastline, which is very rich in fish due to rainy season upwellings, which give rise to nutrient cool water carried on the surface by the ocean current. This marine environment becomes extremely an important destination for water birds

The Gambia stands at the middle of the Sahelian upwellings marine Eco-region (Mauritania to Guinea Conakry) where colonies of species specific congregation of terns, gulls, pelicans, cormorants, spoonbills, herons and waders are found year round for purposes of nesting, roosting, feeding and shelters. The Gambia posses twin offshore Islands, which are completely counted at low tide. Bijol Islands as they are named the most significant bird area in the Gambia. More than 12000 individual birds utilize the area in the non-breeding season and 30000-60,000 individual birds are recorded in the breeding season (Jallow and Jammeh 2005).

Marine mammals such as large and small cetaceans, Sireneans, pinnipeds, rare sea otter are commonly destined in the coastal zones and wetlands of the Gambia. The West African manatee is a highly threatened species and its existence continue to be uncertain as the marine vegetation of mangroves in particular is disappearing at a high rate and are as well as faced with siltation that prevents fresh water flowing into the estuary. Sea turtles are widespread in the entire upwellings of North West Africa and utilized the coastline for nesting, but the demand for this rare species for both income and food is in the increase. Changes in climate could also alter the richness of the upwellings and create drawback in food accessibility, which may result into untimely migration of the species.

3.1 MARINE & COASTAL ENVIRONMENT CHARACTERISTICS

The characteristic of the Marine Environment combined with the relatively favorable conservation status of the coastal ecosystems, have produced a high degree of biological diversity: from the extremely rare West African Manatee, Monk seal; and a variety of cetaceans, major breeding colonies of Sea turtles, water bird colonies and the concentrations of wintering Waders arriving from European breeding grounds.

Wildlife occupies an important place in coastal society's cultures. The above mentioned species contribute to the touristic potential of coastal areas, although this potential is still greatly under-exploited. There is, however, a positive development in the increasing numbers of Nationals and Foreign visitors interested in the rich cultural and natural heritage found in the Gambia following the general trend observed elsewhere in world.

It nonetheless remains that biological diversity now faces a number of threats: deliberate captures (sea turtles) as well as accidental capture of dolphins, manatees and turtles entangled in fishing nets, degradation of the environment (mangrove destruction, land-based pollution of human origin).

There were no published materials and virtually no other information was available on dolphins, whales and seals within Gambian waters before 1996, when a collaborative field research effort was initiated and support mainly by king Leopold III fund for nature exploration and conservation which lead to a preliminary assessment of cetaceans in the Gambia, (Murphy et al 1997) to date solid evidence was gathered for the presence of four species of Dolphinidae, *Tursiops truncatus*, *Sousa teuszii*, *Stenella clymene* Delphinus, *capensis* and short finned pilot whale (Van waerebeek et al, 2000)

The biology and status of Marine turtle populations in the Gambia are poorly documented. The lack of information is partly due to the absence of local turtle specialists coupled with the lack of research resources and infrastructure. The first comprehensive survey of marine turtles of the Gambia coastline indicates the occurrence of 4 species namely: Green, Hawksbill, Leatherback, olive ridley and possibly also loggerhead turtles. Globally Green, Loggerhead and Olive ridley turtles are categorized endangered on the IUCN Red list and Hawksbill and Leatherback turtles as critically endangered (IUCN 2000)

The West African manatee is the least known Sirenian species biologically and has never been studied before across its entire range. Due to its threatened nature which results from excessive subsistence hunting coupled with destruction of habitats, this aquatic mammal a keystone species in the Gambia if not protected is likely to go extinct in the near future. The West African manatee listed as vulnerable in the IUCN red list of threatened animals appears on Appendix II of CITES. In the Gambia manatees occur in both fresh and salt water areas and are said to be abundant in the estuaries where access to freshwater is facilitated.

The Monk seal is a vagrant visitor in Gambian waters. This endangered pinniped has repeatedly been sighted around Bijol Island. There is a resident population around Mauritania

3.2 THE BIODIVERSITY SIGNIFICANCE OF THE COASTAL AND MARINE HABITATS

COASTAL ENVIRONMENTS

Rocky/Cliff Features

Bald cape in Tanji Bird Reserve serves as roosting ground for a large variety of gulls, terns and wader riverine outlets; associated fauna includes Colobus monkeys, Dwarf Crocodile, Grimms Duiker, Sun Squirrel and Green Turaco.

Internal Mud/Sand Flats;

Associated wildlife species includes clawless otter, hippopotamus and Sitatunga

Coastal Dune

Coastal dune scrub woodland extends along the seaward strip of Tanji Bird Reserve to the West of the main road. Associated wildlife species include Red Colobus, Green Vervet and Red Patas Monkeys

Brackish Lagoons

Serve as feeding and roosting ground for a large diversity of gulls and waders

LIVING REEFS

Laterite reefs around Bijol Islands, Solifor Point and Fajara Point are very important for fish spawning and are also important for avifauna

COAST ASSOCIATED HABITATS

Algal and sea grass beds: these are found in the Atlantic Ocean and are very important food for the Green Turtle and others which threatened species in the Gambia.

Salt Marsh

It has moderate to high ecological value for avifauna and possibly also botanical significance. There is a salt marsh dominated by Tamarisk on Jinack Islands in Niimi National Park. Salt marsh areas are important spawning/nursery grounds for some fish species.

Mangrove Or Swamp Forest

These are located around the River Gambia and serves as habitats for many species of small fish, invertebrates and various epiflora and epifauna as well as large birds. Mangroves are major producers of detritus through leaf shedding that contribute to offshore productivity as manatee breeding

Coastal Grass/Scrubland

Potentially important for avifauna and has botanical significance

Coastal Forest/Woodland

(Rhun Palm Zone); this can be found from Duwa Dula to Kartong. It has high ecological value both botanically and for avifauna. It also has potential zoological importance

Coastal Lagoon

This can be found in Tanji Bird Reserve. It has high ecological value for avifauna (both resident and migratory) and has zoological (both marine and terrestrial) and botanical significance. Coastal lagoons are important habitat for mollusks, shrimps and other crustaceans.

3.2.2 OFFSHORE ENVIRONMENT

Island: has high biodiversity quality and ecological value. Bijol Islands is a very important area for roosting (of resident and migratory species of birds) as well as breeding ground for the Green Turtle and feeding area for the Atlantic Monk Seal. Leopard, Hyena and a variety of smaller carnivores are found on Jinack Island (Niimi National Park) which feed on oribi primates and carrion. Hyenas often forage the shoreline looking for dead fish.

3.2.3 THE SOUTHERN COASTAL ZONE

The coastal strip of the Gambia has been subjected to considerable pressure from human activity for many decades. Tourism development has altered much of the national habitat from Cape Point South to Bijilo, and further south fishing activities (notably the collection of wood for fish smoking), clearance of land for agricultural development and timber harvesting have had considerable impacts.

The original primary habitat of the coastal strip was closed woodland dominated by rhum palms (*borassius aethopia*). Existing stands of such forest exist at Bijilo, Kachuma and Duwa Dula. Most of the coastal forest has been degraded to coastal scrub or bushed grassland. Such areas nonetheless retain a considerable ecological value for birds, small mammals and reptiles. River estuaries on the coast are generally characterized by lagoons with associated mangrove fringes, and salt pans (barrier flats). Such areas are dynamic and may undergo considerable alteration in morphology over very short time scales. The lagoons are generally backed by stabilized dune system with characteristic vegetation zones grading into closed canopy forest. An intact example of this vegetation succession exists at the Tanji Bird Reserve.

The fauna of the coastal area vary according to the habitat type with larger mammalian species occurring within the coastal strip.

MARINE MAMMALS

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Cetaceans

Status and Trends of Cetaceans

Over the last seven (7) years period our knowledge of cetaceans in Gambian waters has increased considerably, though there remains much to learn on the diversity, distribution and abundance of both Dolphins and Whales in coastal and offshore waters.

To date solid evidence was gathered for the presence of five species of cetaceans and unidentified small to medium sized whale probably a Minke Whale, appears to be a regular visitor to the Gambian Coastal Waters.

Large cetaceans have been reported but not positively identified within the neighboring country Senegal, a total of 19 species of cetaceans have been reported by Dupuy (1980), and it is highly probable that some additional species also utilize Gambian waters based on the numbers of species known to occur in Senegal.

The Gambia has a resident population of Atlantic Humpback dolphins (*Sousa teuszii*), which occur both in the river estuary and in coastal waters. There is some indication of movements in this species between River Gambia and the Delta du Saloum in Senegal which is separated by 15km of coastline. The bottle nose dolphin (*Tursiops truncatus*), is also resident within the mouth of the river and in the coastal water, and the interaction between these two species merits further investigations

TABLE 1: updated cetacean species check list for the Gambia (from WAF CET 2)

ENGLISH NAME	SCIENTIFIC NAME	STATUS
Atlantic Humpback Dolphin	<i>Sousa teuszii</i>	Appendix II (CMS)
Common Bottlenose Dolphin	<i>Tursiops truncatus</i>	West African population not listed (CMS)
Clymene Dolphin	<i>Stenella clymene</i>	Unlisted (CMS)
Long snouted common Dolphin	<i>Dolphinus capensis</i>	West African population unlisted (CMS)
Short-finned pilot whale	<i>Globicephala macrorchynchus</i>	Not listed (CMS)

Cetacean Reference Collection

The Gambia cetacean reference collection is at Kiang West National Park. During the study two calvariae of Bottlenose Dolphin that stranded on the Atlantic Coast South of the River Gambia Estuary and two common Dolphin skulls, including the first confirmed long-snouted common Dolphin (*Dolphinus Capensis*) were added to the Gambian cetacean reference collection, which consist of 22 specimens representing five species of the family Delphinidae and an unidentified small whale (Miscellaneous post-cranial bones) the adult common dolphins were identified as long beaked or short beaked mostly by the shape of the palatine bones (Van Waerebeek, 1997)

Migration of Cetaceans

Cetaceans as quintessential migratory mammals represent a global natural heritage and the community of states shares the responsibility for undertaking cooperative action for their conservation. The Bonn Convention on the Conservation of Migratory species of Wild Animals (CMS) aims at conserving marine and Avian species throughout their range. The UNEP/CMS sponsored project on a preliminary survey of cetaceans in the Gambia, Guinea Bissau and Senegal (WAF CET 1 & 2) Constitute an auspicious starting point.

There is no data on migration and local movements of Clymene Dolphin (*Stenella clymene*) and the Short-finned Pilot whale (*Globicephala macrorchynchus*) The Atlantic Hump backed Dolphin (*Sousa teuszii*) insufficiently known, there is a potential exchange of individuals between known population or sub population distribution centers (from north to south) Dakhla bay (Beoubrun, 1990), Banc d' Arguin, Langue de Barbarie, Sine Saloum delta, NW bank of the Gambia river Outer estuary (Murphy et al., 1997) and Guinea-Bissau archipelago.

The Bottlenose Dolphin (*Tursiops truncates*) migration and movements in the lower Gambia, river influenced by a strong tidal effect, upstream/downstream movements seen synchronized with the tide, but Bottlenose Dolphin are present year round and the penetrate further upstream in the dry season apparently in pursuit of marine fish species

Threats

The commercial harvest of fish and squid species which are principal prey items for small cetaceans put significant pressure on both prey and the cetacean population (Beddington, 1984, Trites et al, 1997) Bonga Fish (*Ethmalosa Fimbriata*), a popularly marketed fish in the Gambia has been found in the stomach of a Bottlenose Dolphin captured off Gunjur (USNMNIA), but whether it is commonly or occasionally preyed upon is unknown. Mullet (*Mugil spp*) a major prey item for inshore *Tursiops truncatus* is also sought after in the Gambia. Fishermen and Dolphins utilize some of the same fish species in the Gambia River. With the advent of the dry season, wedges of dense seawater penetrate higher upriver and with it, as yet undetermined stenohaline marine fish species. The appearance of Bottlenose dolphins upstream in narrow channels reported alert local fishermen to the return of Marine fishes with the rising salinity at the start of the dry season.

Artisanal fishing effort has dramatically increased over the past decade both in number of fishermen and boats, and by-catches in artisanal fisheries continue to affect several species, especially common bottlenose dolphins living near the shore and Atlantic Humpback Dolphin. Catches, in conjunction with expanding coastal development, may be fracturing a serious threat to the species long term survival. The whales which occupy high sea are in danger due to illegal hunting by foreign trawlers using harpoons

To date cetacean conservation work within Gambian waters has been limited to gathering and collating baseline data, and some educational sensitization of local fishing communities. This has led to a preliminary checklist for the Gambia, which consists of four dolphin species and one whale species the fact that species of cetaceans have been recorded in Senegal however points to the fact that many more cetacean species use Gambian waters as such animals obviously do not recognize artificial anthropogenic barriers. Reliable sighting information on the Atlantic hump-backed dolphins considerably harder to obtain than anticipated. Confusion between this species and the Coastal Bottlenose dolphin, because of their general similarity in morphology and shored habitat, proved an obstacle in evaluating sightings by collaborators and lay observers. Casual sightings could barely be assigned to species unless the observers had received dedicated instruction and had gained supervised field experience.

No abundance estimates are available but circumstantial evidence from small boat surveys, stranded remains and fishery monitoring indicates that the Atlantic humpback dolphin, while still present, has become as rare species in Gambian coastal waters. Firm evidence showed that by-catches in artisanal and industrial fisheries kill unknown numbers of cetaceans and on ratification of the convention on migratory species of wild animals, the Department of Parks and Wildlife Management as well as the fisheries Department have over the past few years paid considerable attention to the by-catch problem, and generally to the conservation status of cetaceans and other aquatic mammals within the Gambia Jurisdictional waters. The more intensive fishing techniques that have been introduced in the Gambia in recent decades have not been without impact on non-targeted species and dead dolphins Presumed drowned in fishing nets occur more frequently than in the past. What percentage of total population of coastal dolphins, washed up carcasses represent, can only be guessed at, but with pronounced increase in heavy trawlers fishing that has developed, it is likely that, the total number of

fatalities is considerable. Fishermen also report having seen netted dolphins being taken aboard some trawlers.

3.3.2 TURTLES

Status and Trends

Four species of sea turtles have been recorded in the Gambia, with possibly a fifth species also being present. However, there is only evidence of breeding for the Green Turtle (*Chelonia mydas*). Anecdotal information regarding nesting, seasonality, and backed up to a certain extent by observations from the preliminary study made, suggest that the main breeding season extends from August through to October with some nesting taking place earlier (in June) and later (in November). The Green Turtle appears to be the commonest species in The Gambia as the majority of sightings, nests, recovered carapices and strandings are from this species. The carapices that have been gathered also show a wide range of ages for this species, from non-breeding Juveniles through to large adults. The Green Turtle is supplemented by lower number of Olive Ridely, Hawksbill, and leather back Turtles.

75% of the Gambia's coastline approx 60km is considered suitable for nesting of large numbers of turtles. However, anecdotal evidence tends to suggest that, the number of turtles visiting the Gambian waters are in small numbers. The value of the Gambia probably rest much more in the shallow offshore waters which appears to have good potential as foraging areas with a high incidence of submerged lateritic reefs and sea grass beds. There appears to be an abundance of potential prey for the various turtle species, including crustaceans, fish, sea urchins and Jelly fish. However, at the moment there is no quantitative Information available on either foraging areas or prey species

TABLE 2: marine turtle checklist for the Gambia

ENGLISH NAME	SCIENTIFIC NAME	STATUS
Green turtle	<i>Chelonia mydas</i>	Endangered (IUCN Red list)
Olive Ridley turtle	<i>Lepidochelys olivacea</i>	Endangered (IUCN Red list)
Logger Head turtle	<i>Caretta caretta</i>	Endangered (IUCN Red list)
Leatherback	<i>Dermochelys coriacea</i>	Critically Endangered (IUCN Red List)
Hawksbill	<i>Eretmochelys imbicata</i>	Critically Endangered (IUCN Red List)

Marine Turtle Migration Routes and Movements

The 14000km long Atlantic Coast of Africa included migration routes, feeding grounds and breeding sites important to six species of marine turtles (*caretta caretta*, *chelonian mydas*, *lepidochely Kempii*, *Lepidochelys olivacea*, *Erethmochelys imbricata* and *Demochelys coriacea*) large gaps in knowledge existed about the conservation status of the turtles along this vast coastline as well as their movements between hatching and reaching maturity. The high

degree of mobility of Marine turtles meant that efforts made in Africa to conserve them would have repercussion in other parts of the world.

Marine turtles do not have a simple life style. It is known that many species travel great distances during their life time from areas where they breed to areas where they forage. Preliminary research on Green turtles breeding in Guinea Bissau for instance through satellite tracking has shown that these turtles travel up to Mauritania to feed and the Gambia coastline is used as one of the transit sites for the migrating turtles of the Region

Threats

The sea turtles found in the Gambia are threatened by a variety of man-induced factors these include the direct and indirect harvest of adults and juveniles by artisanal fishermen and trawlers, harvesting of turtle eggs for personal consumption and/or sale, degradation, erosion and loss nesting habitat through illegal sand mining operations, litter and oil pollution, artificial lighting along the beach, driving on the beach, and foot traffic. Other factors that threaten the continued survival of sea turtles in the Gambia include the negative effect of Natural and domesticated predators on eggs and hatchings.

3.3.3 WEST AFRICAN MANATEE

Status and Trend

The West African manatee (*Trichechus senegalensis*) which belongs to the order of sirenian is an aquatic mammal endemic to Western and Central West Africa. The order sirenian has other representative in the Caribbean, the Amazon and Indo-Pacific region. The wide and scattered distribution of the West Africa manatee ranges from Senegal and Mauritania in the North West, through Sahelian Zone (Mali and Niger) to Chad and along the Coastal zone (Guinea, Ghana etc) as far as Angola. It is therefore capable of living on a wide variety of wetland types, from coastal and marine ecosystems to inland floodplains, lakes and rivers (Wetland International 2000)

The manatee which is well known in folklore and culture in West African riverine and wetland communities, seems to generate local and after national interest everywhere within its range. The manatee has many traditional uses including trapping for food and medicinal purposes as well as being revered as some form of mystical "River Gold" in some areas. However, manatees are, nowadays widely caught accidentally in fishing nets. The manatee occurs in a number of transboundary wetlands and moves between countries, although established migration is not clear. It is included in the Red list of threatened animals and also listed under CITIES Appendix II (Wetland International 2000)

Manatees are found in shallow waters and freshwater rivers but prefer large shallow estuaries, lagoons and weedy swamps. They are widely but thinly distributed along the River Gambia and other small river including Masarinko belong in the Nuimi National Park, and Tanbi Wetland complex.

The September 2005 manatee baseline survey indicated that the population is increasing probably due to less killings of the manatee in previous years.

Threats

- Hunting (subsistence)
- Habitat Destruction
- Fishing (Deliberate/Accidental)
- Cultural and Traditional Beliefs
- Specific body parts have medicinal and cultural value
- The female genital organ may be one of those body parts
- Socio-Economic values
- Meat
- Oil
- Skin
- Bones
- Genital organs

3.3.4 SHORE BIRDS

Status and Trends

Gore (1990) indicated that there are 525 species of birds recorded from the Gambia, but this list has been recently enlarged to 552 species by Barlow et al (1997). This impressive list is represented by 75 families of Birds and gives the Gambia one of the highest density of avian species per kilometer square in Africa over 220 species are known to breed within the country, it is possible that a further 27 species also breed intermittently while 150 species migrate from the palearctic during the Northern winter. There are many inter-African Migrants also and the River Gambia appears to act as a flyway of considerable international importance. There remain however, major information gaps on the status and distribution of birds and in the case of migratory species, origin and dependence on The Gambia for over-wintering or passage purposes. A study of migratory species was conducted within Niimi National Park which was adding an understanding in some ways while raising more questions on others. The study has been abandoned due to the demise of the Team leader.

Shore birds were counted during the Gambia National waterbird census 2006 carried out in the Gambia in January through a grant from Wetlands International African office under the project water bird count along the West African Coast, since it Coordination began in the Gambia in 1998, the water bird census has been conducted mainly between January and March. 10 sites were covered instead of normal 39 sites, two new sites (Cape Point-Fajara and Senegambia beach) were added.

In the Coastal Zone, the Tanji Bird Reserve has been declared, incorporating the Bijol Islands as a bird reserve because of the wide variety of bird species found in the area. The Bijol Islands are major roosting area for a large number of shoreline seabirds, osprey and migrant birds.

More than 12,000 individual utilize the area in the non-breeding season and 30,000 to 60,000 individual birds are recorded in the breeding season. colonies of species specific congregation of Terns, Gulls, Pelicans, Cormorants, Spoonbills, Herons and Warders are found year round for purposes of nesting, roosting, feeding and shelter.

3.3.5 Marine System

Offshore from the Gambia the marine environment is dominated by the continental shelf, which here continues for 40km before dropping to oceanic depths. Number of Pelagic Seabirds offshore peaks during periods of passage, notably March-April and September-October. In the shallower waters, inshore intensive fisheries provide abundant feeding opportunities for seabirds, Gannets, Shearwaters, petrels and skuas all gather in these water and beginning to yield many new discoveries, Barlow, Wachter Tim, Dany D. (1997)

3.3.6 Coastal Shoreline

The greater part of the shoreline is dominated by long shelving sandy beaches Western Reef Heron Stalk the surf. Pied Kingfisher hovers above, whilst Sanderlings and Ruddy Turnstones are very numerous for much of the dry-season. The beaches are punctuated by occasional fishing villages where gulls take full advantage of fish processing operations on the beach. At sand spits formed opposite bend in the Coastline semi-permanent roosts of gulls, terns and warders find rest when not feeding at high tide. Rarities might include Audouins Gull and kelp Gull. Opposite the few freshwater outlets along the beaches, white fronted plover and Giant kingfisher are also encountered

In few laterite out crops form low cliffs overlooking the sea, providing lookout points for gannets and skuas offshore

3.3.7 Estuary and Mangroves

The Gambia River is associated with large and important systems of mudflats and mangroves, which extends inland for 200km. The mudflats as everywhere are rich in invertebrates – annelid worms, molluscs and crustaceans, and the mangrove roots provide a haven for myriads of small fish. At low tide a host of palearctic wader species herons, pelicans, African spoonbill, sacred Ibis and yellow billed storks all stalk the flats. In quieter creeks, Goliath herons and occasional African fin foot sneaks between the mangrove stems. The Mouse-brown sunbird is an active resident strongly associated with mangroves, but less expected forest species such as common wattle-eye and several secretive rarities, notably pel's-fishing owl and white backed night heron.

3.4 PROPOSED INTERVENTIONS

3.4.1 Integrated Coastal and Marine Conservation and Management (ICAM)

The DPWM has recently secured funding from Global Environment facility for integrated coastal and marine management. This project will collect national baseline information on marine turtles and cetaceans for the elaboration of a national conservation plan, as well as promoting public education and awareness. The DPWM will collaborate with the Department of Fisheries, fishing communities and a local NGO, the Gunjur Environmental Protection and Development Group (GEPADG), to conduct marine mammals monitoring activities along the coast

3.4.2 Regional Coastal and Marine Conservation Programme for West Africa (PRCM)

In West Africa, the coastal zone generates resources which provide for a large proportion of the region's development needs

The Regional Marine and Coastal Conservation Programme for West Africa was set up on the initiative of the World Conservation Union (IUCN), the Worldwide fund for Nature-(WWF), Wetlands International (WI) and International Foundation for the Bane d' arguing-(FIBA), in partnership with the sub-regional Fisheries Commission (CRSP). It now represents a coalition of nearly 50 institutions with the aim of coordinating conservation action directed at the Coastal zone of the sub-region's seaboard countries, (Mauritania, Senegal, Gambia, Guinea Bissau, Guinea, Sierra Leone and Cape Verde).

Regional Approach

The phenomena which impact the coastal zone and the human populations whose livelihoods depend on it occur on a scale which reaches beyond national borders. Sea currents and upwellings exert their influence on vast areas, carrying nutrients, living organisms, sediment and pollution over great distances. A large number of fish species belong to stocks which are shared by several countries while migratory animals like sea turtles, cetaceans, manatees and birds spread out over the entire sub region and are also a common heritage.

Activities of PRCM Carried Out Since 2004

Apart from aspects related to governance, which are presented separately, the activities are divided according to the five programmes components to which they belong: support for the establishment and strengthening of marine protected areas, habitat and species conservation and management, the contribution of Marine Protected Areas to the development of Ecotourism, research or communication.

Biodiversity Conservation

This group of activities deals with a number of flagship species such as sea turtles and manatees. Other families, i.e. water birds and Marine Mammals, are also within the PRCM's scope of action but were not included in the 2004 work plan for budgetary reasons

These species are important not only because of their value as indicators of ecosystem's state of health, but also by virtue of their role in the cultural heritage of coastal dwelling societies and as vectors for raising public awareness, hence the title "flagship species"

Sea Turtles are especially important in the West African sub-region. Indeed, the Bijagos and Cape Verde Islands respectively host the largest populations of Green turtles and Loggerhead turtles in the Atlantic. Every year, approximately 7000 families come to lay their eggs on the beaches of Jao Verra/Palao National Marine Park. Satellite transmitters have been placed on some individuals, enabling us to discover the migration route which takes the Green turtle along the coast all the way to the sea grass beds of the Golfe d'Arguin. Satellite tracking of logger heads turtles which breed on the Island of Boa vista (Cape Verde), has shown a dispersal

pattern stretching over coastal waters from Mauritania to Sierra Leone, thus providing an ideal illustration of the eco-region concept which underpinned the creation of the PRCM because they are dependent on terrestrial and marine habitats at different times during the yearly cycle, sea turtles are good indicators of the development of certain phenomena such as tourism or coastal erosion which jeopardize nesting or offshore oil drilling and fishing which have, or could potentially have, a major impact on the survival of turtle population.

A Regional Action Plan developed together with stakeholders contains priorities for turtle conservation. A similar programme has been launched to protect manatee populations in the Gambia.

3.5 GAPS

Key elements for the success of marine and coastal environment initiatives, appears to be the involvement of user groups and local communities, mechanisms for cooperation between administrations, legal provisions need to provide a strong structure, including local, and national elements to reflect the needs of different areas, and clearly stated objectives.

Understandably, marine mammalogy continues to be viewed by most West Africans as largely irrelevant to the many pressing socio-economic needs of African peoples. Nonetheless, ecotourism in the form of dolphin watching and photo-safaris is thought of as promising and could become an important foreign earner in the future. A good knowledge of cetaceans and their distributions will be essential. While local biology students may soon consider marine mammalogy a feasible career choice, a process which consolidated in South America during the 1980s, it is currently still viewed as a temporal project dependent occupation.

Although marine protected areas (MPA) may help maintain relatively healthy fish stocks, very few fishermen recognize them as intangible areas and will happily operate inside. Law enforcement in MPAs is generally so weak that the net positive effect on small cetacean and marine turtle population is most likely negligible.

Diversity and status of marine mammals in Gambian waters

Comprehensive survey and monitoring of coastal and marine resources of conservation value
The Gambia's evaluation of abundance is needed to establish whether some stocks *sousa teuzil* are threatened or even endangered with scientific stock size estimates lacking, the aggregated body of circumstantial evidence suggests that each of the named stocks may consist of hundreds of individuals rather than thousands.

3.6 CONCLUSION

The Gambia's marine and coastal environment has international importance for nature conservation, some areas which are in a semi nature state, requires strict protection, whilst others require appropriate management to ensure their conservation. The effective administration of conservation and environmental protection requires changes in the legislation currently in hand, enhanced and strengthened consultation procedures, the provision of appropriate expertise to local authorities and other decision makers and adequate resourcing.

There is also a requirement for a comprehensive programme of survey and monitoring of coastal and marine resources of conservation value.

Despite the small size of the Gambia, it has an impressive diversity of fauna and flora due to a combination of its geographical position and the presence of The River Gambia. However, to date there has been little investigation aimed at determining the abundance and distribution of most of the Major Group of Marine Mammals and changes in abundance overtime have not been quantified. There remain considerable gaps in our knowledge regarding the diversity of many marine mammals, though the avifauna have received considerable attention. There are currently a number of studies in progress including an ongoing bird ringing programme in Tanji and Bijol Islands Bird Reserve, monitoring of Colonial nesting Birds at Bijol Island, a water fowl census, and an assessment of sites for designation as Important Bird Areas (IBAs) and as wetland of International Importance of Ramsar Sites and preliminary research on whales & Dolphins (cetacean) West African Manatee (Sirenian) and marine turtles.

3.6.1 MAMMALS

The most recent assessment (Murphy 1988) puts the total number of mammals at 99 including marine mammals recorded from the Gambian waters.

3.6.2 BIRDS (Avifauna)

Gore 1990 indicated that there are 525 species of birds recorded in the Gambia, but this list has been enlarged to 552 by Barlow et al (1997). This list of birds is represented by 75 families of birds and gives the Gambia as one of the highest density of avian species per kilometer square in Africa. Over 220 species are known to breed within the country, while 150 species migrate from the Palearctic during the Northern water. There are many Inter-African Migrants also and the River Gambia appears to act as a flyway of considerable International Importance. There remain however major information gaps on the status and distribution of birds in the Gambia.

Chapter 4: Coastal communities

4.0 INTRODUCTION (overview of distribution, land use, cultural groupings/indigenous groups, etc)

Marine fisheries employ large numbers of people residing in the coastal belts of developing countries. In many instances, fishing communities make concurrent or supplementary use of the natural resources available in coastal areas and are seasonally employed in, and dependent for their livelihoods on, different sectors. There are numerous linkages among the various economic activities at the levels of both physical interaction and the socio-economic characteristics of resources users.

Agro-ecological typological criteria, such as those applied to farming systems, can provide a good biophysical basis for management but these rarely coincide with the boundaries of social, economic and institutional variables. Other typological criteria relate to the relative importance of the coastal area to the total area, the occurrence of transnational coastal issues (e.g., marine pollution,)

The attained level of economic advancement and the degree of economic diversification and urbanization are important factors influencing the kinds of management issues which arise or are predominant in the coastal area. In low-income economies with low levels of economic diversification, the key management issue is often an excessive rate of exploitation of the available natural resources. In highly diversified economies, the management focus shifts to the prevention of pollution and habitat degradation. In the transitional stages, there tends to be a dualism and synergism of management issues so that, for instance, a loss of fisheries productivity owing to over-exploitation may be exacerbated by deteriorating water quality and the conversion of the habitat to other uses.

4.0.1 Land use

The most important commercial fisheries in the Gambia is marine fisheries. The ocean extend over large regions of the earth and is characterized by large water volumes and rapid water circulation. This means that footprint of human activities on the environment will be relatively easily eroded in marine environments. Thus the marine area of the Gambia most important for fisheries will be one of the aquatic ecosystems to be obviously affected by human activities.

4.1 Population dynamics (demographics, migration etc)

The growth in the numbers of fisherfolk and fishing communities is determined by changes in the components of demographic change (migration, fertility, mortality) and the dynamics in composition of rural livelihoods. If at times and in certain geographical areas fisheries is perceived to be a profitable undertaking, non-fisherfolk may migrate into coastal communities to make a living in the artisanal fisheries. For instance, civil wars, and other forms of political instability may cause people to migrate to coasts and temporary or permanently go into the fisheries to survive as observed during the crises in Southern Senegal. Also in areas where farmers have undergone a number of harvest failures, or where availability of land access to land has become scarce, or where financial farming returns are decreasing, some farming households, in order to spread risks, may start earning a living through other sources, such as in fisheries. Thus, households and entire communities respectively may transform into fishing communities overtime if income from the fisheries becomes the main source of household income.

4.1.1 Population and Ethnic Groups

When the latest census in the Gambia took place in 2003, the total population in the coastal villages was 44,251 persons, ranging from 387 in Batokunku to 13,934 in Gunjur as can be seen in table below. The main ethnic groups are Mandinka, Serere and Jola, with a concentration of Ghanaian Fante and Fula in Brufut and Manjako and Wollof at Tanji, Tujereng and Gunjur respectively.

Population and ethnic groups in the coastal villages

VILLAGE	POPULATION	MAIN ETHNIC GROUPS
<i>BRUFUT</i>	12,052	<i>Mandinka Serere Jola Fante Fula</i>
<i>TANJI</i>	8,120	<i>Mandinka Serere Jola Fula Manjako</i>
<i>TUJERENG/BATOKUNKU</i>	387	<i>Jola Mandinka Manjako Serere</i>
<i>SANYANG</i>	6,900	<i>Jola Serere Mandinka</i>
<i>GUNJUR</i>	13,934	<i>Mandinka Serere Wollof Jola</i>
<i>KARTONG</i>	2,858	<i>Mandinka Jola Serere</i>

4.3 Access to social services (including, healthcare, education, social security, water and sanitation, communications, political influence, etc.)

4.3.1 Health Facilities

People in the coastal villages depend for medical care on a health center in Gunjur, a dispensaries/connected health centers and primary health care centers in Brufut Tujereng, Sanyang, Kartong and Tanji. The health center in Gunjur and the dispensaries have trained nurses and mid-wives, and the primary health care centers have health workers and trained birth attendants. The health center and dispensaries provide curative and preventive medicine, as well as immunization and ante-natal care.

4.3.2 Sanitation

Fishing communities and related activities have intensified along the coast in the last few years. However, the absence of adequate waste management measures results into indiscriminate dumping of

solid and liquid waste. This is a serious public health threat noting that fish is processed for food in such vicinity. Waste in fishing communities comprises of various material of organic and inorganic nature. This ranges from fish offals and waste by products of fish processing to boat and net construction.

4.3.3 Education

There are primary schools in all the villages along the coast. Gunjur and Tunjerng have Junior Secondary Schools. The schools seem to be well attended and there is a Madarassa in Gunjur.

4.3.4 Housing conditions

Most of the Houses in these villages are made of mud brick material with thatched or corrugated iron sheet roofs. However, there has been a recent increase in the number of cement brick houses in the area. This reflects a relative improvement in living standard. The Ghanaian settlement, "Ghana Town", also has cement brick houses replacing the cluster of simple mud brick houses that epitomize this beach side settlement. The compound set up in these villages provides the inhabitants with large fenced backyards where food crops are cultivated. The Fisheries centers have modern flush toilets and pit latrines for the fisher folk.

4.3.5 Water supply

All most all the major villages along the coast have tap water. Brufut, Sanyang, Tanji and Kartong have few taps on the streets for direct use by the villagers. In all the others, running water is confined to the fisheries centers where the water supply comes from wells dug in individual compounds. The water is of good quality and the supply is quite regular, since the area has a reliable water table.

4.3.7 Electricity

There is electricity supply in Tanji, Sanyang, and Tujereng. In the other villsges a few private solar panels and generators are available for use at ceremonies, feasts, and improvised commercial video film show halls. Some people also use generators in their homes for house lighting and television and video film watching. Private generators seem to be increasing in the area and that is another indicator of improvement living standard. The fisheries centers of Gunjur and Tanji have generator sets which are used for lights and can be a good night navigational aid for the fishermen.

Most people in these villages depend on candle and kerosense lamps. Radios and radio cassette recorders are played on batteries and few old car batteries-which are also used in some homes to operate television sets. Kerosense refrigerators are also used in the area.

4.3.8 Road-Transport

All the villages along the coast are liked by a newly constructed all weather road. However, most of the villages are linked to the fish landing sites by latrine roads constructed during the second phase of the EEC funded Artisanal Fisheries Development Project. These roads make the fish landing sites accessible throughout the year.

The road improvements have attracted a lot of commercial and private vehicle traffic to and from these coastal villages, and that has eased communication tremendously for the inhabitants who could move with their goods conveniently to the markets in the urban area.

All most all the villages have private telephone facilities and covered by both Gamtel and Africel mobile phone services.

4.4 Gender equity

Over the past decade, fishing has shifted from domestic use to the export market and became the third cash income of the Gambia. Like crop production, there is a distinct gender role in the fishing sector. While fish catching is an extensive male activity, 80% of the off-loaders are female. They form about 99% of the traditional processors and more than 50% of the fish processors in the major coastal fishing sites (Saine and Willman, 1995). However, in the commercial fishing companies about 80% of the labour force are women mainly engaged in fish processing and packing for export.

A study conducted by A. Saine and R. Willman (1995) revealed that nearly half of the fish smokers in the coastal fishing areas are women who generally smoke small quantities of catfish, shark, skates and occasionally and other kinds of fish species.

Generally speaking, it could be argued that women form a large proportion of the labour force in the fishing industry but, yet to be well organized to bargain for their rights.

4.5 Economic status and resources use (wealth distribution and poverty levels within the coastal populations , resource use and access, economic activities according to groupings with reference to chapter 5)

The poverty rate in the coastal zones of the Gambia is particularly high and there is high dependence on the coastal resources particularly fish for income generation and food security. Generally, resource users, the coastal communities and other stakeholders lack awareness about the state of the resources and the effects of over-exploitation on its sustainability.

Although it is somehow evident that some of the resource users are aware of the problems with regard to the general state of the resources, poverty and the absence of alternative sources of livelihoods compel them to persist in these unsustainable resource use practices. Most of the resource users and other stakeholders have known nothing besides fishing and fishing related activities for their livelihoods. The changing trends in society and cultural values have little positive effects on how they view these resources, ownership and access. Generally, these resources are considered as common property and open access resources.

4.5.1 Coastal Tourism

Tourism sector provides significant benefits to coastal communities. While tourism alone is not sufficient to support community development, it can provide economic benefits, employment benefits, opportunities for land acquisition for hotels, greater appreciation for cultural and natural heritage. In this context, tourism is a critical component of fostering support for coastal communities.

However, the ecological, social and cultural costs of tourism can be considerable. Even limited impacts

may have major conservation significance. If not planned developed and managed properly, tourism can contribute to deterioration of cultural landscapes, threaten biodiversity, contribute to pollution and degradation of ecosystems, displace agricultural land, disrupt social systems and increase poverty.

Tourism should also contribute to the quality of life of coastal communities, provide incentives to support traditional customs and values, protect and respect sacred sites, and acknowledge traditional knowledge.

4.5.2 Agriculture

There have been significant changes in land use in response to climatological factors and as human settlements expanded. The long-term decline in rainfall observed here as well as in other parts of the Sub-saharan region encouraged a shift of farming cereal and other crops to fruit tree plantations. This is most notable in coastal towns of Tanji, Brufut, Gunjur and Sanyang. In all four communities there is increasing pressure on land which in some places resulted in prolonged conflicts. Farming activities in the context of not only fertilizer and pesticides residues used for production optimization, but excessive sedimentation load due to deforestation or erosion linked to farming practices lead to environmental pollution and degradation.

4.5.3 Shipping and Ports

The discharge of liquid effluents both domestic and industrial in the environment can introduce nutrients, organic matter, and occasionally heavy metals, POPS and hydrocarbons in the sea/rivers. Other sources of environmental pollution of the coastal zone are Harbour activities resulting in dredging harbours for navigation channels (and the associated land filling of coastal habitats); oil spills, malfunctioning of transport systems and/or loading and unloading of fuel.

4.5.5 Aquaculture

The Gambia river has enormous freshwater resources that can sustain huge extraction for various irrigation schemes (rice, Aquaculture and horticulture). The endowment with culturable fish species, the warm temperature and availability of suitable sites for pond construction and abundance of agricultural by products (ingredients for fish feed) will make aquaculture development in the Gambia a step in the right direction.

However, clearing of mangroves eg Scan Gambia Company Ltd. cleared large area of mangroves along creeks near Pirang for Shrimp aquaculture. Mangroves are important areas for fish breeding and provide protection of juvenile fish and Shrimps.

Discharges from aquaculture establishments contain lot of organic matter from left over feed and also contain large quantity of chemicals such as anti – biotics used in Shrimp farming. Sometimes aquaculture is considered a pollutant in this respect. Large quantity of organic matter discharged into the environment can increase the biological oxygen demand (BOD) of the receiving water. Low BOD can cause fish kills through suffocation.

Escape of exotic species from an aquaculture establishment can cause biological pollution. Non-native species in the wild can cause ecological imbalance, competition and spread of disease to other aquatic organisms.

4.5.6 Fisheries

The fisheries sector is divided into two (2) sub-sectors: Artisanal Fishery sub-sector and Industrial Fishery sub-sector. The two sub-sectors are distinguished by their modes of operations.

The Industrial Fishery sub-sector is characterized as high capital investments involving the use of industrial fishing vessels and modern on-shore fish processing establishments. Industrial fishing activities are concentrated along the Atlantic coast. The major players in the sub-sector are private Gambian entrepreneurs in partnership with private investors from countries such as Greece, Spain, Italy, China, South Korea and Holland. There are about a dozen industrial fishing companies and eight fish factories, five of which have been certified to export to EU countries. The Industrial sub-sector provides permanent and part-time employment to between 1,500 to 2,000 people. Entry into the Industrial Fishery is controlled and operates on an application/approval system and a licence and registration scheme.

The Artisanal Fishery sub-sector is characterized as low cost and labour-intensive, and fishing operations involve the use of traditional fishing crafts and less sophisticated fishing gears, methods and techniques and processing technologies than in the industrial fishery sub-sector. Artisanal fishing and related activities are dispersed throughout the country in marine, brackish and freshwater zones. There are approximately 135 artisanal fish landing sites within the country, 10 landing sites along the Atlantic coast and the remaining sites are found along the River and tributaries. The sub-sector provides direct and indirect employment to between 25,000 to 30,000 people. Total fish production by the artisanal fishery sub-sector was 29,316.98 MT in 2004.

Entry into artisanal fishing or access to the resources is not subjected to special requirements, or to the payment of licences or fees. This free open access to the resources partly explains its spectacular growth. For example, in the Gambia, the artisanal canoe fleet grew from a few hundred units in the '60s to close to 15 000 canoes today. This sub-sector that accounts for more than two third of the production operates without any control on its fishing effort.

Non-enforcement of regulations has enabled certain artisanal operators to resort to illegal fishing techniques and gears (beach seines, mono-filament, nylon nets). Such practices are largely responsible for the destruction of marine fauna and flora. These nylon nets, which are non-biodegradable fishing gears, remain in sea perpetually, contributing to ghost fishing and over-fishing.

The fisheries sector is the main provider of animal protein in the diets of many Gambian households because of the relative availability and affordability of fish compared to meat. National per capita fish consumption is 28 kg compared to the African average of 8.2 kg. The contribution of fisheries to GDP is 12 percent and ranks third after agriculture and livestock in the food production sector. It is estimated that the livelihoods of about 200,000 people are critically dependent on fishing and related activities.

4.5.7 Governance

The artisanal fisheries in the operate several different types of gear (multi-gear) and target different species at the same time (multi-species). They operate on a long coastline of about 50 in The Gambia). Confronted with scarce resources in waters under national jurisdiction, foreign artisanal fishermen especially Senegalese are today present in several coastal countries of the sub-region including the Gambia to spread their fishing calendar all year round, the artisanal fishermen have adopted combination of several types of gears. Being a very complex sub-sector, management of artisanal fishing is faced with acute governance problems. The situation is made more difficult by very limited logistical

and human resources for the administration of the fisheries.

4.5.8 Politics

For strategic and empowerment purposes, and to enhance their negotiating capabilities, operators in both the artisanal and industrial fisheries sub-sectors have formed different Socio-Professional Organisations (SPO).

In the Gambia the artisanal fisheries operators have created an organisation the National Association of Artisanal Fisheries Operators (NAAFO) to better defend their interests. Actors in all areas of activity are involved: fishing, marketing, artisanal processing of fish and fishery products.

4.5.9 Mining

Coastal erosion has aggravated due to uncontrolled sand mining and infracts Ural development has led to breach of land use policy guidelines through encroachment into previously reserved areas along the coast. However, the ADB –funded intervention has been successful in reclaiming a significant portion of the beach. The impact of this intervention is having some negative effects along the beaches some beaches are getting sand deposits and in some areas erosion is occurring rapidly.

4.5.10 Forestry

The Gambia possesses considerable mangrove resources, estimated at between 60,000 and 67,000 ha and comprising six different species and four mangrove community types. Among the most biological productive ecosystems in the country, they form important nursery areas for fish and shellfish, provide a range of raw materials, such as fire wood and construction wood, and protect the shoreline from erosion. There is concern about the gradual decline in the abundance quality of these mangrove resources owing to various factors. These include: their increase harvesting as firewood, poles and for building purposes; the application of inappropriate

Harvesting techniques by oyster collectors, resulting in mangrove mortality; the clearance of mangroves for agriculture and aquaculture; and the occurrence of localized mangrove diebacks, the cause of which is not well established.

Most wood supplies for fish smoking are procured from narrow strip of coastal land. Under the ecological and environmental conditions of Western Division about 9400 ha of healthy forest would be needed (A. Saine and R. Willmans 1995) to allow bonga smoking to continue on a sustainable basis. This kind of forest is no longer available in the coastal region. As a consequence, bonga smoking contributes to the ‘mining’ of forests and woodlands in a highly concentrated fashion in the coastal area.

4.5.11 Other development and economic activities

The mangroves in the Gambia River estuary provide a natural habitat for oysters, which are harvested by over one hundred collectors, mostly women, on a seasonal basis. Although many women are engaged in wage-earning jobs, agriculture and oyster collection continue to provide the primary means of subsistence for many families.

While there are no available statistics on the qualitative harvested, average sizes of oysters have become

smaller, indicating intense exploitation. The cutting of the prop roots of Rhizophora spp, to which the oysters are attached, is commonly practiced within the mangrove channels, even though the technique is very destructive. In order to collect oysters sustainably, knowledge is required both of the behaviour, habitat and live cycle of oysters and of proper harvesting methods.

Chapter 5: Economic activities

5.1 COASTAL TOURISM

In The Gambia tourism is increasingly gaining importance in the national economy. In fact, tourism and its associated services now contribute 12% of the country's GDP. Tourism started in the country in the early 1960s, and the attraction mainly revolved around the three Ss – sun, sea and sandy beaches. The emphasis has therefore been on the construction of hotels, especially around the beaches, to satisfy an increasing European appetite for winter holidays.

TOURISM DEVELOPMENT AREA

This is a strip of land along the Atlantic Coast stretching from Kotu Stream to River Allahein in Kartong, with an average depth of Eight Hundred meters from the high water mark.

NATURAL ATTRACTIONS

The entire coastline of the Gambia presents an attractive proposition for the development of tourism such as: wetlands and estuaries, mangrove swamp, creeks, beaches, the river and a host of plants and animal life and cultural, natural and religious heritage sites.

COASTAL VEGETATION AND BEACHES

The quality and beauty of the Gambian beaches make them perhaps the most valuable treasure of the country. Their damage or loss would be irretrievable.

NATURAL AND CULTURAL HERITAGE

From Banjul to Kartong the coastal towns and villages offer unique attractions in terms of natural heritage sites such as kachically pond, the Tanji and Tujereng grooves that provide a variety of experience to tourists.

The conservation and protection of all natural immovable heritage sites along the coast, Such as Kachikally sacred pond, sane mentereng groove, Tanji initiation grooves, and Dua Dula in Gunjur and folonko in Kartong is the mandate of the National Council For Arts and Culture and the people who are the owners and custodians.

COASTAL WETLANDS

The Coastal Wetlands present an interest product including mangroves, which also form part of this natural attraction

In addition to these areas other ecologically sensitive areas, which serve as attraction along the Western coast include:

Solifor point and Bijol island
 Tujereng lagoons
 River Kakimma Delta (Kachumeh Forest)
 Dua Dula to Kartong village
 Kartong point to the Allahein Estuary
 Many other sites such as the Bird reserve are also part of the attractions

Summary of tourist arrival by month 2000-2005

MONTH	YEAR					
	2000	2001	2002	2003	2004	2005
JANUARY	11138	10356	10411	9351	17381	14474
FEBRUARY	10313	10086	10042	8748	18176	13143
MARCH	9539	7494	7531	10682	10835	14817
APRIL	7251	5817	5813	5998	13416	9989
MAY	3291	2309	2311	1927	3198	4238
JUNE	3131	2165	2470	2446	5889	3820
JULY	3297	1977	2124	3398	1962	5313
AUGUST	2951	2361	3919	2316	1748	4670
SEPTEMBER	2928	2153	4109	3133	3110	5020
OCTOBER	4041	3464	5315	6402	4838	6136
NOVEMBER	10461	6323	14265	10788	2930	12926
DECEMBER	10369	2726	12695	8056	6612	16269
TOTAL	78710	57231	81005	73245	90095	110815

5.2 COASTAL ECOTOURISM

Ecotourism in The Gambia is currently in its infancy, with only a handful of true ecotourism projects operating, for example in Brefet, Tumani Tenda, Makasutu culture forest, Foot steps in Gunjur. It has been confirmed through recent statistics that quite a number of tourists visits the Gambia solely to see the wealth of African bird life that can be found here. They tend to travel away from the coast and they hire the small thriving group of professional Gambian birders as guides, in local vehicles to travel around in and stay in up-country camps. Other small numbers of tourists visits The Gambia for the cultural experience of living and experiencing life with Gambia families.

The fact that tourist infrastructure are mainly concentrated around the coastal hotels, most tourist travel up country only on short excursions of a few days duration.

Generally, bird watching tourism is well represented and many British wild life tour operators, especially run bird watching trips to the Gambia that travel through the length and breadth of the country

The Gambia's bird life has also received good attention in much bird –oriented publication that

is read by potential visiting birdwatchers.

Visitation of protected and other natural areas: Currently we are witnessing an increase in the number of visits in protected areas such as the Bijilo forest park, Tanji bird reserve and a host of other natural areas like Jinak in the Nuimi national park and cruising in the Mandinary creek complex and the river up to bird safari camp in Jangangbureh.

PROBLEMS

Tourism in Coastal Areas is one of the fastest growing sectors of the economy in The Gambia. The natural beauty of the coastline combined with favourable climatic conditions made coastal tourism an important foreign exchange earner and provider of jobs. As a consequence the landscapes are remodelled and ecologically degraded by mass tourism. We have therefore identified three problems associated with coastal tourism namely:

ENVIRONMENTAL PROBLEMS

The environmental perception and the behaviour of, tourist, people employed in the industry, the Government and the public can be sited as the main culprit in the creation of such problems. Tourism has created great pressure on local resources, such as energy, food, land and water. The direct impact on the environment is obvious in the negative impact on biodiversity. Tourism is competing with wildlife for habitat and natural resources. Fresh water overuse by the industry and the impact of land degradation through construction of facilities using renewable and non- renewable resources resulted in the strain on the coastal environment where most if not all these resources are located.

Transportation by road is increasing along with the rising number of tourist and, their greater mobility and thus this movement is responsible for an important Share of air emissions and from energy production (generators). Noise pollution caused by cars, motorbikes, buses, as well as recreational vehicles such as safari trucks is an ever-increasing problem of tourism Hotels is large consumers of water and electricity. However most of the time the infrastructure is not designed to cope with peak periods, and use of generator, which is turn, causes air pollution.

The Kotu power station also releases its waste oil (sludge) from the generators into the Kotu stream and the surrounding swamps and Kotu bird reserve. Kotu sewage plant is not able to cope with the dramatic rise in volume of waste water and has malfunctioning problem and as such untreated and partially treated sewage has been released into the Kotu stream which empties in the sea .The sludge

from the Kotu Power Station pollutes the stream, the surrounding swamp and beach.

High concentration of tourist activities and a prevailing natural attraction has had serious waste disposal problems. Improper disposal has been a major despoiler of the natural environment. Solid waste has degraded the physical appearance of the land, water and shoreline and Bakoteh dumpsite cannot cope with this large volume.

Breakwaters and shoreline development caused changes in sediments coastal erosion. Extraction of building materials from beaches and coastal land have destroyed coastal forest and the coastal sand dunes, thereby exposing them to wind, sea and storm water erosion. The coastal areas have been the source of building material like timber and beach sand

ENVIRONMENTAL IMPACTS

Tourism has created great pressure on local resources, such as energy, food, land and water. The direct impact on the environment is obvious in the negative impact on biodiversity, serious waste disposal and pollution problems such as,

- Coastal erosion
- Over exploitation of resources
- Sand mining
- Land use conflicts

ECONOMIC AND SOCIAL PROBLEMS

These are the other two problems created by tourism in the coastal communities. These problems are being mentioned here because they are directly or indirectly linked and affect the natural environment negatively in many ways. The people's social behaviours do affect their environments and this we see in the way these coastal environments have been destroyed because of our behaviour.

AGRICULTURE

Agriculture provides employment for about 70% of the population and contributes about 40% of our export earnings with over 20% of GDP. However it is facing competition from other sector such as tourism. Resources use conflicts results in competition between tourism and local people for the use of prime resources like farmland. Agriculture is the main activity of these coastal communities but with the construction of hotels, infrastructure and other related facilities, farming activities are becoming restricted.

The shifting cultivation of such crop like millet and sorghum is still practice by coastal communities. The agriculture practiced is gradually moving into ecologically sensitive areas and causing great damage through felling of trees, bush fires etc. As a prime sector, it is hoped that agriculture will reduce poverty by raising incomes and providing food security. However agriculture in the Gambia is dependant on rainfall compounded by other challenges and thus leading to low levels of production

The coastal areas are characterized by vegetable gardens; rice fields and women are the main farmers on these fields. These areas are where a verity of vegetable such as okra, tomatoes, onions cabbage, is grown. These activities have both positive and negative impacts in that they conflict or are in competition with the other land uses such as sand mining, deforestation, urban sprawl and fisheries. These conflicting activities lead to a lost in livelihood when rice fields become inaccessible due to excavation and blockage of seasonal rivers and tributaries, the reduction of tree cover and increase soil erosion

PROBLEMS

Despite strides made by government in the development of agriculture, this sector still faces challenges. Due to its dependant on rain water there is the problem of low production and productivity. Thus Gambian farmers tend to be poor and as such cannot afford those production inputs that may improve production and increase productivity. The land tenure system is also very inappropriate and not conducive to product development. Women manifest this in the availability and access to land for farming. Women cannot inherit farmland, which makes it very impossible for them to access production inputs. The inefficient and unfair trade structure in the world market creates bottlenecks for farmers who are poor and usually illiterate. There is also the difference in importance given to cash cropping and subsistence farming both in the international and local market systems. This also makes it almost impossible for small scale farmers to access finance.

5.4 SHIPPING AND PORTS

The Banjul Port is the only area with facilities for sea going vessels. Thus this is the entry point and out point for imports and exports. This makes it a very busy traffic area for vessels.

This is also therefore a very important point of use conflict from ocean going vessels, fishing vessels, artesian fishing, and coastal and marine ecosystems. Problems such as pollution from huge engines, noise and environmental degradation due to the destruction of the marine ecosystems and pollution are prone in shipping and port environments.

Shipping and port activities therefore can be said to have both negative and positive impacts on the environment.

Some of the negative impacts have been mentioned above. However shipping and ports also have positive impact by providing goods and services that may not be available to the country. Sometimes goods imported are those that have negative impact and are unsustainable. An example will be the importation of gas thus reducing deforestation. Bringing in vehicles, fertilizers and farm implements help open up the hinterland for the free movement of goods

and produce. Ports also facilitate the export of our agricultural produce and are a cheap means of transportation of goods and tourist.

- The Banjul Port is the only Port facilities for Ocean going vessels.
- Jetties along the riverbanks are highly under utilized due to the dormant nature of river transport
- Entry point for vehicles, fertilizers and farm implements and exports of agricultural produce

IMPACTS

- Pollution from huge engines, noise and environmental degradation due to the destruction of the marine ecosystems and pollution such as oil spills are prone in shipping and port environments.

5.5 FISHERIES

FISHERIES

The coastal communities of what currently constitute the TDA have numerous fish landing sites. Fishing and fish processing is at a high sale demanding resources. Conflict with traditional land uses in coastal areas when construction of shoreline hotels and tourist facilities cuts off access for the locals to traditional fishing ground and even recreational use of the areas.

Firewood, which is used in fish smoking, is diminishing due to several reasons including deforestation thereby causing great damage to the environment.

However the tourism establishments can be seen as a market for sales of fish and seafood. Yachting, sailing, deep sea fishing, sport fishing also form part of the tourism activities and give additional opportunities for cash to local fishermen.

Different fisheries activities mainly

5,5,1 COMMERCIAL FISHERIES

The commercial fisheries Sub-sector have not reached its full potential. Apart from a few commercial boats and cold stores, commercial fishing is done by foreign vessels but with a fee.

5.5.2 ARTISANAL FISHING

This sub-sector on the other hand is highly diverse operating in marine, estuarine and fresh waters. The majority of the communities located along these areas engage in artisanal fishing.

With low input fishing practices, artisanal fishers use traditional canoes and fishing gears entangling, surround gill nets, hand and long line nets and traps.

They also engage in subsistence and activities generating economic returns eg shrimping demersals species such as sole fish cuttlefish

- A 2006 artisanal fisheries survey shows that there are:
- 1410 head fishermen in the Gambia of these
- 805 are Gambians and 605 non-Gambians
- In the productive Atlantic coast stratum the study revealed that
- 165 Gambians against 249 non Gambians mainly Senegalese
- These head fishermen employ 4694, out of this 78% are paid and 22% unpaid family members
- With 78% age above 30years, 71% are full time and 29 % are part time

- 74% is sole owners of canoes and 14% partnership1082non motorized and 625 motorized canoes

5.5.3 AQUACULTURE

The only sites for such activity is in Sanyang where shrimps are farmed. This is very important to both the local markets as well as the tourism industry. It is obvious that this potential has not been tapped. Some of the reasons why aquaculture in the coastal area is not developed to its full potential could be the availability of fish in the Gambian waters and ignorance of the viability of this economic activity. Investors are not aware of the profitability of such activity and there is

Aquaculture Potentials

§The River Gambia has enormous freshwater resources that can sustain huge extraction for various irrigation schemes (Rice, aquaculture and horticulture).

§This characteristic of the river has rendered the adjacent flood plains gravitationally irrigable, particularly in the Central River Division. This is quite a positive attribute for development of aquaculture along its banks.

Aquaculture Development

- Experimental Ponds in Bansang
-
- The Scan-Gambia Company
-
- The West Africa Aquaculture Ltd

POTENTIAL ENVIRONMENTAL IMPACTS

- Clearing of mangrove areas
- Discharge of effluent into the environment such
- Organic matter
- Chemicals that are used in aquaculture
- Risk of exotic species taking over

5.6 CURIO TRADE

Curio trading in the Gambia's coastal area is a by-product of the tourism industry. Most of the trading takes place in craft centers and markets close to or within the Tourism Development Area. Curios range from clothing to leather works, wood curving bone beads masks and musical instruments.

These craft markets are built by government and stalls are allocated to craft persons are retailers who pay rent to the government via the Gambia Tourism Authority. Craft markets have in turn form associations and are also members of an umbrella association called ASSET. These associations within the craft markets have codes of conduct and a managed in accordance with the GTA's policy guidelines.

The Gambia Tourism Authority in its bid to market the country as a single product makes it a duty to not only market and promotes these products but also train the members of the craft associations in product development and marketing.

- Curio trading in the Gambia's coastal area is a by-product of the tourism industry
- Curios range from clothing to leather works, wood curving bone beads masks and musical instruments.
- A Number of Craft markets have built by Government to promote the
- Increasing employment opportunities
- Strengthening business-to-business linkage
- Provide Training opportunities
- Provide opportunities for communities to benefit from the tourism industry
- Influences levels of visitor spending
- Maintaining and projecting an attractive destination

5.7 MINING

Mining in the Gambia especially Sand mining for the construction industry as well as mineral and other resources are mainly found in the coastal region. The Country's construction and infrastructure sectors obtain a major component of beach sand.

In 1999 an exclusive prospecting license was granted to Carnegie Corporation to prospect for mineral sands such as zircon, ilmenite and rutile, which are found mainly in the coastal areas. In September 2002 after consultation with all stakeholders the NEA gave approval for the Brufut projects. The plant, which was set up in Brufut, was operated between March and July 2003, and produced 12500 tones of preliminary zircon concentrate (65%).

The areas of Sanyang, Batokunku, Kartong, and deposits have been earmarked for mining operations due to the successful trail mining and exports in 2003 and 2004. However this time around the sites under consideration are not only in the TDA but are conflicting with the proposals of the recently prepared tourism master plan. The time span for the mining period is also problematic since it spans from 2005 to 2010. This means that these areas will not be available for tourism development as recommended in the master plan for a period of five years. This is the period for the implementation of the master plan.

IMPACTS OF COASTAL MINING AND QUARRYING

Soil

Wildlife

Livestock

Terrestrial ecosystem

Air quality

Public health

Forest

Tourism

Energy

Agriculture

Land use

The removal of forest cover or vegetation will have a negative impact on the soil structure, forest cover, livestock grazing pattern, wildlife and bird life, and the natural ecosystems. These areas consist mainly of sand dunes separated by depressions. The low water tables on the dunes support grass, palm and Tamba trees but also provide water for rice fields and vegetable gardens. These dunes are the important habitat for several species of flora and fauna and migratory birds. In some areas these dunes are covered with thick shrubs and the water filled depressions are feeding and breeding grounds for small mammals, reptiles and amphibians. It also provides an ideal nesting ground for marine mammals such as the protected green turtle (endangered species).

The removal of these dunes for mineral extraction will definitely change the character and landscape of the whole area and thus changing the habit for a vast variety of ecosystems.

POSITIVE IMPACTS

Revenues

Employment

Infrastructure

Training

Land freed up for tourism development

Land in form suitable for development

Reduce local sand mining issues

Project expenditure boost to local economy

Gambian economy and export base broadened
Integrated project a model for development

NEGATIVE IMPACT OF MINING AND QUARRYING ACTIVITIES

The environmental degradation resulting from sand mining and gravel quarrying has become a major source of environmental damage in the coastal parts of the country e.g. Bijilo Quarry, Kartong sand mining, Kachumeh etc.

None of the stakeholders and especially the Gambia Tourism Authority is benefiting from any royalties from this project and from any other mining and quarrying activities within the TDA. It would have been appropriate for the GTA to be compensated for the time of not developing due to mining activities.

There are no structures in place for the rehabilitation of sand mining sites in Kartong and Kachumeh

There is a lack of monitoring mechanism to establish a proper mining in the present site as well as in the subsequent sites

The Carnegie pilot project was not properly rehabilitated as expected

The borehole was handed over to the community even though it was agreed that it should be handed over to the GTA because of its location to the TDA and also because the GTA would have proposed a coordinated its use by all stakeholders.

There was no plan of action and no time frame provided to enable master plan and the Authority plan for the future development of the affected areas

All sand residue from mining was to be sold by the company even though a replacement was recommended

- Mining in the Gambia especially Sand mining for the construction industry as well as mineral and other resources are mainly found in the coastal region
- In 1999 an exclusive prospecting license was granted to Carnegie Corporation to prospect for mineral sands such as zircon, ilmenite and rutile, which are found mainly in the coastal areas.
- The areas of Sanyang, Batokunku, Kartong, and deposits have been earmarked for mining operations due to the successful trail mining and exports in 2003 and 2004.

Sand mining for construction industry

FORESTRY

The national policy objective of the forestry department is to maintain a 30% land cover of the whole country, 75 % of which should be forest cover for environmental and socio economic development. Another important policy of the Department of forestry is the sustainable forest development of the full potential of the forest through the promotion of ecotourism and the utilisation of non-wood forest product

DEFORESTATION

Forests also suffer negative effects of tourism in deforestation caused by firewood collection, construction industry, agriculture, hotels and organisations.

NATURE AND FOREST RESERVE

There are two gazette reserves along the south coast of the Gambia, which present unique natural attraction to ecotourist, these are the Tanji and Bijol island bird Reserve and the Bijilo Forest Park. The Nuimi National Park has also been gazetted under the above Act. They have an ecological importance that is beyond tourism and recreational value.

Forest clearance on a massive scale for agricultural development, urban growth and general pressures from increasing population have reduced the extent, diversity and stability of the coastal and marine ecosystem of Tujereng and Sanyang Forests.

Kartong Folonko

10 OTHER INDUSTRIES AND ECONOMIC ACTIVITIES

Other activities in the coastal region are multi faceted in that they not only economic activities such as artisan fishing but also cultural and religious activities take place. We have such areas as the two sacred crocodile pools of Kachikally and Kartong Folonko, and the religious shrines of "Kenyeh Kenyeh Jamango Dua Dula" and Sannementereng. In Tanji there is an initiation grove. However other economic activities include housing and sale of land, transportation by land and by sea of goods and services between the neighbouring countries of The Gambia, Guinea Bissau and Senegal. The re-export trade and the movement of people within the region sub region. Another important economic activity is the harvest of wild fruits for local consumption. There is also the firewood collecting for sale in the local markets as well as the use of Rhun palm in the construction industry Oysters harvesting is another activity that is taking place in

the creeks and mangrove swamps along the coastal regions. The cockleshells are also used in works and construction industry while the oyster shells are used in the production of lime or white wash.

Due to the numerous heritage sites along the Gambian coastline it is also common to see visitors both local and tourist at those sites and the proceeds are usually collected by the local custodians of such sites

Chapter 6: Major human and natural impacts on coastal ecosystems

6.1 Main environmental problems and constraints in THE COASTAL AREAS

Unplanned & Uncontrolled Urbanization

Apart from a few provincial towns, most of The Gambia outside the Greater Banjul Area is sparsely populated, and either agricultural or unused. The environment in these areas is generally pristine. Air quality and surface water quality are high and industrial pollution is rare. Where localised groundwater pollution from sanitary waste does occur, the affected people tend to be those who rely on unlined shallow wells for drinking water. Similarly the problem of solid waste disposal and litter in these areas is highly localised. Although waste disposal is almost unregulated, the amounts generated are low because the customary approach to domestic waste handling approximates to good practice in waste minimisation and recycling.

Within the Greater Banjul area the situation is much different. This area, covers most of the 80km coastline and within which the large preponderance of tourism development is located, has a relatively large and rapidly growing population crowded into the urban and peri-urban settlements. Clean water is provided through a piped network to most homes, or at least to publicly accessible standpipes, but provision of other environmental and municipal services (sewerage, solid waste collection, street lighting, road maintenance) is partial and unreliable.

Solid waste is a particular problem as generation has overwhelmed collection and management capacity. The result is that litter and uncollected waste are present in almost every street. Informal dumps of unsightly and potentially harmful waste are scattered around residential and commercial quarters providing breeding grounds for vermin and disease. During the dry season burning wastes produce polluting and potentially toxic smoke, while in the wet season waste clogs drains and creates environmentally harmful leachate.

The large open dump at Bakoteh, less than 1 kilometre from the coast, has long been the main disposal site for wastes collected in the KMC area, but the recent rapid growth in waste volume disposed there has turned the site into a major environmental hazard. The other open dump at Mile II in Banjul is situated in the Tambi wetland just few meters from the Atlantic coast. Black smoke from spontaneous fires, odour, vermin and windblown litter characterise both dumpsites and surrounding areas. There are few industrial waste streams affecting the urban environment in The Gambia, except the main Power Generation plant in Kotu, which occasionally has had serious spillages of sludge. Vehicle emissions are not yet a significant threat to air quality, and there are other sources of air pollution (waste burning, bush fires) that threaten only their immediate surrounds.

Depletion of Water Resources

The Gambia relies principally on groundwater as a source of potable supply. The extraction rate is still well below the recharge rate. At present the national water budget suggests that maximum potential water demand is equivalent to just over 2% of renewable water resources. Projections into the future, even assuming high demand growth and making conservative assumptions about the future availability of the resource, show maximum demand in 2050 equivalent to only around one quarter of potential supply.

Most consumers rely on the National Water and Electricity Company (NAWEC) for water supply. This is obtained from a series of boreholes located in the Kombo area, well away from the major population centres, and pumped to a central treatment plant. The quality of NAWEC's piped water is good, but supply can be erratic because power shortages sometimes interrupt

pumping. For this reason some consumers, including most hotels, have storage tanks or supplementary supplies from their own boreholes. Despite the large surpluses there is some potential that pumping from boreholes could lead to local shortages or, in coastal areas, to intrusion of saline water into the groundwater. This is controlled by the Department of Water Resources who issue abstraction licenses to all individual well operators and prohibit the siting of boreholes within 2 km of the coastline.

High Damage for Land Resources

Although The Gambia is densely populated, there remains a comparative abundance of unused land suitable for tourism development. The land closest to the coast is not very useful for agriculture and has not been heavily settled in the past. Previously, settlements tended to be concentrated around the most productive agricultural areas leaving many vacant sites available for sensitively designed tourist infrastructure. But the situation is changing rapidly as the population pressure in the Greater Banjul Area is driving people to look for homes in less crowded, more pleasant areas. With the advent of new coastal roads, land along the southern coastal strip in particular, is increasingly sought after.

Following the passage of the 1990 State Lands Act, the State is deemed to be the owner of all national lands. People owning land under customary tenure are deemed to be holding 99-year leases under which they may continue with the current use, so long as that use is not in contravention of an approved land use plan. The Land Acquisition and Compensation Act, passed together with the State Lands Act, gives the state the power to acquire land for "planning purposes", where necessary to implement the provisions of an approved plan, and sets out a procedure for determining appropriate compensation for such acquired land.

Land Administration Boards in the Greater Banjul Area and in each division are responsible for allocating unoccupied land to would-be developers, taking advice from the local Planning Authority and ensuring that there are no conflicting claims on the land. The Boards can also, acting on the behalf of the Minister, take possession of land needed for public purposes, after having given the occupant notice, investigated any claims and determined appropriate compensation.

Sea Erosion

Without doubt the major tourism resource in the Gambia lies in the recreational value of its sandy beaches and clean warm coastal waters. The most serious threat to this asset has been the severe beach erosion along the coast. This has resulted in almost total loss of sand in some areas up to 2 metres per year in some areas. Coastal erosion has both natural and anthropogenic causes, but a coastal protection study indicated that the major cause, along all but the northernmost sections of The Gambia's coastline, was illegal sand mining. Sand mining in its self alone may have accounted for more than half of the losses. Vehicles being driven over the beach and erection of hard structures within the set-back area also contribute to the damage.

A recent Coastal restoration project costing around US\$ 20 million has restored the beach in selected areas. A selection of protective and restoration techniques were used including:

- the construction of physical barriers (groynes) going up to 150 metres into the ocean, that modify the tidal action on the sand;
- beach nourishment (using sand dredged from offshore locations) and shaping of the coastline; and,
- planting of appropriate vegetation, such as Palm Trees, to stabilise the beach surface.

Pollution from Land-Based Activities

The bacteriological and chemical quality of the coastal waters is not closely monitored. However, several potential sources of pollution are readily identifiable.

- Inflowing streams might bring in domestic and industrial wastewater;
- Runoff and ground water contaminated with sanitary wastes from unsewered settlements and leachate from unregulated dumps will enter the sea directly by infiltration and through streams;
- Wastewater from the marine outfall used to dispose of Banjul's sewage, might circulate to the beaches before being fully neutralised.

Oil has been observed on the beaches around Denton Bridge, Kotu and Senegambia on several occasions. Some of this clearly originates from the Kotu Power station, which uses heavy fuel oil and exhibits poor handling of fuel transfers and wastes. There have been at least three major oil spills from the plant in the past five years. In addition, there is probably chronic washing of oil into runoff water during the entire rainy season from contaminated surfaces throughout the plant. Oil washes up on the beaches from the sea via the Kotu stream. The recreational value of the beaches is temporarily destroyed over the affected area.

Litter is also often observed all along the coast. Some appears to be the result of irresponsible waste dumping from small beach businesses but there is also scattered waste that was most likely discarded by individuals. Further south the beaches are often pristine, although there may be some washed up fishing detritus (broken floats, nets) and there are reports that some fishermen dump unwanted remains of their catch on the beach.

Controlling coastal and marine pollution

The Gambia is party to international conventions such as MARPOL and the Basel conventions all of which in one way or the other control marine and coastal pollutions. There also exist national laws and regulations that deal with controlling pollution in coastal and marine waters; principal among these is the National Environment Management Act (NEMA) of 1994, section 30(1) of which indicates against pollution of coastal and marine environment including the introduction of organisms. Further pollution control measures are indicated in section 38 of the Act. There are also a series of public health and pollution control Acts that control coastal and marine pollution. Key among these is the Environmental Protection (Prevention of Dumping) Act of 1988. To enforce these Acts particularly the NEMA, the National Environment Agency has an inspection team that continuously monitors the coastal area against pollution. The national

Navy is also involved in monitoring off-shore dumping of waste in the marine environment. A waste bill is also in the offing that would add to the control of

Depletion of Forest Resources

The Department of Forestry has been active in the Gambia since 1979, looking after 66 national forest reserves of huge ecological and commercial value.

During the period 1972 to 1988, however, forest cover declined from some 30% of total land area to just 6% (333,200 ha to 68,500 ha). Moreover the condition of the remaining forest is often poor with more than 70% of the remaining stock degraded.

A major change of emphasis in forest management and movement towards modern best practice began in the 1990s with the introduction of Community Forest Management and the revision of the Forest Act. There are now three systems of forest management as follows:

- State managed forests, which include three of the original 66 national reserves;
- Community managed Forests, which are owned and managed by local communities, with technical oversight by the Department of Forestry; and,
- Joint Forest Management Scheme forests, which are open access (i.e. not formally under a protection regime, but which are jointly managed by the state and the local community with a view to creating a Community Forest in the near future.

The Community Forest model is proving very popular and shows signs of helping to arrest the decline in forest cover. Losses are continuing, however, albeit at a slower rate.

Loss of Biodiversity

Abuko nature reserve was sealed off as a protected water catchment in 1916 and declared a nature reserve in 1968. The Department of Parks & Wildlife Management (DPWM) is responsible for the conservation, management and sustainable use of Gambia's wildlife resources and protected area system. Currently it manages a total of seven protected areas including four national parks and three bird reserves. Only Abuko is fenced, the others are demarcated with pegs. DPWM's task is therefore to work with local people to indicate buffer areas, areas of mixed land use (where local people may collect dead wood or farm, for example, as long as they avoid clearing trees or destroying valuable habitats) and areas of complete protection. Each park is protected by a patrol team that has powers of arrest, although the staff are often poorly equipped, and none has motorised transport.

Local communities are often hostile to the park presence and management. Restrictions on their activities, poor communication and (alleged) broken promises have left a legacy of distrust and even to acts of sabotage, such as setting of bush fires. The parks are rich in fauna with more than 67 species of mammals and 507 species of bird recorded as well as many fish, reptiles and amphibians. It should be acknowledged, however, that many of these are rarely seen and few of the mammals are of species that attract interest from the ordinary tourist.

The 1996 ratification of the Ramsar Convention on Wetlands of International Importance was a step of major significance for birdlife protection and conservation. It is also of some significance for tourism, since an internationally designated site can serve to add weight to marketing material and validate the tourists' own experiences. There are now three designated Ramsar sites (Tanji River Bird Reserve, Boa Boalong Wetland Reserve, and Tanbi Wetland Complex).

6.1.9 High Demand for non-renewable Energy

Energy is an environmental issue because pollution is an almost inevitable by-product of most fuel use and because all use of non-renewable fuels depletes the stocks available for future generations. In The Gambia fuel wood accounts for a large proportion of all the energy used, either directly or as charcoal. When the demand for wood exceeds the sustainable supply, over-exploitation leads to degradation of forests and mangrove areas, reducing their suitability as wildlife habitats and, therefore, their potential value in enriching the coastal and marine ecosystem.

Electricity generation causes polluting emissions (waste oil, greenhouse gases, several kinds of air pollution) and the use of small generators, as in The Gambia, localizes and intensifies any pollution that does occur.

6.2 Fisheries resource extraction

A number of fishing methods are practiced within The Gambian waters that are described as unsustainable and exploitative to the fisheries resources. These practices that are common to both the industrial and artisanal sectors are either fishing gear related or through the method employed. Their impacts range from over fishing, wasteful resource use to destruction of marine habitats. Key ones among them are:

6.2.1 Beach seining:

The beach seine is a type of fishing gear used by artisanal fishermen; the gear has mesh sizes smaller than the regulated ones and therefore captures juveniles and other small-sized fishes that are often not consumed and discarded on the beaches.

6.2.2 Trawling

A great number of the vessels involved are foreign-owned. For example, records show that 95% of the fleet in 1997 was foreign-owned. The impact of this practice has been noticed to include destruction of the marine habitats of demersal and benthic organisms and physical damage to ecosystems. Their catches at times include a lot of by-catches that end thrown away and wasted. Studies have further revealed that about two-thirds of the catches by shrimp trawlers are discarded at sea; for example of about 47, 321tons landed by Senegalese shrimp trawlers in 1998, 2, 056tons (~5%) was discarded at sea (source:)

6.2.3 Stow nets

This method employs small mesh-sized nets in shrimp fisheries by artisanal fishermen; the result is wasteful exploitation and use of fisheries resources threatening the very existence of the resources. Poaching and sharking fishing are the other activities that are unsustainably exploiting the fishery resources and negatively impacting on the coastal and marine ecosystems.

6.2.4 Addressing the impacts of fisheries resource extraction

The Fisheries Act of 1991 and the Fisheries Regulations of 1995 are the main legislations designed to address the impacts of fisheries resource extraction. The two form the legal basis for the “management and utilization and development of the fisheries sector”. The Act and the Regulation also provide for sustainable fishing practices including use of appropriate fishing equipment. In essence, these legislations are designed primarily to conserve fisheries resources at the same time ensuring that the extraction of the resources does not impact negatively on the general environment. The Department of Fisheries also has a continuous program of sensitization of the fishing communities against use of ‘bad’ fishing practices.

6.3 Shoreline management and erosion

Shoreline management and erosion problems are well documented in The Gambia. Management of the shoreline is multi-institutional involving the Departments of Fisheries, Parks and Wildlife Management, Geology, the National Environment Agency, Gambia Tourism Authority among others. In most cases the activities of these departments are not well coordinated resulting into conflicts and poor resource use practices. For example, there are cases where fisheries facilities are situated in close proximity to protected areas that has resulted in disturbance of wildlife in such areas.

Erosion on the other hand had been a major problem along the coastline until March 2003 when the government of The Gambia implemented the coastal protection project. This project addressed erosion at locations along the coastline with the methods of groyne laying and beach nourishment. The groynes have indeed stabilized the places they were laid with the extension of the beach in the area. The beach nourishment is not however as successful as the groynes with extensive erosion still continuing in these areas already nourished

The impact on of erosion is more on coastal infrastructure damage than otherwise. Apart the loss of beaches, loss of coastal ecosystems due to erosion is insignificant at the moment. It must be however be noted that because most of the coastal ecosystems are bordered by sandy foreshores, the average annual erosion rate of 1 to 2 meters along the coastline means a fast loss of land that could threaten the cohesion of the coastal ecosystems. In fact it is being reported that some coastal ecosystems, particularly the Tanji Bird Reserve, are being seriously eroded. This is attributed to the offshore drilling of sand that was used in nourishing beaches in 2004.

6.3.1 Addressing shoreline management and erosion problems

Section 30 (2) of NEMA clearly defines the need to develop a comprehensive management plan for the coastal zone, protection of mangroves and other coastal and marine resources and the adoption of measures to prevent coastal erosion and not the least control of structural developments along the coast. The implementation of the Act in this area may be described as weak since there are no specific and concrete efforts to deal with the various issues mentioned herein. For example there is no comprehensive management plan, covering all interest areas, for the coastal zone and erosion control strategies are weak. There is however efforts being made to delineate and enforce a set back zone along the entire coastline to control structural developments hence erosion and also protect vital coastal ecosystems. There also exist a coastal zone management unit at the NEA that continuously monitor the coastal zone against poor resource use activities and also activities that could lead to erosion.

6.4 Physical alteration and destruction of habitats

Of recent the coastal zone, particularly along the coast line, has seen considerable infrastructural development ranging from hotels, roads, settlements and other industrial activities. No quantitative measure exists but considerable fragmentation of habitats has occurred due to this development. For example, the Tanji Bird Reserve and Bijol Islands, a bird sanctuary along the coast has been dissected by road construction, physically dividing the reserve into two. The mangrove ecosystem of Tanbi Wetland Complex (a Ramsar site) is also fragmented considerably by industrial development activities. Industrial activity and infrastructural development aside, the physical alteration of habitats is also caused by direct human activity through such activities like fuel wood collection, clearance for space for various purposes to mention a few.

6.4.1 Addressing destruction of habitats

The principal initiative for the prevention of habitat destruction within the coastal and marine environment is the creation of protected areas and the involvement of local communities in natural resource conservation. These initiatives are backed mainly by the Forests Act of 1998 and the Wildlife and Biodiversity Act of 2003.

6.5 Climate change

The impact of climate change on the Gambian coastal zone is not documented for now; nonetheless, studies have been conducted that predict the impacts of different sea-level rise scenarios on the coastal zone. The coastal zone, like the entire country, is generally low-lying barely a meter above sea level at some points. The study, (Jallow et al., 1996), had indicated that a one-meter rise in sea level would lead to the inundation of a total of 92,320,000sqkm of land along the immediate coast line. Apparently, low lying areas, barely 1m above sea level, abound in the coastal zone and some of the areas affected by this prediction are the critical ecosystems of the Tanbi Wetland Complex, which is a 6000ha of mangroves and also the Bijol Islands that are identified turtle nesting grounds.

6.5.1 Addressing climate change

There is no law or regulation that deals specifically with climate change impacts within the coastal and marine environment and the entire country for that matter. Details of dealing with

the impacts of climate change do not also exist in any sectoral law or regulation on the coastal and marine environment. Nonetheless however, a project initiative that identified adaptation measures to deal with climate change in the coastal and marine environment through integrated coastal area management has just been completed. These identified adaptation measures are expected to be implemented in a Full Size project expected to last 2007 to 2010.

6.6 Invasive species

Perhaps the only invasive species noted within the coastal and marine environment of The Gambia is the water hyacinth. Though this is yet to cause the serious problems associated with, its potential to do so is a case for concern.

Chapter 7: Coastal governance

7.0 Environmental Management

7.1. Environmental legislation and regulation at coastal zones and their implications

The Gambia's coastline stretches from Buniadou point and Karenti Bolong in Nuimi, North bank Division to the Allahein River in Kombo South, Western Division measuring about 80 km in length. However the coastal zone includes the coastline plus the first 200km of River Gambia from Atlantic Ocean. This extent constitutes one of the areas identified as being of particular importance in The Gambia Environment Action Plan (**GEAP**) and in the National Biodiversity Strategy and Action Plan (**NBSAP**). It is an area rich in natural resources and with particularly high biodiversity of national, regional and global environmental significance, housing important nursery grounds for regional coastal and marine fisheries and breeding, nesting, feeding and refuge habitats for endangered and threatened species.

The coastal environment is under threat from all kinds of pollution and uncontrolled and unsustainable natural resources exploitation. This environment is so important in the economic and social life of the Gambia that it needs to be protected to ensure its sustainable utilization. To meet this objective Government has made rules and regulations to ensure effective utilization and protection of our natural resources. The sun sea and sand are the three essential elements of the Gambia's Tourism industry and over the past few years, nature tourism is also coming up. Tourism depends on the maintenance of a good quality environment at and around the coastal areas.

The following are legal instruments for environmental protection and natural resources management that have implications for the coastal environment and marine environment activities:

7.1.1 National Environmental Management Act, 1994

In 1994, the National Environmental Management Act (NEMA) establishing a National Environment Management Council (NEMC) and a National Environmental Management Agency was enacted. To supplement these bodies, technical working groups and committees are also

created under the Act that would be charged with the duty of caring for the environment in various ways.

In the quest for a cleaner environment, the Act mandates the carrying out of certain functions and empowers the Agency with certain powers. The Agency is to establish criteria for environmental quality, in particular, inter alia, those of effluent and solid waste. On the issue of pollution control, section 38(1) of the Act prohibits persons from discharging dangerous material, substance, oil or mixture containing oil into any waters or other segment of the environment unless done in accordance with the regulations made by the Council.

The Regulations are made under the Fisheries Act, 1991 Paragraphs (c)(v) and (d)(ii) of Regulation 3 of Schedule XV of the Regulations deal with the issue of waste. Paragraph (c)(v) requires that establishments engaged in the handling and storage of fish have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair, while paragraph (d)(ii) dictates, inter alia, that containers for inedible materials and waste should be leak proof and that solid waste disposal should be undertaken daily by the removal and dumping of such wastes to approved dump sites. The Regulations thus lay down some guide for matters falling within its purview.

7.1.2 Hazardous Chemicals and Pesticides Control Management Act, 1994

The purpose of the Act is the control and management of the manufacture, distribution and use of hazardous chemicals and pesticides. The Act establishes a Hazardous Chemicals And Pesticides Control Management Board responsible for the registration, control, and management of all hazardous chemicals and pesticides in the country.

Section 25(1) of the Act empowers inspectors appointed under the Act to enter and inspect premises where contaminated food, foodstuff, food products and by-products are reasonably believed to be contaminated by chemicals or pesticides are kept; seize detain remove and take samples of such food; submit such samples for analysis.

A person is prohibited from disposing of any chemical, pesticide or container used for the storage, distribution or handling of a chemical or pesticide unless done in accordance with guidelines issued by the Board.

The Act prohibits a person from disposing of a chemical, pesticide or container used for the storage, distribution or handling of the same unless done in accordance with the guidelines set by the Board.

7.1.3 Environmental Protection (Prevention of Dumping) Act, 1988

The Act makes provision for the prevention of the dumping of industrial wastes and for the protection of the environment. This Act defines dumping as "any disposal of wastes into land within The Gambia or into any waters under the jurisdiction of The Gambia".

Unless otherwise issued with a permit under Regulations made under the Act, a person is prohibited from dumping or attempting to dump onto land in the Gambia or any waters within the jurisdiction of the Gambia waste produced from a source outside the Gambia.

7.1.4 National Water Resources Council Act,

The Act establishes National Water Resources Council, which is vested with the responsibility, inter alia, of formulating the policy of the Government on water resources development, water utilization and conservation, and of anything incidental to the development and utilization of water resources. The Council is also required to approve plans submitted by the National Water Resources Committee, which is also established under the Act.

The National Water Resources Committee is responsible for, among other things, the coordination and approval of any project or scheme relating to the use, development and conservation of water resources with regards to quantity and quality, and the promotion of the rational use of available water resources including the abatement of its harmful effects.

To further strengthen the water resource base of the country, a Department of Water Resources is also established under the Act. The functions of the Department include the monitoring and safeguarding of the quality of water resources, and the preparation of plans for investigating the rational management, use, control and protection of water resources.

7.1.5 Local Government Act, 2002

The Banjul City Council, the Kanifing Municipal Council (KMC) and the Brikama area council are the three urban councils of the Gambia. KMC was part of the Brikama District Council until 1963 when the Government established the Kanifing Urban District Council (KUDC). In 1990 the KUDC was upgraded to a municipality by the KMC Act 1990. This Act was repealed in April 2002 and replaced by the Local Government Act 2002 (LGA 2002), which establishes and regulates a decentralized local Government system and specifies the functions, powers and duties of established local authorities.

The Council is the supreme policy making body of the area regarding the duties assigned by the Local Government Act 2002.

The LGA confers the following responsibilities to the Council:

Management, protection and conservation of the environment, which includes addressing public concerns on environmental issues and promotion of sanitation practices;
Establishment, acquisition, erection, maintenance, promotion, with the participation of the citizens, sanitary services for the removal and disposal of night soil, rubbish, carcasses of dead animals and all kinds of refuse and effluent;
Prohibition, restriction, regulation or licensing the burning of rubbish or the depositing on any street, public place or unoccupied land any refuse, rubbish derelict vehicles, or any other material and to provide for the removal and disposal thereof.

The Act empowers the Councils to make By-laws, which may define an offence and prescribe penalties on any of the above.

The Local Government Act provides for setting standards and guidelines in liaison with NEA at the national level. The Councils, under the LGA has the authority to enter, examine any land or premises within its jurisdiction, for the purpose of carrying out any inspection, inquiry under the act or by-laws of the Council. The Act also confers to the Councils authority to arrest without

warrant any person it reasonably believes has committed an offence against the provisions of the Act or any order, by law or regulation made under it. Thus the councils have the powers to prevent illegal dumping of solid waste within their jurisdiction.

7.1.6 Public Health Act, 1990

The Public Health Act was enacted to make provision for public and environmental health and connected matters. The Act empowers the Minister (now Secretary of State) to make regulations relating to the collection, removal and sanitary disposal of rubbish, night soil and other offending matter. The Act also mandates the Director of Health Services, who heads the Department of Public Health (DPH), *inter alia*, to abate nuisances and to remove or correct any condition that may be injurious to public health.

Under the Act, a person is prohibited from selling or distributing food, which is unwholesome or unfit for human consumption or is infected or infested as to likely to be unwholesome or unfit for human consumption.

7.1.7 Ports Act (1972)

The Authority established under the Act is required among other things to prevent pollution in Gambian waters. The Port (Wharves) Regulations, 1972 made pursuant to the Act prohibits the dumping of dirt, ashes, bottles, stones, ballast, cargo or anything of a like nature into the water from any wharf.

7.1.8 Factories Regulations

Regulation 20 of the Factories Regulations made pursuant to The Factories Act, 1941 makes provision for the disposal of waste by requiring the occupier to remove all refuse and waste products from the factory at daily intervals on any day that the factory is used, and disposed of in a manner that satisfies the Factories Board.

7.1.9 Physical Planning and Development Control Act, 1990

The Planning Board established under the Act is mandated to prepare development plans generally indicating, among others things, the different land-use zones and utilities services.

7.1.10 Development Control Regulations, 1995

These Regulations were made pursuant to the Physical Planning and Development Control Act, 1991. The Regulations lays down certain guidelines in relation to development structures. The thrust of the regulations in relation to waste management is contained in regulations 79 to 98. In a nutshell, these provisions lay down the requirements for sanitation, drainage and disposal of waste from premises and public utilities.

7.1.11 National Water and Electricity Corporation (NAWEC)

NAWEC is a private limited liability company providing a public service. It is also considered to be a governmental parastatal subject to the Public Enterprises Act. The objects of the company are, *inter alia*, (i) the generation, supply, and distribution of electricity; the provision, distribution and conservation of the supply of water; and the provision, operation and maintenance of sewerage facilities and services.

It should be noted that there is no specific legislation dealing with electrical power in the country and the manner by which waste oil from generators of NAWEC or similar institutions are to be disposed of. The only legislation that deals specifically with the prevention of the discharge of oil on land is section 38(1) of NEMA.

7.2 Protected areas in coastal and marine areas

7.2.1 Tanbi Wetland Complex

The Tanbi Wetland Complex occupies the southern portion of the River Gambia estuary. It is composed primarily of low mangrove forest with a complex of vegetation types on its northern boundary and along the mangrove fringing the mainland. As in all wetland ecologies its functions include coastal stabilisation, sewage sink for the urban area, fish breeding and recreation.

The area covers approximately 6,000 hectares and it includes the area between the island of Banjul and Cape Point in the north and extends to the village of Lamin and Mandinari Point in the South. Despite the fact that much of the land to the west of the site's boundary is urbanised, farmland, and highly deforested the wetland area is intimately connected both to the Atlantic Ocean and the River Gambia, thus forming part of a much larger wetland complex and extending inland along the north and south banks of the River Gambia. The wetland complex also lies adjacent to Abuko Nature Reserve, an area containing remnant gallery forest, and is connected to the Mandina wetlands further south by a thin stretch of mangroves near Mandinari Point. The latter may act as a corridor for animal movement between the two wetland complexes.

The Tanbi Wetland Complex is located within an area of high population density being fringed by Banjul to the east, and Bakau, Jeshwang, Serrekunda, Tallinding and Lamin to the west. The area is subject to considerable agricultural activity on its land ward side and industrial development along the Banjul Highway. The functions of the wetland include acting as a sewage sink for the urban areas, coastal stabilisation on its seaward fringe, fish breeding and nursery grounds and numerous recreational activities especially for tourists visiting the area.

Fishing within the area is widespread and conducted at a subsistence level by the local communities and for semi-commercial purposes at a number of locations. Oyster collection is widespread throughout the wetland and is mainly undertaken by women. The shells are subsequently burnt for the production of lime. Not all the fish and oyster harvest is sold but some part is used for domestic consumption, therefore providing a valuable protein source for low-income families.

Agriculture and market gardening is carried out at various locations in the wetlands. Rice is cultivated over the rainy season and market gardening during the dry season. The most prominent of these is the Bakau Horticultural Project located at Mile 7 where an area of approximately 5 ha is under cultivation. There are also a large number of orchards in the in the periphery areas of Tanbi Wetland Complex which have appeared over recent years. Timber is the main energy source for cooking purposes within the urban area. The high cost of firewood

within the urban area has led to the use of mangrove as an alternative supply. There is evidence of excessive harvesting from some areas within the wetland complex. Other activities carried out in the area include the harvesting of wild fruits and other plant parts for consumption, medicinal purposes etc. This does not appear to be carried out on a commercial basis.

The Tanbi Wetland Complex suffers from diverse threats to its ecological integrity and functioning. The major threats are on its northern, southern and western peripheries where urban encroachment, industrial development and increasing agricultural activities are occurring. The zoning of land under the Greater Banjul Area Physical Development Plan has been contravened in a number of locations in particular along the Banjul - Serrekunda Highway. With industrial development the incidences of pollution has increased and the cumulative impact on the wetland may result in the loss of fish and bird life through contamination. This phenomenon may be further exacerbated by the increasing agricultural development and the associated use of herbicides and pesticides. The clearance of natural vegetation associated with any development results in the fragmentation of habitat that reduces the value of the area for wildlife.

Tanji River Bird Reserve and Bijol Island

The Reserve covers 612 hectares and was gazetted in 1993, primarily due to the diversity of avifauna present. It includes 3.7 km of coastline, open beach, coastal lagoon, rocky headland, estuary of the Tanji River and two off shore islands called Bijol islands. (Figures 3 and 4) It lies on the Atlantic coast, 15 km Southwest of the main tourist centres of Fajara and Bakau and 1km from the expanding town of Brufut. The Reserve is also close to the communities of Tanji and Madiana and Ghana Town.

The Reserve boundary encloses the tidal, saline reaches of the small Tanji River which is bordered by 2 km² of low mangrove forest, salt marsh and mudflats. Long shore drift creates a shifting channel for the river as it reaches the ocean and is blocked by a beach parallel to the land. This has also created several small lagoons between the river's mouth and Cape Point. The Point is the land ward limit of a lateritic outcrop, which reappears 2km off shore to form the tiny Bijol Islands, which are included in the Reserve. The two unstable islands are accumulations of sand trapped by laterite reefs. They were formerly lightly wooded, disappeared in the 1960s and have gradually reformed since then.

The Bijol Islands are the only off shore islands along the entire 80 km of coastline of The Gambia and are an important site both at the local level and national level. They provide the only known breeding site in country for Caspian Terns, Royal Terns and Grey-headed Gulls at the present time. The surrounding waters are used by Monk seals *Monachus monachus*, Atlantic Hump-backed Dolphins *Sousa teuszii* (which are endemic to West African coastal waters), Bottlenose Dolphins, *Tursiops truncatus* and Minke Whales *Balaenoptera acutorostrata*. The Bijol islands may, officially, only be visited for research purposes. However, they are regularly disturbed by fishermen (who are known to harvest tern and gull eggs) and tourists. The Department of Parks and Wildlife Management (DPWM) has recently acquired a boat for monitoring such activities and funds to provide a sensitisation programme for the local

communities about the importance of the fauna. This programme has reduced the number of illegal visits to almost zero.

The Reserve comprises a good variety of habitats including dune scrub woodland, dry coastal woodland, mangrove, salt pan and flats and seasonal fresh water swamp. Green turtle (*Chelonia mydas*), a globally threatened species also occurs here and nests within the mainland reserve and Bijol Islands. It is designated as an important Bird Area (criteria: that 4 species namely turnstone, Caspian tern, lesser black-backed gull and Audouin's gull occur on Bijol Islands in numbers greater than 1% of the African population).

The major threats associated with TBR are the overexploitation of its natural resources by a growing local population, which will result in further degradation, and fragmentation of its habitats. Loss of forest around the reserve serves to isolate the area thereby reducing its value due to the lack of corridors for terrestrial fauna to move to and from other suitable habitat. This threat is further exacerbated by the fact that there are no alternative affordable resources for the local population to use (e.g. gas instead of wood for cooking), or alternative income generating activities that would permit them to be able to afford the alternatives. Lack of resources at the level of DPWM also prevents an ongoing dialogue with the communities being developed to address the issue of education and sensitization, and possible remedies in the form of developing alternative resources, income generating activities etc. Cattle grazing and sand mining activities are a threat to vegetation and coastal habitat directly through vegetation loss by trampling and grazing and also by subsequent coastal erosion.

7..2.3 Nuimi National Park

This coastal park is located in the northwest corner of the country and extends from just outside the town of Barra to the northern border with Senegal where it is contiguous with the Delta du Saloum National Park (Figures 3 and 4). Jinack Island, included in the Park, and separated from the mainland by the Niji Bolon channel has some 12km of narrow, sandy beaches facing the Atlantic, backed by sand dunes. The island also has a small coastal lagoon, seasonally wet salt marshes, narrow *Rhizophora* mangrove bordering the bolon, mudflats and rice fields. The remainder of the island is degraded savannah woodland or arable, and the mainland section of the park has more extensive, tall *Rhizophora* mangrove forest either side of the larger Massarinko bolon and further small areas of salt marsh and mudflats. There are three small villages in the park, one on the mainland and two on Jinack Island.

Gazetted in 1996, and proposed as a Ramsar site, the communities peripheral to and within Nuimi National Park are composed primarily of subsistence farmers and fishermen, and as a consequence they are dependent on natural resources for the maintenance of their livelihoods. The wetland areas of the park are of considerable importance in this subsistence economy such as for wet season rice cultivation and dry season market gardening, provision of dry season grazing for live stock, fishing and shellfish gathering. Various materials are also derived from the wetland environment including mangrove poles for roofing and grasses for thatching and fence construction. Activities of the human population of the park include fishing and some arable and livestock farming. There are also pressures from the villagers to gain additional benefit from the expansion of tourism including the building of more guesthouses.

The major threat to NNP is the overuse of natural resources by the local communities within the park. There are no alternative resources that the local communities can use (natural or affordable), and few monetary resources available to provide the education and sensitisation to the local communities to aid in their understanding about sustainable use. A growing population in this area is thus a major threat to the park. Fire has also contributed to a modification in the vegetation structure in the area, and continues to be a threat to vegetation diversity. Coastal erosion is affecting parts of Jinack Island causing a loss in the total surface area of the island and areas of coastal scrub. Certain activities of the human population of the Park pose some threat to the integrity of the Park. There are pressures from the villagers to gain additional benefit from the expansion of tourism including the building of more guesthouses which if not controlled and regulated could lead to deforestation and loss of ecosystem.

7.3 Coastal ecotourism

The concept of community tourism in The Gambia is often discussed but little has been developed. Several studies have been undertaken which may help in determining the views and aspirations of the local communities. Community projects are therefore slowly being established. The Tumani Tenda Community Based Ecotourism Project was one of the first to be developed but at present is not receiving many visitors. Other projects are on the drawing board with the aim of promoting the uniqueness of the village and surrounds, specifically their culture, handicrafts, cuisine and history. However, all the projects will need assistance in promoting the principles of ecotourism, education, training and resource management in order for them to succeed. Presently though, communities that do receive visitors tend to be exploited by the tourism industry. Local residents have little involvement in planning and decision-making in tourism. As an example, while visitors pay for tour packages, which include visits to the villages, these local groups are mostly dependent upon tips directly from tourists, rather than on pre-arranged financial or other benefits from the ground operator. There is no direct connection between the commercial tourism sector and the community providing the 'entertainment'.

7.3.1 Specific policies and plans for ecotourism development in coastal areas.

Environmental Protection & Management

To protect the natural and associated cultural values which underpin ecotourism in The Gambia through research, planning, monitoring and control and the active participation of local communities.

Ecotourism Industry Development

To create systems and the regulatory environment that will support the development of ecotourism opportunities that will provide enjoyment, appreciation and understanding of natural areas and to promote these opportunities effectively and responsibly.

Infrastructure Development.

To provide infrastructure necessary to present and protect natural and associated cultural and historical resource values which are consistent with the principles of ecotourism.

Community Development.

To ensure local people and the wider community benefit from ecotourism and develop a greater environmental awareness.

Fig.2 Protected Areas in The Gambia



8.0 Recommendations

To promote cross-sectoral learning about coastal resources and uses as well as conflicts and issues, and information exchange among institutions and stakeholders groups at the local and national level;

To formulate effective, participatory approaches and strategies for addressing coastal management problems

Establishment of institutional mechanism for integration

Establishment of a National Management Committee for the Coastal and Marine Environment

Formulation of National Policy for the Coastal and Marine Environment

Surveys, researches, assessment methods and procedures for prioritization

Protection of valuable ecosystems and living resources including worldwide endangered species and their habitats

Establishment of a firm base for the economic development of the transboundary coastal area

Co-managed Marine Protected Area System through supportive activities of related international NGOs

Breeding turtles and their eggs should be protected (from man etc)

Data collected within breeding season on live, dead, by-catch etc

Plastic and other solid wastes should be removed from the beach to enhance turtle breeding and attract tourist

The entire coastline be surveyed, data collected on the species present, and a national monitoring programme established

Explore possible areas of regional cooperation and consensus on a plan of short to medium term conservation actions for marine turtles

Research on manatee corridors and threats during migration

Identify key habitats of manatees to map out these dwelling sites e.g. tributaries leading from the main lands into the river

Identify breeding sites and species of fruit trees whose flowering period coincides with the mating period of the manatee

Education and information to raise peoples understanding about the manatee in general

- Relevant policy guidelines for all coastal development and activities
- Proper implementation and effective monitoring structures must also be put in place
- The recommendations of the coastal environment report must be followed to the letter
- Because of its fragile nature, all developments must be preceded by an EIA
- All relevant institutions and stakeholders must work hand in glove in the integrated management of the coastal environment
- All developments must therefore be in line with Governments sustainable development policy and in line with international codes and standards

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