

7.11 Mauritania



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Capital city	Nouakchott
Population (2005 est.)	3,000,000 (2.4% growth)
GDP per capita (USD 2005 est.)	\$2 234
Life expectancy at birth (2005 est.)	63.2 years (male - 61.5, female - 65.0)
Land and water area	1,030,700 km ² (land - 1 030 400, water - 300)
Length of coastline	754 km
Highest point of elevation	Kiedier Ljill 915 m
Mangrove area (2005 est.)	100 ha
Marine protected areas (2007 est.)	6 311.68 km ² (31.33% of total territorial waters)
Capture fisheries prod. (2006 est.)	193,230 metric tones
Aquaculture fisheries prod. (2006 est.)	0 metric tones recorded

Coastal Climate: The climate is characterized by extremes in temperature and by meagre and irregular rainfall. Annual temperature variations are small, although diurnal variations can be extreme. The harmattan, a hot, dry, and often dust-laden wind, blows from the Sahara throughout the long dry season and is the prevailing wind, except along the narrow coastal strip, which is influenced by oceanic trade winds. Most rain falls during the short rainy season (Hivernage), from July to September. The average annual precipitation varies from 500 to 600ml in the far south, to less than 100ml in the northern two-thirds of the country. Prevailing oceanic trade winds from the Canary Islands modify the Harmattan, producing a humid but temperate climate. Rainfall in Nouadhibou is minimal, averaging less than three centimeters annually and occurring between July and September. Temperatures are moderate, varying from mean maximum of 28°C and 32°C to mean minimum of 16°C and 19°C for Nouadhibou and Nouakchott respectively.

Coastal Geomorphology: Mauritania is generally flat, it is 1,030,700 km² forming vast, arid plains broken by occasional ridges and cliff like outcroppings. A series of scarps face southwest, longitudinally bisecting these plains in the centre of the country. The scarps also separate a series of sandstone plateaus, the highest of which is the Adrar Plateau, reaching an elevation of 500 m (1 640 ft). Spring-fed

oases lie at the foot of some of the scarps. Isolated peaks, often rich in minerals, rise above the plateaus; the smaller peaks are called *guelbs* and the larger ones *kaédi*. The concentric *Guelb er Richat* (also known as the *Richat Structure*) is a prominent feature of the north-central region. *Tiris Zemmour*, has an elevation of 1 000 m (3 280 ft) and is the highest peak. Approximately three quarters of Mauritania is desert or semi desert. As a result of extended, severe drought, the desert has been expanding since the mid-1960's. To the west, between the ocean and the plateaus, are alternating areas of clay plains (*regs*) and sand dunes (*ergs*), some of which shift from place to place, gradually moved by high winds. The dunes generally increase in size and mobility toward the north. The country is mostly desert, with the exception of the fertile Senegal River valley in the south and grazing land in the north.

The Coastal Zone, or Sub-Canarian Zone, extends the length of the approximately 754 km along the Atlantic coast. Battering surf and shifting sand banks characterise the entire length of the shoreline. The *Ras Nouadhibou* (formerly *Cap Blanc*) peninsula, which forms *Dakhlet Nouadhibou* (formerly *Lévrier Bay*) to the east, is fifty kilometres long and up to thirteen kilometres wide.

Coastal Currents and Tides: Current meter measurements obtained during the coastal up welling experiment JOINT-I (Feb. to April 1974) are used to describe some aspects of the semi-diurnal tidal currents on the shelf and across the continental slope off Mauritania. On the shelf the semi-diurnal tides represent the dominant short-period fluctuations. Semi-diurnal current speeds range between 1 and 10 cm s^{-1} . The mean speeds of about 5 cm s^{-1} are 15% to 25% of the residual current speeds. The main contribution to the semi-diurnal currents comes from the M2 tide. The mean amplitude of the currents at the period of the S2 tide is about half as large as the amplitude due to the M2. The signal of tidal currents at the period of 12.00 hours (S2) is probably biased by the influence of weak semi-diurnal wind variations. At the diurnal frequency band the daily wind fluctuations of the land-sea-breeze interferes with the tidal currents. When averaged over time, the semi-diurnal tides inshore appear barotropic. Over the continental slope baroclinic tides contribute significantly to the tidal currents and enhance the tidal energy there. The interactions of barotropic and baroclinic tides also contribute to the observed marked phase differences of the semi-diurnal currents across the continental

slope. Whereas the semi-diurnal currents rotate counter-clockwise on the shelf they rotate clockwise 50 km offshore the shelf break.

Ports and Harbours: *Nouakchott*, is the capital city of Mauritania and one of the newest capitals in the world. It is located near the West African Atlantic coast and was developed as the capital of Mauritania after it gained independence in 1960. In the past Mauritania lay on one of the most lucrative trade routes in West Africa. Mauritania had always had to rely on neighboring ports, for it only had the fishing harbour of *Nouadhibou*, located in the extreme north-west, without any useful links to the southern, central and eastern parts of the country. Several projects to build a port were consequently contemplated but due to the peculiar configuration of the coast line which includes a sandy coast, lack of natural safe havens and moving sand banks it did not justify building a traditional harbour with quays. Plans were consequently drawn up at the beginning of 1963 to build a port called *Port Wharf*, including the construction of industrial and trade buildings. This became operational in 1966. This wharf, located 350 km south of *Nouadhibou*

Figure 1. Tide gauge installation at *Nouakchott port*.





Figure 2. The IMROP Research Vessel.

and 450 km north of Dakar was designed to accommodate traffic of up to 50,000 tones. The ports capacity was successfully increased in stages to 200,000 tones by improving available equipment and organic growth. This was mainly due to cope with the traffic of copper ore from Akjoujt (120 miles (195 km) northeast). In 1977 the Wharf was lengthened to provide 3 extra berths for ships of average tonnage raising its capacity to 320,000 tones. However, the rapid growth of traffic, coupled with projects developing new industries and the increase in inland trade to land locked countries led the Mauritanian government to negotiate with the Peoples Republic of China in order to build a deep sea harbour at Nouakchott. These negotiations led to the signature in October 1974 of an economic co-operation agreement in order to build such a port. Preliminary work commenced in 1978 with the foundation stone being laid on 10th April 1979. The inauguration of the Nouakchott deep-sea harbour, christened the 'Port of Friendship' took place on 17th September 1986. The Autonomous Port of Nouakchott, called PANPA for short, took over the management of the port and as such the port became operational in 1987 attracting trade between the

two Capes (White and Green). Stevedoring activities were privatized in 1990 offering competitive storage facilities and warehousing tariffs. While there has been a steady increase in the port's activity, the level of traffic remains below that of the more northern port of Nouadhibou. PANPA's capacity is now estimated to be 1.5 million tones per annum and processes more than 90% of Mauritania's imports. Nouakchott port is an import port representing approximately 96.4% of all annual traffic. Imported goods include wheat, cement, clinker, flour, sugar, semolina, milk and general equipment. Exports include plaster from Samia (Mauritania's main producer), animal skins and fish.

Coastal Economy: The Majority of the population still depends on agriculture and livestock as a source of livelihood even though most of the nomads and many subsistence farmers were forced into the cities by recurrent droughts in the 1970's and 1980's. Mauritania has extensive deposits of iron ore which account for almost 50% of the total exports. The nation's coastal waters are among the richest fishing areas in the world, but over exploitation, predominantly by foreign fishermen, threatens this key source of revenue. Offshore oil deposits began to develop in 2004.

Fisheries: The main impact of oil activities in the coasts of Mauritania will be undoubtedly over fishing activities, both artisanal and industrial, because the country has one of the most productive marine eco-regions in Western Africa. In Mauritania, close to 50% of the commercial trade comes from fisheries, which is 43% of their total exports, 25% of their national budget, and more than 14% of the GDP. 40,000 of the country's jobs depend on fisheries. For many centuries the economy of Mauritania was based on bartering. Later a large portion of their income came from the mining of iron ore in the north western part of the country. There are three types of fisheries in Mauritania. Industrial fisheries are carried out in deep waters and the Government of Mauritania has to grant the permits. European countries are the main beneficiaries of these permits. Then we have artisanal fisheries that are carried out mainly in shallow coastal waters; the fleet is made up of out-board motorboats (pirogue-type) that come to the coasts to deliver their cargoes, or that approach the big industrial ships offshore; their fishermen are mainly from Senegal or Guinea Bissau and Moorish Mauritanian businessmen are in charge. The third type of fisheries is artisanal on foot or the traditional Imraguen lanches style (previously



Figure 3. Artisanal fishermen at the Banc d'Arguin.

described). Although there is greater control over the industrial and artisanal and traditional fisheries, the pressure on coastal resources is still too great, and the current fishing levels should be lowered. Today, fishing in Mauritania exceeds 600,000 tones per year, of which 80% is industrial fishing and the rest artisanal. The most valued species are certain types of sharks, rays, croakers and grey mullets. The latter are especially valued for their eggs (caviar), particularly in Spain, France and Italy. In Mauritania's maritime exclusive economic zone, we can detect close to

13,000 ship movements every year, having caused already adverse impacts on biodiversity. In fact, of all the oil waste dumped from every ship that goes through the waters of Mauritania, it is estimated that more than 7% will come from the Chinguetti oil field.

Mineral Resources: The exploitation of iron which is currently ensured by the industrial National Company and mine (SNIM) which replaced Miferma, started with time of French colonization in the area of Zouérate. The ore is extracted from open mines and brought to the harbour terminal of Cansado in Nouadhibou by rail. This is a distance of 650 km following the border of the Western Sahara. The train ore tanker is one of the largest in the world with three motorized carriages drawing 200 coaches weighing 24,000 tones. The total exploited iron corresponds to 10.4 million tones per annum. The total of the iron exported to Europe corresponds to 10.2% of its needs. It acts as the

most important source of revenue for Mauritania (94.9%). Currently, Mauritania is the 13th highest iron producer in the world.

Agricultural products: Agriculture is especially practised in oases and the area bordering Senegal. It is principally practiced in the major river beds after the withdrawal of flooding, and farmlands are generally irrigated with pumping of water from the river. Rain fed cropping is practised in the back-country, but is seriously compromised in periods of dryness.

ADDRESSING KEY COASTAL ISSUES AND HOT SPOTS

The coastal area constitutes a vital element of the marine ecosystem due to its biological and ecological functioning, including zones important for reproduction and productivity. These zones are exposed to human activities which can present potential threats to their ecological functioning. Their sustainable management requires thorough knowledge of these systems.

The peninsula of the Cape Blanc shelters more than 100 individuals of the seal monk of the Mediterranean (*Monachus*) which constitutes the greatest global concentration. Other marine mammals are also protected by law, taking into account the role that they play in the ecosystem.

Research and management activities are being undertaken with the following objectives:

- To study the eco-biology of the marine mammals, in particular that of the seals
- To ensure the follow-up of the standings of marine mammals
- To guarantee survival and the reintroduction in their natural environment of the sick, wounded or orphan seals
- To sensitize the public with the protection of the seal monk and its habitat



Figure 4. Islands and channels in the shallow part of Banc d'Arguin.

The results and activities thus far include:

- IMROP is one of the rare African institutes to have an operational centre of rehabilitation for the seals. The wounded baby seals or orphans are cared for and observed, before being returned to sea as soon as their conditions allow it
- Development of a national expertise in the field of the rehabilitation of the seals
- Vaccination of several small seals against the Herpes virus
- Regular monitoring of the population of the seals and their habitat
- Sensitizing of the population and local fishermen
- Development of a national action plan to safeguard the seal monk and determination of the causes of mortality of these marine mammals

DEVELOPMENT AND ACHIEVEMENTS OF THE NODC

The NODC of Mauritania was founded in 2001 and placed under the responsibility of the Oceanographic and Fisheries Mauritanian Research Institute (IMROP). Two structures of the IMROP ensure the essence of work of the NODC: 1) the Laboratory Environment and Medium (LEM), and 2) the Service of Information and Communication (SIC). The activities of ODINAFRICA are an important part of the action plans of these structures.

The Objectives of the centre include:

- To describe the coastal mediums and their dynamics in both physical and biological terms
- To include/understand the functions of these mediums and the interactions with the marine ecosystem



Figure 5. Analysis of physical parameters of water on board RV Amrigue.

- To evaluate the current and potential impacts of the human activity on the coastal mediums
- To study the biodiversity of the aquatic environments and to thus contribute to a better conservation of the species

Products and services of the NODC include:

- Oceanographic database management
- Study of coastal water hydrodynamics, including the influence up-welling
- Studies of coastal water quality
- Description of the habitats and the littoral ichthyologic settlements
- Studies of human activity in the coastal zone
- Publication of atlases on various topics including hydrology
- Training and outreach with local experts, including data base management
- Management of library collection and bibliographies, including the computerised management of the library catalogues using INMAGIC software, ODINAFRICA (Afrilib), and the African numerical deposit (Ocean docs)
- Provision of access to the bibliographical databases and catalogues of libraries of international associations (ASFA, AGORA, AFRILIB, IAMSLIC IT, Z39)
- Edition and publication of coastal and marine research, including publication through “e-repository” online

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Figure 6. Students using the IMROP library facilities.

Figure 7. Release of young Seal into the ocean after rehabilitation at IMROP.

