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DRAFT ENVIRONMENTAL REPORT ON MAURITANIA

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JANUARY 1979

ENVIRONMENTAL REPORT ON MAURITANIA (Draft: Jan. 1979)

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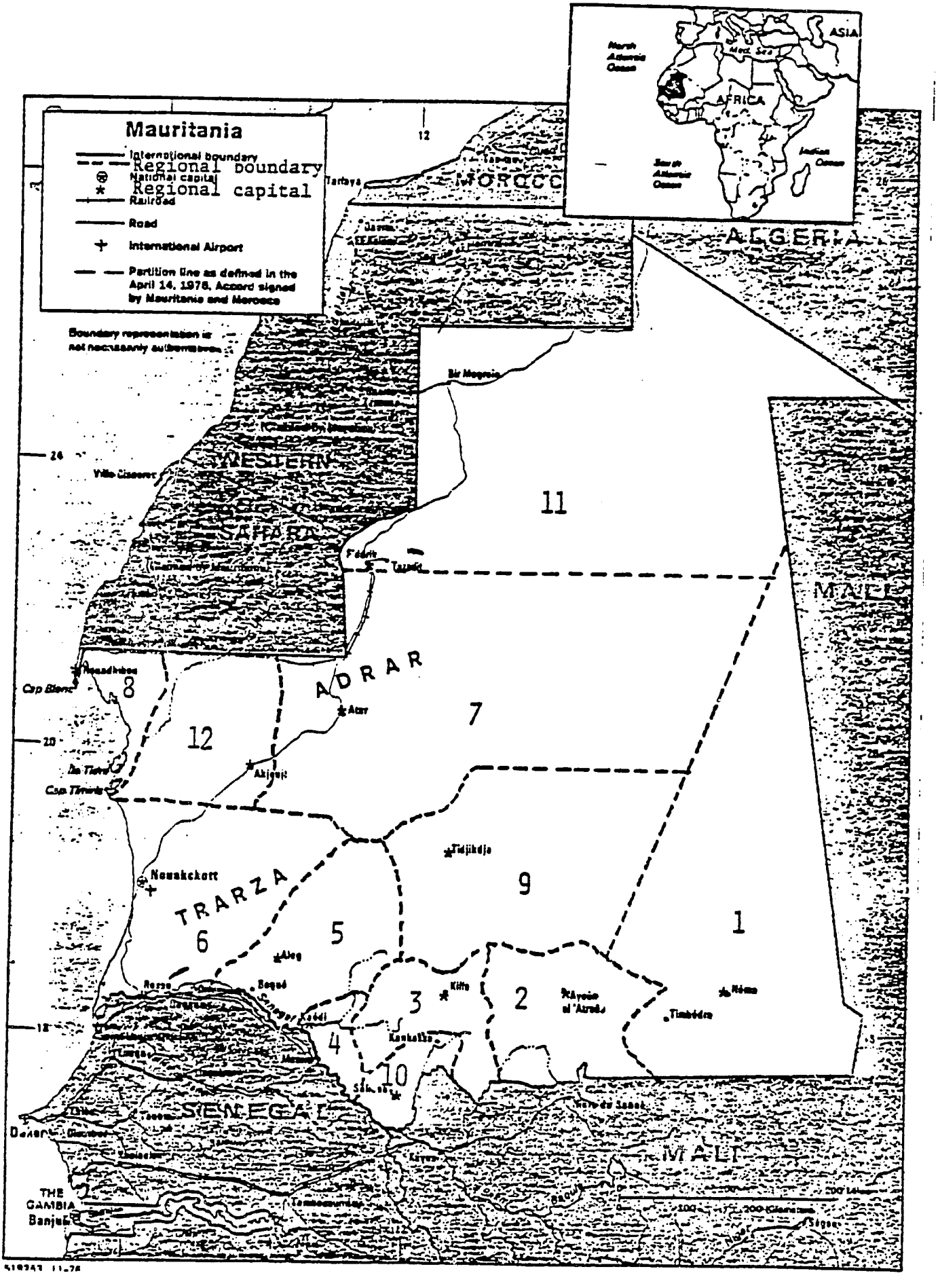

Mauritania
International boundary
Regional boundary
National capital
Regional capital
Railroad
Road
International Airport
Partition line as defined in the April 14, 1976, Accord signed by Mauritania and Morocco
Boundary representation is not necessarily authoritative.
ASIA
AFRICA
MOROCCO
ALGERIA
WESTERN SAHARA
MALI
ADRAR
TRARZA
SENEGAL
THE GAMBIA
Banjul
Dakar
Nouakchott
Nouadhibou
Cap Blanc
Cap Timiris
Ile Tidra
Atar
Akjoujt
Tidjikdja
Aleg
Boghé
Kiffa
Kankossa
Sélibaby
Néma
Timbédra
Aioun el 'Atroûs
Bir Moghrein
Tarfaya
Villa Cisneros
Fdérik
Zouérat
Kayes
Bakel
Matam
Podor
Saint-Louis
Bogué
Kaédi
Tambacounda
Niger
Sénégal
Gambie
Falémé
Senegal
Mediterranean Sea
North Atlantic Ocean
South Atlantic Ocean
Indian Ocean
12
20
24
26
100
200 Kilometers
1
2
3
4
5
6
7
8
9
10
11
12

INTRODUCTION AND SUMMARY

The Islamic Republic of Mauritania, formerly a part of French West Africa, received its independence in 1960; in 1961 it adopted a constitution providing it with a presidential system of government under Moktar Ould Daddah who, in conjunction with the Mauritanian People's Party remained in power until July 1978. At that time, as a result of increased internal dissent focusing on the war being waged with rebels fighting for the independence of the former Spanish Sahara, part of which Mauritania had annexed as its own territory in 1976, the government was overthrown in a coup. The country is now under President Ould Mohamed Salek.

Occupying territory about 4/5's the size of Alaska, Mauritania is divided administratively into 12 regions and the district of the capital (Nouakchott), apart from the Department of la Guera (Western Sahara).

A land of contrasts, Mauritania has a landscape ranging from the hot nearly rainless deserts of the Saharan north to the fertile and green banks of the Senegal to the south, a population split between Arab-Berber nomads and black sedentary farmers, and an economy clearly divided between a modern industrial sector and a traditional agricultural sector. Burdened with a precarious climate, Mauritania has recently suffered heavily under an extended drought, which has threatened its traditional agricultural base and led to the progress of desertification in its Sahelian zone.

The problem of rapid desertification of much of its territory and the consequent loss of land devoted to both grazing and subsistence agriculture is the major environmental problem facing Mauritania today. This process, although severely aggravated by the drought affecting the entire Sahelian area of Africa, has been made all the worse by certain practices which have upset the delicate balance of the area's ecology. These developments, which may to a large extent be attributed to population pressures, include the extension of agriculture to marginal lands formerly reserved for grazing; the growth of livestock herds ,in many cases as a direct consequence of the establishment of new watering facilities, and resulting overgrazing; and deforestation resulting from foraging for firewood or clearing of land for agricultural purposes. With the failure of the rains beginning in the early 1970's marginal lands were no longer able to produce food and because they had been cleared of their natural, better adapted vegetation were frequently lost to the desert, livestock, deprived of both water and food, died in large numbers, and herdsmen, seeking to feed their animals, resorted to stripping of trees as fodder, accelerating the process of deforestation and the desertification which frequently followed.

In Mauritania, where, until recently, the overwhelming majority of the population consisted of nomadic herdsmen dependent on their animals for food and as a source of income (see page 2), the drastic depletion of their herds also meant a loss of livelihood; this has resulted in the movement of nomadic herdsmen to urban areas where they live in crowded tent suburbs where decent water and sanitary facilities are in short supply and where disease is consequently rife. The problem of adequately dealing with these new "urban" dwellers is a major problem for the Mauritanian government.

The restoration of the delicate balance which has in the past has allowed for the successful if somewhat tenuous existence of the peoples of Mauritania is of vital important for the continuing survival of the country.

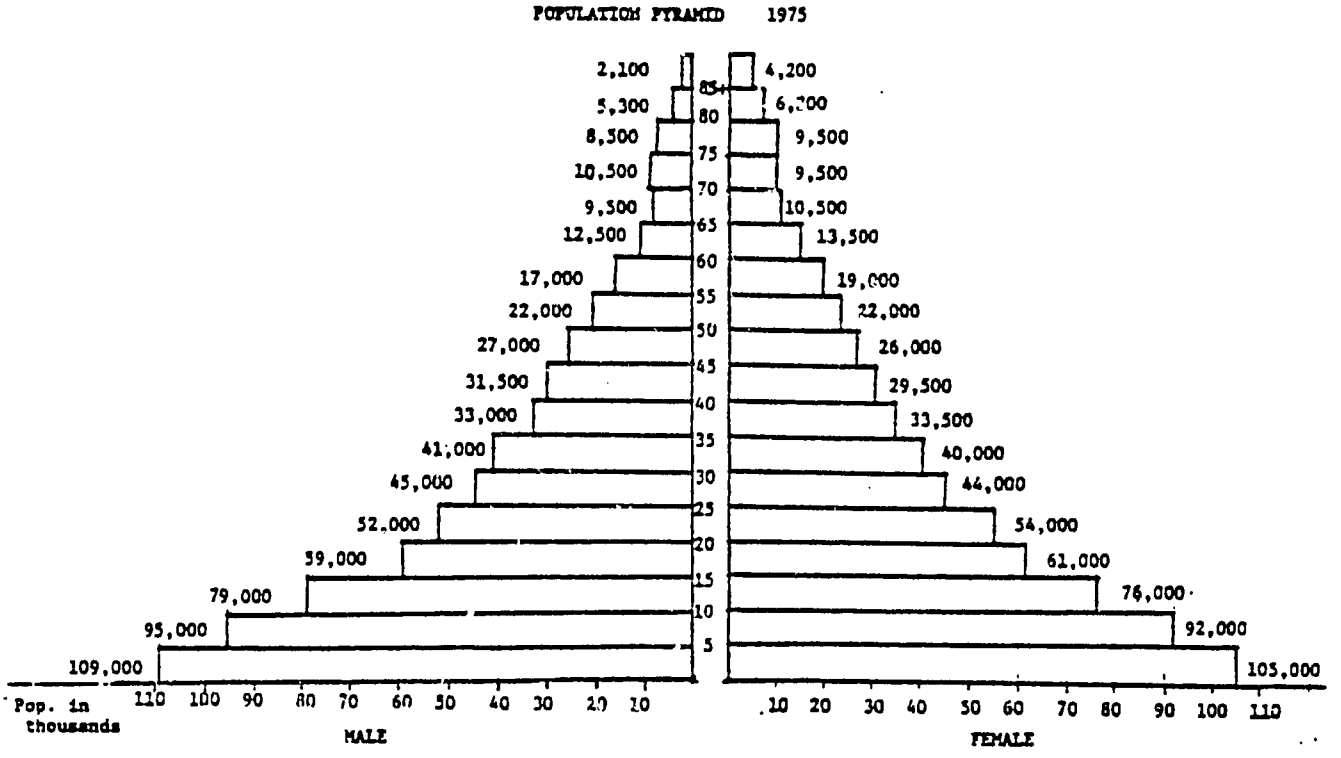
1. POPULATION CHARACTERISTICS

After years of planning an official census was taken in Mauritania in late 1976, the results of which were released in late 1977. Unfortunately only scanty details of this census were available for this report. Other population data consists mostly of estimates.

Population: 1957-1976

1957	1960	1967	1975	1976
841,742	942,102	1,067,413	1,231,161	1,420,000

Population by age and sex(1975):



Population by region and major towns:

REGIONAL POPULATION BREAKDOWN

Region	Population	Chief Town	Population 1975 est.	Population 1976 census (where available)
I—Hodh Oriental	202,140	Nema	9,403	
II—Hodh Occidental	109,800	Ayoun el'Atrous	13,614	
III—Assaba	97,370	Kiffa	16,658	
IV—Gorgol	98,720	Kaedi	19,826	20,848
V—Brakna	147,080	Aleg	—	
VI—Trarza	171,380	Rosso	18,463	16,446
VII—Adrar	62,500	Atar	13,897	15,326
VIII—Sai du Levrier	32,240	Nouadhibou	22,931	21,976
IX—Tagant	73,530	Tidjika	8,193	
X—Guidmaka	91,430	Selibaby	5,559	
XI—Tiris-Zemmour	25,500	F'Derik*	2,192	
XII—Inchiri	16,000	Akjoujt	13,001	
District—Nouakchott	103,480	Nouakchott	103,483	134,986

* Zouerate, the largest town in Tiris-Zemmour, had a population of 17,474, according to the 1976 census.

Population by race:

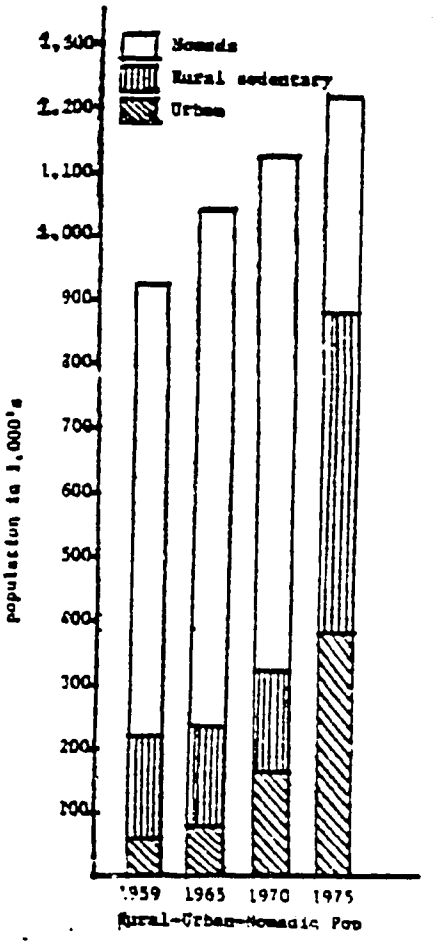
THE PEOPLES OF MAURITANIA

GROUPS	racial background	% of pop.	area of country	language	religion	traditional occupation
MAURES						
"White"	Arab-Berber	33%	northern	Hassania-Arabic	Islam	warriors, nomadic herdsmen
"Black"	Arab-Berber-Negroid	33%	northern, but some in Senegal Valley	Hassania-Arabic	Islam	nomadic herdsmen, some sedentary farmers
BLACKS						
Toucoleurs Fulbe(Peuls) Soninke Wolof Bambara	Negroid	33%	southern, especially in Senegal Valley	various sub-Saharan African languages	Islam	sedentary farmers and cattle raisers; fishermen(Senegal River); exception: the semi-nomadic (transhumant) Fulbe

Population by urban-rural-nomadic:

As indicated in the accompanying graph, a significant change in population figures has taken place within the last ten years in Mauritania: there has been a complete switch in the ratio of nomadic to settled populations and a concomitant growth in urban population. Nomads, who constituted more than 65% of the population in 1965, are, according to the 1976 census, now only about a third of the population.

This drastic change in the population pattern may be attributed above all to the Sahelian drought of the first half of the 1970's and its renewed occurrence in Mauritania. By devastating their flocks, the drought brought an end to the economic base of nomadic life, driving the nomads towards areas where food and water could be obtained and bringing them in great numbers to the cities, where they must rely on the government to supply them with food. Around larger towns such as Nouakchott, large tent cities have sprung up (Nouackhott has recently been reported to have more tents than houses), where people live without proper water supply, without proper sanitary facilities and without employment.



Educational characteristics of population:

Literacy: 1960: 5% of population;
1970: 10% of population.

Children of secondary school age actually enrolled in school:

1960: 0.4%
1970: 2.0%

Health characteristics of population and population growth:

Average annual birth rate: 44.4 per 1,000
Annual rate of population growth: 2.1%
Number of years to double population: 33 years
Infant mortality rate: 187 per thousand live births
Crude death rate: 24 per thousand
Expectation of life at birth: 43.5 years

Health problems and disease: Recent and long-range health statistics (neither of which are particularly reliable) indicate that, apart from malnutrition resulting from drought-caused food shortages, malaria and respiratory and parastic diseases are the major causes of illness, as shown by the following table:

Reported cases of communicable diseases:

Disease	1971	1972	1973
Malaria	45,916	36,713	30,545
Tuberculosis	7,126	8,780	4,331
Whooping cough	3,231	4,088	4,330
Influenza	9,830	12,697	18,541
Pneumonia	732	1,281	2,431
Bacillary & Amoebic Dys.	1,732	1,823	14,152
Vesical Schistosomiasis	7,374	5,629	—
Brucellosis	1,448	—	—
Measles	5,628	10,681	11,636
Chicken pox	3,608	2,061	2,364
Mumps	2,408	2,065	3,158

Based on data from the Mauritanian Health Services

The major cause of death, especially among the nomadic population, has been respiratory disease; this has been attributed to their exposure both to extreme variations in temperature and to sand suspended in the air. Malaria has been particularly widespread, ranging in its occurrence from the Senegal River region to the northern oases; it has been estimated that about 70% of the population contracts the disease at some time. Smallpox has been effectively eradicated.

The drought and the consequent crowding of former nomads into tent cities on the outskirts of cities, where health and sanitation facilities are inadequate, has led to an increased incidence of contagious and waterborne diseases. The increased occurrence of measles (see above table), which has taken place despite an expanded immunization program, may be attributed to the exposure of new populations to the dieases and to a weakened resistance resulting from drought-related malnutrition. The drought has also led to a substantial increase in infant mortality. In some nomadic camps the average overall death rate has soared from 23 to 65 per 1,000 population.

Health care in Mauritania has been spotty; as recently as 1973 it was estimated that only about 15% of the population was receiving medical attention. Faced with this deficiency, Mauritania, with the help of external aid, has been strengthening its efforts to improve health services, with the goal of providing basic health care for large numbers of the population. Mobile teams are being created for prophylactic medicine and health education in rural areas, and health centers are being established in regional capitals and secondary cities.

Population control

There is no population control program in Mauritania; the government has been reported to be opposed to such efforts.

2. GOVERNMENT ORGANIZATIONS RESPONSIBLE FOR ENVIRONMENTAL AND NATURAL RESOURCES ACTIVITIES

NOTE: The past several years have seen fairly frequent shifts in the distribution of functions among government ministries, and the actual number and names of ministries have varied from time to time. Several of these changes have affected the responsibilities of the Ministry of Rural Development, the agency with the heaviest burden of environmental functions. What effect the coup d'etat of July 1978 has had on this ministry is not yet known; it is listed among those ministries functioning under the new government, but its responsibilities may be somewhat different from those mentioned here.

MINISTRY OF RURAL DEVELOPMENT (Minister: Ba Oumar—July 1978)

The functions of this ministry were most recently outlined in a decree of May 3, 1976, which assigns the ministry overall responsibility in the areas of agriculture, livestock, and forests and the protection of nature:

- agricultural directorate: responsibility for, among other things, the sanitary examination of food products; conservation, improvement and research on cultivated plants; and agricultural research in general;
- livestock directorate: responsible for animal health and the inspection of animal products; matters relating to herding and transport of livestock;
- directorate for the protection and improvement of agro-pastoral land: reponsibility for the conservation of waters and forests; the protection of wildlife and control of hunting; controlling agricultural pests and dangerous wild animals; forest development.
  There are two subdivisions or services:
  - the nature protection service;
  - the service for the improvement of rural land.

Assuming that this Ministry has taken over the functions of the former Ministry of Water Resources, it is also responsible for matters such as: water extraction; regulation of waters and policing of surface and underground waters; hydro-geological studies; and the study, construction and control of barrages, irrigated areas, and dikes.

UNDER THE AEGIS OF THE MINISTRY OF RURAL DEVELOPMENT:

1) Societe national pour le developpement rural (SONADER) (National Association for Rural Development)
   Location: Nouakchott Established: by decree in 1975

   Functions:
   - study, implementation and control of work related to hydroagricultural projects;
   - the determination, identification and implementation of procedures for the realization of hydroagricultural projects, including pre-feasibility studies;
   - management and training for the programs with which it is entrusted;
   - coordination and maintenance of the hydro-agricultural equipment entrusted to it.

   SONADER's initial task is to focus on the Senegal River, where 80% of its activities are to be directed. Assistance from OMVS (see below) and from AID is being utilized to help to make this an effective organization for the development of irrigated agriculture.
   Initial budget: 25,000,000 UM (ouguiya) ($1.00=44UM)

2) Centre national des recherches agronomiques et de developpement agricole(CNRADA) (National Center for Agronomic Research and Agricultural Development)
Location:Kaedi Established: by decree in 1974
Functions: Research into agricultural matters, including: study of techniques and methods to ensure rational exploitation of natural resources such as pasturages, water and forests with the aim of effectively preserving the environment and fighting desertification; training of agricultural personnel.

3) Centre national d'elevage et des recherches veterinaires (CNERV) (National Center for Livestock and Veterinary Research)
Location: Nouakchott Established: by decree in 1973

4) Office Mauritanien des cereales (OMC) (Mauritanian Cereals Office)
Location: Nouakchott Established: August 1975
Functions: to determine overall needs for cereals and to assure their marketing and equitable distribution throughout the country.

5) Coordinating Committee for Drought Control Planning (Comite de coordination du projet du lutte contre la secheresse)
Established: December 17, 1976
Functions: the planning of drought control. Funded by a $2,500,000 grant from AID, the committee meets three times a year.

6) Comite pour la protection et la conservation de la nature
Established: 1959; reorganized in February 1977
Functions: its preliminary advice is obligatory for any activity capable of changing the natural environment and for all questions relating to:
-the protection of soils, water resources and flora and fauna;
-the conservation and rational use of natural resources
-national parks and nature reserves.
The committee meets two times a year at the request of its president, who is the Ministry of Rural Development or his appointee.

THE MINISTRY OF PLANNING AND MINES (Minister: Mohammed el Moktar Ould Zamel—July 1978)

The functions of this ministry were most recently enumerated in decree of September 26, 1977.

The ministry is charged with: development plans and programs, including their financing and executive; the establishment of statistical documentation concerning the economic, social and cultural life of the nation, and through its Directorate of Mines and Geology, with prospecting for mineral resources, the implementation of mining legislation, and the administrative and technical control of classified establishments and of trade in petroleum products.

OTHER MINISTRIES:

Ministry of Health, Work, and Social Affairs (Minister: Dr. Diagana-July 1978)

Two of the branches of this ministry are concerned with health: the Directorate of Health handles most health care programs and administers training programs; the Directorate of Social Affairs bears the responsibility for maternal and child care programs. Although efforts are being made to integrate the functions of these two directorates, the continue to operate separately and on separate budgets.

There are no provisions within the ministry for the collection of accurate health statistics.

Ministry of Industry and Fishing (Minister: Ahmed Ojld Bouceif—July 1978)

- no details available.

GOVERNMENT CORPORATIONS (The Ministry to which these organizations are responsible under the newly reorganized government is not clear)

Societe nationale industrielle et miniere (SNIM)
Location: Nouakchott Established: October 1975
Functions: SNIM is the organization with basic control of exploitation of the mineral resources of Mauritania. Under it are placed both copper and iron mining operations.
It is run by Council, which includes the Ministry of Rural Development; day to day operations are under a director general; it is under the general supervision of the president.

Societe nationale d'eau et d'electricite (SONELEC)
Location: Nouakchott Established: May 1975
Functions: SONELEC is charged with the production, transport and distribution of water and power. It is the Mauritanian Water and Power Company.

INTERNATIONAL ORGANIZATIONS

Organization pour la Mise en Valeur du Fleuve Senegal (Organization for the Development of the Senegal River) OMVS
Established: 1974
The organization consists of three members states: Senegal, Mali and Mauritania.

The main objective of OMVS is to plan and fin financing for the integrated development of the Senegal River Basin. Its overall program is expected to extend over 35 years and cost a projected $3.7 billion dollars. While its goal is improvement of the living standard through agricultural development and increased agricultural and mining production, its programs for achieving this goal include:

- the development of irrigated agriculture to achieve double-cropped irrigation agriculture;
- livestock improvement;
- expanding mining and processing of iron, bauxite, and phosphates;
- improvement of fisheries, forestry and tourism.

Major projects include:

- the dam at Diama on the Senegal Delta to arrest salt water intrusion and provide water for irrigation;
- the improvement of ports of call along the Senegal River.

Construction of the Diama Dam is planned for 1978-1980.

C.I.L.S.S. (Permanent Inter-State Committee for Drought Control in the Sahel)
Formed in 1973. Members: Cape Verde, The Gambia, Upper Volta, Mali, Mauritania, Niger, Senegal, and Chad.
Periodic meetings of the organization involve the participation of the heads of state of these nations.

The organization's programs, which depend on heavy international investment (the Club of the Friends of the Sahel was formed in 1976 to obtain this support), have the goal of the long-term development of the Sahel and its eventual self-sufficiency in the production of millet, sorghum, maize, wheat, rice, sugar cane, meat and fish. Its initial program covering the period 1977-1982, is a food-supply scheme requiring international investments of more than three million dollars.

3.0 LAWS GOVERNING THE ENVIRONMENT AND NATURAL RESOURCES

As part of French West Africa, Mauritania was subject to laws promulgated for that jurisdiction; the Mauritanian constitution, adopted in 1961, provides that such laws are to remain applicable to the new state until replaced by new ones. This explains why several of the laws dealing with the environment date, as do nearly half of the Mauritanian statutes currently in force, from the period prior to Mauritania's receiving its independence in 1960.

Although many aspects of environmental control are covered under this "modern" law, important questions such as land ownership, land use, and water rights are regulated in whole or part either under Islamic law or under traditional systems. This hold true perhaps most significantly in the flood plain of the Senegal River, where there exists a complicated traditional system of land ownership and usage little understood by outsiders.

OVERVIEW OF LAWS GOVERNING THE ENVIRONMENT AND NATURAL RESOURCES

[Numbers indicated those sections of the report in which the laws are summarized; blank areas indicate that no legislation was found.]

RENEWABLE RESOURCES	Protection	Reserves	Ownership	Restoration	Utilization
Water	3.1 3.2.1		3.2.1 3.2.2		3.2.1 3.2.2
Air	3.1				
Forests	3.3.1	3.3.1 3.3.2	3.3.1	3.3.1	3.3.1 3.3.2
Wildlife	3.6.1 3.6.2	3.6.1			3.6.1 3.6.2
Fisheries	3.5		3.5		3.5
NON-RENEWABLE RESOURCES					
Minerals			3.4		3.4
LAND USE					
Agriculture					
Pesticides					
Solid Waste					

3.1 GENERAL POLLUTION CONTROL

Decree [of October 20, 1926] concerning regulation of dangerous, unhealthy or offensive establishments in French West Africa

Provisions: Subjects to government surveillance all industrial or commercial enterprises of any description which might cause danger or inconvenience to the safety, health, or convenience of a neighborhood, either with regard to public health, agriculture, or fishing.

Three classes of establishment are identified: 1) those which should be located at a distance from inhabitated places; 2) those which, although they may be located in inhabited places, must take special precautions so as not to adversely affect those areas; and 3) those which, because they seem unlikely to be detrimental to an area, are subject to only broad provisions.

Establishment determined to come under the provisions of the law are to be specified by decree. Both class 1 and class 2 establishments are subject to authorizations before they may be set up; these authorizations may place conditions on their operations.

In principal, this law provides for the control of both air and water pollution from industrial establishments; a similar law has been, in fact, the basis for the control and regulation of pollution in France. The extent to which this law has been invoked in Mauritania is not known.

3.2 WATER LEGISLATION

3.2.1 Decree [of March 5, 1921] regulating the water regime in French West Africa

Provisions: Regulates principally state waters (defined elsewhere as coastal waters up to the high tide line as well as a zone of 100 meters measured from this limit; navigable waters; non-navigable waters and their sources; lakes, ponds and lagoons; and navigation and irrigation canals—in effect, all waters are state waters).

Provisions covers: the conservation of waters; dredging, widening, and straightening of watercourses; the use of water for irrigation and for mining operations; protection from flooding; reclamation of ponds and swamps; draining of wetlands; and sanctions and penalties.

Water protection and use: -prohibits the depositing of refuse, animal wastes, stones, gravel, wood, etc., in the bed or on the banks of a watercourse, lake, lagoon or canal;
-prohibits the discharge of infected or dangerous waters;
-requires a permit for any diversion or use of state waters.

3.2.2 Civil Code:

Provisions: Article 640 and following of the Civil Code detail the obligations of landowners with regard to waters flowing through their property; in general property owners are required to pay an indemnity for any action which would reduce the natural flow of such waters through adjacent properties. The Code grants landowners the right to use and dispose of rainwater falling on their properties, but requires them to pay an indemnity if their use of such waters reduces the flow of watercourses through adjacent properties.

3.3 FORESTS

3.3.1 Decree [of July 4, 1935] concerning the forest regime of French West Africa

Provisions: declares as state forests all non-occupied and unowned forests, as well as all perimeters of reforestation;

-recognizes three types of state forests:

1. classified forests: these include all forests already under special regulations at the time of the promulgation of this decree and any declared as such under this decree; rights of usage in such forests are limited, the actual extent of permitted usage to be specified in the classifying decree;
2. protected forests: all state forests other than classified forests;
3. perimeters of reforestation: all unvegetated land and insufficiently wooded areas, including:
   - -mountain slopes of 35 degrees or more
   - -littoral dunes
   - -terrains which might produce dangerous landslides.

In general, activities such as the felling of trees and the grazing of animals are limited in classified forests; traditional rights in such forests are limited to the collection of dead wood, the picking of fruit and of food and medicinal plants, and other activities as specified in the classifying decree; commercial activities require a permit; burning and clearing of land for farming is formally prohibited. In protected forests, traditional rights of individuals and communities, including commercial exploitation of gum trees, palms, etc., may be exercised without a permit, but such activities are not to harm the productive vegetation. All activities are prohibited in perimiters of reforestation; when such areas are declared sufficiently reforested, they are to be treated as classified forests. Exploitation of forests by public or private corporations requires a permit.

Protected species: special authorization is required for the felling uprooting or mutilation of gum trees (Acacia senegal), Khaya senegalensis, Borassus aethiopica, Pterocarpus orinaceus, Bombax costatum, Faidherbia albida, and coconut palms. Other species enjoying partial or complete protection can be specified by decree.

Other provisions of the law deal with the prevention of brush fires, the restriction of activities in private forests (no permits are to be issued, for example, for the felling of trees on mountain slopes or in important hydrological basins), and the apprehension and punishment of offenders.

Implementation: this law and other forestry legislation is implemented by the officials of the Service des Eaux et Forets of the Ministry of Rural Development with the assistance of police officers and other officials.

3.3.2 Other forestry legislation

The Decree no. 65.080 of 29 April 1965 fixing the fees for the exploitation of forest products

Provisions: establishes fees to be paid for the right to exploit various types of trees; generally, higher fees are required for "protected species": *Khaya senegalensis*, *Borassa aethiopica*, *Pterocarpus orinaceus*, *Bombax costatum*, and *Faidherbia albida*; consideration is also taken of the purpose for which the wood is to be used.
The working of classified forests is limited to the Service des Eaux et Forets; however, permission may be granted for the gathering of dead wood or for the working of trees specifically marked by the Service.

Other decrees issued in pursuance of the July 4, 1935 Decree include the Decrees nos. 10.027 and 10.028 of February 17, 1961, which change the boundaries of the classified forests of M'Boyo and Silbe; in both cases, specific areas lose their classified status and other areas are classified to compensate for their loss.

3.4 MINERAL RESOURCES

Law no. 77-204 of July 30, 1977 on the Mining Code

Provisions: Mines and quarries are declared the property of the state and prospecting for and exploitation of mineral wealth is put under state control.
Permits of varying terms of validity are granted for research and exploitation of mines; the rights and obligations of holders of mining titles are detailed, including, among other things, the obligation to repair all damage which the work may occasion to surface property.

Implementation: the Directorate of Mines and Geology of under the Ministry of Planning and Mines is reponsible for the surveillance of mineral prospecting and exploitation; its agents as well as police officers are responsible for apprehending offenders against the provisions of the code.

3.5 FISHERIES

Law No. 62.038 Containing the Code Governing the Merchant Marine and Maritime Fishing

Provisions: Book VIII grants to the Maritime Authority the power to regulate: zones and times of the year in which fishing is permitted and those species which may be caught; fishing methods and equipment; actions to prevent the depletion of the stock of fish through capture or destruction of spawns or undersized individuals; the conditions for the establishment of fisheries; measures to ensure the conservation of fish both in the sea and on the littoral.
Decrees are to be issued to specify hygienic measures relating to conservation, treatment, breeding, and transport of fish. In Mauritanian waters, fishing is limited to Mauritanian vessels but agreements may be made to allow fishing by other fleets.

Fines are specified for infractions of the code or regulations made under it.

Implementation: The Ministry of Industry and Fishing, acting as the Maritime Authority.

Decrees issued under the code have established closed seasons for specific sea fauna (langoustes).

3.6 WILDLIFE AND GAME

3.6.1 Law no. 75-003 of January 15, 1975 on the Hunting Code and the Protection Fauna

Provisions: -prohibits the capture, detention, possession or export of wild animals without a permit;
-prohibts actions such as: hunting using lamps; burning the bush to rout out game; use of drugs in hunting; hunting from vehicles, motor boats, or airplanes; sales of meat from wild animals; shooting of animals with young; collection or transport of wild birds not recognized as harmful; the collection of eggs of protected birds, especially ostriches; (prohibitions against certain hunting methods may be suspended in the case of harmful or dangerous animals);
-provides for the creation of national parks for the conservation of animals;
-provides for declaration by decree of protected and partially protected species of animals but, apart from ostriches, the law itself contains no references to specific animals;
-makes the minister charged with the protection of nature responsible for declaration of closed and open season for hunting;
-permits may by issued by the Ministery charged with nature protection for hunting certain protected species;
-exceptions may be stated by decree for hunting of animals for food;
-fines are specified for infractions as well as conditions for apprehension of offenders

Implementation: The Ministry of Rural Development (as the ministry charged with the protection of nature), specifically the officials of the Nature Protection Service (Service de la Protection de la nature, as well as various forestry officers.

3.6.2 Decrees issued under the Hunting Code

The Decree no. R-071 of August 13, 1976 concerning the closing of the hunting season closed the hunting season for an indefinite period of time beginning on June 1, 1976 throughout the whole of the country, with the exception of the hunting of ducks, teals, and warthogs in the Keur-Macene hunting area.

Law no. 74-177 of 29 July 1974 forbids the sale, importatation, and possession of hunting arms throughout the country and requires that such arms be deposited with specified administrative officers. Exceptions to the law are persons authorized to hunt in designated hunting areas.

4. RESOURCES

WATER RESOURCES

Rainfall and climate (see map, page 10a)

Mauritania is on the whole a hot and dry land, with daytime temperatures exceeding 38 degrees C over six months of the year in most areas and rainfall ranging from an average low of 36.3 mm in the coastal zone to an average high of 649.0 mm in the Chemama zone of the far south. For most areas precipitation is concentrated in the months from July to October. Heavy evaporation is typical of the greater part of the country.

Periodic falure of the rains seems to be characteristic of the Mauritanian climate in this century. 1913 was a year of scanty rainfall, followed roughly thirty years later by the drought of 1940-42. The most recent drought, which underlined the fragility of life in this area of the world, lasted from 1970 to 1975. After some respite, Mauritania experienced another bad year in 1977, with rainfall levels lower than those of 1972.

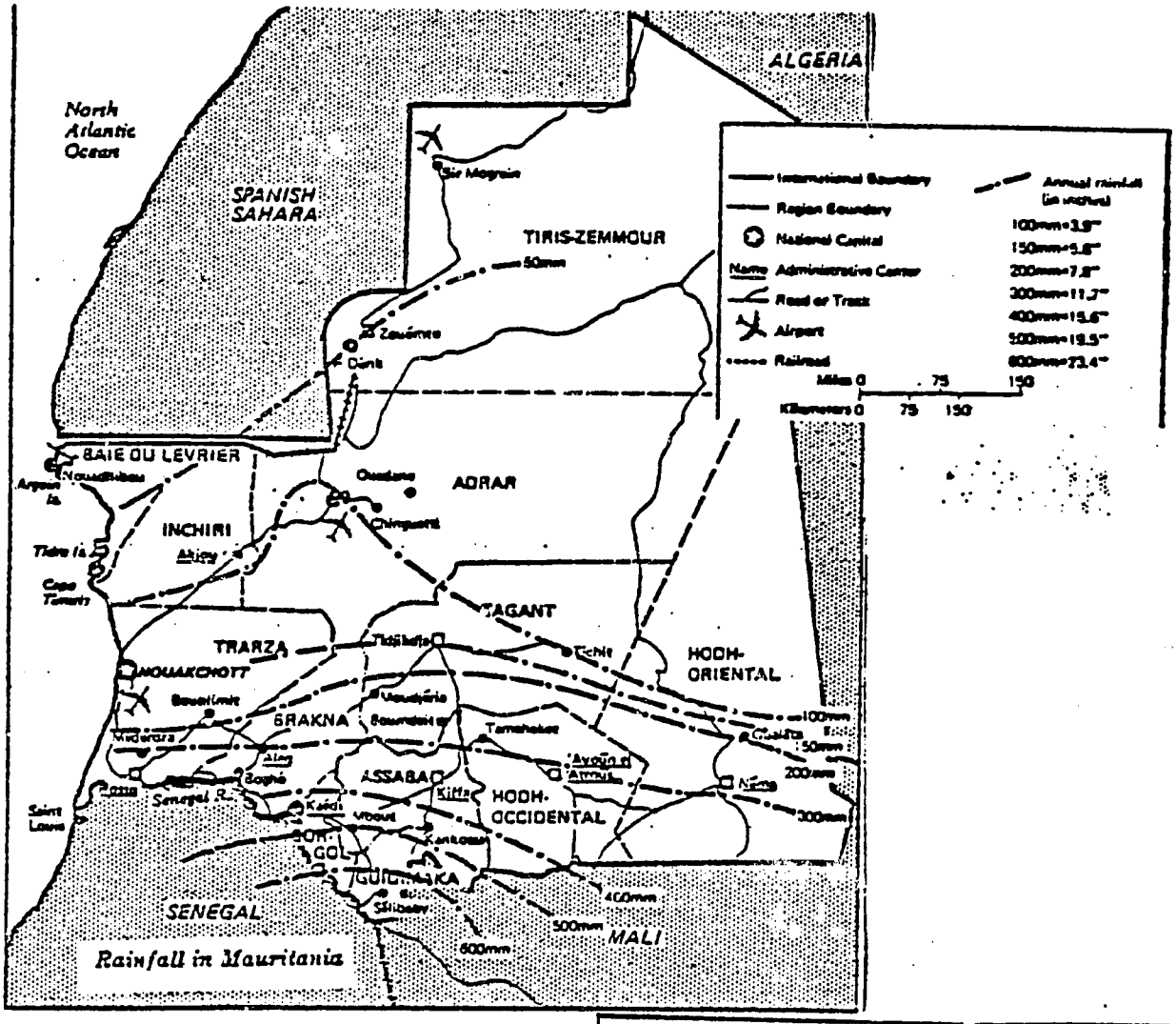
Rainfall and other features are the basis for a division of the country into four geographical and climatic zones (see map): the Saharan; the Sahelian; the Chemama; and the Coastal.

Rainfall in representative locations in Mauritania

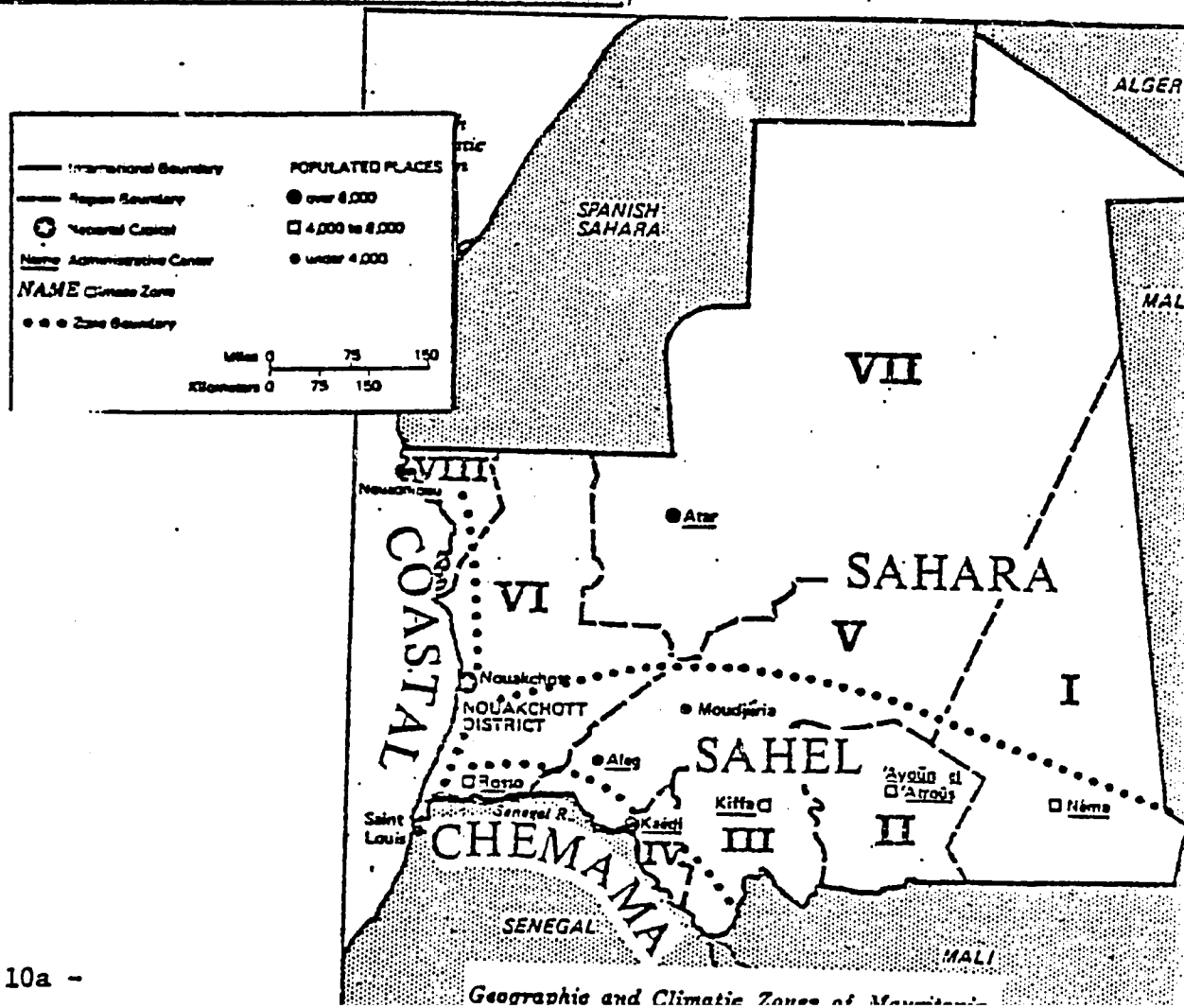
Zone	Location	Average rainfall Total	Heaviest month	Drought year low
Saharan	Atar	103.5 mm (4.1 in.)	Sept.: 37.8 mm (1.5 in.)	19 mm (1971) (0.76 in.)
Sahel	Kiffa	350.7 mm (14.03 in.)	Aug.: 121.1 mm (4.8 in.)	119 mm (1972) (4.6 in.)
	Nema	315.0 mm (12.6 in.)	Aug.: 116.7 mm (4.7 in.)	183 mm (1973) (7.32 in.)
Chemama	Selibabi	649.0 mm (26.0 in.)	Aug.: 226.3 mm (9.1 in.)	289 mm (1972) (11.6 in.)
Coastal	Nouakchott	138.4 mm (5.5 in.)	Aug.: 60.4 mm (2.4 in.)	18 mm (1971) (0.72)

Surface waters

The Senegal River, which serves as the border betweeen Senegal and Mauritania in the southwestern area of the country, is the only major non-seasonal stream in Mauritania. Between August and December the river floods the alluvial plain, replenishing Lak Rkiz and supplying moisture for the recession agriculture under which most Mauritanian crops are grown. Although



Rainfall in Mauritania



Geographic and Climatic Zones of Mauritania

the flow of the river at Bakjel, at the entrance to the alluvial valley, normally averages about 780m3/s (cubic meters per second), in 1924 it was measured at 1,247m3/s (a record high), and in 1972, a drought year, it dropped to the record low of 264m3/s.

Waters in the delta of the Senegal (roughly between Rosso and the Atlantic) are too saline for use in agriculture.

Other rivers are mostly of a temporary or seasonal nature. These are the wadis, dried stream beds which when filled with rainwater produce flows of often several hundred kilometers in length and overflow their banks to provide moisture for recession agriculture. Several wadis (Kolimbin, Karkara, Garfa and Gorgol) discharge into the Senegal. but their contribution is too insignificant to make them important tributaries of that river. Wadis usually converge on depressions where their waters are dispersed and drained; such areas are marked by a concentration of vegetation.

Groundwater

Groundwater resources of varying depth and quality are present throughout Mauritania and are of significance in supplying water for human consumption, for agriculture, and for mining operations. No complete survey of these water resources has yet been made, and despite government efforts in that direction, no hydrogeological map of the country has yet been produced.

Among the most important groundwater resources are the aquifers of the coastal sedimentary basin. These include: the aquifers which supply the water needs not only for the capital of Nouakchott but also for the port of Nouadhibou and for mining operations at Akjoujt and Zouerate.

Many of the available groundwater supplies have been determined to be too saline for exploitation.

Recharging of groundwater supplies is of essential importance. In many areas rainfall is sufficiently heavy to recharge supplies, and in the south acquifers are recharged by drainage from the Senegal River basin. However, in many other areas, especially in the north, where rainfall is sparse and evaporation heavy, only a small portion of rainfall is available for recharge. This has led to the speculation that these resources may have been fed during humid periods in the past and, because of lack of continuing recharge, may dry up under extensive use.

Desalination

Desalination of seawater is another source of water supply and has been of special significance for the city of Nouakchott, which has had a desalination plant in operation since 1969.

WATER USE

Demand on water resources comes from several quarters: agriculture and livestock herding; industry; and domestic consumption.

Agriculture and livestock herding:

Presently most agricultural endeavors depend on seasonal floodwaters to meet their water needs; included here is not only the agriculture practiced on the flood plains of the Senegal and its tributaries (the Gorgol, the Karakora, etc.) but also that dependent on the seasonal flooding of the banks of wadis in other areas of the country.

Irrigation

The Maures have traditionally built small earthen dams to collect rainwater and prevent its loss from wadis; these dams, about fifty of which are reported to be found in Brakna, the Hoidh, Assaba, the Tagant, and even Adrar, serve for livestock watering and for the irrigation of relatively small land areas; they are slowly being replaced by more modern structures.

Although government development plans call for extensive use of irrigation, several large hydroagricultural projects presently being in the planning or construction stage, little modern irrigated agriculture is actually practiced at this time. Pilot projects along the Senegal, involving never more than about 125 hectares each, have demonstrated, however, that farmers in the basin can adapt to irrigated farming.

Major irrigation projects currently in progress are:

the Gorgol irrigation project: plans call for the construction of two dams and the irrigation of about 30,000 hectares of land for both rice and sugar production; by 1977 one dam was in operation and about 900 hectares under production;

the Diama Dam: part of the OMVS (see page 7) plan for development of the of the Senegal River, this dam, construction of which is scheduled for 1978-1980, would not only arrest salt water intrusion into the Senegal River but also provide irrigation waters that would allow the extension of cultivation to large areas of land.

Agriculture under rainwater (dryland agriculture);

Some agriculture in areas beyond the flood plains is practiced strictly with reliance on the scanty rainfall; mostly millet and beans are grown.

Utilization of groundwater in agriculture

Groundwater sources are tapped in a limited way for livestock watering and for agriculture; of special importance here are the oases, where wells, hand-worked or motorized, are used to irrigate palm groves and other crops, chiefly grains and legumes.

water for domestic consumption

Groundwater sources throughout the country are tapped for human consumption; these include not only wells designed to meet local needs, but also aquifers supplying major population centers such as Nouakchott and Nouadhibou. In 1970, 2,400 connections in Nouakchott were supplied with a total of 980,000 cubic meters of water drawn in part from the aquifer of Trarza (about 60 kilometers away) and partly from a desalination plant.

Increasing water supply to rural populations, only 10% of which were judged to have reasonable access to decent water in 1970, is a goal of the Mauritanian government, which, with United National assistance, has been training prospecting and drilling teams to locate and tap groundwater resources. Supplying the tent camps around Nouakchott and other urban cenetrs with water is also the object of a government program.

Chief responsibility for domestic and industrial water supply falls to SONELEC (the National Corporation for Water and Energy Supply).

SOIL AND VEGETATION

The resource (see map, page 14a)

Except for the small area of the country along the Senegal River, Maauritania is a land of poor soils and scanty vegetation. About 40% of the country is covered by sand, some in fixed, some in mobile dunes. Soils and vegetation differ generally in accordance with the geographic and climatic zone in which they occur: the Sahara, the Coastal Zone, the Sahel and the Chemama (Senegal River zone) (see maps of rainfall, climate and geography and soil and vegetation).

The arid desert soil of the Saharan zone, which occupies roughly two-thirds of the country, permits of little vegetation, except in those mountainous areas where water sources permit small-leafed and spiny plant and scrub grasses, and those areas between dunes where a high water table upports low growing acacia and soapberry trees, among others. The only cultivation occurs in the oases, where date palms flourish and other crops are grown on a limited basis.

The coastal zone, which receives the least rainfall of any region, is almost devoid of vegetation, especially in the northern areas, where the dunes are active; however, the generally higher level of humidity along the sea area does permit the growth of dwarf acacia , tamarisk bushes and swallowworts.

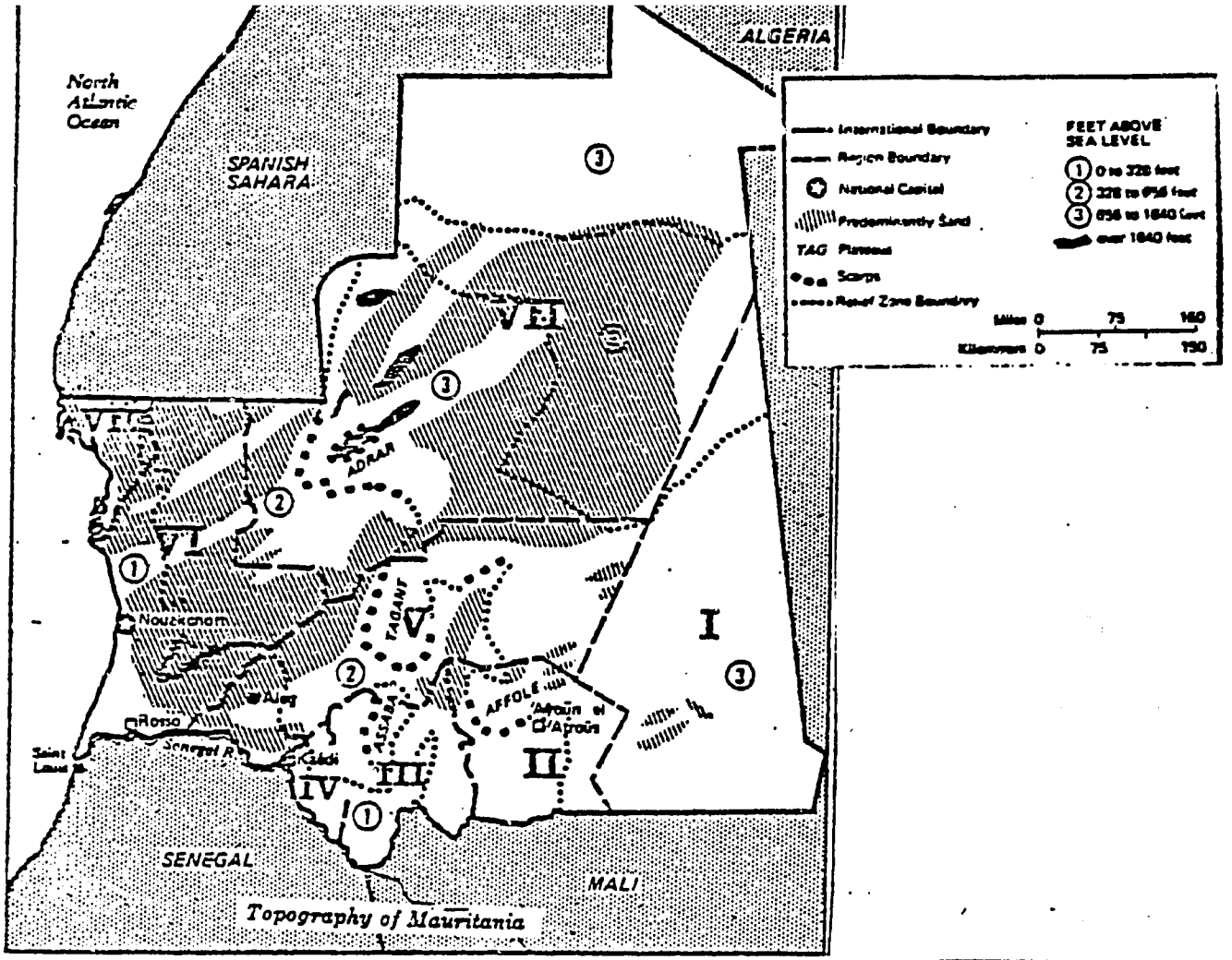
In the Sahelian zone the generally sandy soil begins to give way to clay towards the South. In the north scrub grasses and spiny acacias dominate the dunes, and date palms grow on the Tagant plateau. In the central Sahel fixed dunes are covered by savanna grasses, brushwood, balsm and spurge. The southern Sahel is an area of flat savanna grasslands broken by the occasional baobab tree. Here are forest areas of palms and acacias; in Brakna and Trarza are large forests of Acacia senegal, which is exploited for its gum. In the far southern Sahel rain is sufficient to support agriculture,and millet, maize and sorghum are grown.

The Chemama or Senegal River zone, with its rich alluvial and clayey soil, is an area of abundant vegetation; along the banks of the Senegal are found dense stands of acacias as well as willows and a rich grass cover. Thesflood plains are the chief agricultural area of the country. In the mixed marginal forest beyond the flood plains grow acacias and jujube trees

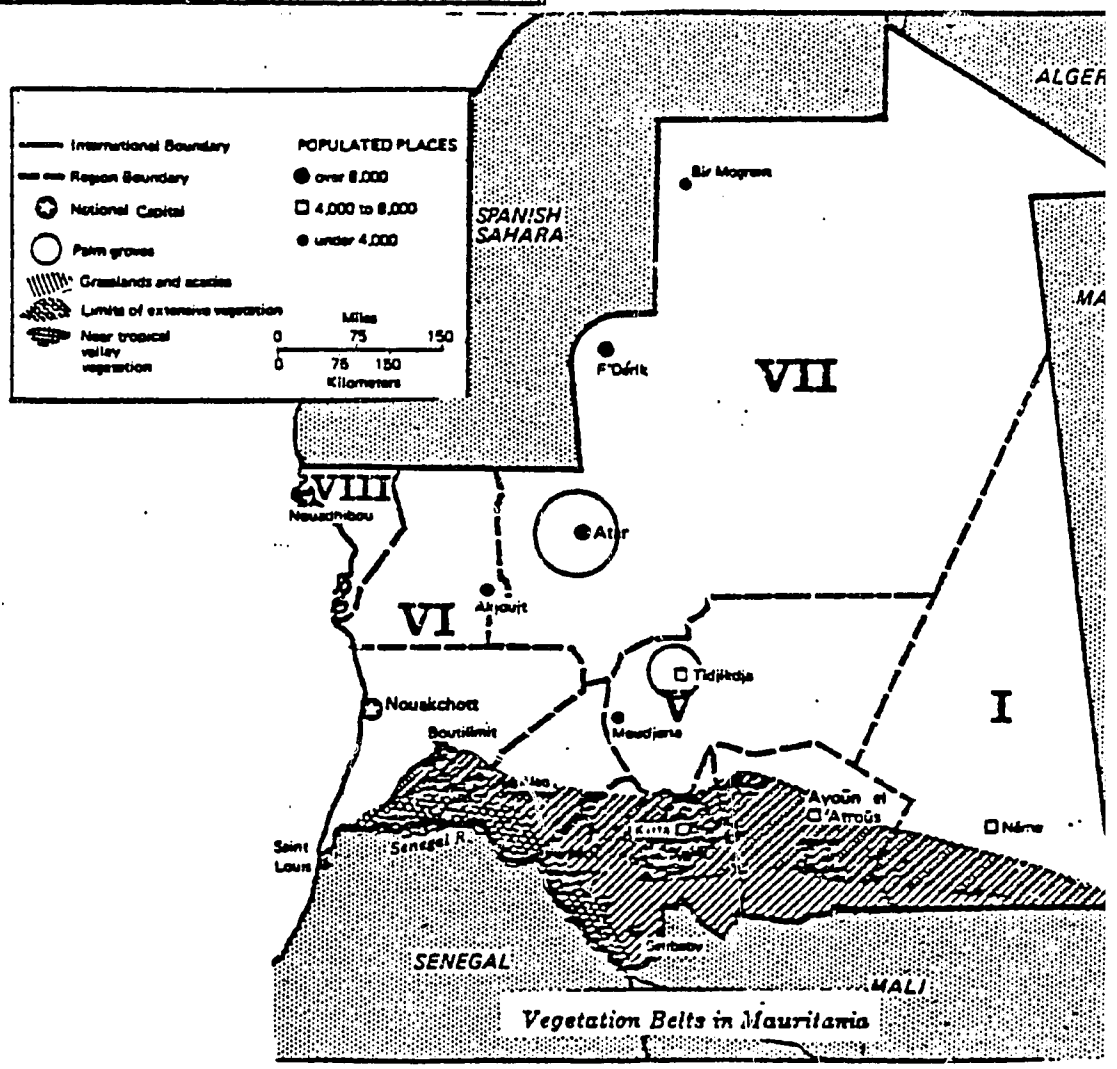
Utilization of soil and vegetation

The soils of the Chemama provide especially fertile ground for agriculture, while on the less rich soils of the drier Sahelian zone a more tenuous form of agriculture, dependent on rainfall for moisture, is practiced. Agriculture is also found in the oases (principally date palms) and along the seasonal wadis of the Sahelian and Saharan zones.

Vegetation of both the herbacious and woody varieties has been utilized to support the herds of both nomadic and sedentary livestock herders. In the northern Saharan zone, the sparse vegetation growing between dunes has provided suitable feed for camels, while the somehwat more abundant vegetation of the southern Saharan zone and the Sahel has served as pasturage not only for camels but for also for sheep, goats, and, especially in the more southern regions, cattle. These areas have been the territory of the nomadic herdsmen. In the southern region cattle are also kept by sedentary farmers.



Topography of Mauritania



Vegetation Belts in Mauritania

the effects of the drought on soil and vegetation

The soil and vegetation of Mauritania are an especially fragile resource. This is particularly true of the Sahelian zone, where during the drought of the 1970's the scant vegetation, already in desperately short supply because of lack of rain, was even further depleted by starving livestock. Deprived of its fixing vegetative cover, soil in many areas was carried away by the wind, thus contributing to the progress of desertification in many areas.

FORESTS

The Resource

Mauritania is predominantly a land of sparse vegetation, some desert areas being among the most barren in the world, others sustaining only occasional clumps of hardy grasses and no trees. Nevertheless there are forest lands in the southern sections of the country, and trees are a features of the landscape in most of the savannas and steppes of the Sahelian zone. In 1974 the FAO estimated the total forest land at 15,000,000 hectares or about 14% of the total area of the country.

As described in the section on soils and vegetation, dense forest growth is limited to the Senegal Valley. The most prominent genus of tree is the acacia, ranging in size from the relatively tall Acacia nilotica of the Senegal Valley to the often dwarfed Acacia raddiana of the dunes. Date palms, often growing wild along wadis and cultivated in oases, are also frequently in evidence. There are no coniferous species growing in Mauritania.

Uses of Forests

Mauritania's limited forest resources serve several important functions: as firewood; as forage for both wild and domesticated animals; as a source of gum arabic; and as construction material.

Forage trees include such important evergreen species as Balantes aegyptica, and evergreen acacia varieties, especially Acadia raddiana, which has been important as a forage food in especially dry years and is said to be a favorite food of the camel.

Firewood, the chief and most inexpensive source of energy, serves the dual function of both lighting and heating; annual use of firewood comes to about 0.45 m^3 per person, or an average of 1000 kg of fuel wood for two people. Total national consumption has been estimated by the government at 460,000 m^3. It was estimated in 1970 that about 500 of Mauritania's 10-15 million hectares of forest land were required to meet this demand for firewood. In that year, about 80% of this used in the form of charcoal.

Acacia senegal, growing in the Sahelian zone, especially in Brakna and Trarza, is exploited for gum arabic, a substance used in medications, confections, and adhesives, which is Mauritania's largest export from the agricultural sector (about 1,500 tons a year).

Wood is also used on a limited scale in construction (about 1,000 cm^3 in 1972) and for other industrial purposes (about 35,000 cm^3 in 1972-FAO estimates).

Deforestation

The Sahelian drought of the early 70's and the renewed occurrence of drought in Mauritania in 1977 have had a disastrous effect on forest areas across the entire Sahelian zone. Although figures for Mauritania are not available, it was estimated in 1975 that in Niger and Chad about 50% of Acacia raddiana individuals died as a result of the drought. Undue stripping of trees by herdsmen desperate to provide forage for their animals has contributed to tree loss in the Sahel, since trees so severely amputated are often not able to regenerate. The continued lack of necessary moisture has also hindered the growth of new tree cover, further hampering efforts to replace trees lost as a result of use for firewood or construction material.

Losses caused by and as a consequence of the drought, however, have only aggravated a situation already made somewhat desperate by encroachments on forest land for firewood and construction materials as well as by the clearing of land for expanded agricultural activity. Deforestation around settled areas, where growing populations have exploited the forest wealth, is reported to be especially severe. Bush fires further contribution to forest loss, and the improper stripping of gum acacia trees is responsible for significant damage to this important resource. Deforestation problems extend to the palm groves of Atar, where the deterioration and loss of palm trees has been attributed not only to the drought but also to insect infestations and improper agricultural practices, including irrigation with overly saline water.

Government programs against deforestation

Moves to protect forest resources include the control of bush fires through a series of firebelts. Furthermore, the Mauritanian government has proposed several forestry projects for financing; these include: establishment of forest nurseries at Selibaby Magma, Kaedi, Rosso and Boghe; the establishment of 600 village forests along the Senegal River; the regeneration and afforestation of forest stands in the Senegal River basin; sand dune encroachment control for the protection of tamourts, oases and towns; and a plantation of windbreaks as part of the Gorgol irrigation scheme. Such government programs are under the aegis of the Ministry of Rural Development.

WILDLIFE

The resource

In the northern Saharan zone of Mauritania wildlife is limited chiefly to insects, reptiles (especially vipers) and the occasional wild sheep and antelope, while the southern Saharan zone contains ostriches, gazelles, jackals and wild sheep, which also occur in greater numbers in the Sahelian zone along with bustards, wild ducks, fennecs, civets, otters, hyenas, warthogs, cheetahs, monkeys, and a great variety of birds. In the Senegal Valley there are lions, panthers, cheetahs, hippopotamuses in decreasing numbers as well as antelope, orxes, ostriches, warthogs and crocodiles.

The expansion of domestic herds on to grazing lands formerly limited to wildlife as well as uncontrolled hunting have led to serious declines in wildlife numbers in Mauritania and throughout the Sahel in general. In 1973 a French naturalist visiting Mauritania reported that he had not observed a single gazelle in an area where ten years before he had spotted at least twenty.

Wildlife utilization

The extent to which wildlife is exploited for consumption by Mauritanians is not recorded, although antelopes and gazelles are reported to be hunted throughout the country. Hunting of animals for sport is also practiced.

Protection of wildlife and natural reserves

As indicated in the section on legislation, laws involving the protection of wildlife are in force; these contain, among other things, provisions prohibiting the carrying of firearms and completely proscribing hunting throughout the country. In accition, various reserves have been established; these reserves, the locations of which are indicated on the map, are described below.

1. Reserve integrale de faune de la Baie du Levrier (Integral wildlife reserve of the Baie du Levrier)
   Established: April 1962; Area: 3,100 sq km;
   Wildlife: ostriches, gazelles, numerous seabirds.
   Restrictions: within the reserve it is is forbidden to destroy, to hunt or to capture game animals or to disturb their natural surroundings.

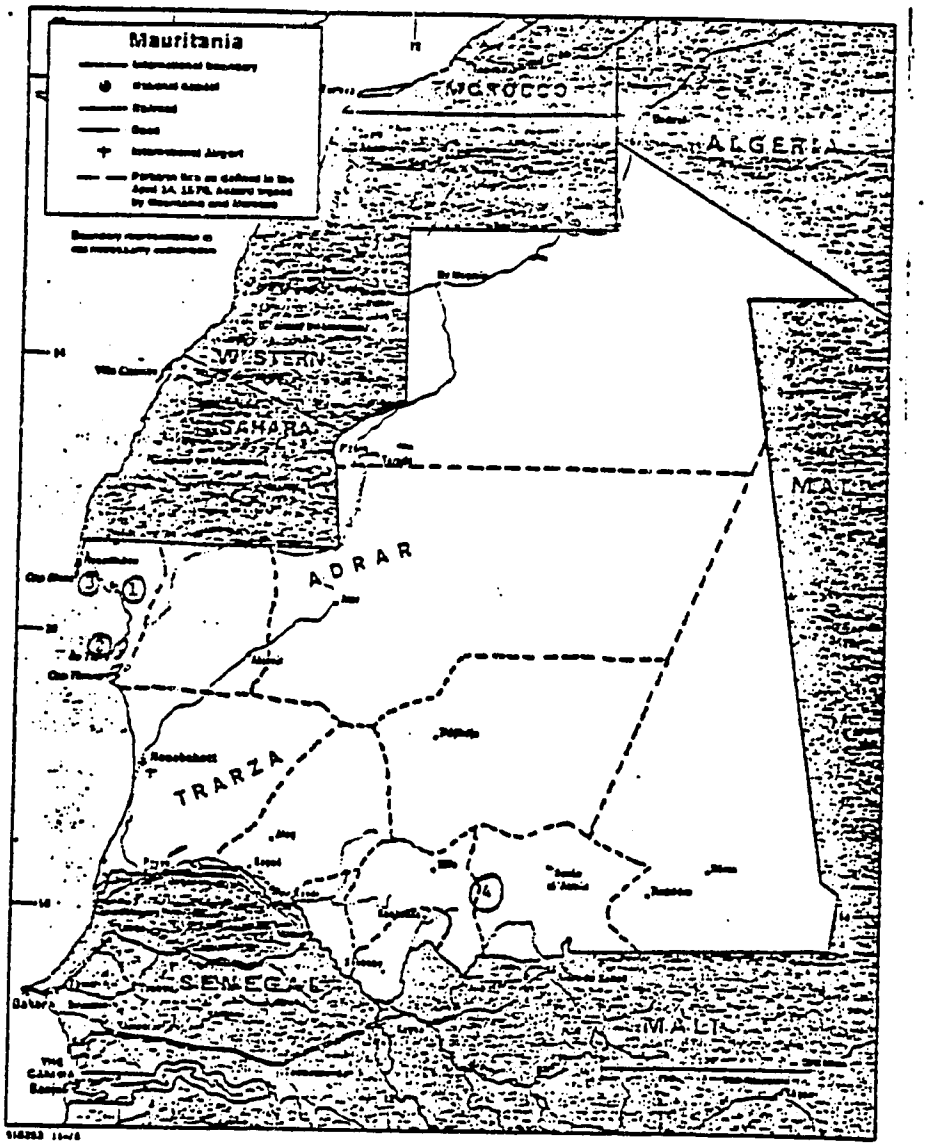
2. Reserve naturelle des Iles Mauritaniennes (Mauritanian Islands Strict Nature Reserve)
   Established: April 28, 1962; Area: 38 sq miles;
   Wildlife: seabirds: long-tailed cormorant; gull-billed tern; royal, common, bridled and little terns; slender-billed and grey-headed gulls; spoonbill; grey heron; reef heron; flamingo.
   Restrictions: complete prohibition on all hunting, whatever the weapons or methods employed, on the introduction of any species, collecting, forestry, agricultural or mineral exploitation, and on any act calculated to harm or disturb the fauna and flora. Exceptions permissible in the case of companies engaged in oil exploration and exploitation.

3. Parc nationale du Banc d'Arguin
Established: by decree of March 17, 1977
Purpose: propagation, protection, conservation and management of both marine and land flora and fauna as well as the protection of geological sites of a particular scientific and esthetic value, in the interest of and for public recreation.

4. Reserve partielle de faune d'El Agher
Established: June 21, 1937 Area: 3,710 sq km
Wildlife: elephants, gazelles(damas and dorcas), ostriches, lions, panthers, warthogs, leopards.
The reserve consists of two sections: a) a very remote, uninhabited area which is full of game but receives no supervision; and b) a more accessible area between the towns of Kiffa and Aioun-el-Atrouss, the major objective of which is the preservation of a herd of about forty elephants.

Nature reserves are under the administrative purview of the Service des Eaux et Forets of the Ministry of Rural Development.

Locations of Mauritanian Nature Reserves and Parks



FISHERIES

The resource

The abundant fish of Mauritania's coastal waters, especially those of the Arguin Banks of the north, are an important natural resource. Several varieties of fish occur, most prominently mullet, and lobster are also found in abundance. To increase its control of this important resource Mauritania in 1972 extended its territorial limits from 12 to 30 miles.

The waters of the Senegal River are also a plentiful source of fish, among which Tilpaia nilotica (locally called sidere) and Citharinus citarus (locally called dimbere) are most valued as food fish.

Utilization

Mauritania's Atlantic fishing grounds are presently exploited chiefly by foreign vessels, among which Japanese and Canandian ships figure quite prominently, but considerable quantities of the catch (about 70,000 tons in 1974) are brought minto Nouadhibou for processing in Mauritanian plants. With the completion of the construction of a deepwater port at Nouakchott, fish processing will be extended to that city as well. Products of Mauritanian fish processing operations are frozen fish, fish meal, dried fish, oil, and canned fish.

Little of the fish catch of the Atlantic is consumed by Mauritanians (only about 1,000 tons in 1974); the Maures, with certain exceptions, are not fisheaters. The overwhelming bulk of the production of Mauritania's fish-processing plants is exported, Japan, whose fleets are also responsible for considerable quantities of the catch, being the chief customer, followed by Spain, the Federal Republic of Germany, and Italy. France is the principal customer for lobster (langouste), importing nearly 15 tons per year.

The fish catch of the Senegal River is consumed predominantly by the fishermen themselves (there are an estimated 500 fishermen along the Senegal, many of whom are members of specific minority-group castes) or sold in local markets; a small quantity is dried and shipped to other areas. An estimated 15,000 tons of Senegal River fish was consumed in 1972.

MINERALS

The resource

Mauritania's mineral wealth consists of iron ore deposits at Zouerate, copper deposits at Akjoujt, and gypsum deposits to the north of Nouakchott. These resources, which have exploited only in the past decade, are responsible for producing the major portion of Mauritania's foreign exchange. Important salt deposits are found in the Saharan zone not far from Zouerate; these have been exploited for centuries by the Maures, who transport the salt by camel to other areas of the country, principally Adrar and Tichitt. Reserves are said to be almost inexhaustible.

Presently exploited mineral wealth

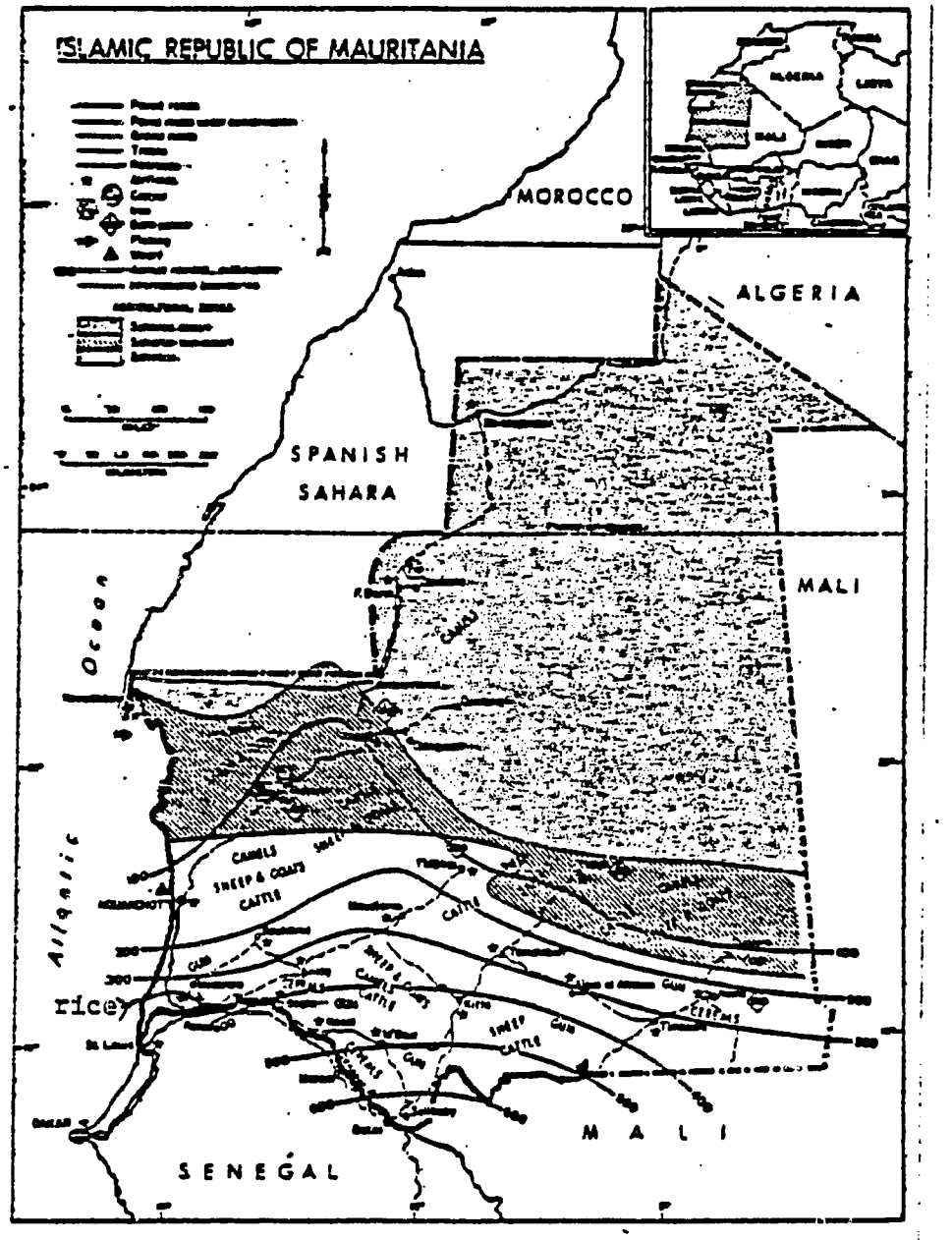
mineral	reserves (tons)	production per year (tons)	expected date of exhaustion
iron ore (rich)	76,000,000	9,415,000 (1976)	1987
copper oxides (2.7% copper, 3.6g/t gold)	2,300,000 (as of 1975)	9,433 (copper content of processed ore)	1979
copper sulfides (to be mined beginning in 1979)	16,900,000 at 2.25% copper and 1.3g/t gold	a projected 1,220,000 tons of concentrate with a 25% copper content	1993-1999
	36,000,000 at 1.28% copper and 1.28g/t gold	100,000 tons of concentrate or 25,000 tons of copper per year (projection)	1993-1999
gypsum	4 billion	11,991 (1976)	not forseen
salt	immense reserves	650-700 (15,000 bars)	not forseen

Faced with the foreseeable exhaustion of its richest mineral reserves, Mauritania intends to begin exploiting less rich iron ore deposits in about 1982. Meanwhile, the search is continuing for further deposits of copper and iron ore as well as for phosphates, sulfur, chromium, beryllium, and rare earths (yttric earths). Foreign firms have been conducting searches for petroleum along the Mauritanian coast since 1966; to date no reserves have been discovered.

Small scale mining operations yield construction materials such as sand, gravel, clay, and stone.

Utilization

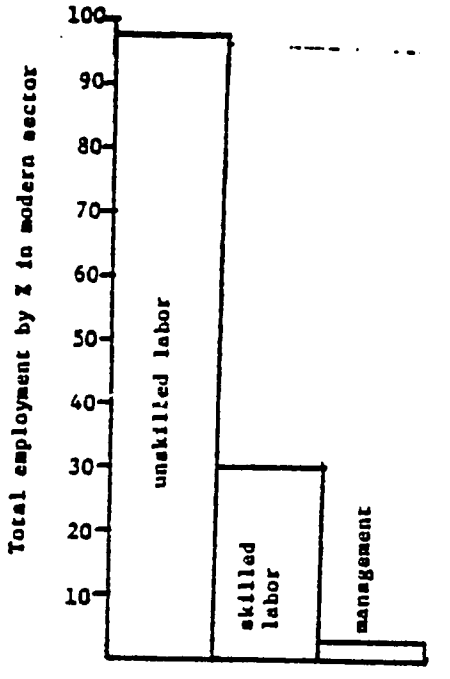
Nearly all of Mauritania's minerals are exported, chiefly to France.



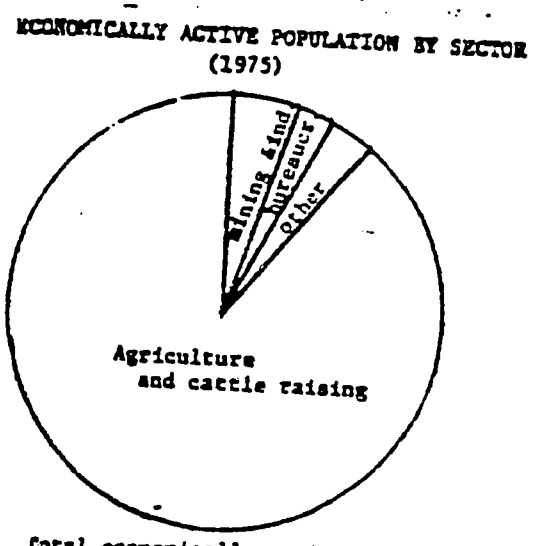
ECONOMIC ACTIVITY IN MAURITANIA

5.0 THE ECONOMY OF MAURITANIA AND ITS ENVIRONMENTAL CONSEQUENCES

The economy of Mauritania is sharply divided into two sectors: the modern (mining) and traditional (farming and livestock herding). Although the modern sector has been responsible for a great increase in the Mauritanian GNP ($460,000,000 in mid-1975/$340 per capita), little of the wealth generated by this sector actually reaches the mass of the population of the country. The modern sector offers few jobs for Mauritanians, and those available are mostly lower paying positions (see graph below).



Mauritanian workers in the modern sector.



Total economically active population = 500,000

For 1974, the GDP was calculated at $241.5 million; per capita for the modern sector was about $500, for the traditional, on the other hand, only about $70.

The effects of the recent drought have led to increased government interest in the development of the rural sector of the economy: the present four year plan (1975-1979) calls for 18.6% of investments in the rural sector (previous plan: 14%); 20.5% in the modern sector (previous plan: 34%); 44.3% for infrastructure (previous plan: 33%); and 16.6% for the social and cultural sector (previous plan: 19%). More of the revenues from mining operations are also expected to be directed toward the rural sector than in the past.

Traditional Sector

Livestock

Livestock herding, chiefly by nomadic Maures, has been the dominating activity of the traditional Mauritanian economy. Most of the cattle, sheep and goats produced by this sector have been exported on the hoof to Dakar in Senegal, but because this in an unofficial acvitivity, they do not occur in government statistics. For noncommercialized livestock herders, milk—the principal source of food for the nomads—has been the most important output. Livestock are also slaughtered for meat; a small-scale effort to commercialize this aspects of livestock raising was made with the establishment of a slaughterhouse in Kaedi in 1969.

Although livestocks statistics for Mauritania are highly unreliable and vary widely from source, the following table using statistics taken from the Mauritanian government and from the UN Food and Agricultural Organization should give some idea of the growth and decline of livestock numbers over the past twenty years.

Livestock herds by category

	Thousands of heads			
Herd	1959	1968	1973	1975
cattle	1,250	2,300	1,900	1,900
sheep & goats	8,000	6,700	5,200	4,800
camels	500	720	700	722
asses	200	300	230	271

As reflected in these figures, the drought of the 1970's has had a serious effect on livestock; the reduction of pasturelands and water sources during these years led to the death, slaughter or transportation out of the country of large numbers of livestock. The loss of herds and the exhaustion of their pasturelands has resulted in the movement of nomads into the southern region of the country, especially into urban areas such as Nouakchott; although some reversal of this trend was noticed in 1976, the renewed drought of 1977 took many more nomads from the land. At worst, this important and once dominant sector of the economy, deprived of its workers, is threatened with collapse.

Environmental effects of livestock raising

The pressures of large herds of cattle and other livestock on the frail and limited vegetation resources of the land have frequently been cited as one of the chief reasons for the progress of desertification in the Sahelian region of Mauritanian and other West African nations. In Mauritania, as in other nations of the Sahel, a series of years of good rains and the establishment of boreholes to provide watering places for animals, encouraged the growth of livestock herds; this, in conjunction with the expansion of farming activities, has not only led to the replacement of open woodland by grass steppe in much of the Sahelian zone of the country but also strained the scant vegetation resource to the point where it was unable to meet the demand placed upon it when the drought of the early 1970's struck. The loss of human and animal lives as well as of land to the desert were the result.

Farming

Traditional agriculture, consisting of the growing of millet and sorghum, is practiced mainly in the flood plains of the Senegal River, although small amounts of millet are grown under rainfall conditions beyond this zone, and seasonal crops are also harvested about the wadis in the Saharan and Sahelian zones. Most of this crop, which is grown under primitive conditions without the use of animal-drawn plows or fertilizers, is consumed by its producers as are also the dates grown in the oases of the north. Because of the drastic reduction in agricultural output during the early years of the 1970's and once more during the dry year of 1977, Mauritania has been forced to buy or accept as relief large quantities of its grain needs.

The following table compares agricultural production during a "normal" year (1969) with that during the drought years.

	Production in metric tons		
Product	1969	1973-1975	1977
millet and sorghum	100,000	30,000	30,000
wheat	300	3	*
sweet potatoes	2,000	4	*
dates	17,000	13	*
rice	1,000	*	2,484
cow peas	400	8	*

* Indicates figure not available

A significant development on the agricultural scene is the increased production and consumption of rice. At M'Pourie, an experimental station near Rosso maintained by the Ministry of Rural Development, rice has been grown for the past several years with the financial and technical assistance of the Chinese. This farm, which harvested 2,484 tons of rice in 1977, is now expanding its operations and is expected to meet about 10% of the rice needs of the country. Rice, now being grown in other areas as well, is becoming increasingly preferred by Mauritanians, especially in the cities, to the traditional millet and sorghum, a changing food taste which is bound to have important effects on agricultural developments. In recent years, Mauritania has been importing or receiving in relief about 32 tons of rice per year.

The only current agricultural export item is gum arabic, about 1,500 tons of which are shipped to Senegal each year.

Farming and the environment

Expanded agricultural activities during years of abundant rainfall led to a clearing of land for farming and a strain on the limited soil and water resources which became all too evident during the drought years of the 1970's.

The Sahelian drought has forced Mauritania to place greater emphasis on agricultural development, especially on the kind of controlled irrigation that could open up new lands to agricultural endeavors not dependent on the often unreliable rains. Major schemes with their goal of food-independence for Mauritania have been considered under the section on water resources.

It is generally agreed that Mauritania, in its agricultural development, must strike a delicate balance between the needs of its people and the limitations of its soil and water resources.

THE MODERN SECTOR AND ITS ENVIRONMENTAL EFFECTS

The modern sector of the economy, based chiefly on the mining and exportation of iron and copper is responsible for the growth of the Mauritanian GNP in recent years and accounts for 80% of total exports. Exploitation of these resources is in the hands of state companies, iron mining having been nationalized in 1974 as COMINOR (Complexe Minier du Nord) and copper mining, earlier carried out by SOMIMA (Societe Miniere de Mauritanie), in 1975. Extraction of these minerals as well as of the gypsum reserves is under the general direction of a state corporation: Societe nationale industrielle du Nord (SNIM).

MINING

MINERAL	Location	Production (1976)	Ownership	Resources affected	Environmental effects
Iron	Zouerate	9,415,000 tons of ore	COMINOR/SNIM (state)	water piped in for mining	strip mining
Copper	Akjoujt	9,433 (tons of copper)	SNIM (state)	water piped in for mining and processing operations	strip mining
Gypsum	north of Nouakchott	15,000 tons	SNIM (state)	uncertain	uncertain

No data is available regarding potential or actual environmental effects of current mining operations. Both iron and copper mines are, however, located in the Saharan region of the country in settings already so barren as to be scarcely susceptible of significant environmental damage. Nor are they located in the vicinity of significant groundwater or surface water resources that might be adversely affected by their operations. The possible effects of the operations on workers working in and living near the mines have not been documented. Data on enviornmental controls could not be found.

FOOD PROCESSING INDUSTRIES

FISH PROCESSING

The waters off the Mauritanian coast are rich in fish, an estimated 200,000 to 300,000 tons being caught each year, predominantly by foreign fishing fleets. Most of this catch is shipped directly to Europe. In 1974 about 70,000 tons of fish were unloaded in Nouadhibou for processing. Nine different firms are involved in the frezzing, drying, and canning of fish as well as in the production of fish meal and oil. The following firms bore the greatest share of this work:

FISH PROCESSING PLANTS

Name	Location	Established	Operations	Ownership	Pollution
IMAPEC Industries Mauritaniennes de Peche	Nouadhibou	1970	drying, oil and meal, freezing, canning	private	water?
SOFRIMA Societe des Frig-oriques de Mauritanie	Nouadhibou	1966	freezing	private	water?
MAFCO Mauritanian Fishery Co.	Nouadhibou	1971	freezing	private	water?

No data could be found on environmentally damaging aspects of Mauritanian fish processing operations or on environmental controls.

OTHER FOOD PROCESSING INDUSTRIES

Name	Location	Established	Ownership	Nature of activity	Production	Pollutio
SONICOB (Societe nationale pour Industrial-du Betail)	Kaedi	1969	state	meat freezing & leather production	500 t per year	water?
SOSUMA (Societe sucriere de M)	Nouakchott	1978? (ready to begin operations)		sugar refining, production of loaf sugar	1,000 ton per year capacity	water?
SOBOMA (Societe des Boissons de M.)	Nouakchott	1975		production of soft drinks		

CHEMICAL INDUSTRY

Name	Location	Established	Ownership	Nature of activity	Production	Pollution
SOMAURAL (Societe M. des Allu-mettes)	Nouakchott	1972	private	production of matches	17,280,000 matchsticks (1977)	
SMGI	Nouadhibou	1968	private	oxygen and acetylene for mining as well as medical and surgical materials	10,000m^3 oxygen, 28,000m^3 acetylene (1973)	

ELECTRICITY PRODUCTION

Name	Location	Established	Ownership	Nature of activity	Production	Pollution
SONELEC	Nouakchott Nouadhibou Kaedi Rosso Akjoujt Atar	1965 1955 1969 1970 1970 1973	state	electricity production	39,609,809KW total (1976)	

INDUSTRIAL PLANS

Industries in the planning or study stage include dairy at Rosso, a textile complex in Nouakchott and a petroleum refinery at Nouadhibou with a capacity of one million tons per year of gasoline. Increases in electricity production to support mining operations are also planned.

INDUSTRY AND POLLUTION

Mauritanian industrial development is still at a very early stage, and, with the exception of the fish-processing operations in Nouadhibou, does not contribute significantly to the nation's overall economy. The environmental effects of this nascent industry have not been recorded, although pollution of sea water from fish-processing plants and air pollution from electricity production might be presumed to be present to some degree. In any case, pollution and environmental damage from the modern sector do no presently and most likely will not in the forseeable future pose the same nearly overwhelming problems for Mauritania as do the complex of problems arising from the drought and abuses in the traditional sector.

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