

Coastal Statistics, 2000	Madagascar	Sub-Saharan Africa	World
Length of coastline {a} (km)	9,935	63,124	1,634,701
Percent of population within 100 km of the coast	55%	X	39%
Area of continental shelf (km <sup>2</sup> ) {b}	96,653	987,021	24,285,959
Territorial sea (up to 12 nautical miles) (km <sup>2</sup> )	124,938	871,895	18,816,919
Claimed Exclusive Economic Zone (km <sup>2</sup> )	1,079,672	7,866,074	102,108,403

## Coastal Biodiversity and Protected Areas Data, 1990s

Area of Mangrove Forests (km <sup>2</sup> )	3,097	38,013	169,452
Percent of Mangrove forests protected	0%	1%	13%
Number of Mangrove Species	9	17	70
Number of Seagrass Species	8	15	58
Number of Scleractinia Coral Genera {c}	58	68	X
International Legal Net Trade in Live Coral, 1997 (number of pieces) {d}	-155	-202	X
Number of Marine or Littoral Protected Areas, 1999	3	150	3,636
Wetlands of International Importance, Extent (km <sup>2</sup> ), 2000	531	143,481	730,116

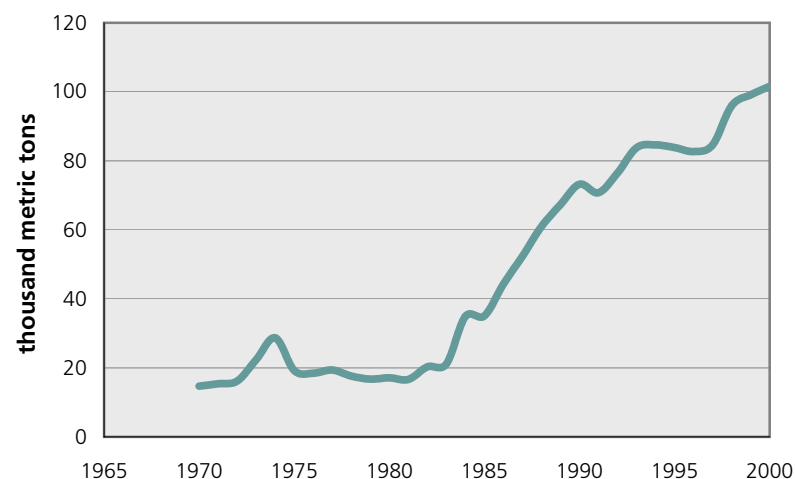
## Fisheries Production

Average Annual Capture (excludes aquaculture) in metric tons:			
Marine Fish, 2000	101,593	X	84,411,066
Molluscs and Crustaceans, 1997	12,995	140,424	12,055,801
Aquaculture Production (in metric tons):			
Total (includes freshwater), 2000	7,280	55,520	45,715,559
Marine and Diadromous Fish, 1997	X	1,202	2,623,888
Molluscs and Crustaceans, 1997	X	6,299	9,889,688
Aquatic Plants, 1997	X	3,095	7,241,754

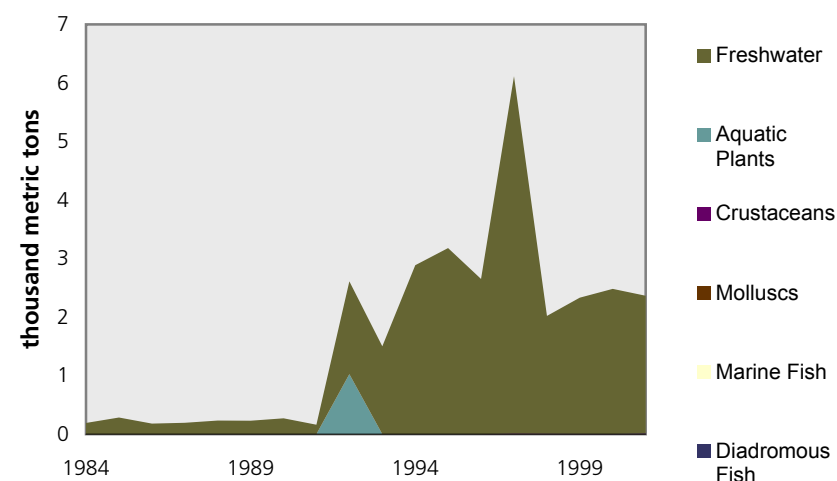
## Fish Consumption and Trade, 2000

Per Capita Food Supply from Fish and Fishery Products (kg/person)	8	8	16
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### Average Annual Capture of Marine Fish, Madagascar



### Total Aquaculture Production, Madagascar, 1984-2001



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## Coastal and Marine Ecosystems-- Madagascar

	Madagascar	Sub-Saharan Africa	World
<b>Fish Consumption and Trade, 2000 (cont'd)</b>			
Fish Protein as a % of Total Protein Supply	5%	6%	6%
Annual Trade in Fish and Fisheries Products			
Imports (thousand \$US)	4,632	778,886	60,008,337
percent change since 1980	1822%	-3%	275%
Exports (thousand \$US)	33,707	1,642,028	54,570,489
percent change since 1980	82%	X	258%
<b>Fishing Effort, both freshwater and marine</b>			
People Employed in Fishing and Aquaculture, 2000 (number)	83,310	1,995,694	36,116,329
Docked Fishery Vessels, 1995-98 (number) {e}	73	X	1,297,017

### Other Resources:

Country Profiles of the Food and Agriculture Organization of the United Nations' Fishery Sector:  
<http://www.fao.org/fi/fcp/en/MDG/profile.htm>

### Footnotes:

*Some footnotes are not incorporated here. Please refer to the Data Tables section of EarthTrends for a full listing.*

- a. Figures should be interpreted as approximations. Estimates may differ from other published sources
- b. Up to 200 meters depth c. Reef forming corals (i.e. "true" or stony corals).
- d. Imports - exports = net trade. E. Data are for the most recent available year in the listed range of years.

Trade in Fish and Fisheries Products, Madagascar, 1980-2000



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## Coastal and Marine Ecosystems—Sources and Definitions

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### Coastal Statistics

**Length of Coastline** was derived from the World Vector Shoreline database of the United States Mapping Agency. The estimates presented here were calculated using a Geographic Information System (GIS) with a resolution of 1:250,000 kilometers and an underlying database consistent for the entire world. In general, the coastline length of islands that are part of a country, but are not overseas territories, are included in the coastline estimate for that country (i.e., Canary Islands are included in Spain).

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**Percent of Population within 100 km of Coast.** Estimates were based on 1995 population figures. The Gridded Population of the World is a raster data set that provides information on the spatial distribution of the world's human population. The grid cells are approximately 4.6 km on each side. Populations are distributed according to administrative districts which vary in scale, level and size from country to country. A 100 km coastal buffer with a 10 km 'safe area' falling into the sea were used in the geographic information system to calculate the number of people in the coastal zone for each country individually.

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**Area of Continental Shelf.** According to the UN Convention of the Law of the Sea, the Continental Shelf is the area of the seabed and subsoil which extends beyond the territorial sea to a distance of 200 nautical miles from the territorial sea baseline and beyond that distance to the outer edge of the continental margin. Coastal States have sovereign rights over the continental shelf (the national area of the seabed) for exploring and exploiting it; the shelf can extend at least 200 nautical miles from the shore, and more under specified circumstances.

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**Territorial Sea** is defined under the United Nations Convention on the Law of the Sea (UNCLOS) as the 12-nautical mile zone from the baseline or low-water line along the coast. The coastal State's sovereignty extends to the territorial sea, including its sea-bed, subsoil, and air space above it. Foreign vessels are allowed "innocent passage" through those waters. Even though the established limit for a territorial sea is 12 nautical miles, some countries claim larger areas.

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**Claimed Exclusive Economic Zone** . Under UNCLOS, coastal States can claim sovereign rights in a 200-nautical mile exclusive economic zone (EEZ). This allows for exploration, exploitation, conservation and management of all natural resources in the seabed, its subsoil and overlaying waters. UNCLOS allows other states to navigate and fly over the EEZ, as well as to lay submarine cables and pipelines. The inner limit of the EEZ starts at the outer boundary of the Territorial Sea (see above). Under UNCLOS, "land-locked and geographically disadvantaged States have the right to participate on an equitable basis in exploitation of an appropriate part of the surplus of the living resources of the EEZ's of coastal States of the same region or sub-region."

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### Sources

Center for International Earth Science Information Network (CIESIN), World Resources Institute, and International Food Policy Research Institute, "Gridded Population of the World, Version 2 alpha" (Columbia University, Palisades, NY, 2000) available at: <http://sedac.ciesin.org/plue/gwp>.

Pruett, L. and Cimino, J. Unpublished data, Global Maritime Boundaries Database (GMBD), Veridian - MRJ Technology Solutions, (Fairfax, Virginia, January, 2000).

## Coastal Biodiversity and Protected Areas Data

**Area of Mangrove Forests and Percent of Mangrove Forests Protected** . Mangrove estimates were calculated by the World Conservation Monitoring Center (WCMC) by compiling many national and regional data showing forest extent. The legends of these maps were harmonized into 15 different tropical and 11 non-tropical forest types for the globe, defined specifically for this study. Percent protected includes forest areas that fall within the protected areas in the world that are listed by IUCN - World Conservation Union as being within their management categories I-VI.

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**Number of Mangrove Species** . Mangrove trees and shrubs, including ferns and palms, are found along river banks and coastlines in tropical and subtropical countries. Their main characteristic is that they can tolerate salt and brackish water environments. Original data on species richness was compiled by the World Conservation Monitoring Centre (WCMC) from a variety of sources including, governments, mapping agencies, non-governmental organizations, international agencies and scientists. The year and quality of the data vary from country to country, therefore figures are not strictly comparable between countries.

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**Number of Seagrass Species** . Seagrasses are marine angiosperms that live in seawater. They grow in soft substrates like sandy soils and form large underwater meadows in coastal regions of the world. The total number of seagrass species is low, but these plants provide habitat, breeding, and feeding grounds for many species of fish and shellfish. The year and quality of the data vary from country to country, therefore figures are not strictly comparable between countries.

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**Number of Scleractinia Coral Genera** . Coral reefs are home to more than a quarter of all known marine fish species. In general coral reefs are found in shallow waters, between the Tropic of Capricorn and the Tropic of Cancer. Most reef-forming corals belong to the family Scleractinia, which are also called true or stony corals. They may be solitary or colonial and have a heavy external calcareous skeleton. The year and quality of the data vary from country to country, therefore figures are not strictly comparable between countries.

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**International Legal Net Trade in Live Corals** includes pieces of all coral species traded under the regulation of the Convention on International Trade in Endangered Species (CITES). Net trade is calculated as total imports minus total exports; a negative value means that a country or region exports more coral than they import. CITES monitors the trade in more than 2000 species of Coral. The typical size of live coral pieces in trade is 10 x 6 cm in cross section, 6cm in height and weighing about 200g. Species traded within national borders or illegal trade in wildlife and wildlife products are not reflected in these figures. Mortality of individuals during capture or collection, transit, or quarantine also are not reflected in these numbers.

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**Number of Marine or Littoral Protected Areas** . IUCN defines a 'marine protected area' as: "any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment." "Marine" is defined as any site which is known to incorporate at least some subtidal area permanently submerged under the ocean. "Littoral" is defined as any site which is known to incorporate at least some intertidal area. The categories of marine and littoral are not exclusive. Many of these protected areas have a large terrestrial component. The degree of protection varies from one country to another.

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**Wetlands of International Importance, Extent** . The Convention on Wetlands of International Importance especially as Waterfowl Habitat, signed in Ramsar, Iran, 1971, is an intergovernmental treaty for the conservation and sustainable use of wetlands. When a country becomes a Party to the Convention,

it agrees to designate at least one wetland for inclusion in the List of Wetlands of International Importance (the "Ramsar List") and to promote its conservation. In order for a site to qualify as a Ramsar site, it has to have "international significance in terms of ecology, botany, zoology, limnology or hydrology."

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### **Sources**

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) annual report data, World Conservation Monitoring Centre (WCMC) CITES Trade Database (WCMC, Cambridge, U.K., December, 1999).

Iremonger, S., C. Ravilious, T. Quinton, "A statistical analysis of global forest conservation." In: S. Iremonger, C. Ravilious, and T. Quinton (Eds). "A Global Overview of Forest Conservation CD-ROM" (World Conservation Monitoring Centre (WCMC) and Centre for International Forestry Research, Cambridge, U.K., 1997).

Protected Areas Database of the World Conservation Monitoring Centre (WCMC), unpublished data (WCMC, Cambridge, U.K., August, 1999).

Ramsar Convention Bureau, Gland, Switzerland. Available on-line at: <http://ramsar.org/sitelist.pdf>

Spalding, M., F. Blasco, and C. Field (Eds.). "World Mangrove Atlas", The International Society for Mangrove Ecosystems (ISME), Okinawa, Japan, 1997.

World Conservation Monitoring Centre, unpublished data, WCMC, Cambridge, UK (August, 1999). The data presented here has been compiled by WCMC from different published sources.

### **Fisheries Production, Consumption and Trade:**

**Capture** is defined by the Food and Agriculture Organization of the United Nations (FAO) as "the nominal catch of fish, crustaceans and molluscs, the production of other aquatic animals, residues and plants and catches of aquatic mammals, taken for commercial, industrial, recreational and subsistence purposes from marine waters. " Statistics for aquaculture are not included in the capture totals. Production of fish, crustaceans and molluscs is expressed in live weight--the nominal weight of the aquatic organisms at the time of capture. Data include all quantities caught and landed for both food and feed purposes but exclude discards. Figures are national totals which include fish caught by a country's fleet anywhere in the world.

**Marine Fish Captured** include cods, hakes and haddocks; flounders, halibuts and soles; herrings, sardines and anchovies; jacks, mullets and sauries; redfishes, basses and congers; tunas, bonitos and billfishes; and miscellaneous marine fishes. Marine capture totals exclude freshwater species, brackishwater species, and harvest totals from mariculture and aquaculture.

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**Mollusc and Crustacean Capture** data refer to marine and inland waters molluscs and crustaceans caught or trapped. Crustaceans include freshwater crustaceans, sea-spiders, crabs, lobsters, shrimps, prawns, and miscellaneous marine crustaceans.

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**Aquaculture** is defined by FAO as "the farming of aquatic organisms, including fish, molluscs, crustaceans, and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. [It] also implies ownership of the stock being cultivated." Aquatic organisms that are exploitable by the public as a common property resource are included in the harvest of fisheries.

**Total aquaculture production** includes marine, freshwater, and diadromous fish, molluscs, crustaceans, cephalopods, miscellaneous aquatic animals, and aquatic plants cultivated in marine, inland or brackish environments.

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**Marine and Diadromous Fish** . Diadromous fish include sturgeons, paddlefishes, river eels, salmon, trouts, smelts, shads, and miscellaneous diadromous fishes. Marine Fish include cods, hakes and haddocks; flounders, halibuts and soles; herrings, sardines and anchovies; jacks, mullets and sauries; redfishes, basses and congers; tunas, bonitos and billfishes; and miscellaneous marine fishes.

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**Molluscs and Crustaceans** . Molluscs include freshwater molluscs, abalones, winkles, conchs, oysters, mussels, scallops, pectens, clams, squids, and miscellaneous marine molluscs. Crustaceans include freshwater crustaceans, sea-spiders, crabs, lobsters, shrimps, prawns, and miscellaneous marine crustaceans.

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**Aquatic plants** include brown, red, and green seaweeds, and miscellaneous aquatic plants.

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**Per Capita Food Supply from Fish and Fishery Products** is defined as the quantity of both freshwater and marine fish, seafood and derived products available for human consumption. Data were calculated by taking a country's fish production plus imports of fish and fishery products, minus exports, minus the amount of fishery production destined to non-food, and plus or less variations in stocks. The data represent apparent consumption in live weight basis, which means that the amounts of fish and fishery products consumed include all parts of the fish, including bones.

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**Fish Protein as a percent of total protein supply** is defined as the quantity of protein from both freshwater and marine fish, seafood and derived products available for human consumption as a percentage of all the animal protein available. Data were calculated by taking a country's fish production plus imports of fish and fishery products, minus exports, minus the amount of fishery production destined to non-food uses (i.e., reduction to meal, etc.), and plus or less variations in stocks. The data represent apparent consumption in live weight basis, which means that the amounts of fish and fishery products consumed include all parts of the fish, including bones.

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**Annual Trade in Fish and Fishery Products** . Import and export values of fish and fisheries products includes that of fish that are live, fresh, chilled, frozen, dried, salted, smoked or canned, and other fish products and preparations. Molluscs, crustaceans, meals, oils, sponges, corals, and inedible products are also included in these totals. Values are expressed in thousands of United States dollars.

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#### **Sources**

Fishery Information, Data and Statistics Unit, Food and Agriculture Organization of the United Nations (FAO). 2002. *FISHSTAT Plus: Universal software for fishery statistical time series*, Version 2.3 (available on-line at <http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp>); Aquaculture Production dataset. Rome: FAO.

Food and Agriculture Organization of the United Nations (FAO), *FAOSTAT on-line statistical service*. Available on-line at <http://apps.fao.org>. FAO: Rome, 2002.

#### **Fishing Effort, both Freshwater and Marine**

**People employed in fishing and aquaculture** includes the number of people employed in commercial and subsistence fishing (both personnel on fishing vessels and on shore), operating in freshwater, brackish and marine areas, and in aquaculture production activities.

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**Decked Fishery Vessels** . The term "fishery vessel" refers to "mobile floating objects of any kind and size, operating in freshwater, brackish and marine areas, and used for catching, harvesting, searching, transporting, landing, preserving and/or processing fish, shellfish and other aquatic animals, residues and plants." Decked vessels are those that have a fixed structural deck covering the entire hull above the deepest operating waterline. Decked fishery vessels data include trawlers, purse seiners, gill netters, long liners, trap setters, other seiners and liners, multipurpose vessels, dredgers and other fishing vessels, and non-fishing vessels such as motherships, fish carriers, fishery research vessels, etc.

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#### **Sources**

Fishery fleet data are from the Food and Agriculture Organization of the United Nations (FAO), Fishery Information, Data and Statistics Unit (FIDI), July, 2002.