

MR
301.54
N277

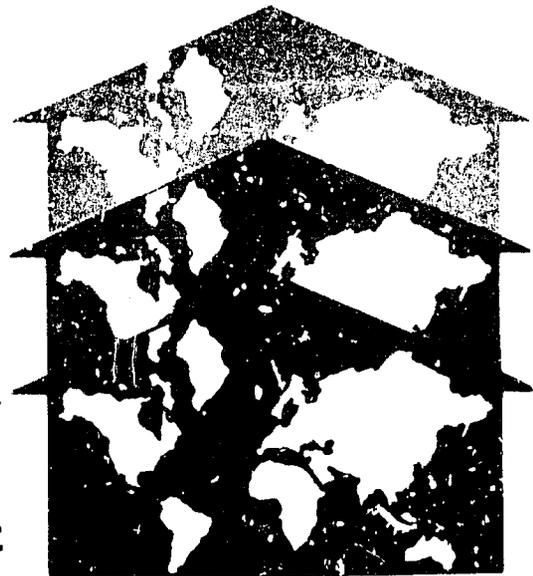
Dep

PN-APG-201

**MAURITANIA:
SHELTER SECTOR ASSESSMENT**

JANUARY 1979

**AGENCY
FOR
INTERNATIONAL
DEVELOPMENT**



OFFICE OF HOUSING

MAURITANIA:
SHELTER SECTOR ASSESSMENT

JANUARY 1979

PREPARED FOR
OFFICE OF HOUSING
AGENCY FOR INTERNATIONAL DEVELOPMENT

BY

NATIONAL SAVINGS AND LOAN LEAGUE
WASHINGTON, DC

Joseph Perta, Co-leader
Housing Finance Economist

Roger Fourcade
Housing Finance Consultant

Sonia Hammam, Co-leader
Socioeconomic Analyst

F. Denis Light
Engineer

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

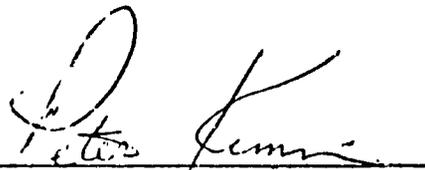
FOREWARD

This study was conducted in 1978 by the National Savings and Loan League under the auspices of the Office of Housing of the Agency for International Development and through funding provided by this office. The purpose of the study was to develop information and make recommendations relating to the shelter sector in Mauritania.

The study team was led by Joseph M. Perta and Sonia Hammam with other team members being F. Denis Light and Roger Fourcade, a consultant to the National League.

While the summary findings and recommendations of the report have been discussed with representatives of the Government of the Islamic Republic of Mauritania, the report is not to be interpreted as an official position of either the Government or the Agency for International Development.

It is hoped, however, that the Government of the Islamic Republic of Mauritania will find the report and its recommendations useful as it formulates and implements its future shelter programs.



Peter M. Kimam
Director
Office of Housing

MAURITANIA SHELTER SECTOR ASSESSMENT

TABLE OF CONTENTS

LIST OF CONTACTS.....	i
TEXT TABLES.....	iii
ACRONYMS.....	iv
<u>SUMMARY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS</u>	
I. Summary Findings and Conclusions.....	v
II. Recommendations.....	xiv
<u>I. POPULATION CHARACTERISTICS.....</u>	<u>1</u>
A. Human Settlement Patterns.....	1
B. Overall Demographic and Ethnic Structure.....	9
C. Migration, Sedentarization and Urban Growth Patterns.....	11
D. Conditions Among the Poor in Major Population Centers.....	17
1. Incomes and Employment.....	18
2. Expenditure and Consumption Patterns to Meet Basic Needs.....	21
3. Employment Opportunities.....	24
<u>II. DIMENSIONS OF THE SHELTER PROBLEM.....</u>	<u>27</u>
A. Human Settlement Patterns.....	27
1. Urbanization Trends and Growth of Squatter Communities.....	28
2. Densities.....	32
B. Housing Stock.....	35
C. Public Utilities and Services.....	40
1. Potable Water.....	40
2. Waste Disposal.....	44
D. Health and Sanitary Conditions.....	46
E. Environmental Conditions.....	48
<u>III. SHELTER DELIVERY SYSTEM.....</u>	<u>51</u>
<u>Overview of Shelter and Shelter-Related Institutions.</u>	<u>51</u>
1. Ministère de l'Environnement, de l'Habitat et de l'Urbanisme.....	52
2. Ministère des Finances.....	55
3. Centre National d'Hygiène.....	56

<u>Components of the Shelter Delivery System.....</u>	56
A. Land.....	56
1. Availability of Public Land in Urban Areas.....	56
2. Land Use.....	58
3. Tenure.....	60
4. Land Prices.....	62
5. Informal Sector.....	64
B. Infrastructure.....	67
1. Water.....	67
2. Electricity.....	67
3. Sanitary Sewage Disposal.....	68
C. Construction Technology, Labor and Management.....	69
1. The Informal Sector.....	69
2. The Formal Sector.....	75
a. Costs.....	75
b. Labor.....	78
c. Organization.....	80
D. Building Materials.....	82
E. Housing Finance.....	85
1. Formal Sector Finance.....	85
2. Informal Finance.....	94
F. Shelter Institutions.....	99
1. SOCOGIM.....	99
2. ADAUA.....	104

ANNEX I: TABLES

- A. Monthly Salary Levels and Steps by Sector
for Workers, Laborers, and Employees
- B. Distribution of Income Among Salaried and
Non-Salaried Employment Groups
- C. Percentage and Number of Urban Households
in Temporary Shelter
- D. Estimated Representative Building Materials
Prices in Nouakchott

ANNEX II: GEOGRAPHIC AND CLIMATIC CONDITIONS

ANNEX III: OVERVIEW OF GOVERNMENT STRUCTURE

ANNEX IV: ECONOMIC SITUATION

ANNEX V: ADAUA PROPOSAL FOR SURFACE WATER DRAINAGE
IN SATARA SQUATTER SETTLEMENT

BIBLIOGRAPHY

MAURITANIA SHELTER SECTOR ASSESSMENTLIST OF CONTACTSMinistère d'Equipment

Ahmed Salem Ould Sidi, Ministre
M. Diagana, Director General, D.H.U.

SOCOGIM

Moustapha Ould Abderahman, Director General
Mamadou Cissoko, former Director General
Yves le Troher, Directeur Financier
M. Kaitta, Technical Director
M. Dabo, Caisse d'Epargne Logement

SONELEC

M. La Parre

Service des Domaines (Ministère des Finances)

M. Dione, Directeur Général
M. M. Boukhraiss, Conservateur de la propriété
foncière et des hypothèques

Ministère du Plan et des Mines

Assane Diop, Directeur du Plan
Mohamed Ould Michel, Financement Etrangère
Samir Kanoun, Conseillé Technique

Service de la Statistique (Bureau de la Recensement)

M. Sy, Directeur Général
M. Gerard Noel, Conseillé Technique

Centre National d'Hygiene

M. Dawo, OMS Sanitary Engineer
Dr. Pablo Cartagena, OMS Epidemiologist

Bureau de Travail

M. Tidiane, Directeur Général

Ministère de l'Enseignement Fondamental et Secondaire

Dr. Jean-Paul Ayach, Medecin de l'Hygiene Scolaire

GIRM: Regional Governors:

M. Tidjane: Gouverneur à Rosso
M. Abdel Asis Ahmed: Aleg
M. Baham Ould Mohamed Laghdaf: Kaedi
M. Bal Mohamed El Bechir: Kiffa
Sidi Mohamed Ould Abdelrahman: District of
Nouakchott

BMDC

M. Kane Amadou Tidjane, Directeur Général

Banque Centrale de Mauritanie

M. Salikou Diallo, Directeur du Credit

ADAUA (Rosso)

Moussa Camara, Socio-Economiste
Mlle. Tandia Aminata, Assistante Sociale
M. Lamine Ben Barka, Ingenieur
M. Ladj Camara, Ingenieur
M. Josep Esteve, Architecte-Urbaniste
M. Serge Theunynck, Architecte-Urbaniste
Mme. Miriam Baro, Administrateur

World Health Organization (OMS)

Dr. Bosse
Dr. Rondriamamana, Internist

USAID/Mauritania

Robert Klein, Director
George Hawbaker, Project Officer
John Grayzel, Sociologist

US/Peace Corps

Patrick Dumont, Director

US Embassy

Charles Dunbar, DCM

TEXT TABLES

	<u>Page</u>
1. Evolution of Urban Population Centers 1961-77.....	15
2. Cumulative Distribution of Monthly Household Income in Major Urban Centers.....	20
3. Estimated Housing Deficit and Annual Need.....	36
4. Water and Electrical Connections of SONELEC System.....	41
5. Costs of SOCOGIM "Logements Economiques" 1977.....	77
6. Distribution of Bank Credit by Economic Sectors 1974-1977.....	88
7. Authorizations of Medium-Term Credit for Housing Construction Granted to Individuals During the Year.....	90

TEXT FIGURES

1. Population of Urban Centers 1977.....	3
2. Administrative Divisions.....	5
3. Organigram of Ministère de l'Environnement, de l'Habitat et de l'Urbanisme.....	53
4. Rendering of Two-Room Unit Proposed by ADAUA for Self- Help Construction in Satara.....	106
5. Plan and Cross-Section of Two-Room Unit Proposed by ADAUA for Self-Help Construction in Satara.....	107

ACRONYMS

ADAUA	Association pour le Développement d'une Architecture et d'un Urbanisme Africains
BAAM	Banque Arabe-Africaine pour le Mauritanie
BALM	Banque Arabe-Libyenne pour le Commerce et le Développement
BCM	Banque Centrale de Mauritanie
BIMA	Banque Internationale pour la Mauritanie
BMDC	Banque Mauritanienne de Développement et de Commerce
CMRN	Comité Militaire de Redressement National
CNSS	Caisse Nationale de Sécurité Sociale
DHU	Direction de l'Habitat et l'Urbanisme
GDP	Gross Domestic Product
GIRM	Government of the Islamic Republic of Mauritania
IDA	International Development Association
SMB	Société Mauritanienne de Banque
SNIM	Société Nationale Industrielle et Minière
SOCOIM	Société de Construction et de Gestion Immobilière
SONELEC	Société Nationale d'Eau et d'Electricité
SONIMEX	Société Nationale d'Importation et d'Exportation
UM	Ouguiya, the Mauritanian currency (1 UM = US\$0.022 or 45 UM = US\$1.00)
WHO	World Health Organization
WMO	World Meteorological Organization

SUMMARY FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

I

Summary Findings and Conclusions

During the past twelve years, the process of sedentarization that has been taking place since the beginning of this century accelerated markedly, causing profound and apparently permanent changes in human settlement patterns in Mauritania. Between 1965 and 1977, approximately one-third of the population abandoned the nomadic way of life to settle in both rural and urban areas. Encouraged in part by persistent and severe drought and a gradual disintegration of traditional social patterns, these population movements have altered the basic structure of Mauritania's society and its economy in ways that are only now becoming evident. In addition, the Mauritanian economy is presently facing a crisis in terms of its balance of payments, debt service burden, and public finances. The GIRM has adopted an economic and financial rehabilitation plan, the *Plan du Redressement*, to deal with the emergency situation, which calls for considerable austerity for at least the next six years in public expenditures, external borrowing, and investment in the economy. While this period of austerity coincides with rapid urbanization and the increased need for shelter for urban migrants, the government cannot be expected at this time to provide the high level of expenditure out of its own resources that would be required for a massive shelter program designed to fully address existing shelter problems.

Nevertheless, the shelter problems of those who have settled in the vast squatter areas around Mauritania's cities and towns require immediate attention, at least on a preliminary basis, before they become even more severe. Half or more of the residents of Nouakchott, the capital, and towns like Rosso in the south, are living in tents or semipermanent shacks (*baraques*), without access to such basic and essential urban services as potable water and adequate waste disposal. As a result, sanitary and general health conditions among the poor living in Mauritania's towns are no better and may well be worse than those of rural and nomadic groups. Government institutions with responsibility for the shelter sector are constrained not only by the lack of financial and human resources but also by the absence of an overall strategy for defining and addressing the existing situation.

A. Population and Settlement Patterns

The period following Mauritania's independence in 1960 has been marked by a significant and apparently permanent change in the settlement patterns of the population as the result of two distinct but related processes: sedentarization and urbanization. Both of these processes predate the severe

1968-72 drought (which accelerated their impact) and are likely to persist in the future, though perhaps at a less dramatic rate since the most major changes may have already occurred. The consequences of these two trends are revealed quite dramatically in changes in the social composition of the population that took place between 1965 and 1977, the years for which survey and census data are available. The nomadic population, which had for centuries been dominant in Mauritania's society and, through herding, in its economy, dropped sharply in this period from 65% to 36% of the total population, while the sedentarized rural population increased from 25% to 42% of the total and the urban population grew from 10% to 22%. As result, much of the population that had formerly been engaged in herding has settled in rural agricultural areas and in urban centers (defined by the census as settlements with populations of 5,000 or more).

Two migratory movements, which are reflected in the increases of both rural and urban populations, have characterized the sedentarization process. The first of these involves settlement in small rural villages and is based on agricultural activities. The recent sharp rise in rural settlement is attributable to the drought that decimated livestock herds, as well as to the gradual dissolution of the caste-related hierarchical division of labor among nomadic groups. The loss of the traditional lower-caste labor force has not only encouraged upper- and lower-caste groups to settle in villages but also seems to have changed herding patterns, with the herds of most nomadic groups now grazing over smaller areas and being slaughtered at markedly increased rates. Much of the migratory movement towards rural settlement areas has centered in the Sahelian zone, which now contains roughly half of Mauritania's rural population. Further changes in settlement patterns in this zone are likely to occur, however, because the overgrazing of the grass and scrub of the Sahel, combined with the drought conditions that have prevailed for nearly a decade, has contributed to the spread of the desert into this region.

Urbanization, the second migratory movement associated with sedentarization, is essentially a manifestation of a generalized rural exodus towards urban centers that has been occurring among both nomadic and sedentarized rural populations. It is unlikely that the abandonment by nomadic groups of traditional herding activities is solely responsible for the fourfold increase in the size of the urban population between 1961 and 1977, as it appears that the majority of the estimated 400,000 nomads who have sedentarized since 1965 has settled in the rural villages of the Sahel. Over the long run, however, this group is likely to contribute to the urbanization trends, given the delicate ecological balance of that zone, which has been disrupted not only by the drought but also by increased rural settlement.

The increase in the urban population, therefore, must be viewed in the context of the varied interplay of social, economic, political, and climatic factors that have increased the rural-urban migratory trend from both the Senegal River Valley and the interior of the country. Chief among these are the gradual disintegration of traditional social patterns; the decline in agricultural production and decimation of the herds (particularly during the drought years); the increased education of rural youths in the River Valley; the diversification of the economy and the growth of a modern commercial, service, and transportation sector; the creation of a new capital and three

industrial towns since independence; and the reinforcement of the localized commercial role of urban population centers in the center of the country with regional administrative functions.

The overall urbanization trend has not been evenly distributed throughout the country. The bulk of it has occurred in Nouakchott, which was established in 1960 and now contains 134,000 residents or 45% of the urban population, while another 15% is concentrated in the mining-related industrial towns of the northwest. Less dramatic effects of the rural exodus have occurred in the towns in the River Valley, which are tied to traditional agricultural production and livestock. The combined population of these towns has increased from 22,612 inhabitants in 1961 to 51,364 in 1977. Similarly, the towns of the interior have grown at an overall average of 5.4% per year since 1961. They function as local transport and marketing centers for the economic activity in those regions and combine both commercial and agricultural activity in varying degrees. These towns, with a combined population of 70,824, account for 23% of urban residents. Their increased population is a consequence of both the sedentarization of nomads and the more generalized rural exodus. It is likely that with the completion of the Nouakchott-Kiffa-Néma highway, the secondary towns will experience a further increase in population, but if insufficient development projects are planned in these areas, the road may eventually encourage further migration to the capital.

B. Conditions in the Shelter Delivery System

The impact of the rapid increase in urbanization is evident in the extension of urban boundaries, increased densities within the older quarters or urban centers, and the growth of peripheral squatter settlements composed of temporary structures. These settlements contain migrants of both rural and nomadic origins, as well as longer-term residents who are unable to find alternative shelter elsewhere. The largest of these settlements are around Nouakchott and Rosso, where 58% and 42%, respectively, of their populations, or approximately 80,000 and 7,000 people, respectively, now reside. Construction using permanent materials is forbidden except where a formal subdivision and allocation of land has been made as in parts of Nouakchott's first and fifth *arrondissements*, and in the peripheral areas of Aleg and Kaedi. Consequently, an estimated 48% of all urban households outside of the northern industrial mining towns, or approximately 22,000 households, are living in temporary units, defined as tents, huts, and *baraques* (crude shacks built of scrap materials).

In addition to the existing deficit, calculated as the number of urban households living in temporary and/or shared units, there is a need for approximately 5,000 units per year in urban centers outside the industrial mining towns, using long-term estimates of population growth. Even when it is assumed that some decline will occur in the extraordinarily high growth rate of Nouakchott, approximately 75% of the new annual need in the urban centers under consideration will be located in the capital city. Annual production levels to meet 10% of the existing deficit, and all of the need arising from the annual increase in population, would require that production increase by at least ten times the levels estimated for Nouakchott in recent years.

Faced with the enormous problems arising from the major changes in human settlement patterns and an unprecedented rate of urban growth, both formal and informal shelter delivery have been found to have serious constraints in virtually all of the components of the delivery system. This assessment is not based on the assumption that the shelter delivery system could have been expected to fully address all of the needs of the many thousands of recent urban migrants, but rather on an evaluation of its effectiveness given its existing resources and present organization. Evidence of shelter development activity in the informal sector suggests that the considerable potential of this sector is, and will remain, the most important means by which the shelter needs of the low-income urban population are met. But the informal sector is itself constrained by a variety of highly interrelated problems in the delivery system that should be addressed in order to improve the effectiveness of informal efforts.

In January 1979, the GIRM established a new ministry, the *Ministère de l'Environnement, de l'Habitat et de l'Urbanisme*, and incorporated into it most of the institutions responsible for shelter. These include SOCOGIM, the national housing agency, and SONELEC, the public utility, as well as the *Direction d l'Habitat et l'Urbanisme* (DHU), the *Direction de l'Hydraulique et de l'Energie*, and the *Direction de la Protection de la Nature*. In addition, the *Service des Domaines*, under the *Ministère des Finances*, is responsible for the management, sale, and lease of public lands, and the *Banque Mauritanienne du Développement et du Commerce* is the most active of the banks financing shelter construction. Although these institutions are involved in the formalized aspects of shelter delivery, the informal sector accounts for the greatest part of the activity that takes place in each of the components of the delivery system.

1. Land

Despite ample evidence to indicate that the informal sector accounts for the major portion of shelter production, this sector's progress in meeting demand using permanent materials is severely constrained by bottlenecks in the formal land delivery system. Given the costliness and slow pace of equipping and extending infrastructure services, and the inadequacy of existing cost-recovery mechanisms, the formal subdivision and distribution of land has not kept up with demand. At the same time, while lower-income groups appear to have resources or access to resources to undertake construction at less than one-third to one-half of the cost of formal construction, these groups are understandably reluctant to make major investments without some security of land tenure.

Land use planning and subdivision are the responsibility of DHU, which uses two types of zoning for housing: residential and traditional. The latter, which is most pertinent to low-income groups, employs a tenure system based on public leasehold whereby the individual has the right to occupy the land while the state retains ownership. Investment of a minimal sum in construction is not required as in residential zones, and standards for lot sizes, building coverage, and construction are lower than those used in residential zones. The fee paid for the permit of occupation is about 30 UM (67¢) per square meter. With a permit of occupation, the individual's tenure does not allow for the sale or subdivision of the lot.

In recent years officials of the District of Nouakchott distributed for free approximately 7,000 lots to squatters living in tents and *baraques* within the city and in peripheral areas, but there are now at least as many families living in squatter settlements in the same *arrondissements*. In attempting to deal with this situation, District officials have been instrumental in assigning lots of not more than 100 square meters to families in peripheral squatter settlements, but construction using permanent materials is forbidden within these *zones de regroupement* because no system of tenure has yet been established for them.

When land is allocated in zones designated for traditional housing, construction using permanent materials is undertaken. The process is gradual and may take several years to complete, its pace being largely a function of resources. Informal credit may be made available from family members or merchants who allow for the purchase of materials on credit and charge an additional sum to the normal price. The process itself is generally accomplished with the assistance of masons, while the family acts as the general contractor and provides materials and some labor input. This type of construction is more affordable in areas where local materials (*banco* and stone) are available, since materials account for 90% of construction costs when cement block is used. It is evident from the construction in Nouakchott's first and fifth *arrondissements* that a number of informal means have been used to gain access to shelter--for example, illegal subdivision and sale of lots by their occupants without title to the land; the consequent construction of units on smaller lots; and the liquidation and reinvestment in shelter of all assets held by a family in nonmonetarized or illiquid form.

Conclusions: The single most critical constraint in the delivery system is the difficulty which low-income groups have in obtaining some form of secure tenure to a parcel of urban land on which to build. DHU, which is responsible for subdividing urban land, appears to lack the resources with which to plan and implement land subdivisions. But far more important than this problem (which could be overcome with an increase in qualified personnel for DHU) is the requirement that land be equipped with adequate infrastructure, particularly water, before it can be subdivided and allocated. With an estimated 110,000 people in Nouakchott, as an example, dependent on public fountains for their water supply, however, this reluctance to allocate land without adequate infrastructure seems to imply that a standard exists within government that does not realistically take account of prevailing conditions.

While there is no question as to the desirability of ensuring that adequate infrastructure is available in newly subdivided areas, it is quite clearly not possible at this time to provide it on the scale at which it is needed. As a result, low-income families who lack some form of tenure to urban lots cannot undertake the informal construction of a dwelling unit using permanent materials, and therefore they lack both adequate shelter and access to improved infrastructure services. The rate at which such groups could meet their own shelter needs is seriously inhibited, and a significant source of investment (which would generate an important increase in employment in the informal sector) is lost to the urban economy. Given the lack of financial resources available to formal sector institutions, it appears that reducing the infrastructure required before land can be subdivided and

allocated to the most minimal levels (i.e., some public fountains and graded roadways) would at least result in a valuable and major increase in the supply of shelter built by the urban poor themselves, even though access to improved infrastructure services may still not be available to them.

2. Infrastructure

The rapid growth of population in urban centers has far exceeded the capacity of existing infrastructure systems. While the types of shelter available to the one-half of all urban households living in temporary shelter do not differ from those in which rural and nomadic groups live, the higher densities, limited mobility, and lack of basic sanitation and related infrastructure in urban squatter zones make traditional tents and huts less sanitary and less adequate shelter than in rural areas. Health and environmental conditions related to shelter within urban squatter settlements, therefore, are likely to be worse than those in rural areas. Thus despite the presence of a greater number of medical facilities in urban centers, the incidence and transmission of diseases is high.

The water distribution system, under the responsibility of SONELEC, the public utility company, provides water in ten of the seventeen urban centers, but fewer than 17% of all urban households are connected to the system. SONELEC also supplies a total of 93 public fountains in urban areas with water being paid for by the local government and then resold to individuals in the ten centers. Thirty-three of these public fountains are in Nouakchott, serving approximately 20,000 households (110,000 people), or over 80% of the city's population. The inadequacy of the supply of public fountains and their distance from residents in the peripheral areas have encouraged the growth of a large and active informal distribution system by water vendors. But the cost of water to the individual small consumer using this informal distribution system is ten times the price paid by the vendor at the fountain, and thus water consumption among those who rely on public fountains is estimated to be less than 8 litres per person per day for all uses, which local health officials consider inadequate to meet nutrition and hygiene needs. Even at this level, however, a family would be required to spend up to one-quarter of a median-level income on water alone, and thus actual consumption levels can be assumed to be considerably lower, which poses additional problems in terms of health and sanitation.

Low-income squatter groups rely on pit latrines for waste disposal, but in many areas, especially those with sandy soils, these latrines are often only shallow depressions within small open-air enclosures. While these may be adequate for nomadic groups that can move their camps when conditions become unsanitary, they constitute a serious health hazard in crowded and confined urban squatter zones.

Conclusions: Urban infrastructure cannot be significantly expanded until increased investment resources are made available. But given the present austerity program, no major increase of GIRM resources allocated to urban infrastructure can be expected in the near future. It is possible, however, for local authorities to capture a portion of the substantial profits earned by informal water sellers, and this could be used to finance the extension

of the system of public fountains. Providing for a more sanitary system of waste disposal in areas like N'ouakchott's fifth *arrondissement* where sandy soils predominate would require that pit latrines be lined with masonry to allow greater depth while preventing the collapse of the sides of the pit. The construction costs of such a simple latrine, however, are likely to be very high on a per family basis, and further investigation will be required to find a less costly alternative.

An additional constraint to the provision of urban infrastructure lies in the apparent lack of coordination between SONELEC, which is responsible for water, electricity, and sewage, and the other institutions and local authorities concerned with shelter provision. Indeed, the projects undertaken by SOCOGIM have been delayed for considerable periods because SONELEC could not provide for the timely installation of water and electrical connections. Despite the fact that all of these institutions operate with limited resources and therefore cannot be expected to expand the supply of shelter and infrastructure services at a rapid rate, there should at least be some effort made to coordinate their various activities so as to avoid the increased costs that all experience as result of delays encountered in any one aspect of shelter delivery.

3. Shelter Construction

Nearly all shelter construction is undertaken within the informal sector by families who have some form of secure land tenure. Informal sector construction using concrete block is generally about one-third of the cost of formal construction, and informally built units are both spatially and structurally well-suited to the needs of low-income families. Most families that do have tenure appear to be able to mobilize sufficient resources over a period of several years to build a permanent dwelling.

Although formal responsibility for the construction of low and moderately priced housing is assigned to SOCOGIM, this institution has completed only 100 units in the five years since it was established, and has had 200 additional units under construction for several years. SOCOGIM has experienced considerable difficulties in project implementation and management due to high cost overruns and delays by contractors, lack of coordination in the provision of infrastructure, lack of financing, and inadequate financial management of its portfolio. Despite some cost reductions achieved by SOCOGIM's acting as its own general contractor, and government subsidization of land costs, the lowest priced unit being built by SOCOGIM is US\$13,500, and this is affordable only by families with incomes in the top 10% or less of the urban income distribution. Yet SOCOGIM has leased the 100 completed units under lease/purchase agreements with interest rates lower than the cost of funds to SOCOGIM and repayment terms twice as long as SOCOGIM's repayment terms on some of these funds, and apparently is prepared to offer the same highly subsidized lease/purchase arrangements on the 200 units now under construction. As a result, SOCOGIM's financial position at the present time is untenable.

Conclusions: It is clear that formal sector construction undertaken both by private contractors and by SOCOGIM is far too costly to be afforded by the

vast majority of Mauritania's urban population. The standards applied in formal sector construction and the overhead costs involved drive per-square-meter costs to a level several times greater than that in the informal sector. Consequently, if any of the units that SOCOGIM may build are to be affordable by low-income groups, standards will need to be significantly lower than those currently applied, and unit designs will need to be greatly simplified. But far more promise for substantially increasing shelter production lies with the informal sector. Again, however, lack of secure land tenure is a serious constraint on the rate at which informal sector construction can take place. Furthermore, limited access to credit substantially inhibits construction activity in both the formal and informal sectors.

4. Building Materials

Only sand, gravel, shell aggregate, water, and some clay are available locally for construction. All other building materials are imported by a small group of entrepreneurs that apparently manipulates the market by withholding supplies and driving domestic prices up to two or three times import costs. This is especially evident in cement, the most commonly used building material, which can be imported for US\$62 per ton, but is sold for \$US150. Nevertheless, individuals often purchase cement and manufacture blocks on the site to insure quality and adequate supply for the building of their units. Concrete blocks are also manufactured and sold by small producers in limited quantities.

Clay soils for the production of mud bricks are available in the south along the Senegal River Valley, but higher rainfall levels in this area require that the bricks or blocks be stabilized with small quantities of cement or other binding materials. ADAUA, a consulting group working for SOCOGIM on the upgrading of the Satara squatter community in Rosso, has developed an inexpensive stabilized block using local clay in a Cinva-Ram process, and this offers considerable potential for reducing costs and assuring an adequate supply of permanent building materials. In addition, the potential for using local deposits of gypsum for producing plaster blocks and using lime for the domestic production of cement is being investigated.

Conclusions: The major problem with regard to building materials results from the high import component and the artificially high prices charged by the few major suppliers who are apparently able to manipulate the market. In addition, the small scale of building materials production using imported components tends to further restrict supply. Given this situation, the production of indigenous building materials offers significant potential for reducing costs and for promoting the development of domestic extractive and manufacturing industries. Existing deposits of lime should be further evaluated for the possible production of cement. This key material is likely to long remain an important component in permanent construction because of its structural qualities and the relative ease with which it can be used. The domestic production of cement and of indigenous building materials could also serve to sufficiently increase supplies and therefore to preclude the kind of market manipulation that currently takes place; a continuous and inexpensive supply of essential materials would thus be ensured.

5. Housing Finance

The BMDC, a semipublic enterprise, is the most important formal sector institution that finances housing, both through SOCOGIM and by making direct mortgage-type loans. Direct loans to individuals are financed by the BMDC and other banks with their own investment capital (at 11% plus 2 percentage points on the loan) and through rediscount with the Banque Centrale. Banks finance a maximum of 30% of the construction cost over terms of five to seven years, which requires individuals to save the remaining 70% in advance of beginning construction. Due to limited capital available from the Banque Centrale, BMDC provided 97 individual mortgage-type loans in 1978 (out of 120 granted by all banks), for a total of UM/67 million (US\$1.5 million), or an average of approximately UM/700,000 (US\$15,500) per loan. Quite clearly, loans of this amount can be amortized only by families in the top 1% or 2% of the urban income distribution, and are made even more prohibitive in that the borrower must have accumulated 70% in cash, roughly UM/1.63 million (US\$36,300) using this average loan amount.

Personal savings are the most important means of financing housing in the informal sector. But savings are usually held in illiquid form, and construction of a permanent dwelling often requires the liquidation of such assets as jewelry, dowry goods, livestock, and even a portion of an illegally subdivided building lot. Credit can also be obtained informally from family members; from building materials suppliers who charge a higher price to those who purchase on credit (but who do not release the materials until all of the installment payments have been made); and from such credit societies as *ton-tins*, to which individual members regularly contribute a small amount, with the pooled resources going to members in turn. With the exception of SOCOGIM's savings program, the *Systeme Test d'Epargne Logement* (Experimental Savings for Housing System), little effort has been made by formal sector institutions to mobilize domestic savings to finance shelter development.

Conclusions: The absence of adequate housing finance, and the relatively short lending terms and high downpayments required by formal sector institutions, mean that only those at the highest income levels have access to credit, which severely slows the rate at which construction activity takes place. Thus for urban residents at all income levels, shelter construction is largely dependent on the rate at which individuals accumulate personal savings, and these are usually held in illiquid form. Any significant increase in the supply of urban shelter is therefore constrained by the lack of long-term resources allocated to shelter development. In almost all cases where effective housing finance systems have been developed, such resources have been mobilized from the savings of those individuals who have potential access to long-term credit for shelter construction. This has been found to provide an important incentive for individuals to intermediate their illiquid assets in the form of savings, and thereby make them available to the rest of the economy. While SOCOGIM has attempted to establish such a system by instituting a contract savings program, it lacks both the legal authorization to implement it and the financial capability to manage it. It also has not been able to sustain the rate of production needed to make a contract savings system workable. Nevertheless, the present scarcity of resources for shelter development could potentially be overcome

if a savings system were developed. In addition, extending access to credit for shelter to the thousands of low-income urban families that are effectively precluded from borrowing from the formal sector, would result in a substantial increase in the supply of shelter built through the self-help efforts of these groups.

6. Shelter Institutions

From the discussion above, it seems clear that the institutions responsible for shelter in Mauritania lack both the resources and the coordination required to make their efforts effective. In the absence of clearly defined national shelter policy guidelines, SOCOGIM has devoted all of its activities to addressing the needs of upper-income groups on a highly subsidized basis, and has yet to provide any shelter services for the urban poor. With the precarious state of its finances, it can hardly be expected to serve the critical needs of this group until it can improve its financial condition and lower the standards used in the design of its projects. While ADAUA's efforts in Satara appear to be appropriately designed for low-income squatters and to take advantage of the human resources such people can bring to bear in improving their shelter conditions, it has yet to secure the financing needed to ameliorate the serious drainage problems in the area and to provide the funds that it hopes to lend to low-income families for its aided self-help program.

II

Recommendations

A. Development of a Shelter Strategy

Any strategy designed to address the shelter sector in Mauritania at the present time must take account of two fundamental factors: (1) that changes of enormous magnitude are taking place in the settlement patterns of the population, with far-reaching consequences in terms of the structure of both the society and the economy; and (2) that given the present economic crisis and the austerity program recently devised to deal with it, government cannot now be expected to provide the capital resources required for major improvement in the shelter sector. Yet the evidence of informal construction undertaken by the urban poor themselves once they have some form of land tenure indicates that resources are available from such groups and that investing these resources can be encouraged to result in a significant increase in the supply of shelter. Preparing for and mobilizing this increased investment is especially important because shelter construction and the building materials industries that support it can offer an almost unique opportunity to stimulate the development of the domestic economy and provide an effective means of generating employment, thereby increasing the incomes of the urban poor and mobilizing those domestic resources that have not previously been intermediated in the formal economy.

It is therefore recommended that a strategy be adopted to remove existing constraints to the functioning of the informal delivery system and to

encourage its expansion to provide for a substantial increase in the informal production of low-cost shelter. As part of such a strategy, the capability of relevant shelter institutions should be improved to better assist the sector. The creation in January 1979 of the *Ministère de l'Environnement, de l'Habitat, et de l'Urbanisme* and the realignment of most of the country's shelter-related institutions within this ministry should assure greater coordination among them. More importantly, it should allow for the development and articulation of national shelter policy guidelines to rationalize the activities of shelter-related institutions and provide the groundwork for a comprehensive program of shelter development.

In this regard, it is recommended that within the context of overall economic and social development planning, the GIRM adopt a policy of spatial development planning that seeks to stabilize the settlement of population groups in areas with long-term economic potential and viability. Quite clearly, existing conditions in the shelter sector are in large measure attributable to the massive changes in settlement patterns whose scale, in proportion to the size of the domestic population and the brief period of time in which the changes took place, has few parallels in the experience of most other societies. It could not have but been expected that these developments would have overwhelmed both the financial and institutional resources of any government. Yet while rural-to-urban migration appears to be a pervasive trend in the developing world, in the Mauritanian context it has already exceeded the capacity of urban centers, particularly Nouakchott, to absorb and adequately shelter nearly half of their current populations. Thus every effort needs to be made to stem the continued flow of migrants to the urban areas and to stabilize existing settlements so as to slow the rate of increase in the numbers of urban poor without employment, land, or adequate shelter.

B. Specific Recommendations

To improve the effectiveness of the shelter delivery system, the following actions should be taken in each of the components identified above:

1. Land: Evidence gathered in the course of this assessment clearly indicates that lack of access to secure tenure precludes many low-income urban residents from investing their own resources to improve their shelter conditions. It is therefore recommended:

- a. That land in areas presently occupied by squatters be designated as *zones traditionnelles*, and that such land be subdivided and allocated as rapidly as possible; only minimum level of such essential infrastructure as public fountains should be provided so that, at the least, low-income families can have regularized and official tenure and construct permanent units, even though they may still lack access to adequate infrastructure services.
- b. That in undertaking the subdivision of land in urban peripheral areas an effort should be made to avoid imposing a simple grid pattern on such areas that does

not take account of existing occupancy patterns. Rather, the preservation of existing patterns is recommended in order to avoid the high costs and disruptions of families and informal communities that arise from extensive re-location. Such an approach recognizes the value of the modest investment many squatter families have already made in the land they presently occupy, and the value that their existing location represents in terms of access to employment opportunities and the emerging coherence of new communities. While this kind of approach will require thorough analysis of existing settlements, it should preclude the extensive resettlement that is so costly for both government authorities and low-income occupants. In addition, it should allow for the identification of numerous unoccupied parcels that could be sold to low-income families who are presently renting shelter within both squatter communities and other parts of the urban centers.

- c. That the true and current costs of subdividing and allocating urban peripheral land should be added to the price of this land when regularized tenure is accorded to the occupants. While it was the original intention of the laws established for the sale of public lands that the prices charged were to cover all such costs, the existing prices were set over a decade ago and no longer reflect the true costs of subdivision and allocation, and this has contributed to the considerable speculation in land prices evident at present.

2. Infrastructure: The lack of adequate infrastructure services, particularly water supply and distribution, has been estimated as the ultimate cause of sickness for over 80% of those seeking medical assistance at public health clinics in urban peripheral areas. Yet while the extension of the system of public fountains is constrained by a lack of financial resources on the parts of local authorities, informal water sellers in many cases sell water from public fountains for far more than it costs them. To ameliorate this situation, it is recommended:

- a. That a study be undertaken to devise a system for recapturing the costs of extending the system of public fountains into low-income areas, perhaps through the taxing and/or licensing of informal water sellers, while at the same time ensuring that prices to low-income consumers are not raised. While a certain amount of policing may well be required by local authorities to prevent price increases, the large number of informal water sellers should tend to encourage sufficient competition to assist in this effort.
- b. That once the subdivision and allocation of peripheral land is accomplished, the funds collected from a tax or license on water sellers be used to extend the public fountain system into these areas.

- c. That in conjunction with these efforts, local authorities designate specific areas for the sanitary disposal of household refuse in pits that could be dug under community auspices at regular intervals throughout newly subdivided areas. Provision should be made for the digging of new pits once these become filled and are covered over.
- d. That local authorities seek to organize within such communities an effort to promote and encourage, where soil conditions permit, the digging of pit latrines on individual lots, and where soil conditions require, the construction of masonry-lined latrines, to allow for the sanitary disposal of human waste.

3. Construction: Given the relatively high costs of formal sector residential construction, including that undertaken by SOCOGIM, and the substantially lower costs when the poor build for themselves via the informal sector, it is strongly recommended:

- a. That the focus of such formal institutional efforts as those of SOCOGIM with respect to the urban poor be directed exclusively at facilitating the auto-construction process of the informal sector through aided self-help programs (and conversely, that formal sector institutions refrain from attempting to construct units for the urban poor as this apparently cannot be accomplished without unrealistically massive subsidization). Self-help programs should incorporate many of the principles that have been developed for SOCOGIM by ADAUA in the Satara area of Rosso, and could include, *inter alia*, assistance in the production of local building materials, the development of appropriate and simplified construction designs and techniques, and the arrangement of suitable financing with institutional lenders.

4. Building Materials: While not alone responsible for the high cost of formal sector construction, the large import component in commonly used building materials, and the oligopolistic manipulations of suppliers, result in high market prices of building materials. Yet Mauritania contains such raw materials as lime, gypsum, and clay soils from which suitable building materials can be made. To the extent feasible, then, it is recommended:

- a. That the production and use of local materials be encouraged, especially on an artisanal level for self-help construction as this would ensure a sufficient number of producers to preclude domination of the market by a few large producers. The potential for establishing local production of cement should be fully studied; and further investigation of the use of plaster blocks made from gypsum should be undertaken. In addition, the production of stabilized clay blocks should be encouraged, again building on the technical design work already completed by ADAUA.

- b. To the extent possible, a study should be made of the potential for producing Cinva-Ram type blocks from stabilized soils in and around Nouakchott and other cities, which would require an exception to the existing prohibition in the capital on the use of *banco*-type building materials.

5. Finance: Despite the fact that formal sector financing for shelter is available only to those at the highest income levels, evidence indicates that substantial savings, often in illiquid form, are accumulated over a period of years by families at income levels for the "self-financing" of shelter construction. This has the effect of limiting the rate at which shelter production can take place, and denies the economy the use of significant resources until a sufficient amount of savings is accumulated to begin construction. To address these issues, it is recommended:

- a. That an effort be made to mobilize the savings of families at all income levels that would be specifically directed to the financing of shelter. In the brief span of its existence, the *Systeme Test d'Epargne Logement* of SOCOGIM has mobilized over twice the amount of savings as the *Caisse Nationale d'Epargne*, indicating the degree to which potential access to credit to finance shelter is a motivating factor in the promotion of savings. Such a system could form the basis for a savings mobilization effort, as could the preliminary experience with the *Caisse Populaire* begun by ADAUA in Satara, although it is strongly recommended that this not evolve into a contract savings system, which would require a quantum increase in the formal sector production of shelter units.
- b. That the potential be explored for mobilizing the capital resources of higher income groups through the sale of participation certificates or similar instruments. These should carry a higher rate of interest than that paid on local savings accounts, but could be government guaranteed and thus be made attractive to domestic investors. Such a device would not only assist in generating a pool of resources to finance both lower- and higher-cost shelter production but would also have strong anti-inflationary impacts on the domestic economy.
- c. To facilitate the auto-construction process and to increase the rate at which informal shelter construction activity takes place, access to credit for the purchase of building materials should be extended to those low-income families who receive secure tenure (permits of occupation) to lots in *zones traditionelles*. The experience among such groups in many developing countries and the activities in informal finance in Mauritania strongly suggest that the repayment of such credit can best be assured when it is extended through community-based organizations rather than through

formal sector banks or public agencies. The organization of a community-based credit organization such as the *Caisse Populaire* in Satara could serve as a model for the development of lending and repayment techniques appropriate to low-income borrowers.

- d. To further assist in the auto-construction process and to encourage and increase the supply of building materials, small loans should be granted to artisanal building materials producers, particularly to those using locally available raw materials. Credit could be extended by BMDC as part of its planned effort to assist artisanal producers of all kinds, or through the kinds of community-based organizations suggested above. In addition to increasing supply and lowering costs, an increase in the level of activity of small-scale building materials producers would serve to generate much-needed employment for low-income residents of urban centers.

6. Shelter Institutions: Although a variety of specific and general recommendations have been made with regard to SOCOGIM in terms of particular components of the shelter delivery system, this institution is involved in so many aspects of shelter delivery that several additional points are discussed below. The most important of these for the immediate future and for SOCOGIM's financial viability concerns the financing arrangements on the 200 medium- and high-cost units to be completed in 1979. It is recommended:

- a. That the lease/purchase and rental agreements for the units under construction be examined and that the monthly payments be raised to a level high enough to ensure that the income from this portion of its portfolio will cover both the amortization and financing secured by SOCOGIM for their construction and the overhead, maintenance, insurance, and reserve costs that SOCOGIM will be required to pay. Action on this recommendation is considered essential to prevent further decapitalization of the institution (and its potential bankruptcy) and to ensure that those higher-income groups that can afford to pay for housing are not the recipients of substantial subsidies, while the shelter needs of the urban poor are ignored.
- b. That consideration be given to charging a high enough monthly payment on these and other medium- and high-cost units that SOCOGIM may build so that its net income, after all direct and indirect costs have been met, on such investments would allow for some cross-subsidization of SOCOGIM's efforts to address the shelter needs of the urban poor.
- c. In order to facilitate the kinds of auto-construction through aided self-help programs recommended above, SOCOGIM should begin to develop the capacity within itself, or through consultants like ADAUA, to support the organization of low-income communities for mutual self-help and community upgrading.

I. POPULATION CHARACTERISTICS

A. Human Settlement Patterns

In the past, traditional settlement patterns of Mauritania's land space were characterized by a large number of widely dispersed nomadic camp grounds in which most of the population lived, a few permanent settlements based on trade and oasis agriculture in the Sahara and Central Sahelian zones, and a small sedentarized population in the Senegal River Valley to the south. As recently as 1961, the year following independence, the two most important urban centers in terms of size were the north central desert town of Atar and the southern agricultural town of Kaedi with populations of 9,528 and 9,197 respectively. Only three other centers had populations of more than 5,000 inhabitants; these included the newly created capital of Nouakchott, the port-city of Nouadhibou, and the river-town of Boghe.

Over the past 12 to 16 years, however, the acceleration of two distinct but not unrelated processes, sedentarization and urbanization, has resulted in significant changes in both settlement patterns and the spatial distribution of the population. The area which has been most affected by both these processes lies south of the 18th parallel and includes the River Valley and Sahelian zones of the country. The sedentarized population in these zones

now represents approximately 56% of the total population within an area which comprises less than twenty percent of the total land mass (Figure 1).

The degree to which the sedentarization process has taken place in recent years is underscored by the fact that between 1965 and 1977, one out of every two nomads became permanently settled. The proportional distribution of sedentarized vs. nomadic populations was almost totally reversed during that period, as can be seen in the table below.

COMPOSITION OF THE POPULATION:
1965 and 1977
(in number and percent)

	<u>1965^{1/}</u>			<u>1977^{3/}</u>	
	<u>Population</u>	<u>Percent of Total</u>	<u>Adjusted Percentage^{2/}</u>	<u>Population</u>	<u>Percent of Total</u>
<u>TOTAL POPULATION</u>	<u>1,028,200</u>	<u>100.0%</u>	<u>100%</u>	<u>1,420,076</u>	<u>100.0%</u>
Nomadic (Transhuman)	770,000 (--)	74.9% (--)	65% (--)	513,659 (67,000)	36.2% (4.7%)
Rural	158,400	15.4%	25%	595,653	41.9%
Urban	99,800	9.7%	10%	310,764	21.9%

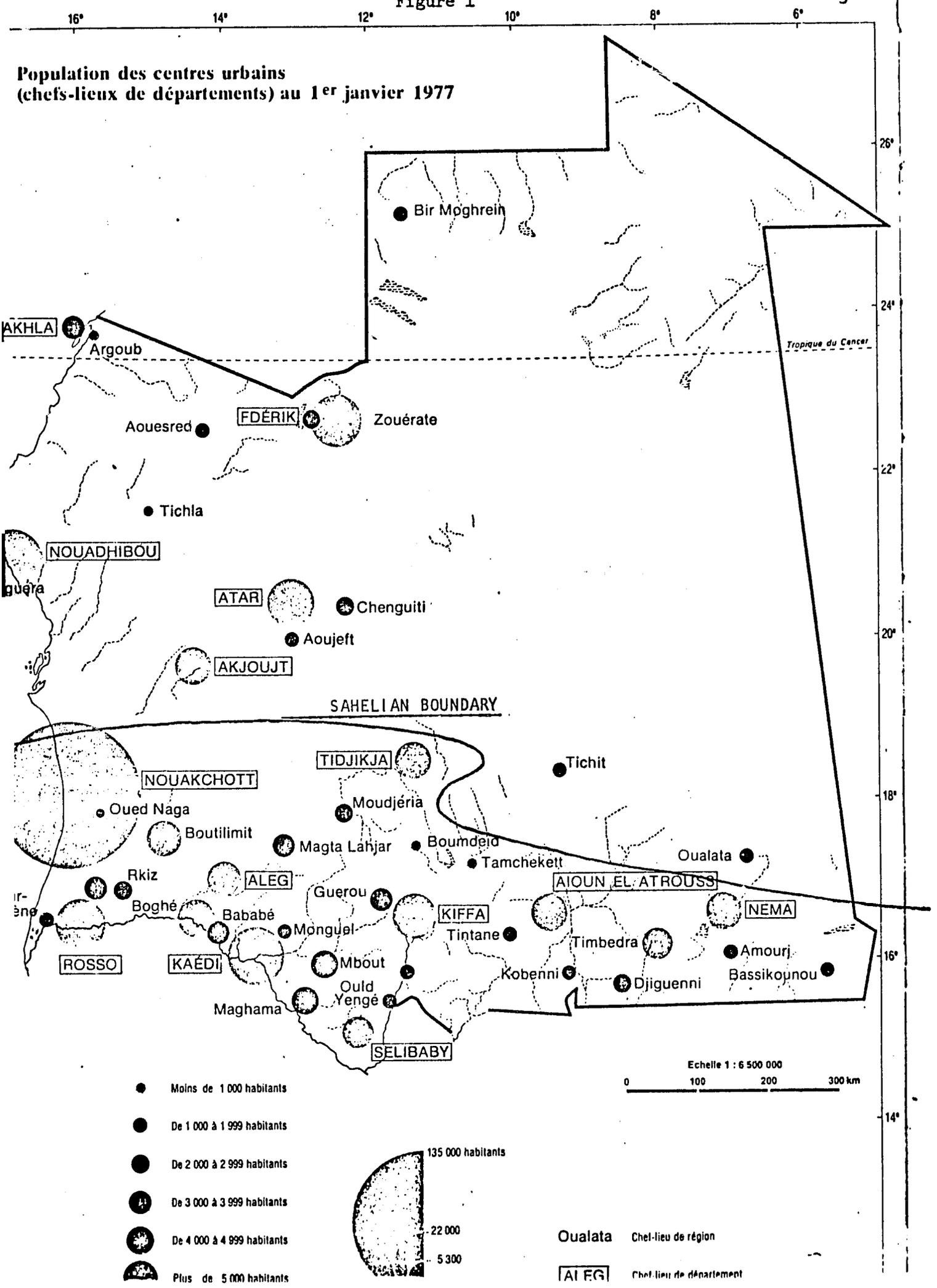
1/ Based on 1965 CEDES Survey, which defined Nomadic and Rural populations differently from 1977 Census.

2/ Adjusted Percentage to make 1965 and 1977 exercises conform.

3/ Based on 1977 Census. Urban population includes sixteen urban centers with population of 5,000 or more, as well as F'Derik and Dakhla which had a combined population of 6,110.

Figure 1

Population des centres urbains
(chefs-lieux de départements) au 1^{er} janvier 1977



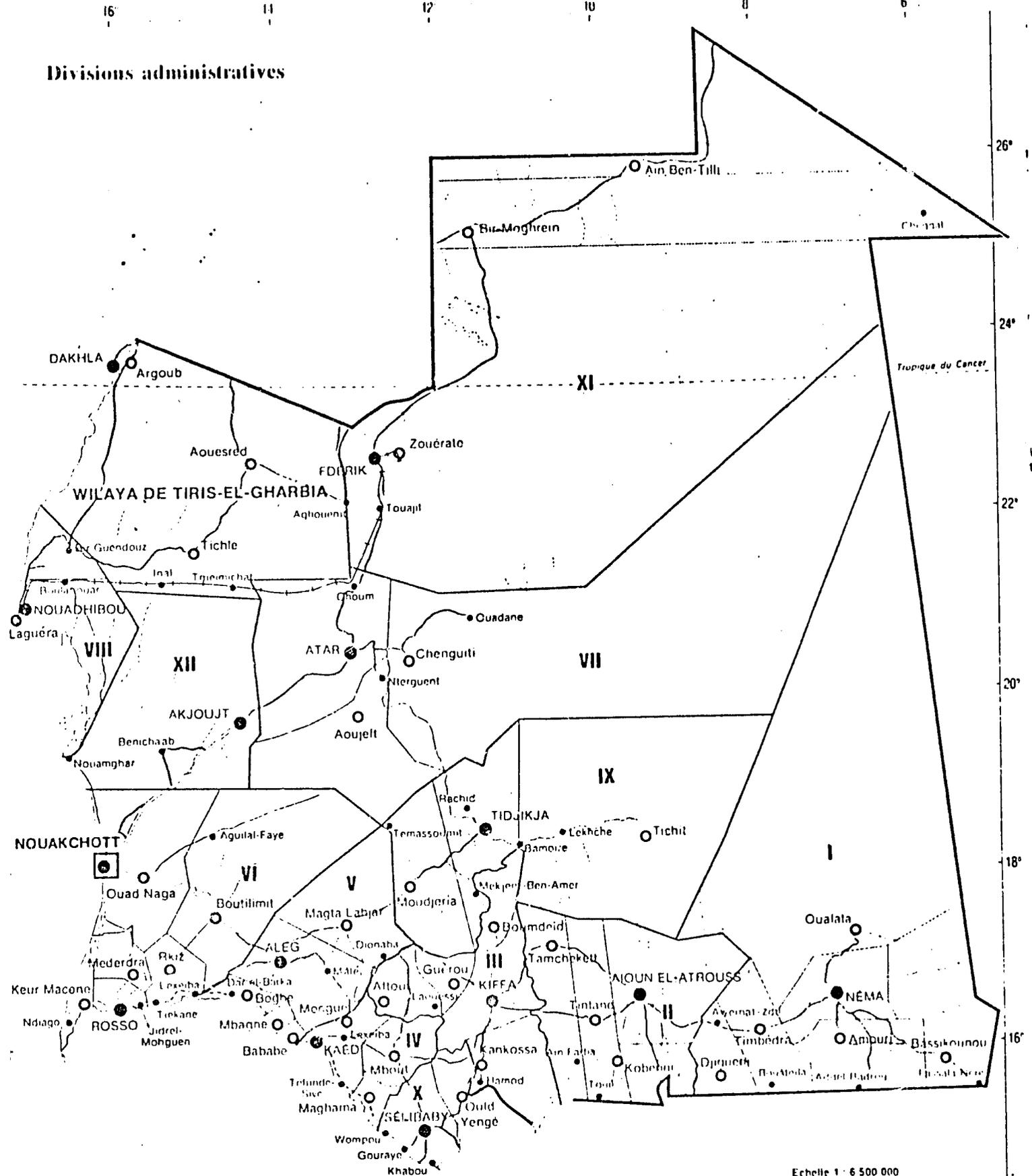
Thus while in 1965 nomads accounted for 65% of Mauritania's inhabitants, by 1977 they represented only 36%. It should be noted, however, that this process of sedentarization has been taking place, albeit in a more gradual manner, since the turn of the century. Nomadic groups still represent a slight majority in the First, Second, and Ninth regions in the east of the country, and account for almost half the population of the Sixth region in the southwest. (Figure 2 identifies the thirteen regions of the country.)

Two distinct migratory movements are evident in the process of sedentarization. The first involves the creation of new rural villages by formerly nomadic herdsmen. This movement has added to the size of the non-nomadic rural population which increased from 158,000 in 1965 to 595,653 in 1977. Thus, despite the existence of a strong rural-urban migratory trend, the rural population has been expanding at the rate of 12.8% per year as a consequence of sedentarization. The rural areas most affected by this have been in the departments directly north of the traditionally sedentarized and densely populated River Valley zone.

The second migratory movement which has characterized the sedentarization process is more directly linked to urbanization, and is essentially one manifestation of the more generalized rural exodus towards urban centers. It has contributed directly to the high rate of urbanization of 10% per year, over the past sixteen years. The populations of urban centers -- defined as concentrated settlements with more than 5,000 inhabitants -- have increased from 73,144 in 1961 to 304,654 in 1977. The number of centers with more than 5,000 inhabitants has increased from five in 1961 to sixteen and includes the majority of the regional capitals. Only the

Figure 2

Divisions administratives



- Capitale nationale
- Chef-lieu de région
- Chef-lieu de département
- Chef-lieu d'arrondissement
- Limite régionale
- Limite départementale
- VII** Numérn de région
- Routes
- Principales pistes
- Voie ferrée

regional capitals in the Eleventh and Thirteenth regions, F'Derik and Dakhla respectively, have populations under 5,000.

Urban centers in Mauritania can be classified into four groups, including the capital, Nouakchott, in which the bulk of the increased urbanization has occurred. The other fifteen urban centers contain 56% of the urban population, and include eleven of the thirteen regional capitals as well as four departmental capitals which have reached urban size: Boghé in the Fifth Region, Zouerate in the Eleventh Region, Boutilimit in the Sixth Region and Timbedra in the First Region. These fifteen centers can be divided into the three remaining groups, based on function and location, as can be seen in the table below:

	1961		1977		Average Annual Growth Rate
	Urban Population	Percent	Urban Population	Percent	
<u>Nouakchott</u>	5,807	7.9%	134,986	44.3%	23.3%
<u>Mining Towns</u> (Nouadhibou, Zouerate, Akjoujt)	12,460	17.0%	47,479	15.6%	9.3%
<u>River Towns</u> (Kaedi, Rosso, Boghe, Selibaby)	22,612	31.0%	51,364	16.9%	5.6%
<u>Central and Eastern Towns</u> (Atar, Kiffa, Aioun, Nema, Tidjikja, Boutilimit, Aleg, Timbedra)	32,265	44.1%	70,824	23.2%	5.4%
<u>TOTAL</u>	<u>73,144</u>	<u>100.0%</u>	<u>304,653</u>	<u>100.0%</u>	10.0%

(Adapted from 1977 Census Data)

1. Nouakchott: By 1977, Nouakchott had a population of 134,986 inhabitants and has been growing at an average annual rate of 23.3% since 1961. Its population accounts for 44% of urban residents and one-tenth of the national population. Only four of the thirteen administrative regions in the country have larger populations than the city of Nouakchott, which covers an area of only 120 Km². Planned in 1957, the capital was not expected to contain more than 30,000 inhabitants, but has long since more than surpassed its capacity. Originally, it was divided into three arrondissements, but in 1974, shortly after the drought, two additional peripheral arrondissements, the first and fifth, were created to absorb the squatter populations which had settled in tents and baraques (shanties) both within the city and around the peripheral zones. Seven thousand subdivided lots were distributed within these two new arrondissements, and while most of these have been built upon, many more squatters have settled beyond the subdivided areas. Census figures for 1977 indicate that roughly half of the city's population is located within these two recently created arrondissements.

2. The Northern Industrial Mining Towns: (Nouadhibou, Zouerate, and Akjoujt) The populations and high rates of growth in these towns have depended primarily on the mining industry. They have drawn people seeking employment from various parts of the country as they are located within sparsely populated regions. Akjoujt's future is uncertain since the closing of the copper mine, and only Nouadhibou is diversified enough with fishing, commercial activities, and port and rail facilities related to the mining industry, to sustain its role as a dominant urban center.

3. The Senegal River Valley Towns: (Kaédi, Rosso, Boghé and Selibaby)

These towns are older than the "modern" northern industrial centers and have traditionally functioned as agricultural market centers. They exist within densely populated rural areas which have traditionally contained sedentarized agricultural as well as semi-nomadic populations. Their growth has been more moderate and steadier than that of the other urban centers. Rosso, however, is the exception with a growth rate of 8.5% per year, as it seems to have been more directly affected by the rural exodus and the sedentarization of nomadic groups during the drought years. Additionally, its role as a relay point for trade between Dakar in Senegal and Nouakchott has contributed to its growth.

4. The Eastern and Central Towns: (Atar, Kiffa, Aioun, Néma, Tidjikja, Boutilimit, Aleg and Timbedra) These towns, with the exception of Atar, are within the Sahelian region. They have all experienced a rate of growth which is inconsistent with their economic base, due largely to the increased sedentarization and migration during the drought period. The Sahelian towns are located in areas which have been traditional pastoral centers with a marginal agricultural base, and they function as transportation and commercial centers. There is some indication that the high rate of growth recorded between 1961 and 1977 began to slow down after 1975. Only Aleg and Boutilimit, which are on the Nouakchott-Néma road, did not experience this diminution in growth rates. Atar, along with Tidjikja, is also known for date production; however, its importance as a major urban commercial center has come into question with the development of economic activities further to the south. The loss of part of its population to other urban centers has in recent years been compensated by in-migration from rural areas during the drought and the war in the north.

B. Overall Demographic and Ethnic Structure

Demographically, Mauritania's population is characterized by an almost equal number of males and females among its 1,420,000 inhabitants. The age distribution in 1977 indicates that 44.3% of the population is below 15 years of age, while another 49.7% is between 15 and 59 years. The latter age group represents a potential "economically active" population of 705,740, half of which is male. Birth rates estimated in 1965 were 43 per thousand and death rates were estimated at 27 per thousand, suggesting a natural annual rate of increase of 1.6%; but this is inconsistent with the apparent increase in population between 1965 and 1977, which was on the order of 2.7% per year. It should be noted that the 1977 Census is the first complete census of the population undertaken in Mauritania, and therefore it seems reasonable to assume that the 1965 CEDES Survey underestimated population size while it overestimated death rates. The actual growth rate, as estimated by census officials, lies between the two extremes suggested above, at 2.2% per year. Infant mortality rates, which have been estimated for Nouakchott for children under four years of age, are 20 percent, and life expectancy is 41 years nationwide.

Ethnically, there are two distinct populations. The originally nomadic Moors represent 75% of the population and are divided into two races. The black Moors are of Sudanese descent and prior to their liberation functioned as the traditional serfs (harateen) of the castebound Moorish society. They share the same customs and language as the white Moors who are of Arab and Berber origin. The African ethnic groups which represent the

remaining 25% of the population include Toucouleurs, Soninke, Wolofs and Peuls. With the exception of the Peuls, who are nomadic, these groups have been traditionally sedentary and engaged in agriculture in the southern part of the country. Within urban centers both Africans and Moors can be found in varying proportions among migrants and recently sedentarized peoples. The traditional groupings along tribal and ethnic lines that characterized the older quarters of cities and towns do not appear to apply in either the more recent subdivisions or in the squatter settlements found along the urban peripheries, both of which tend to be more heterogenous in their composition.

C. Migration, Sedentarization and Urban Growth Patterns

The structure of Mauritania's population as revealed by the 1977 Census indicates that a remarkable transformation in its social composition has taken place, largely due to the unprecedented rate of sedentarization and urbanization in recent years. The 1977 Census, in reporting an average population growth rate of 2.2% per year, counted 1,420,076 inhabitants, including an estimated 67,000 nomads ("transhumans") who live outside the country during part of the year and account for approximately 5% of the nomadic population. Approximately 36% of the total population is now nomadic, 42% is rural, and 22% is urban. While this represents a radical change in the twelve years since the 1965 CEDES Survey, which estimated the population to be 75% nomadic, 15% rural and 10% urban, that survey must be viewed with some caution because it used definitions different from those applied in the 1977 Census, and estimated the urban population by making projections based on a 1961 survey. With adjustments to make the 1965 and 1977 exercises conform, it is now estimated that the population in 1965 was 65% nomadic, 25% rural and 10% urban. Regardless of these statistical differences, however, it is clear that the changes in the composition of the population are indicative of a significant shift in settlement patterns, which has been both the cause and result of important social, economic and cultural adjustments.

Traditional nomadic herding has long been the predominant way of life and more than simply an economic activity for most of the Mauritanian population. Yet it needs observing that nomadic groups have also been familiar with both rural and urban settlements in the past, as a result of the diversification of their activities to include agricultural production

and commerce. What is new in regard to the recent changes in settlement patterns is their extensiveness and apparent permanence, as there is little evidence to indicate that these shifts are either temporary adjustments to prolonged drought or that they are significantly reversible. The climatic conditions that accelerated the abandonment of nomadic herding activities have been accompanied and, in fact, preceded by a dissolution of the traditional social structure upon which survival of nomadic groups as social and economic entities depended, as well as by the introduction of inoculation techniques for improved livestock health, and more commercial forms of organizing and conducting herding activities.

The increases in both rural and urban populations and the concomitant decrease in the nomadic population reflect two migratory movements which have characterized the sedentarization process. The first of these involves a permanent settlement of nomads in rural villages which is based on the agricultural activities of many of these groups. While the recent sharp rise in rural settlement is partly attributable to the drought that decimated livestock herds, it is also the result of the gradual dissolution of the caste-related and hierarchical division of labor that followed the liberation of lower-caste groups (harateen and abeed) which provided most of the labor force in the traditional nomadic society. Not having had significant exposure to alternatives, these groups may have initially maintained the nomadic way of life following their liberation; but the advent of drought conditions appears to have encouraged their rapid abandonment of it as conditions became increasingly less tenable. In addition, the loss of this labor force has encouraged upper-caste Moors as well to settle in rural villages and oases along with the harateen.

The spatial impact of this migratory movement toward rural villages has been felt most strongly in the Sahelian or sylvo-pastoral zone which now contains approximately half of the non-nomadic rural population of 595,000. (The remaining half lives in the traditionally sedentarized and densely populated agricultural area along the Senegal River Valley.) It is estimated that the majority of the 400,000 nomads who have sedentarized since 1965 has settled in the Sahel. Over the long-run, these populations are likely to influence urbanization trends and to provide new urban migrants, given the precarious ecological balance in that zone and the disruption that has occurred there as a result of the drought and the increased settlement which has taken place in both villages and towns.

Urbanization is the second migratory movement characteristic of the sedentarization process. It accounts for the increase in the urban population and is essentially a manifestation of the exodus of both nomadic and rural groups toward urban centers which has occurred in the various regions of the country and affected most of the regional capitals and Nouakchott. The lack of data on the regional origins of urban migrants makes it difficult to determine the exact proportion among them of former nomads and of previously sedentarized groups, and therefore the direct contribution of sedentarization to the 10% average annual urban growth rate is as yet unknown. Nevertheless, it is unlikely that the abandonment by nomadic groups of traditional herding activities is the sole factor in the increase in the urban population from 73,000 in 1961 to 311,000 in 1977. This increase has taken place within the context of the varied interplay of social, economic, political, and climatic factors which have operated to increase the rural-urban migratory trend from both the River Valley zone and the interior of the country. These

include the gradual disintegration of traditional social patterns; the decline in agricultural production and decimation of the herds, particularly during the drought years; the trend toward greater commercialization of herding activities; increased education of rural youths in the River Valley zone; the diversification of the economy with the growth of a modern commercial, service and transportation sector; the establishment of a new capital and the rapid growth of the three industrial towns since 1960; and the reinforcing of the regional commercial roles of population centers in the interior with administrative functions.

While the bulk of the urban growth has occurred in Nouakchott, whose 134,000 residents account for 45% of the urban population, the rural exodus and the sedentarization of nomads have combined to affect the size of the towns in the interior as well as those in the River Valley. (See Table 1, below.) The valley towns (Kaédi, Rosso, Boghé and Selibaby) which account for 17% of the urban population, are located within the traditional agricultural area. Their relative isolation from existing and planned transportation routes which connect major population centers to the rest of the country, has contributed in part to their growth as rural populations in the surrounding areas have moved into these towns. Access to education among the traditionally sedentarized groups in these surrounding rural areas, however, has been greater than that in much of the rest of the country, and as a result has encouraged a significant number of rural youths to move first to secondary towns and eventually to the capital. Only Rosso has experienced a relatively high growth rate, 8.5% compared to an overall average of 5.6% for all four towns, due to its diversified activities and its location on the border along the main trade route between Dakar and Nouakchott.

Table 1

EVOLUTION OF URBAN POPULATION
CENTERS 1961-77

	<u>1961</u>		<u>1977</u>		<u>Average Annual Growth Rate</u>
	<u>Urban Population</u>	<u>Percent</u>	<u>Urban Population</u>	<u>Percent</u>	
1. Nouakchott	5,807	7.9%	134,986	44.3%	23.3%
2. Nouadhibou	5,283	7.2%	21,961	7.2%	10.0%
3. Kaedi	9,197	12.6%	20,848	6.8%	5.6%
4. Zouerate	4,659	6.4%	17,474	5.7%	9.2%
5. Rosso	4,811	6.6%	16,466	5.4%	8.5%
6. Atar	9,528	13.0%	16,326	5.4%	3.7%
7. Kiffa	4,359	6.0%	10,629	3.5%	6.1%
8. Aioun	4,877	6.7%	8,775	3.0%	4.0%
9. Néma	3,891	5.3%	8,232	2.7%	5.1%
10. Boghé	5,867	8.0%	8,056	2.6%	2.1%
11. Akjoujt	2,518	3.4%	8,044	2.6%	8.1%
12. Tidjikja	3,661	5.0%	7,870	2.6%	5.2%
13. Boutilimit	2,774	3.8%	7,260	2.4%	6.6%
14. Aleg	1,360	1.9%	6,415	2.1%	10.9%
15. Selibaby	2,737	3.7%	5,994	2.0%	5.4%
16. Timbedra	<u>1,815</u>	<u>2.5%</u>	<u>5,317</u>	<u>1.7%</u>	7.4%
<u>TOTAL</u>	<u>73,144</u>	<u>100.0%</u>	<u>304,653</u>	<u>100.0%</u>	10.0%

(Adapted from 1977 Census Data)

The central and eastern towns of the interior have grown at a similar average rate, 5.4% per year since 1961. They function as local transport and marketing centers for the economic activity in these areas and combine both commerce and agricultural activity in varying degrees. These towns

(Atar, Kiffa, Aioun, Nema, Tidjikja, Boutilimit, Aleg and Timbedra), with a combined population of 70,824, account for 23% of urban residents. Their increased population size is a consequence of both the sedentarization of nomads and the more generalized rural exodus. It is likely that with the completion of the Nouakchott-Kiffa-Nema highway, they will experience further increase in population. However, without any development projects planned in those areas, they are likely to feed the continuing high rate of migration to Nouakchott.

D. Conditions Among the Poor in Major Population Centers

The rapid growth of urban centers which has occurred in Mauritania has not been accompanied by the improvement in living conditions which migrants from rural and nomadic backgrounds may have expected. Despite the generally better -- if still limited -- access to services and employment opportunities found in urban areas, living conditions for most of the urban population are no better, and in some instances may well be worse, than those among both rural and nomadic inhabitants. To a considerable extent, this is due to the unusually high urban growth rate itself, particularly in the capital, and to the difficulties encountered both by low-income groups in adjusting to urban life and by formal institutions in providing basic services for large and concentrated populations.

In regard to shelter, for example, the types of dwellings available to the 48% of all urban households living in non-permanent units do not differ from those available to both rural and nomadic populations. But the higher densities, limited mobility, and lack of even minimal sanitation facilities within squatter settlements around urban centers, make the traditional tents and huts significantly less adequate in these areas than they are for many rural and nomadic groups. These same conditions make the semi-permanent baraques (shanties) built of scrap wood and tin in such cities as Rosso and Nouakchott where salvage materials are available, scarcely better shelter than that found in non-urban areas. Yet only about 17% of the low-income residents of Nouakchott rent rooms or share rental rooms and another 10% are lodged for free with relatives and friends. The choice of alternatives to semi-mobile dwelling units, therefore, is not only limited by incomes, lack of access to building materials, and

local regulations regarding tenure, but also by the lack of alternative housing at prices which low-income urban groups can afford.

1. Incomes and Employment: The most recent data available on incomes are based on a 1975 sample survey of 1,556 urban households conducted in eight cities by SOCOGIM. The results of this survey were analyzed and published in a report by SOCOGIM and the M&R consulting firm, Le Logement en Mauritanie: Besoins et Ressources. According to information provided in this study, in 1975 half of all urban households had incomes of less than UM/5,788 (US\$129) per month. It is unlikely that this median income level has risen appreciably in the past three years, given the continued urban migratory trend which accounts for most of the 10% average annual urban growth rate, and the consequent expansion of the low-income portion of the urban population. It seems reasonable to assume that during these three years, the 14% increase in the output of the transportation, commerce and services sector which favors urban employment was not sufficient to offset the effects of the influx of low-income migrants.

In addition, there has been no substantial increase in wages during this period, and the increases in salaried employment have had little impact on low-income groups. While the number of salaried positions in both public and private sectors has increased by one-third from 33,000 to 44,000, or from 10% to 14% of the urban population, most of the increase was in the private sector, in which expatriots account for 20% of those employed. Basic minimum salary levels have remained constant since they were established in 1974 when an across-the-board increase of UM/1,500 (US\$33) was granted. Among such lower level salaried groups as unskilled laborers and employees in construction, services, transport and commerce,

basic wages range from UM/3,312 to UM/6,370 (US\$74 to US\$142), placing the highest incomes earned among these groups slightly above the 1975 median. (See Annex I, Table A.) Without more recent and precise data on income levels, the fact that there has been a continued increase in migration without an appreciable offsetting effect from changes in employment or wage levels leads the Team to conclude that the 1975 monthly median income of US\$129 remains representative of the current urban income distribution.

There are, however, wide regional variations around this overall urban median, as can be seen in Table 2 below. In Kaédi and Aleg, for example, almost two-thirds of the households fall below the overall urban median income level, while in both Rosso and Nouadhibou approximately two-thirds and four-fifths of the households, respectively, earn more. The median income level in Nouakchott is closest to the overall urban median, which -- while somewhat unusual as in most developing countries incomes tend to be concentrated in the capital city -- may in part be explained by the fact that Nouakchott contains so large a portion of all urban residents, and has a population over six times greater than that of the second largest city.

Another factor which distinguishes the distribution of urban incomes in Mauritania is the relatively high median income level in money terms compared to other countries at a similar stage of development. But while the money income at the median level is relatively high, at least one-fifth of the households in each of the seventeen urban centers (with the exception of Nouadhibou) receives less than UM/3,000 (US\$67) which is under the basic minimum wage of UM/3,312 (US\$74). In Nouakchott, 23% or 5,644 households falls below this level which is significant given the importance of cash to meet such basic needs as food and water in that city.

Table 2

CUMULATIVE DISTRIBUTION OF MONTHLY
HOUSEHOLD INCOME IN MAJOR URBAN CENTERS
(in ouguiyas and cumulative percentages)

<u>Income Levels</u>	<u>Nouakchott</u>	<u>Nouadhibou</u>	<u>Rosso</u>	<u>Atar</u>	<u>Aleg</u>	<u>Kaédi</u>	<u>All 17 Urban Centers</u>
Less than: UM/3,000	23.0%	6.0%	18.0%	21.0%	45.5%	34.0%	22.5%
4,000	36.5%	12.0%	31.0%	36.5%	57.0%	55.5%	35.5%
5,000	45.0%	16.5%	36.0%	52.0%	63.0%	63.5%	43.5%
6,000	55.0%	23.0%	47.5%	59.5%	75.0%	75.5%	53.0%
7,000	64.5%	31.0%	57.0%	67.0%	79.5%	83.5%	61.5%
8,000	71.5%	42.0%	62.0%	74.0%	85.5%	88.5%	68.5%
10,000	81.0%	54.0%	74.5%	81.0%	90.0%	94.5%	78.0%
Above 12,000	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
<u>NUMBER OF HOUSEHOLDS</u> : ^{1/}	24,543	--	2,994	2,968	1,166	3,791	54,419
<u>MEDIAN INCOME</u> : (in US dollars)	UM/5,499.5 (122)	8,666 (193)	6,262 (139)	4,855 (108)	3,477 (77)	3,743 (83)	5,788 (129)

SOURCE: SOCOGIM/M&R: Le Logement en Mauritanie: Besoins et Ressources,
Nouakchott 1975

1/ Number of Households based on 1977 Census of Population, and average household size of 5.5 persons.

On the whole these money incomes cannot be compared to rural incomes as they do not reveal the regional disparities which exist in purchasing power and standards of living. In addition, they do not adequately account for the fact that there is a regional redistribution of incomes in the form of remittances from workers in urban centers to families and communities in rural areas.

The major occupational categories among households with incomes below the urban median level are predominantly in the informal sector, which is the primary source of income for two-thirds of the urban population. The economic activities of these households include traditional artisanal agriculture and fishing, which together account for 15% of all urban employment, as well as commerce, services, small-scale modern artisanal production, transport, domestic service and construction. Lower-level salaried workers and employees in the formal construction, commerce, transport and services sectors are also represented among below median income groups as their wages range from US\$74 to US\$142 per month.

Based on SOCOGIM/M&R survey data (included in Annex I, Table B), there is a definite relationship between income levels and employment categories, with variations in income greater among non-salaried groups than they are among those in salaried positions. Among the latter, the lowest paid employees are the traditional artisanal agricultural and fisheries workers, while the highest paid workers are those in the transportation sector, only 10% of whom earn less than the median. Approximately one-third to one-half of those employed in commercial, service, and modern artisanal activities fall within the lower half of the urban income distribution.

2. Expenditures and Consumption Patterns to Meet Basic Needs: Data on expenditure and consumption patterns are either non-existent or incomplete. The official consumer price index reflects European-style consumption patterns which are not relevant to low-income groups. The only source of comprehensive data on expenditures is the SOCOGIM/M&R survey, but this relates only to rental housing costs. Nevertheless, other less complete data do exist in the form of average consumption figures for water, food

and shelter and together provide indicators of patterns related to how basic needs are met. But in the absence of survey data on expenditures and consumption, the information presented here is meant to be suggestive and to point out some of the implications of what is known about these patterns among low-income groups. There are two additional factors which should be noted regarding urban consumption in general. First, urban consumption represents such important changes and adjustments on the part of the low-income population as the substitution of rice for wheat in diets; the purchase of milk in powdered and canned form to replace fresh milk; the use of domestically kept animals for income producing purposes rather than as a form of savings; and the purchase of water which traditionally is free in rural and nomadic environments. Second, these adjustments imply both an increased reliance on cash incomes to meet basic needs and a limitation of the opportunities to trade in kind for many basic consumption goods.

According to the SOCOGIM/M&R survey, rental expenditures apply to only 24% of all urban households, and among this group the average rental expenditure is reported to be 18.5% of income. If expenditures are stratified by income levels, however, those earning less than the median spend an average of 24% of income on rent. Average rental prices for one room without utilities range from UM/500 to UM/2,000 (US\$11 to US\$44). Rents are paid by only 17% of the low-income groups, while about 10% spend no money on shelter as they are lodged for free, and the remaining 73% are listed as owners, a large proportion of whom are likely to be living in temporary shelter and do not own the land on which they live. Yet, even ownership of temporary shelter requires expenditures which range from US\$100 for a tent to US\$500 to US\$1,000 for a baraque. Houses built with mud brick cost

an average of UM/150,000 (US\$3,300) plus maintenance costs. While the SOCOGIM/M&R report does not stratify housing types by income category, it is reasonable to assume -- given the distribution of income in various centers and the prevalent housing types -- that a proportion of those earning less than the median income invest in housing made of such local materials as banco. In Kaedi, for example, 77% of the urban households live in some form of permanent shelter, while about 75% earn less than the overall urban median income. Conversely, in Nouakchott approximately half of the population is housed in temporary shelter, and it can be assumed that the incomes of almost all of this group are below the fiftieth percentile of the income distribution. The apparent lack of expenditure by this group on permanent shelter is partly a function of lack of income, but also and perhaps more importantly, it is an indication of constraints imposed by the tenure system, and of the lack of alternative less costly forms of construction within the capital, given the dependence on imported materials. It should be noted, however, that the rental market in Nouakchott is now becoming significant and that rents paid by the urban poor there represent a range of 25% to 30% of monthly income.

Expenditure on food is the largest part of the family budget among low-income groups. While no survey has been undertaken of food consumption and expenditure, it is estimated that within such larger urban centers as Nouakchott and Rosso, the typical meal of fish and rice, providing 1,000 calories per person, costs an average of UM/160 (US\$3.60) for a family of six. On a monthly basis this would absorb over two-thirds of a median level income. In addition, average water consumption levels, estimated at eight litres per person per day, would seem to represent a monthly

expenditure of about one-fourth of median income for a family of six. But given the money costs of providing food, water and shelter compared to income levels, it is likely that actual consumption patterns are much lower among the urban poor than any overall consumption figures would suggest. Because food expenditure represents a large portion of family income in the major urban centers, it is likely that nutritional levels are even lower among the urban poor than those of rural and nomadic groups, and lower than the national average caloric intake of 1,988 calories per day. Similarly, the cost of the average water consumption level of eight litres per person, approximately UM/48 per family per day, when taken as a proportion of average income would appear to discourage a large proportion of the urban poor from consuming at this level, despite the fact that it is considered to be inadequate to meet all needs, particularly hygiene.

3. Employment Opportunities: Lacking census data on the occupational distribution of the economically active population, or any recent data on the levels of unemployment, the information provided here relies heavily on both the SOCOGIM/M&R survey and a series of reports by the ILO on the employment situation in the modernized portion of the informal sector of Nouakchott. As indicated above, the informal sector provides most of the employment opportunities of low-income urban groups. Two-thirds of all urban households rely upon some form of non-salaried employment as a source of income. While this proportion varies according to the urban center, in both Nouakchott and Rosso it represents half of the income earning groups. Formal sector employment opportunities have not kept pace with the growth of urban populations, and consequently it is the informal sector which absorbs migrants into the labor force. It is also the prime

avenue of urban employment for women who work as traditional artisans, domestic servants and in commerce.

This sector is traditionally dominated by petty trade and services, and there does seem to be an over-representation of petits commercants whose incomes are fairly small. There is some evidence, however, that the informal sector as it operates in Nouakchott also contains significant semi-modern small-scale production, service and construction enterprises. A total of 216 such enterprises operate in the capital, providing employment to an estimated 1,920 workers, which is equivalent to one-third of the number employed in comparable formal sector activities. These enterprises include wood and metal working shops, foundries, bed manufacturers, mechanics garages, various machine repair shops, specialized construction contractors and masons. A majority of the owners of these enterprises received their training as apprentices in the informal sector, and apprenticeships remain a strong tradition as evidenced by the fact that there are a total of over 500 young apprentices presently attached to approximately 131 enterprises. It is interesting to note, furthermore, that the backgrounds of these owners are similar to those of the population groups which their enterprises serve, as a majority come from formerly rural and nomadic families.

While the skill levels of other types of workers are relatively low, their incomes are competitive with those in formal sector employment. This specialized semi-modern informal sector operates to a large extent on a neighborhood basis and is well represented in the first and fifth arrondissements, both of which are low-income areas and are the least urbanized sections of Nouakchott. Production and service enterprises in these areas account for 38% of all informal sector activities, while 43.3% of construction

enterprises are also located within the two recently created arrondissements. The importance of these enterprises to the urban economy is not limited to the function of absorbing migrants into the labor force and consequently reducing unemployment, but also includes the provision of the only access to goods and services in low-income areas of the city. The sources of capital for these informal sector enterprises are largely indigenous, and represent personal and family savings, as well as a monetization of assets which were previously held in illiquid form. Finally, while no data exist on similar activities in other urban centers, the fact that the modern formal sector is less developed in these areas would seem to indicate that the operations of the semi-modern informal sector is an important means of providing goods and services in such areas.

II. DIMENSIONS OF THE SHELTER PROBLEM

A. Human Settlement Patterns

The impact of both sedentarization and urbanization is evident in the growth and spread of spontaneous squatter settlements on the peripheries of most urban centers, in the increased densities within the older structured quarters, and in the extension of urban boundaries. Spontaneous settlement has characterized the development of traditional quarters in Mauritania's older urban centers, particularly those along the Senegal River Valley which were created without benefit of planned subdivision, and were based on traditional tenure rights. In the Moorish towns of the north, a more symmetrical alignment of the housing has been followed, but these settlements have also developed spontaneously. The settlement of older city centers is characterized by higher densities and narrow winding passageways. The further the location from the city center, the less dense and more symmetrically aligned the settlement is likely to be.

Traditionally, such settlements were family and tribally centered, with characteristic African compounds in the south containing members of the extended patrilineal family, while in the Moorish culture houses normally contain the nuclear family with only parents of the heads of household included from the extended family. Privacy was provided and valued by both cultural groups by limiting the focus of the African compound and the Arab house toward the interior courtyard which functioned as the most important portion of the dwelling unit, and in which a variety of family-centered activities were conducted.

These patterns of settlement have become increasingly difficult if not impossible to maintain with the growth of urban populations. Extended family compounds in the south are breaking up as space is no longer available

within the towns, and shelter has become an investment good with an increase in rental housing in the major urban centers. At the same time urban land has become valued by both tribal and private owners while its supply for residential use is limited.

1. Urbanization Trends and the Growth of Squatter Communities: The populations of the major urban centers have in most instances doubled over the past ten to sixteen years. Mauritania has gone from containing only two urban centers, Atar and Kaedi, with populations of approximately 10,000 in 1961, to having six such centers by 1977. The urban population, growing at an average rate of 10% per year since 1961, currently consists of approximately 54,419 households with approximately 45% or 24,543 households located in the capital. If the current rate of urban growth were to continue, the urban population would increase to 38% of the total population by 1985; and Ncuakchott, if it continued to grow at over 23% per year, would have a population of 200,000 by the end of 1979, and of one million by 1996. It seems unlikely, however, that the capital could continue to grow at the same rate as that of the past twelve years. Rather census estimates suggest that the future growth rate of the capital will be 15%, which would make its 1978 population equal to 155,234 inhabitants.

While the future rates of urban growth are difficult to determine (as these projections suggest), given the extraordinary and unexpected rates experienced during the past 10 to 16 years, it is not anticipated that the same growth patterns will persist. The problem faced at present, however, is precisely the result of past trends, which even the halving of the urban growth rate to 5% per year would not resolve or attenuate, since 45% of the

current urban population outside of the mining towns has not found permanent shelter. It is estimated that 22,023 urban households live in some form of temporary shelter, and approximately 65% of these, or 14,235 households are located in Nouakchott. These figures are based on the assumption that the percentage of all housing units which are temporary has not changed since 1975 when the Census Bureau undertook a survey of housing types in urban centers, and appears valid in light of the high urban growth rate and the generally slow rate of construction. On the basis of this assumption, Annex I, Table C gives the percentage of households living in temporary shelter projected on 1977 Census figures for urban populations.

The 7,000 lots distributed in Nouakchott in 1975 provided land for approximately 40,000 people living as squatters out of a total population of 104,000 in the capital at that time, approximately half (or 50,000) of whom were then living in tents and baragues. Theoretically, therefore, this distribution of land should have reduced the 1975 squatter population to approximately 10,000. With the migration into Nouakchott of approximately 10,000 people per year since 1975, and assuming that none of these migrants was able to find an alternative to temporary shelter, the squatter population should have been only 40,000 by the end of 1977, but this figure seems unreasonable for it implies that 94,000 people (the balance of the 1977 population of 134,000) are living in permanent housing. This requires the further assumption that the housing stock, which in 1975 consisted of 8,500 permanent units, has more than doubled in the intervening years. Thus in the absence of more recent estimates of the squatter population, and given the lack of evidence that the rate of new construction has been sufficient to provide this number of units, it appears reasonable to

accept the 1975 distribution of temporary shelter as still being valid.

Analysis of these data reveal the extent to which the urban squatter problem is concentrated in Nouakchott. Leaving aside the households living in the industrial mining town of the north, it is estimated, as noted above, that 22,023 or 48% of all urban households reside in temporary dwellings. But a disproportionately large portion, 65%, of these are located in the capital. Nearly 9,000 households in Nouakchott, or 40% of all urban households in temporary buildings, live in tents in the squatter communities around the city's periphery, and another 25% of the total, approximately 5,400 additional households, are living in such areas in crude shacks (baraaues) built of scrap materials. These two groups account for nearly 80,000 people, and constitute an overwhelming number of squatters given the resources of both the city and the GIRM to provide services for them. And it is likely that these groups will continue to grow in number because with the exception of Selibaby whose population is relatively small, the four towns with over 50% of the households living in temporary shelter are located along the major east-west highway from Nouakchott to Néma, which passes through Boutilimit, Kiffa and Aioun. Indeed, Boutilimit, which is closest to the capital on the part of the road which was completed first, has over 80% of its households living in temporary shelter. It is logical to assume that a very large portion of these households are in transit, as Boutilimit offers little or no economic opportunities for low-income groups, and that many of them will eventually migrate into the capital. In the face of this emerging trend, only massive and very costly efforts to develop the secondary towns along the highway would succeed in slowing the migration toward Nouakchott. While more modest efforts might hold some of the

population within these centers, their impact would only be noticeable in the long term, and consequently it is likely that over the next several years, the low-income squatter population of Nouakchott will continue to grow, representing an increasingly large percentage of those urban households living in temporary shelter.

With such a large proportion of the urban populations housed in temporary shelter in peripheral areas, municipal boundaries have had to be expanded in most urban areas to absorb such groups. But the expansion of boundaries has effectively taxed the ability of local authorities to provide both basic services and a supply of residential land to which some form of tenure is assured. In an effort to control the rapid expansion of squatter areas, local authorities in Nouakchott and in varying less organized degrees in the other urban centers, have created zones de regroupement. Local authorities have undertaken the regrouping of squatter populations and the temporary allocation of small lots of less than 100m² in the peripheral areas in an attempt to impose some minimal level of organization on these settlements. The standard practice of grouping five or six of these lots together with a passageway between the groupings, results in five or six usually unrelated families being located contiguously without any barriers -- and thus without the traditional privacy -- between their lots.

Construction using permanent materials is forbidden, and to date no decision has been made in Nouakchott regarding the tenure situation of this half of the city's population. Local authorities are reluctant to repeat the Nouakchott experience of providing land for free to squatters, given the land speculation which resulted and the fact that many of the intended

beneficiaries sold the land and relocated themselves once more as squatters in the areas beyond the formally subdivided parts of the first and fifth arrondissements.

But despite the problems involved in moving squatter families to zones de regroupement, this intermediate method of controlling squatter settlements is still being used. In Nouakchott, for example, many thousands of squatters were recently moved by the District government out of an area which had been designated (and reportedly sold) as an industrial zone. Besides being costly for local governments, such movements of squatter populations usually displace those families that are more integrated into the urban economy, and consequently have located themselves closer to employment centers as opposed to settling farther out in the peripheral areas of the zones de regroupement. Moreover, the prohibition against permanent construction and the uncertainty of tenure have accentuated the shelter problem by maintaining the status of these areas as temporary shelter zones rather than allowing them to develop into permanent communities.

2. Densities: Urban densities have traditionally been characterized by relatively low land use densities and high room occupancy levels. These two contradictory factors are the result of the traditional use of space, where the courtyard functions as the center for a variety of activities while the habitable rooms are used occasionally for sleeping in inclement weather, and for storage of personal effects. With increased urbanization, however, as land becomes more valuable and the demand for rental space increases, these patterns break down and densities have consequently increased. The spacious courtyards found in rural areas and in the smaller towns of the interior are less common in the larger urban centers.

Nevertheless, overall densities in these major centers remain comparatively low, ranging from 120 to 240 persons per hectare. What has changed is the fact that as urban lots have decreased in size, either as a result of illegal subdivision or the building of extra rooms for rental, room occupancy rates have increased and become the primary problem in terms of urban densities. The average of three persons per room in permanent units hides the fact that the 48% of the urban population in temporary shelter lives in one room units. Rounding off the average household size of 5.5 persons, this implies that for nearly half of all urban households, room occupancy rates are six persons per room.

Occupancy rates of six persons per "room" in temporary squatter settlements where lots are small and have few, if any, barriers surrounding them, compound the problem of densities in these areas because households are forced to live in close proximity to one another with hardly any separation between dwellings, or between areas where household refuse is dumped, or where temporary latrines are located. In traditional houses, part of the courtyard is closed off for latrine and bath areas, while in nomadic camps, the spaces are less densely occupied and families can and do move away when waste matter collects. Thus sanitation conditions are likely to be worse, due to the high densities and permanence of squatter settlements, than they are in both rural and nomadic environments.

The table below provides a breakdown of room occupancy rates by type of tenure, based on a 1975 SOCOGEM survey of 1,817 households in Nouakchott, Nouadhibou, Kaédi, Rosso, Atar, Aleg, Aioun and Tidjikja. Overall the survey found that 61% of those sampled owned their units (including squatters who owned their units but not the land), 24% were renters, and 15% were lodged for free.

ROOM OCCUPANCY RATES BY
TYPE OF TENURE
(in percent)

<u>Number of Rooms Per Dwelling</u>	<u>Type of Tenure</u>			<u>Total</u>
	<u>Owners</u>	<u>Lodged for Free</u>	<u>Renters</u>	
1	49.1%	28.0%	56.1%	47.7%
2	25.4%	27.3%	24.9%	25.6%
3	13.6%	28.0%	13.5%	15.7%
4	6.2%	13.7%	3.7%	6.7%
5 and above	<u>5.7%</u>	<u>3.0%</u>	<u>1.8%</u>	<u>4.3%</u>
	100.0%	100.0%	100.0%	
<u>Percent of Total:</u>	<u>61.1%</u>	<u>15.0%</u>	<u>23.9%</u>	100.0%

(Adapted from SOCOGIM/M&R survey of 1,817 households, of which eight were non-respondents.)

Among low-income groups, however, it is estimated that a majority own their own units, and that a total of approximately 90% are either owners in this sense or renters, with nearly all of these households occupying a single room. Indeed, 30% of all those surveyed were reported as owners of one-room units. In contrast, only 28% of those lodged for free occupied dwellings of one room, compared to 49% for owners and 56% for tenants. This is due to the fact that many of those lodged for free tend to be officials whose housing is provided by the government. Among all tenure types, nearly half of all households occupy one room and other quarter are living in two-room units, indicating the degree to which high room occupancy rates are pervasive.

B. Housing Stock

Estimates of the existing stock have been computed on the same assumption as that used to determine the number of temporary units, namely that the percentage distribution of temporary and adequate units has not changed as the urban population increased between 1975 and 1977. While housing deficits are often overestimated, the assumption used in computing Table 3 below, is a conservative one because low-income squatter groups are the great majority of recent migrants, which might well raise the percentage of households living in temporary shelter. Nevertheless, the table reveals that an estimated 48.5% of all urban households outside the Industrial Mining Towns were housed in adequate dwellings, defined basically as units built of permanent materials, including cement block, stone, and in dryer areas, adobe. It is important to bear in mind, as discussed below in the section on Public Utilities and Services, that only a small percentage of those units designated as adequate has access to such basic public infrastructure as water; approximately 44% of the adequate units in Nouakchott is connected to the SONELEC water system, 35% in Rosso, 14% in Kaédi, and 22% in Aleg.

There are significant regional differences in the distribution of adequate units, however, with Nouakchott estimated to have adequate units for only 41% of its households, while an estimated 62.4% of households in the River Towns and 53.5% of those in the Central and Eastern Towns are adequately housed. In some cases, these estimates differ sharply from those reported in Le Logement en Mauritanie: Besoins et Ressources which were taken from the Census Bureau's 1975 survey, "Liste des Habitations et des Menages Urbaines." In reporting a higher number of adequate units in nearly all of the Central and

Table 3

ESTIMATED HOUSING DEFICIT AND
ANNUAL NEED

	Total Number of Households ^{1/}	Number of Temporary Units ^{2/}	Percentage of Total	Number of Adequate Units ^{3/}	Number of Shared Units	Existing Deficit	Estimated Annual Increase in Number of Households ^{4/}
<u>Nouakchott</u>	<u>24,543</u>	<u>14,235</u>	<u>58%</u>	<u>9,988</u>	<u>320</u>	<u>14,555</u>	<u>3,681</u>
<u>River Towns</u>	<u>9,339</u>	<u>3,124</u>	<u>33%</u>	<u>5,828</u>	<u>387</u>	<u>3,511</u>	<u>556</u>
Kaédi	3,791	872	23%	2,604	315	1,187	212
Rosso	2,994	1,257	42%	1,737	--	1,257	254
Boghé	1,464	395	27%	997	72	467	31
Selibaby	1,090	600	55%	490	--	600	59
<u>Central and Eastern Towns</u>	<u>11,896</u>	<u>4,664</u>	<u>39%</u>	<u>6,367</u>	<u>865</u>	<u>5,529</u>	<u>656</u>
Atar	2,968	416	14%	2,225	327	743	110
Kiffa	1,932	1,024	53%	696	212	1,236	118
Aioun	1,596	990	62%	564	42	1,032	64
Néma	1,496	195	13%	1,179	122	317	76
Tidjikja	1,418	397	28%	963	58	455	74
Boutilimit	1,320	1,082	82%	184	54	1,136	87
Aleg	1,166	560	48%	556	50	610	127
<u>TOTAL</u>	<u>45,778</u>	<u>22,023</u>	<u>48%</u>	<u>22,183</u>	<u>1,572</u>	<u>23,595</u>	<u>4,893</u>

Based on SOCOGIM/M&R Le Logement en Mauritanie: Besoins et Ressources, Nouakchott 1975.

- 1/ Number of Households is based on 1977 Census of Population and excludes the 8,633 urban households in the Industrial Mining Towns (Nouadhibou, Akjoujt, and Zouerate/F'Derik).
- 2/ Temporary units taken from Annex I, Table C, are defined as huts, tents, and baragues.
- 3/ Adequate units estimated on same basis as Annex I, Table C, less an estimate of shared units.
- 4/ Annual increase in Number of Households estimated on average annual growth rates computed in Table 1, p. 15, with the exception of Nouakchott which is estimated to grow at 15% per year.

Eastern Towns, and in two of the four River Towns, these sources relied on estimates of the populations of these towns which proved to be far greater than those counted by the Census Bureau in its 1977 Census of Population. Despite this, the estimates presented here are consistent with the percentage distribution of temporary and adequate units calculated in the previous studies, but are based on the 1977 population figures.

The existing deficit, calculated in Table 3 as the number of households in temporary units plus the number of households in shared units, is estimated to be 23,595, nearly 52% of all urban households outside the Mining Towns. More than 60% of this overall deficit, or 14,555 households is concentrated in the capital, another indication of the extent to which the shelter problems occasioned by changes in human settlement patterns are most acute in Nouakchott. On a local basis, the existing deficit is equivalent to 59.3% of all households in Nouakchott, 37.6% of all households in the River Towns, and 46.5% of those in Central and Eastern Towns.

To this existing deficit can be added an estimate of the annual need for additional units which results from increased growth in the urban population. The long term compound average annual growth rates of the urban population which were adapted from 1977 census data, as reported in Table 1, page 15, have been used in making this estimate for all towns but Nouakchott, in which case an expected growth rate of 15% (rather than the 23% reported in Table 1) has been applied. Despite this adjustment in Nouakchott's expected growth rate, over 75% of the increase in the urban population outside of the Mining Towns, and therefore over 75% of the annual need for additional units, will be in the capital. This estimate is entirely

consistent with earlier observations regarding the predominance of this city as the prime target of the continuing urban migratory trend, a situation which presents both the GIRM and local authorities of the District of Nouakchott with powerful evidence of the need to address shelter conditions in the capital. Indeed, while government officials acknowledge the need for a spatially balanced approach to shelter development, some have observed that the major problem is already present in the capital and that there it must be met.

To estimate the annual number of units required to fill the existing deficit and meet the need which results from urban population growth, is difficult for it requires an estimation of the rate at which adequate units can realistically be built. If approximately 10% of the outstanding deficit were to be met each year, this would initially require nearly 2,400 units, plus nearly 4,900 more to accommodate the growth of population, or a total of 7,300 units per year. While no estimate of the residential construction rate exists, it can be implied from the estimates made above that approximately 1,500 units were built in Nouakchott in the three years from 1975, when 8,500 adequate units were reported, through 1977, when there were an estimated 9,988 adequate units in the city. Thus approximately 500 new permanent units were built in Nouakchott in each of these years, which would mean that the number of adequate units is expanding at slightly less than 6% per year. If 10% of the existing deficit estimated for the capital, or 1,455 units, were met each year, and all of the 3,681 new units required to accommodate the growth of the city's population were built, 5,137 new units would be needed in Nouakchott each year, which is ten times the estimate of current production. Quite clearly, a program which aimed to increase

production tenfold could hardly be termed realistic, especially when the country's largest formal sector producer of housing, SOCOGIM, has yet to sustain a production rate of 100 units per year.

Nevertheless, there is evidence to suggest that the informal construction sector can be relied on to some degree, as many low-income families in the capital manage to build small units using permanent materials once they have some form of secure tenure to a parcel of land. These efforts are significantly less costly than comparable formal sector construction, and are financed by a variety of informal techniques, including the liquidation of idle assets, and borrowing from family members and/or building materials suppliers. While it cannot be expected that a construction rate of over 7,000 units a year will be achieved in the near future, it seems reasonable to suggest that removing the constraints to the acquisition of land, and extending small amounts of credit to low-income families for the purchase of building materials, would result in a significant increase in the number of adequate units built each year.

C. Public Utilities and Services

The rapid growth of population in Mauritania's urban centers poses serious problems in terms of water provision and waste disposal. These urban services are the responsibility of SONELEC, the country's public utility company, which also provides electric power. But urban population growth has greatly exceeded the rates at which access to water, sanitary sewage disposal, and electricity have expanded.

1. Potable Water: Despite the prevalence of desert and near-desert conditions throughout much of the country, only ten urban centers are served by the SONELEC water system, and the number of water connections in these centers is equivalent to less than 17% of all urban households. These figures, derived from those in Table 4, are considerably over-estimated because the connections reported by SONELEC include a variety of governmental and commercial users, as well as private residences. Only 41% of metered water consumed in Nouakchott, for example, in a representative period studied by the World Health Organization, was consumed by private users, while 27% was consumed by government ministries, schools, and administrative offices, 19% by private businesses and industries, and 12% by foreign embassies and embassy-related residences. These consumption figures do not correspond directly with the proportional distribution of water connections themselves, as some government and commercial users obviously consume far more water than an average residence. They do, however, suggest that only a small portion of the 9,242 water connections serve private residences.

Table 4

WATER AND ELECTRICAL CONNECTIONS
OF SONELEC SYSTEM
(as of December 31, 1977)

	<u>Number of Households</u> ^{1/}	<u>Number of Water Connections</u>	<u>Equivalent Percentage of Households</u>	<u>Number of Public Fountains</u>	<u>Number of Electrical Connections</u>	<u>Equivalent Percentage of Households</u>
Nouakchott	24,543	4,424	18.0%	29	4,379	17.8%
Nouadhibou	3,993	2,009	50.3%	20	2,583	64.7%
Kaédi	3,791	551	14.5%	12	380	10.0%
Rosso	2,994	606	20.2%	5	684	22.8%
Atar	2,968	91	3.1%	7	791	26.7%
Ikjoujt	1,463	1,008	68.9%	6	525	35.9%
Boutilimit	1,320	319	24.2%	3	--	--
Leg	1,166	120	10.3%	4	--	--
Federdra	<u>NA</u>	<u>114</u>	NA	<u>4</u>	<u>--</u>	--
<u>TOTALS:</u>	42,238	9,242		90	9,342	

SOURCE: "RAPPORT D'ACTIVITE: Mois de Decembre 1977," SONELEC.

1/ Number of Households based on 1977 Census of Population and average of 5.5 persons per family.

Yet even these gross equivalences clearly indicate that at least 80% of the urban households in towns which are served by SONELEC's water system (excluding the mining towns of Nouadhibou and Akjoujt) do not have direct access to publicly supplied potable water. Indeed, with the exception of Boutilimit, the number of water connections for both residential and non-residential users is only a small percentage of the estimated number of existing adequate dwelling units. The remaining urban centers not served by the SONELEC water distribution system, and those settlements with populations of less than 5,000, depend exclusively on groundwater drawn from wells varying from 9 meters (30 feet) in depth in the River Valley zone, to 18 meters (60 feet) in the Sahel, and 183 meters (600 feet) in the Sahara. Under an emergency program, the United Nations bored 36 wells in the years following the 1968-1972 drought in rural villages and such urban areas as Nouakchott, Nouadhibou, Rosso, Atar, Chengueti, Akjoujt and Kiffa. But the pumping of groundwater in the absence of thorough evaluation of the aquifers and their rechargeable capacities raises serious questions of potential depletion, and the possible infiltration of salt and/or brackish water further degrading the already low quality of the water supply for human consumption.

Many adequately housed families not connected to the SONELEC water distribution system, and the thousands of squatters in peripheral settlements around the major urban areas, rely for water supply on the system of public fountains and the distribution by informal water sellers. At the present time, thirty-three of these public fountains and two additional distribution points located in the first, fifth, and the newly identified but undeveloped sixth arrondissements of Nouakchott, serve approximately 110,000 people, or

over 80% of the city's population. With so few public fountains, an informal distribution system has developed there and in other towns, whereby individual vendors equipped with donkey carts and 200 liter barrels purchase water from attendants at the fountains for UM/4 per 200 liters, or UM/20 per 1,000 liters (one cubic meter). Vendors then re-sell the water at either UM/30 for the whole 200 liters, or more commonly at UM/1 per liter to those households purchasing only small quantities. In effect, then, vendors can receive as much as UM/1,000 (US\$22.20) from the sale of one cubic meter for which they pay UM/20 (US\$0.44) -- a return of fifty times cost. Vendors with smaller barrels purchase water at UM/2 for 50 liters, or UM/40 per cubic meter, in which case maximum earnings fall to twenty-five times cost, still a substantial return.

Individuals who live close enough to the public fountains to carry their own water rather than purchase it from vendors, are charged nothing for less than 20 liters, and pay UM/2 per 20 liters for larger quantities. With a total of only 35 distribution points, however, this group is a small portion of the estimated 20,000 families relying on the public fountain system. With average consumption estimated at 8 liters per person/day for all uses including cooking, drinking, washing, and hygiene, the balance of the population would pay approximately UM/1,440 (US\$32) per household per month, if the household consumed water at the overall average rate. It can be assumed, however, that many low-income families actually consume less.

The public fountains in the District of Nouakchott have been installed at the request of local authorities by SONELEC, which charges the city a

preferential rate of UM/18 per cubic meter (versus UM/25 per meter for those with private connections). Provisional estimates indicate that the District paid SONELEC approximately UM/4.9 million (US\$109,000) for water provided by public fountains in 1978, during which period the District received approximately UM/2.6 million (US\$58,000) from sales at the distribution points. In addition, the District paid approximately UM/2.25 million (US\$50,000) to attendants at the 35 distribution points. Thus the District incurred costs of approximately UM/7.15 million (US\$159,000), and provided a subsidy to users of the public fountains of approximately UM/4.5 million (US\$100,000).

Local authorities have become concerned both about the size of this subsidy, and about low consumption levels among the poor living in crowded conditions in squatter settlements, although a proposal to provide water for free to such groups has been rejected because this might encourage its wasteful use. While local authorities clearly recognize the importance of informal water sellers and their contribution to expanding the water distribution network, the city has begun to determine the actual number of these vendors in the interest of registering and/or licensing them, and thereby capturing at least a part of their profits while still assuring that they continue providing the distribution service. The tax or license fees would form a reserve with which the city could pay for the installation of additional public fountains and cover a portion of the subsidy cost.

2. Waste Disposal: Nouakchott and Akjoujt are the only urban centers equipped with waterborne sewage systems, which serve a total of approximately 3,000 and 400 private homes, embassies, public buildings and commercial establishments, respectively. The balance of the urban households rely on

septic tanks (for units with individual water connections) and latrines of various types. In areas where sandy soils predominate, as in the squatter settlements around Nouakchott, shallow pits inside open-air enclosures are used for the disposal of human waste. With limited land space available, latrines of this kind are dug near the tents and baraques. Their inadequate depth keeps the solids close to the surface, which -- combined with high air temperatures -- provides favorable conditions for the rapid breeding of germs, bacteria, and flies, and contributes to the spread of diseases and infections. With almost 80,000 squatters in the capital dependent on this kind of system, and with small quantities of water available for personal hygiene, sanitary conditions among these groups are obviously poor. In areas to the south, deeper pit latrines are dug in the clay soils. But with higher precipitation levels and poor percolation of the soil, these latrines become odiferous and unsanitary during the rainy season. Finally, while surface water drainage is generally adequate in sandy terrain where little rain falls, the lack of sufficient absorptive capacity of the clay and laterite soils causes ponding of stagnant water during the rainy season.

D. Health and Sanitary Conditions

As noted above, sanitary and health conditions related to shelter within urban squatter settlements are likely to be worse than those in rural areas. It has been reported, for example, that the complaints of an estimated 80% of those who seek medical assistance at public health facilities are attributable to inadequate supply and distribution of water, to the poor quality of much of the water which is consumed, and to the inadequate sanitation which results from lack of water. These conditions prevail among the urban poor, despite the fact that most of the country's health care services are concentrated in the urban areas. Each of the major urban centers has at least one Health Center and one Maternal and Child Health Center, in addition to which Nouakchott and Rosso have relatively large and well-equipped hospitals. The District of Nouakchott has the largest number of health care units, including a polyclinic, five Maternal and Child Health Centers (one in each of its arrondissements), and the National Hospital. Nevertheless, infant mortality rates of 169 per thousand live births are reported in Nouakchott, and these are not much lower than the overall national average of 186 per thousand. The major cause of infant and child mortality in Nouakchott and Rosso is red measles, which is highly infectious and spreads rapidly in squatter settlements due to the high densities, lack of sanitation facilities, and the consequent prevalence of flies and disease carrying insects. In addition, the high cost of food in urban areas contributes to low nutritional levels and to increased susceptibility to infection on the part of much of the urban population.

The problems associated with the most common diseases in Mauritania, therefore, tend to be most acute among low-income groups in squatter areas. Malaria is frequently found in both urban and rural areas, as are parasitic diseases associated with poor quality water from wells and cisterns. Only ten urban centers are served by the SONELEC water system, but 84% of the households in these areas do not have direct connections, and consequently the water they receive is often of dubious quality due to the lack of proper sanitary procedures in the informal water distribution system. Water quality is also poor in the remaining urban centers which rely on wells in the oasis towns of the interior and on the river in the south. In the case of Nouakchott, partially treated sewage water is used to irrigate the area where most of the city's vegetables are grown, which accounts in part at least for the high incidence of parasitic diseases and typhoid in the capital.

E. Environmental Conditions

Primary responsibility for environmental considerations lies with the Direction de la Protection de la Nature under the Ministère de l'Environnement, de l'Habitat et de l'Urbanisme, which was established in January 1979. Responsibility for the articulation of national policy with respect to the environment has been shifted from the Ministère du Développement Rural, which had been concerned with the effects of environmental issues on agriculture, herding and fisheries activities, although the agricultural school at Kaédi continues to address the subject of the environment and ecology as a part of its program of studies. Prior to this recent change in ministerial responsibilities, it appeared that the major focus of environmental concerns was centered on agricultural development efforts in the Senegal River Valley, the Sahel, and the oases of the Sahara, and not on the environmental impacts of urban settlements. While the role of the Direction de la Protection de la Nature has yet to be fully defined, it seems that in a country which is as vulnerable to changes in the environment as Mauritania has been during the past decade, the spatial and environmental impacts of rapid urbanization will warrant its careful evaluation. At the present time, the adequacy of qualified personnel and the institutional capability for this kind of evaluation effort cannot be determined, although it can be assumed that external assistance may well be needed.

Nevertheless, environmental problems with regard to human settlements are apparent in several urban centers. Among these is Rosso, an old and established river port on the Senegal River connected to both Nouakchott and Dakar by paved road. Rosso is low lying and is protected from the Senegal River by an extensive dike system. A further perimeter dike protects

a larger area around the town from rain water which collects to the north. Within this dike, the terrain slopes downward from the river toward a depression between Rosso and the squatter settlement of Satara, immediately adjacent to the north. The drainage system in Rosso itself includes paved and unpaved ditches connecting to three pumping stations, which discharge into the Senegal River. The third pump is dismantled, and a fresh water lake is set between it and the river so that at the time of low lake water levels when saline intrusion comes up the river to Rosso, additional fresh water is available to the town. Rosso is built on clay resulting in limited sewage percolation. Detritus of all kinds collects in the drainage ditches along the main road to the river ferry crossing, and mosquitos and rats are prevalent in the dry or transitions seasons when water does not flow through the canals. Satara, also located on clay soils, is the site of many squatter-type huts and baragues. The land here slopes at 0.3% toward Rosso and forms a depression between the two districts with maximum depth up to 1.5 meters. At times of heavy rainfall, flooding spreads throughout this area causing baragues and huts to collapse, and reducing low quality earthen blocks to mud. In addition, there is no pumping station in Satara to collect the drainage and discharge it into naturally drainable areas.

Kiffa, the center for agriculture and herding in the surrounding region, also serves as a commercial center for Selibaby to the south and Aioun and Néma to the west. The area of settlement is expanding towards the south and west, but is restricted in other directions by stony and rocky hills, and by peripheral oases where date palms grow. There are numerous dams around the town that contain water for the dry-season irrigation of fields in which such

vegetables as beans, onions, and potatoes as well as millet and sorghum are grown. Kiffa is not served by the SONELEC water system, and the major environmental problem in the area in terms of shelter is the supply of underground water, which is inadequate in quantity and, being brackish, is of poor quality.

Kaédi, the nation's agricultural production and marketing center and the third largest town in the country, is located on the Senegal River. The town includes a modern center, traditional settlements, and areas for agriculture and fishing. It has limited land for expansion toward the northeast, and is contained by the river and the flood plain, rice-growing areas, and the airport, located close to the town. The agricultural area has an extensive system of river-fed canals for irrigation, controlled by a major lock and pump station on the Senegal River, which supports the expanding rice production activity in the region. While river transportation is expected to improve with the completion of several dams along the river to control flooding, the town lacks an adequate overland connection to the highway network being completed to the north.

III. SHELTER DELIVERY SYSTEM

However formally or informally organized, the factors that constitute the shelter delivery system include the same basic elements: land; infrastructure; construction technology, labor and management; building materials; and finance. A variety of public or private institutions is usually involved in the formally organized aspects of shelter delivery, especially when the particular shelter services are in some way communal -- as with infrastructure. In Mauritania, and in most developing countries, the vast majority of the population relies for its shelter services on the informal sector, which because of its informal and evolutionary nature is often more responsive to existing conditions and to the limitations of individuals' resources. This sector itself, however, is to some degree constrained from functioning as a fully efficient market by the inefficiencies inherent in its informal organization, by the regulations and restrictions imposed by formal institutions, and by the absence of coordinated and comprehensive national shelter policy guidelines which are necessary to assure effective and equitable distribution of shelter resources.

OVERVIEW OF SHELTER AND SHELTER-RELATED INSTITUTIONS

Within the administrative structure of the GIRM, responsibility for shelter and shelter-related infrastructure and services has recently been transferred from the Ministère de l'Équipement to the newly created Ministère de l'Environnement, de l'Habitat, et de l'Urbanisme. In addition, the Ministère des Finances and the Centre National d'Hygiène under the Ministère de la Santé, du Travail, et des Affaires Sociales are involved in some aspects of formal sector shelter delivery. The major functions of the various institutions relevant to the shelter sector are as follows:

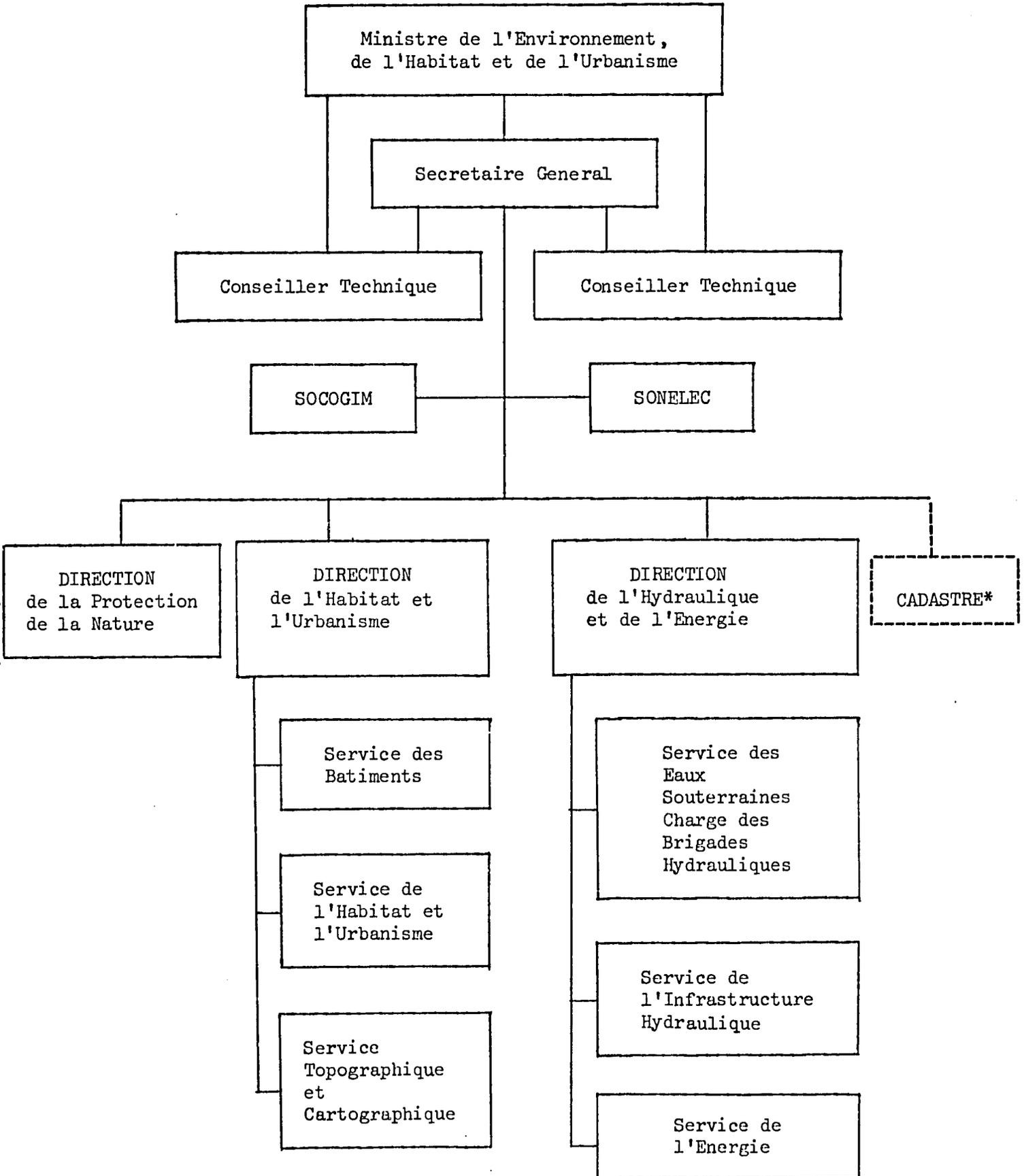
1. Ministère de l'Environnement, de l'Habitat et de l'Urbanisme:

This ministry is to be comprised of two basic levels of institutions including semi-public corporate entities responsible to the Minister, and the line departments or direction (See Figure 3 below). The former include:

a. SOCOGIM (Société de Construction et de Gestion Immobilière) was formed in 1974 to address the need for an increased supply of shelter for middle- and low-income groups. The Third Five-Year Development Plan approved a program for SOCOGIM to build 3,000 units between 1975 and 1979, two-thirds of which were to be low-cost (logements économiques) and the balance medium- and high-cost (logements de haut et moyen standing). By the end of 1978, however, SOCOGIM had completed only 100 logements économiques, and had 100 similar units and 100 logements de standing under construction. Production has been constrained primarily by the lack of long-term financing. In addition, SOCOGIM has encountered a variety of problems in project implementation and management which include under-estimated construction costs and inflation, contractor capability and timeliness, lack of coordination in provision of infrastructure services, and inadequate financial programming. Despite a major comprehensive study and survey of the shelter sector, undertaken with the assistance of outside consultants in 1975 (Le Logement en Mauritanie: Besoins et Ressources), SOCOGIM has not yet thoroughly assessed the appropriateness of its programs (in both physical design and financial feasibility aspects) in terms of the shelter needs of Mauritania's low-income population.

Since 1976, SOCOGIM has retained the services of ADAUA (Association pour le Développement d'une Architecture et d'un Urbanisme Africains), a non-profit international consulting group with headquarters in Geneva, to design and implement a squatter settlement up-grading project in the Satara zone of Rosso. Organized into three workshops dealing with architecture and urbanization, engineering, and social services, ADAUA has conducted surveys of the 1,400 families living in Satara, tested a variety of local materials suitable for use in residential construction, and prepared the preliminary subdivision plans of the zone and of the units to be constructed. It is currently in the process of devising an integrated community-based development program which takes account of individual preferences, existing informal occupancy of the land, and the need to generate employment and economic activity, all with the objective of maximizing the participation of local residents in the design and implementation of the up-grading effort. (Further analyses of SOCOGIM and ADAUA are contained in Section III.F below.)

ORGANIGRAM OF MINISTERE DE
L'ENVIRONNEMENT, DE L'HABITAT ET DE L'URBANISME



* The Cadastre is presently under the Ministry of Finance, but the GIRM is considering the possibility of including it within this new ministry.

b. SONELEC (Société Nationale d'Eau et d'Electricité) is a public enterprise responsible for the production and distribution of water in ten urban centers (Nouakchott, Nouadhibou, Rosso, Kaédi, Akjoujt, Atar, Aleg, Boutilimit, Dakhla, and Mederdra) and of electricity in eight centers (Nouakchott, Nouadhibou, Kaédi, Rosso, Akjoujt, Atar, Dakhla and La Guerra). At the end of 1977, there were slightly more than 9,000 individual water and electrical connections throughout the country.

While annual water production increased approximately 20% to 7.2 million cubic meters in 1977 (compared to 1976), distribution remains a problem both in Nouakchott and in smaller towns, some of which are not served by the SONELEC system. Electrical capacity is approximately 53,000 kilowatts, but nearly 80% of this has been built at Nouadhibou and Akjoujt in connection with the iron ore, oil and copper refineries which have not yet come on-line in those centers. SONELEC recorded a small profit on its overall operations in 1977, largely because it was able to purchase surplus electric power from SNIM for re-sale to households in Nouadhibou and Akjoujt at a considerably lower price than it charged to consumers. Operating costs which exceeded revenues in other centers were therefore offset, but may not continue to be when refinery activity commences and industrial demand increases.

In addition to the above, the Ministère de l'Environnement, de l'Habitat et de l'Urbanisme includes three major line departments (direction), each of which contains several sections (service). Those most related to the shelter sector are:

c. Direction de l'Habitat et l'Urbanisme (DHU) and its "Service de l'Habitat et l'Urbanisme," are responsible for overall city and town plans, and for the subdivision of residential, industrial and commercial areas in urban centers. Master Plans are being completed for Nouadhibou, Rosso and Nouakchott, which, however, do not as yet appear to take account of the vast squatter settlement beyond the 5^{eme} arrondissement of the capital. DHU has undertaken urban subdivisions in Nouakchott and Kaédi, and has been involved in the subdivision of the Satara squatter zone to the north of Rosso. In addition, DHU is presently developing standards for the subdivision of urban land and codes for building construction, for the administration of which it will need additional trained staff.

d. Service Topographique et Cartographique, under DHU, is responsible for topographic surveys and for drafting the charts and plans used in land subdivision.

e. Direction de l'Hydraulique et de l'Energie is responsible for research and inventory of water and energy resources. It has undertaken studies of groundwater supplies and identified substantial

water reserves in underground aquifers in many regions of the country, particularly in the southwest.

f. The Cadastre, now part of the Ministère des Finances, may be incorporated into the Ministère de l'Environnement, de l'Habitat et de l'Urbanisme. Such a move would provide the new ministry with the capability to identify all privately and publicly held lands, and significantly assist the ministry in its role in the development of urban centers.

2. Ministère des Finances: Under this ministry, the Service des Domaines and the Banque Centrale de Mauritanie, through the Banque Mauritanienne de la Developpement et du Commerce (BMDC), have relevant roles in the shelter sector.

a. Services des Domaines is responsible for the management of all government lands; for establishing a cadastral system to form the basis for land tax assessment; for the attribution and sale of land to individuals; and granting official title, "titre foncier." It is also responsible for making land available for public use (e.g. V.R.D. and public buildings). The Service sells and/or grants title to land in Nouadhibou and the District of Nouakchott, while the offices of the regional governments in other urban centers set comparable prices for government land sold in those areas. In addition, the Service provides land to SOCOGIM for its housing projects.

b. BMDC (Banque Mauritanienne du Developpement et du Commerce), a semi-public enterprise with 76% of its initial capital provided by the GIRM, finances housing both through SOCOGIM and by making direct mortgage-type loans. Housing loans represented approximately 40% of BMDC's lending activities in 1977, with the balance in commercial loans mostly to finance imports of building materials. Financing for SOCOGIM's lease/purchase projects is provided by the Banque Centrale through BMDC, which also serves as the depository for SOCOGIM's accounts. Direct loans to individuals are financed by BMDC with its available investment capital (at 11% plus 2 percentage points on the loan), and through re-discount with the Banque Centrale, which charges BMDC 5.0% on loans carrying a maximum 10.5% rate of interest. BMDC finances up to 30% of the construction cost over terms of five to seven years. Due to limited capital available from the Centrale Banque, BMDC provided a total of 97 individual mortgage-type loans in 1978 for a total of approximately UM/67 million (or US\$1.5 million), or an average of UM/700,000 (US\$15,500) per loan. Officials report that demand considerably exceeds available capital for housing finance, and therefore, BMDC intends to allocate to housing as an yet undetermined portion of the US\$2.5 million loan it is seeking from the International Development Association (IDA) of the World Bank.

3. Centre National d'Hygiène has a sanitary engineer on loan from the World Health Organization (WHO) who is assisting the Centre in establishing a training program in the numerous aspects of sanitation related to public health. This is part of a larger effort to improve sanitary conditions in urban areas, which requires that the WHO expert and the Centre coordinate their activities across a variety of ministries and municipal authorities. In addition, the Centre is presently conducting an assessment of sanitation needs and water provision systems as a preliminary step in establishing a mechanism for overall sanitary planning.

COMPONENTS OF THE SHELTER DELIVERY SYSTEM

A. Land

The land situation in Mauritania presents a peculiar paradox for while the land area is extensive and the population relatively small, the availability of land for residential use in urban centers is generally limited. This is largely a consequence of the complex tenure system and the generally inadequate system of distributing urban land, given the extraordinary demand which has arisen as a result of rapid urbanization.

1. Availability of Public Land in Urban Areas: The availability of publicly held land is guaranteed by the law defining the public domain, Law #60-139 of August 2, 1960, which identifies all vacant and undeveloped land as belonging to the state. Vacancy is established through the evident lack of construction, cultivation, and wells. Traditional tribal rights to land based upon customary usage are recognized, but this usage must be permanent and regular. While the state can claim such land if it has been unoccupied or undeveloped for a period of ten years, it is incumbent upon the state to prove that the land has not been in use during that time.

The reserves of public land which may be allocated to individuals or to SOCOGIM for residential use in urban areas are dependent upon this law defining the state's right to vacant land. In the case of urban land which has been subdivided, all parcels -- with the exception of those that are already registered or those which have been allocated and developed but not yet accorded final title -- belong to the public domain. The state must settle all other claims to land which falls within an urban subdivision and, according to the law, it can do so by relocating those residents who do not have established rights.

The state also has the right of eminent domain over property which is either individually or tribally owned when its acquisition is necessary for public use. But despite the extensive land holdings of the state and its rights to claim or acquire land, the supply of urban residential land which can be distributed by the government remains limited. This is partially due to the fact that residential parcels in a subdivision cannot be allocated to individuals until they have been equipped with a certain minimal level of infrastructure, which in turn requires more resources than have been available to meet the recent increases in demand that accompanied rapid urban growth. Moreover, the law is sufficiently vague about tribal rights when they conflict with the state's right to land so that in practice expropriation has proven controversial, particularly in rural areas. In urban areas, the state has usually settled informally with the tribal group in question by agreeing to allocate to it a certain number of parcels within the new subdivision. This practice may prove more difficult over time as urban real estate has become a valued investment and it is increasingly in the interest of those with established customary

claims to either maintain their claims or sell them to others at much higher prices than the state can offer. The absence of an established cadastral system and the fact that most private and tribal land is unregistered makes the resolution of conflicts arising from various property claims quite difficult. In Nouakchott, for example, only a little over 2,000 lots are reported to be registered with the Service des Domaines, although it is estimated that about twice as many parcels of land are eligible for final title, but have not yet been registered.

2. Land Use: Plans for the subdivision of land are prepared by the Direction de l'Habitat et l'Urbanisme (DHU) in conjunction with both local authorities and the Service des Domaines. These plans take into account existing privately owned permanent structures. Draft plans indicating proposed land use are drawn up by the Service Topographique and must be approved by the local governing authorities before being sent to the Ministère de l'Equipement to be finalized. Once this process is completed and the costs of subdivision have been calculated, the proposed plan must then be submitted to the Council of Ministers for approval before it can be executed by DHU.

In urban centers where master plans exist (Nouakchott, Nouadhibou, Kaedi and Rosso), land is zoned according to four basic uses: industrial, commercial, artisanal and residential. The latter includes zones résidentielles for middle and upper-income Western-style dwellings, and zones traditionnelles where construction in non-permanent traditional materials and styles is allowed.

No estimate of the average number of lots which are subdivided and allocated annually was available from either the DHU or the Service des

Domaines. However, the Service reported that it had a backlog of 25,000 registered requests for land in urban areas. While these include requests for parcels in both residential and traditional zones in Nouakchott and in the residential zones of other urban centers (but not requests for industrial or commercial uses), it is not known whether they have been received from families in need of land for shelter or from individuals seeking to obtain urban land as an investment. Nevertheless, the actual supply of land is markedly below this level of demand. Within the past year only 400 lots have been zoned for traditional housing in the Ksar Liaison area of Nouakchott and these remain undistributed due to the difficulty of the terrain, which is a dune. The inadequacy of the system of supplying land has in certain instances led local officials to take the initiative in allocating land which is minimally serviced. The largest operation of this type affecting low-income groups was undertaken in 1975 in Nouakchott where 7,350 parcels of land averaging 200m² each were distributed for free by the government of the District of Nouakchott. This was largely a response by the District to the huge squatter settlements which had grown up around the city's periphery by that time. Subsequently, however, squatter settlements have continued to grow, and are now estimated to contain approximately 40% of the entire population of the city. Thus despite the distribution of a large number of parcels by the District government, demand for land continues to be substantial.

Additional problems arise because new areas zoned for traditional housing are often located on land which is considered marginal for other uses and as a result is more costly to equip with minimum infrastructure. Such areas also tend to be distant from town centers, as in Nouakchott's

first and fifth arrondissements and the Gedida area of Kaedi. As a consequence, low-income groups in this latter town have been relatively slow to move to newly allocated lots in the traditional zone despite high densities within the older quarters.

3. Tenure: The legal acquisition of land for residential use by individuals is governed by the following three types of tenure: a) private freehold based on a registered title - titre foncier - to the land; b) public leasehold whereby the individual obtains the right to occupy the land and to pass this right to his heirs but not to sell it; and c) tribal rights.

Private freehold property is held primarily in areas zoned for middle and upper-income residential use. In order to obtain title the individual purchaser must develop the land by investing a minimum sum of UM/1,000,000 (US\$22,000) within a period of two years from the date on which the Service des Domaines allocates the lot. A relatively low "lease" price of UM/100 (US\$2.20) per square meter is initially charged, along with a subdivision fee of UM/3,000 (US\$67.00). The price of the final title to the land, however, is calculated as a percentage equivalent to at least one-third of the investment made.

While freehold title is obligatory in residential zones, it is optional for individuals with tribal rights to land or with land which has been allocated in traditional zones. To obtain freehold title in traditional zones, development of the land must also take place within a period of two years, and while no fixed investment is required as in residential zones, the building must meet certain minimal standards regarding the materials used. Local materials (banco and stone) are permitted and the construction

must conform to street alignment patterns and other regulations regarding public service provision. The price of a freehold title to this land is then calculated at the end of the two-year period upon completion of the construction.

A less expensive and more appropriate form of tenure for low-income groups is that normally used in traditional zones where the state grants an occupancy permit to individuals who can then build on the land while actual ownership is retained by the state. The permit may be transferred to the heirs of the occupant but sale and other forms of disposal of the land are prohibited. If the occupant is unable to complete the development of the land, it may be transferred to another individual through the Service des Domaines, providing that there has been an investment of at least UM/10,000 (US\$220) and that the transfer does not take place before the end of the first year of occupation. These stipulations are intended to discourage speculation.

Theoretically, anyone can apply for an allotment of land and obtain an occupancy permit in traditional zones, but priority is generally given to existing residents who do not qualify for freehold title. The allocation of public leasehold land and the granting of permits of occupation in traditional zones are the responsibility of local authorities in all urban areas except the District of Nouakchott, where these functions are performed by the Service des Domaines since all of the land in the capital which has not been designated for private ownership is state-owned. The price of an occupancy permit in traditional zones varies according to the subdivision. The standard payment charged in Nouakchott is UM/30 (US\$0.67) per square meter, which is supposed to compensate for the development costs incurred by the state.

The third form of tenure, based upon traditional tribal rights, applies in the older quarters (Ksars) of such cities as Kaedi, Atar, Kiffa, and even in such areas as the squatter settlement of Satara in Rosso. Tribal claims are recognized by law as long as there is evidence of use, which in residential areas requires the existence of some construction. As urban centers grow and absorb peripheral, formerly agricultural, or grazing lands, it is more difficult to determine what constitutes the proper use upon which tribal claims are based. Furthermore, this form of tenure conflicts with the state's right to land that is either vacant or undeveloped for a period of ten years, and allows a certain amount of land to be held off the urban market at the discretion of the group by which it is claimed.

4. Land Prices: The prices of public lands designated for residential use are set at relatively low levels and do not reflect either the costs of subdividing the land and equipping it with infrastructure, which is assumed by the state, or the market rates for serviced urban land. The low prices charged initially for freehold land in residential zones, and for permits of occupation in traditional zones, have given rise to considerable speculation in subdivided land, and constrained the financial capacity of the state to provide an adequate supply. The existing price levels indicated below, which have been set by the Service des Domaines for Nouakchott, tend to be the same as those applied by local authorities in other urban areas.

Urban Land Prices

	<u>Zones</u>	<u>Prices per M²</u>	
		UM/300	US\$6.70
1.	Zone Commercial "Haut Standing"	100	2.20
2.	Zone Residentielle	120	2.70
3.	Zone Artisanale	30	0.67
4.	Zone du Ksar	50	1.10
5.	Zone Industrielle et Commercial	30	0.67
6.	Zone d'Habitat Traditionelle		

The sale of lots by individuals whether legally or illegally, however, is at considerably higher prices. Lots in traditional zones are sold privately for between UM/800 and UM/1,500 (US\$17.80 to US\$33.30) per square meter, compared to the official price when sold by the state of UM/30 (US\$0.67) per square meter. The pricing system theoretically provides for the increase in the value of urban land which results from infrastructure development to be recaptured by the state when -- in granting freehold title -- it charges a fee calculated as a percentage of the investment made in the land. Yet as noted above, the number of freehold titles which are registered with the Service des Domaines is only about one-third of those actually eligible for registration, and consequently a large portion of the revenue due to the state, both in the form of title fees and real estate taxes, is lost to it.

Those revenues that are collected from the lease and sale of land and from title fees are now deposited in a recently created special fund with which the Service des Domaines is to pay at least some of the costs of subdividing and equipping urban land. In an effort to overcome the imbalance between the cost of providing serviced land and the amounts charged to individuals, and the resulting imbalance between the supply of and demand for land, the Service des Domaines has proposed an across-the-board doubling of

the officially established prices. While this proposal has yet to be approved, it is unlikely that the higher revenues will cover the real costs to the state of providing serviced land, (although the newly created special fund and improved accounting procedures should allow the Service des Domaines to make a more accurate determination of the difference between costs and revenues). Additional potential revenue, moreover, will still be lost to the state because the proposal spreads the increase in prices evenly among all land users, even though certain groups can -- and do -- pay considerably more for land as is evident from the highly speculative prices which prevail in the private market.

5. The Informal Sector: Land is acquired informally through the illegal occupation of vacant public land on the peripheries of urban areas; the purchase of illegally subdivided lots from tribal owners or holders of occupancy permits; and the temporary leasing of use rights by individuals who have been attributed land which they are not occupying. In the first case, construction in permanent materials (cement block) is rare as the residents are aware of their tenuous claim to the land, particularly in the major urban centers where local authorities exercise some degree of control over building activities in squatter settlements. Where such local building materials as banco and stone are available, however, they are sometimes used for construction in these settlements.

The illegal sale and subdivision of land by individuals who have been allocated parcels in both residential and traditional zones are common methods of transferring land informally. Occupants who have no definitive title are able to sell all or part of their parcels at highly speculative prices. In residential zones this practice often arises because of the

inability of occupants to invest the minimum of UM/1.0 million required to obtain freehold title. The illegal sale and subdivision of land which is initially acquired at low official prices provides many beneficiaries of lots in new subdivisions with a source of capital which is otherwise not normally available to them. This capital in some cases may actually allow those who subdivide and sell a portion of their parcels to pay the costs of constructing a unit with permanent materials on the portion of the parcel retained for personal use. While commercial transactions such as these do not provide secure tenure, the purchase of land informally seems to allow buyers to take greater risks with their investments in permanent structures. Indeed, it is interesting to note that a relatively high level of investment is generally put into construction on land for which some form of payment has been made.

The third form of informal land acquisition duplicates the traditional practice of leasing tribal lands. While this form of communally held property was not customarily sold to outsiders, use rights were frequently provided. A private leasehold system seems to operate in some areas, whereby individuals who have been attributed parcels of land rent it out temporarily, a practice which provides them with a steady source of capital that may be used eventually for construction.

Average lot sizes in peripheral squatter settlements vary according to the urban center. While in smaller towns with agrarian bases, lot sizes tend to be large (about 300m²) since their use is predominantly rural, in larger urban areas the parcels closer to the center average about 80 to 100m² since this land is at a premium and its residents tend to be more integrated in the urban environment. Finally, in informal

settlements the use of land is mixed with few distinctions made between residential, artisanal and commercial activities, although the latter, usually in the form of small grocery shops, tend to be located along the main informally established thoroughfares.

B. Infrastructure

The services and utilities available to housing sites in Nouakchott are generally dependent on the specific location, size configuration and to the financial capability of the residents. According to a December 31, 1977 study, only 18% of the households in Nouakchott had individual water connections and only 17.8% had access to electric power supply. The majority of Nouakchott's residential population depends and receives its water supply from 33 public fountains located throughout the city.

Water and electric power supply is the responsibility of SONELEC, a government-owned corporation. Due to the topographic conditions within Mauritania, however, only ten urban centers are served by SONELEC's water system, and only eight are provided with the electric power supply. Nouadhibou and Akjoujt provide their own water and power generation.

1. Water: With minor exceptions along the Senegal River, Mauritania's water supply depends on ground water through a system of wells. Following the 1968-1972 drought period, the United Nations drilled 36 new wells around Nouakchott, Nouadhibou, Rosso, and a number of smaller communities and villages throughout the country. Unfortunately, there are no studies available to determine or to assess the capacity of ground water sources in order to evaluate the potential for increased production or the danger of gradual drying out of existing sources. There is equally no way to estimate the effect of rains in the higher precipitation regions or recharge of aquifers.

2. Electric Power: All electric power in Mauritania is thermo-generated and is provided only to eight major industrial cities, with Nouadhibou and Akjoujt providing their own generation. The generating

capacity has been assessed as:

Nouakchott	5 plants	7,000 kw
Rosso	4 plants	800 kw
Kaédi	6 plants	1,200 kw
Atar	3 plants	350 kw
Nouadhibou	4 plants	22,100 kw
Aleg	2 plants	45 kw
Akjoujt	5 plants	11,000 kw
Boutilimit	3 plants	77 kw

Although there is no available assessment of the existing power generating plants as to the possibility for an increasing production, expansion of the SONELEC system certainly exists, however, at the expense of high priced imported fuel.

3. Sanitary Sewage Disposal: Nouakchott and Akjoujt are the only two urban centers with available water borne sewage disposal systems. These serve primarily public buildings, embassies and major commercial establishments. Only about 400 private homes in Akjoujt and 7,000 in Nouakchott are connected to the systems. Other households rely on a variety of septic tanks and latrines. In areas with sand or sandy soils, where latrines cannot be excavated to a sufficient depth, such as the squatter settlements around Nouakchott, health conditions tend to be quite poor. An improvement of these conditions is however not a single matter and cannot be affected without an improvement of overall sanitary conditions and without a considerable increase in the supply and use of potable water.

C. Construction Technology, Labor, and Management

1. The Informal Sector: The vast majority of the urban population obtains its housing, whether it be some form of temporary and mobile structure or a more permanent and fixed dwelling unit, through informal means. This sector's activities include the acquisition of land, materials, labor, and financing in the production of housing of a wide variety of types.

Among the residents of peripheral settlements where land is acquired illegally, the provision of initial shelter is relatively simple and inexpensive. The types of units most frequently found in these areas include tents, unbaked mud brick or stone housing, where such materials are available, and baraaues, which again depend on the availability of salvage materials. The tents in the large urban centers, however, differ from those on nomadic campgrounds in that they are likely to be made of cheaper materials, some form of heavy cotton canvas rather than wool. Tent production is still dominated by the Moorish caste women who specialize in tent-making, and they can be found for sale on the market for about UM/6,400 (US\$142). The abundance of tents in peripheral settlements is due to both cultural and economic factors. This form of shelter is traditional among Moors and is likely to remain in use as part of the dwelling unit even when more permanent forms of shelter are obtained by the individual family. Thus the tent not only represents the cheapest form of shelter for the new migrant but also one to which there is a strong traditional attachment.

Tent zones in urban centers differ in several respects from nomadic campgrounds. The clustering of related tribal or family members is unusual in urban

squatter areas, and the spaces allowed for sanitation and waste disposal are severely limited. Some form of make-shift fencing to delimit the individual family's lot and to provide a minimum of privacy is attempted since the boundaries between lots are ill-defined except in the cases where municipal authorities actually assign them. A make-shift, partially enclosed bath area and pit latrine occupy part of the lot while cooking is carried out in the open.

The second form of shelter that represents an adaptation from the rural dwellings to a cheaper version of a modern dwelling unit is the baraque made of scrap wood with corrugated tin sheet roofing. These are usually one room of about 20 m², although a few elaborate structures of three rooms plus a veranda are occasionally found. The construction materials are bought in the market or at the port where large wooden crates are salvaged and sold for this purpose. Material for a 20 m² baraque costs approximately UM/20,000 (US\$440). Labor, which is often hired, brings the total cost to approximately UM/22,500 (US\$500). The resale value of baraquas is high since the salvage materials from which they are made are scarce. Baraquas can, in fact, be sold for US\$500 to US\$1,000 depending on their size, and the money gained in such sales is normally used to finance part of the construction in more permanent materials.

The acquisition of a more private form of shelter in these peripheral zones depends to a large extent on the availability of materials. Houses of banco, sunbaked mud brick, of normally not more than one room are built with the family providing some or all of the labor in making the bricks and constructing the unit. Masons specializing in such construction and in the mixing of materials to make bricks are also utilized both in town and in the

peripheral settlements. The craftsmanship differs, but in towns like Aleg the skills can be found that are necessary to build elaborate structures using mud brick mixed with a small quantity of cement. This form of construction, which is prevalent in both the southern River Valley towns and some of the Sahelian towns, provides traditional shelter at affordable prices. It has been estimated that the construction of large three-room units of durable quality in the Aleg area costs about one fourth of the cost of similar construction using cement block in the formal sector. The main drawback of banco construction is the continual need for maintenance and refinishing, and in the Satara squatter area of Rosso, the prejudice against the use of local materials in construction is due to the fact that frequent flooding is a constant threat to the houses.

The use of banco, however, is common in the traditional type of dwelling unit construction, which includes the round thatch-roofed huts of the nomadic African Peuls and in traditional African compounds of several dwellings centered around a walled-in courtyard shared by members of the extended family in towns like Kaédi and Selibaby. Banco is also used in the evolution towards a modern house that retains the customary courtyard among both Moorish and African ethnic groups, with an additional veranda (a roofed structure that opens onto the courtyard) that acts as a transition area between the interior of the house and the open space of the courtyard, where most daily activities take place. The rooms themselves are normally built in a row with adjoining storage spaces (magasins) for foodstuffs and household goods. The W.C. and kitchen are separate structures occupying different corners of the courtyard. The kitchen is only partly enclosed and is not roofed since the fuel used is normally

charcoal, which requires cooking in an open space. The courtyard is not only used for a variety of family activities, cooking, laundry, and reception of guests but also as a dining area and a communal bedroom (except when the weather is inclement). Thus the rooms for family use are not only few in number but also small in size since most activities are not centered within the enclosed spaces.

This semi-modern type of dwelling, as well as the traditional African compound and Arab house, is built in a variety of materials other than banco, including stone in such Moorish towns as Atar, and cement block. Such dwellings represent a considerable investment of both time and money for the owners, and are built gradually over a period of time. But such efforts are rarely undertaken without some formalized transaction involving land taking place. These transactions range from the legal acquisition of subdivided lots to the informal arrangements between individual land seller and buyer, whether the land is part of a formal subdivision where the seller still does not have title and therefore is not legally allowed to sell, or the land belongs to the owner through traditional rights. The gradual process of construction begins with the building of enclosure walls that define the lot and provide privacy. Many of the families normally live within the lot in temporary shelter for a period of time while construction of the first room is being completed, unless they are reasonably well off and have access to other forms

the family accumulates enough savings to build in cement block. Although there has been no inventory of the housing stock according to the construction materials used, and traditional or temporary shelter outnumber that built with more permanent materials, there is evidence of an increased use of the latter as the family becomes more integrated in the urban environments, even in areas where the availability of local materials permits other kinds of construction.

As indicated above, rooms tend to be small, and are rarely larger than 20 m², which requires about 500 blocks per room. These are often bought on credit, with blockmakers receiving orders for the number needed and normally stockpiling them until they are fully paid for. Such credit purchasers carry an additional charge (moudaf) which can reach 10% to 20%. Alternatively, the materials to make cement block can be bought and stockpiled by the family until they have enough for their construction needs. Blockmakers are then used to make the blocks on site. This method of making blocks under close supervision of the household assures that it is better quality material than those sold on the market. While blocks on the market are cheaper to purchase (averaging about UM/3 per brick) than making them on site, the merchant's price is based on a higher quantity of cement than is actually used.

The cost of informal construction in cement block is difficult to assess due to the length of time taken in building, and to fluctuations in materials prices. Estimates made on the basis of site visits, however, to various dwelling units within the Fifth arrondissement indicate that a fully completed structure with wooden window shutters, whitewash on the interior,

cement slab floors, and tin sheet roofing supported by wooden beams ranges in price from UM/3,000 to UM/5,000 per square meter, depending on finishes and the manner in which land was acquired. In the instances where land is allocated, its cost is a minimal percentage of total cost, while informal transactions over land raise both the cost of construction per square meter and its share of total cost. Labor, on the other hand, does not represent a substantial part of the total investment as individual families are capable of controlling the share of the construction for which they hire labor. Payment is normally by the piece rather than the day, thus affording more control over the price. Labor costs for a 20 m² room range from UM/4,000 to UM/5,000. Payment is in installments with an initial down-payment made before the work begins.

Informal construction costs for both labor and materials rise in instances where the units are built by small contractors. The price charged for the total unit is based on the contractor's provision of both materials and labor, and his estimate of the total cost is given as a lump sum, without a breakdown for labor and materials. The advantage of using contractors is that the process of construction is speeded up, although incidences of contractors failing to deliver units are reported. Despite the fact that these prices are higher, small-scale contractors in the informal sector are still able to build at considerably lower costs than the formal sector, even though their profit margins range from 30% to 40%. These contractors are usually self-financed and few of them (10% in Nouakchott) use any formal credit from banks. The rest, however, may obtain credit indirectly from the formal sector through friends, relatives, and entrepreneurs with access to the banks. These contractors operate both within the

formal and informal sectors, since they are used by larger businesses on big jobs, but most of the work of small-scale contractors is within the informal sector in residential construction for individual families. A survey of the informal sector in Nouakchott reveals that most of the clients of fifty different building trades enterprises are residents of the quarters in which the enterprises operate. Relationships remain personal and the risk of default on payment by the client is minimal. An advance of one-third of the agreed upon price is normally required with the final payment made upon delivery. In instances where no advance is paid, the final cost of construction is about 10% to 20% higher, due to the credit financing provided by the contractor.

2. The Formal Sector: Formal sector residential construction is limited in Mauritania to those with high incomes for whom custom building is done, and to the project-scale activities of SOCOGIM. A brief review of the major aspects of this sector's activities is contained in this section.

a. Costs of Construction: The substantial fluctuation of costs and the lack of availability of construction materials present critical problems in estimating construction costs, particularly for larger projects with more extensive completion schedules. Certain general costing guidelines have been used in making preliminary estimates; however, actual offers from different contractors indicate that the use of the guidelines would seem to be limited to very preliminary cost projections.

As expected, construction costs fluctuate with the location of products, primarily due to material transportation costs; supply, lodging and food expenses of the labor; as well as difficulties with electric power and water supply. If Nouakchott prices are assumed as a base level of 100%, the

prices of residential construction in other locations may be with some degree of flexibility, expected as follows:

Aleg	110%
Aioun	135%
Akjoujt	105%
Atar	120%
Boutilimit	110%
Kaédi	115%
Kiffa	120%
Nema	150%
Nouadhibou	105%
Rosso	105%
Tidjikja	150%
Zouerate	150%

La Société de Construction et de Gestion Immobilière (SOCOGIM) had completed one hundred low cost dwellings (logements économiques) in Nouakchott by the end of 1977. The project consisted of one-, two-, three- and four-room units each on a walled-in lot varying from 164m² to 200m² in area. Each unit includes a kitchen, bathroom containing one lavatory, shower and turkish toilet, and a storage area. The interiors of these units contain 32m² in one-room units, 50m² in two-room units, 63m² in three-room units and 75m² in four-room units. The final construction costs indicate an average cost per square meter of interior space of approximately UM/8,200 (US\$182.20) or approximately US\$18.20 per square foot. Using this price, the costs of the units can be averaged as follows:

one-room unit	UM/262,400
two-room unit	410,000
three-room unit	516,600
four-room unit	615,000

The final costs reported by SOCOGIM, however, show a substantial variation in costs most likely depending on the contractor and the size of the contract, as indicated in Table 5.

COSTS OF SOCOGIM "LOGEMENTS
ECONOMIQUES": 1977
(in ouguiyas)

<u>Size of Unit</u>	<u>Number Built</u>	<u>Construction Cost Per Unit</u>	<u>Approximate Cost Per M²</u>	<u>Total Cost (in ouguiyas)</u>
<u>One-room unit:</u>	1	232,565	7,268	232,565
<u>Two-room units:</u>	13	293,606	5,872	3,816,878
	23	377,232	7,545	8,676,336
<u>Three-room units:</u>	32	432,169	6,860	13,829,408
	10	538,176	8,415	5,381,760
	5	643,573	10,215	3,217,865
<u>Four-room units:</u>	4	614,477	8,193	2,457,908
	<u>2</u>	835,547	11,140	<u>1,671,094</u>
<u>Sub-Total:</u>	100			43,273,814
Studies and Supervision.....				2,265,483
Infrastructure.....				13,257,379
Miscellaneous.....				<u>2,000,000</u>
<u>TOTAL COST:</u>				60,796,676

Average construction cost per unit: UM/432,738 (US\$9,616).

Average construction cost per square meter: UM/8,200 (US\$182).

Average total cost per unit: UM/607,967 (US\$13,510).

These units are hardly low-cost in the Mauritanian context, as they are affordable only by those in the top 10% of the Nouakchott income distribution. The 100 logements économiques presently under construction are likely to be significantly more costly as they will be ready for occupation approximately two years after the first 100 units were completed, and higher financing and construction costs are being incurred. While no data on annual increases in construction costs and building materials prices are available, these are likely to be increasing at at least the same rate as the overall inflation rate of 10% to 12% per annum. Thus even the low-cost units being built today can be assumed to cost a minimum of UM/10,000 per square meter, which is at the low end of the range of UM/10,000 to UM/13,000 per square meter reported for other residential construction.

b. Construction Labor: Mauritania's construction labor force and its level of compensation seem to directly reflect the conditions of the local construction industry, specifically the industry's low demand. Most workers are unskilled or semi-skilled and the trades have no apprentice program. The employers pay strictly minimum wages, "interprofessional salary rates," officially effective since 1974, and extras are not normally paid. Although there is an established 40 hour work week for labor, the construction industry adopted a 44 hour week to match the government schedule. The law provides for various increased rates for overtime work which, however, seems to be rarely applied.

Currently the labor supply seems to equal or somewhat exceed the demand, due to the work slowdown. Because the major labor force has been generally attracted to and is concentrated in the capital, however, or in the industrial cities, a considerable shortage is being experienced elsewhere. Most

trades are controlled by guilds which regulate and limit the number of members. The masons may be an exception apparently because some are coming from Senegal, attracted by opportunities in Mauritania's industrial/mining centers.

There are three basic categories of labor and the official minimum wage scales specify the hourly rates apparently based on the degree of individual skill.

- Batiments et Travaux Publics
(Buildings and Public Works)
- Mécanique Generale
(General Mechanics)
- Transport Routiers
(Road Transport)

Construction labor (masons, plumbers, carpenters, plasterers, roofers, iron and steel workers, painters, tile setters) generally fall into Group No. 6 of the first category and their hourly wage rate varies from UM/30.08 to UM/35.07, or about UM/5,213 to UM/6,078 per month. These wages represent the net pay to the worker. The effective cost of labor is, however, approximately 40% higher as a result of applied taxes and benefits. Due to the absence of major construction programs and cost/progress records, it is practically impossible to assess the productivity of Mauritania's construction labor. It was reported, however, that a mason will lay about 80 block per 8-hour day which is approximately 50% of the U.S. average.

c. Organization: There are about 25 registered contractors in Nouakchott divided into six official categories which indicate their construction capacity, and approximately 75 unregistered firms engaged in general or specialized construction work. Most of the registered contractors are large firms, relatively well organized and with generally good experience and capability in securing the necessary construction materials, organizing labor, maintaining construction equipment and preparing estimates and bids. These contractors, however, generally prefer higher priced public or private contracts. Virtually none of them have engaged in any lower level or lower cost construction, particularly in projects that could be classified as low-income housing.

All small contractors are exposed to the same problem: securing the necessary materials at reasonable prices and delivery terms, and, therefore, maintaining construction schedules. It would seem that the large contractors are able to maintain better cooperation or, in some cases, direct partnership with the importers (commerciants) of construction materials, and therefore they receive preferential treatment in delivery at more stable prices. The slow-down of construction work in Nouakchott, however, affected primarily the large firms with high overhead in equipment maintenance and labor, and consequently a number of contractors are in liquidation or are selling out. These events may somewhat improve the availability of skilled labor in Nouakchott and as a result some temporary improvement may also be realized in the delivery and price of construction materials.

The formal construction industry is relatively well supplemented by numerous small-scale tradesmen (tâcherons) who are hired to do small

construction work using materials accumulated over some extended period of time by owners of land. This "auto-construction" process also has some problems. The individual owners are generally not experienced in construction management and are, therefore, may be subject to overcharge, poor performance by the tradesmen, and to considerably higher prices of materials which they can purchase only in small quantities at a time.

D. Building Materials

Of all the commonly used building materials, only sand, gravel, shell aggregate, water and some clay can be truly considered as being of local origin. Virtually all others, even such basic materials as cement, reinforcing steel and lumber, are imported, although it appears that quantities are limited. While the government theoretically controls imports with a limited number of authorized importers and restrictions on the availability of foreign exchange to finance imports, building materials importers manage to hold supply well below demand, and consequently to drive up prices. It has been reported, for example, that the f.o.b. cost of a ton of cement at the Port of Nouakchott is UM/2,800 (US\$62) plus a tax of 14%, but suppliers commonly charge as much as UM/7,000 per ton (US\$156).

Suppliers who have used bank credit to finance imports and who withhold building materials from the market until prices rise substantially, are often in arrears in repaying their loans to the banks. As a result, the BMDC reports that 15% to 20% of its short-term loans made in 1978 for building materials imports are not being repaid at all, and that an additional 30% to 35% of these commercial credits is late in repayment. With 60% of its 1978 loans made to finance commerce, and the bulk of this going to construction materials imports, a significant percentage of its portfolio is in arrears. Bank officials are confident that these loans will eventually be fully repaid, but not until suppliers decide that prices are high enough to warrant the sale of their inventories. The slight slowdown reported in construction activities in 1978 in part accounts for the fall in prices, and the consequent manipulation of the market by wholesalers. In addition, transportation costs within the country also account for some of the fluctuation in building materials prices.

These conditions critically affect the level of construction activity, particularly in low-cost construction where costs should be kept to a minimum. Both SOCOGIM and individuals in the informal sector are especially hard hit by manipulation of the building materials market. The unit prices reported in Annex I, Table D, have been extracted from a contractor's bid to SOCOGIM for one of its projects, and represent a recent average of costs in Nouakchott, the main supply and distribution center. Transportation costs to other urban areas increase these prices by approximately UM/40 per ton per kilometer.

It appears that the fluctuations in the cost of imported materials are more the result of artificial market manipulation than of actual cost increases at the point of origin, although the costs of certain materials such as cement, asbestos, and metal roofing, show some real inflationary trend.

While materials supply and cost conditions present real difficulties for any planned large-scale shelter construction program, there has been little organized effort to increase competition among suppliers or to encourage the expansion of supplies. Some efforts are underway to investigate the potential of manufacturing or processing local materials for import substitution, but these have yet to be fully explored. The following factors indicate that significant possibilities exist, given that:

- Mauritania apparently has substantial deposits of limestone, yet there is no cement, gypsum, chalk or plaster production plant.
- There is a small steel plant in Nouadhibou that has never been put into operation, yet the country has large deposits of iron ore which are being exported and are subject to world market price

fluctuations, while needed steel products are imported at high cost and in hard currency.

- The volume of available shell deposits has apparently not been assessed as to the possible use in cement or other production.
- Copper deposits exist, and while these are not mined at present due to low world prices, expensive electric wire and water pipes are imported.
- Small concrete block manufacturing of relatively good quality exists in Nouakchott, however the volume of production and the price of the product seem to make it suitable only to more affluent purchasers.

Thus while present building materials supply conditions impose a serious constraint of the expansion of shelter, Mauritania has the potential to reduce its dependence on imports by encouraging the production of local materials.

E. Housing Finance

The Mauritanian economy is characterized by a relatively undeveloped financial sector, largely oriented toward the short-term financing of commercial activities, which alone account for 40% of overall bank credit in the economy. An additional 30% of overall bank credit has been extended to the mining sector, in which virtually all of the long-term credit in the economy is concentrated. Eighty percent of all bank credit is short-term, and the balance is equally divided between medium and long-term credit, with 99% of the latter in mining, leaving very little formal sector credit available for housing finance. While a variety of informal financing techniques are often employed in shelter finance, in part to compensate for the absence of formal sector financing, these tend to be short and medium-term in nature. As a result, the great majority of shelter development activities is dependent upon the rate at which individuals can self-finance their housing, through personal or family savings, the accumulation of cash, and the liquidation of other assets. But however housing is financed, it requires an unusually large investment, with even the simplest two-room unit built via the informal construction sector using permanent materials costing the equivalent of two and a half years of an urban median income level family's total earnings. Thus the absence of long-term financing from both the formal and informal sectors seriously constrains the further development and expansion of the supply of shelter in Mauritania.

1. Formal Sector Finance: Mauritania's currency, the ouguiya (UM) (equal to approximately 2.2 cents US, or $UM/45 = US\$1.00$), was introduced in 1973 when the country withdrew from the West African Monetary Union and

established a national central bank, the Banque Centrale de Mauritanie (BCM). In addition to the BCM, the banking system includes five deposit money banks, in four of which the government has a majority participation, either directly or through the Banque Centrale de Mauritanie; while in the fifth, the Banque Arabe - Libyenne pour le Commerce et le Développement (BALM), it holds a 49% interest. In addition to a Postal Savings Bank, the banking sector includes the following:

	<u>Year Established</u>	<u>Capitalization (millions of UM)</u>	<u>Number of Offices</u>	<u>GIRM/BCM Participation</u>
Banque Internationale pour la Mauritanie (BIMA)	1961	150	6	70%
Banque Arabe-Libyenne pour le Commerce et le Développement (BALM)	1972	200	2	49%
Banque Arabe-Africaine pour la Mauritanie (BAAM)	1974	150	2	51%
Banque Mauritanienne de Développement et de Commerce (BMDC)	1973	80	2	80%
Société Mauritanienne de Banque (SMB)	1967	100	2	51%

As noted above, in nearly all of these institutions, the allocation of bank credit is heavily concentrated in commerce (40%) and the mining industry (30%), as well as in construction, which accounted for 10% of the 1977 total,

and unclassified credit, which accounted for 18% of the total and consisted mostly of credit to private households for the acquisition of new housing (Table 6, below). The share of the private sector and public enterprises in total credit to the economy was approximately 60% and 40% respectively in 1977, with the private sector accounting for 80% to 90% of the credit allocated to commerce, construction and transportation, while in the nationalized mining industry, public enterprises accounted for all of the credit to this sector.

Short-term credit increased by approximately 26% in both 1976 and 1977. In the latter year, short-term credit to commerce rose by over 40% and accounted for 70% of the total increase in short-term credit. This rapid expansion was mainly a consequence of the reduced availability of foreign suppliers' credits for the financing of commercial imports, which in 1977 recorded only a modest rise. Unclassified credit increased by 56%, accounting for over one-fifth of the overall increase. Housing loans were the main factor in this increase of unclassified short-term credit, in both 1976 and 1977. In addition, the increase of medium-term loans in these two years at rates of 38% and 16% respectively, was largely connected with the construction and acquisition of private housing.

Deposits in commercial banks rose at an average annual rate of 17% from 1975 through 1977, but more slowly than the increase in bank credit to the economy. The rates of increase in demand deposits showed only minor annual variations, while term deposits increased 60% in 1975 and 26% in 1976, but declined by 15% in 1977. Term accounts require a minimum deposit of UM/1.0 million (US\$22,000), and pay 5% to 7% interest depending on the term, with

Table 6

DISTRIBUTION OF
BANK CREDIT BY ECONOMIC SECTORS
1974 - 1977

(in percentages)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
Commerce	50.2%	34.8%	33.5%	39.7%
Construction	12.7%	9.1%	11.3%	9.9%
Fishing	10.3%	4.2%	1.8%	1.6%
Mining	3.4%	37.2%	35.6%	28.7%
Transportation	6.9%	3.3%	3.1%	2.3%
Unclassified	<u>11.5%</u>	<u>11.4%</u>	<u>14.7%</u>	<u>17.8%</u>
<u>Total</u>	100.0%	100.0%	100.0%	100.0%

(in millions of ouguiyas)

<u>TOTAL BANK CREDIT:</u>	<u>2,613</u>	<u>5,181</u>	<u>6,206</u>	<u>7,397</u>
Short-term	2,283	3,712	4,690	5,906
Medium-term	262	482	665	773
Long-term	68	987	851	718

Source: IMF

58

three months being the minimum. The most important source of resources for commercial bank credit operations in recent years has been the Banque Centrale de Mauritanie, whose share of total commercial bank resources rose from 11% in 1974 to 26% by the end of 1977, in which year over 60% of the increase in commercial bank credit to the economy was refinanced at the Banque Centrale de Mauritanie.

Much of the increase in credit for shelter is reflected in the rise in authorizations granted by BCM to local banks for the lending of funds to finance shelter, as indicated in Table 7 below. With the exception of BMDC, banks use their own resources to finance these loans, but need prior authorization from the Banque Centrale de Mauritanie. The sharp increases in this kind of medium-term credit which occurred in 1977, reflect both the excess liquidity in banks at that time, particularly BIMA and BAAM, and the rise in demand for shelter financing. Changing liquidity conditions, and repayment problems encountered on the parts of many borrowers who were building units for the rental market which have yet to be occupied due to delays in obtaining water and electrical connections, are expected to result in a slow-down in commercial bank lending for shelter. All medium-term credits for housing granted by BCM are for five to seven years, including one year's grace, at interest rates from 11% to 13%.

The largest formal sector lender financing shelter is the EMDC, which alone among the banks has access to a rediscount facility provided by the Banque Centrale de Mauritanie. EMDC finances 30% of the construction cost up to a maximum of UM/2.0 million (US\$44,000). Loan terms are generally five years, but eight year loans including one year's grace on the repayment of principal during construction can be granted, depending on the income of

Table 7

AUTHORIZATIONS OF MEDIUM-TERM
CREDIT FOR HOUSING CONSTRUCTION GRANTED
TO INDIVIDUALS DURING THE YEAR
(in thousands of ouguiyas)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
<u>Authorizations Granted by BCM</u>					
BMDC	6,854.7	24,619.9	29,457.7	38,489.1	67,160.0
BIMA	0.4	--	2,000.0	45,655.6	26,180.0
BAAM	--	--	--	11,220.0	15,123.0
BALM	--	--	--	2,250.0	3,000.0
SMB	<u>2,200.0</u>	<u>2,700.0</u>	<u>600.0</u>	<u>2,700.0</u>	<u>2,250.0</u>
<u>Total</u>	9,055.1	27,319.9	32,057.7	100,314.7	113,713.0
<u>Number of Loans Granted</u>					
BMDC	16	40	35	67	97
BIMA	1	--	1	16	9
BAAM	--	--	--	5	11
BALM	--	--	--	1	1
SMB	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>
<u>Total</u>	18	41	37	91	120

Source: Banque Centrale de Mauritanie

the borrower. Loans which are refinanced at the Banque Centrale de Mauritanie carry an interest rate computed on the basis of the BCM discount rate, currently 5.5%, plus 5.0% charged by BMDC, for a total 10.5% charged to the borrower. Loans financed with the resources of the BMDC itself carry an interest rate of 11.0% plus a 2.0% front-end fee. Qualified applicants must be salaried and can borrow up to two and one-half times their annual incomes. All applications are submitted to SOCOGIM for technical review, after which the BMDC submits the application to the Banque Centrale de Mauritanie for its approval before a loan authorization can be made. Applications must contain a verification of employment, construction plans and specifications, a construction permit issued by DHU, a land occupancy authorization from the Service des Domaines, and a complete estimate and description of costs. Once the application has been approved and a loan authorization granted, title to the land is obtained from the Service des Domaines and held in the name of the lender (BMDC) until the loan has been fully repaid. While mortgage life and fire insurance are not presently required, BMDC is attempting to institute a comprehensive insurance program for life and fire insurance coverage.

The BMDC granted a total of UM/67 million (US\$1.5 million) in loans of this type to 97 individual borrowers in 1978, for an average of UM/700,000 (US\$15,500) per loan. A loan of this amount would require monthly payments of approximately UM/15,045 (US\$334) to UM/10,800 (US\$240) at 10.5% interest for terms of five and eight years, respectively. If 25% of a household's income were allocated to shelter, only those in the top 1% or 2% of the urban income distribution could amortize such a loan. In addition, the requirement that borrowers have a cash downpayment of 70%, which in the example

above would be equal to UM/1,630,000 (US\$36,300) for a unit costing approximately UM/2.3 million (US\$52,000), quite clearly limits even further those who could qualify for formal sector financing.

The BMDC intends to create a development department within the bank which would be the recipient of a US\$2.5 million line-of-credit from the International Development Association (IDA) of the World Bank. Bank officials hope to channel a portion of this line-of-credit into the financing of a sites and services project for urban families with incomes of UM/3,000 to UM/4,000 per month. The present proposal calls for BMDC to finance SOCOGIM in the implementation of the project. IDA funds will be loaned to the Banque Centrale de Mauritanie at 0.75%, and BCM would pass these through to BMDC at 7.5%, with the difference used to form a reserve fund for the guaranty of repayments to external creditors. Loans to individual beneficiaries of such a proposed project would be made at 11% to 13%, which would include a percentage to cover SOCOGIM's projected-related administrative costs. Further details of this proposal are unavailable at the present time, although they are expected to be finalized during the first half of 1979.

Savings are mostly derived from large public and private enterprises, and small savers tend to rely on the informal sector to accumulate savings. In the formal sector, small savings accounts are held by the Caisse National d'Epargne, a postal savings system which was established in 1968, and is under the supervision of the Ministère du Transport, Postes, Télégraphes et Télécommunications, Artisanat, et du Tourisme. By the end of 1977, the postal savings system had a total of UM/7.26 million (US\$161,000) in 1,359 accounts, for an average account size of UM/5,340 (US\$119). The interest rate paid on savings, which is set by decree of the Ministère du Finance

on the advice of the system's Board of Directors, is currently 3.35%, and interest is paid annually. The minimum deposit to open an account is UM/20, and individual account balances cannot exceed UM/300,000, while for cooperatives, charities and similar institutions, there is no maximum. Funds deposited with the Caisse d'Epargne tend to be very fluid, with the constant deposits and withdrawals of the predominantly small account holders suggesting that it is used mostly as a short-term depository. Funds deposited with the Caisse d'Epargne can be put on deposit with the National Treasury, or utilized to make small loans to public agencies, home finance institutions, and credit unions, all with government guarantee. With its small total balance and the rapid turnover of funds, however, the postal savings system has made few such investments and tends to deposit much of its funds in short-term certificates with commercial banks.

Small savers also deposit funds in a recently begun experiment of SOCOGIM's, known as the Systeme Test d'Epargne Logement Socogim. This pilot program, instituted by SOCOGIM in an effort to determine the amount of savings which could be mobilized for home financing, has received only provisional government approval, and therefore is not yet a legal entity. Savings have been obtained from 1,400 depositors in thirteen urban centers, for a total of UM/17 million (US\$380,000), or an average of UM/12,000 (US\$270) per account. Only eleven of these centers, however, are in Mauritania; the other two are Dakar and Paris, where many Mauritanian expatriots work. The seventy-five depositors in Paris account for a total of UM/3 million of the Systeme Test d'Epargne's deposits, for an average balance of UM/40,000 (US\$900). Interest of 4% per annum is paid to depositors, but no interest is paid on withdrawals.

The objective of this experimental system is to allow people of middle and lower-middle incomes to obtain financing for housing. The basic contractual arrangement developed by SOCOGIM envisions savers being informed of the amount of savings required to qualify for financing, the time limit on its accumulation, the loan repayment period, and the time limit for assignment of a SOCOGIM house. Because SOCOGIM has not received official approval for this system, however, it has not been able to enter into any contractual agreements with savers, and has not been able to make use of the savings it has collected for the financing of its programs. As a result many accounts are being closed and savings withdrawn. Contract savings systems in general can only be effective as a means of mobilizing savings if the system can provide savers with the realistic possibility of gaining access to housing. With the difficulties encountered by SOCOGIM in producing a steady stream of shelter units, however, it does not seem likely that adequate incentives can be assured to make the system successful.

2. Informal Finance: While the formal sector is limited to bank credit for a maximum of 30% of construction costs, and to the lease/purchase arrangements provided by SOCOGIM (and discussed below), the informal sector exhibits a variety of mechanisms which are adapted to the needs for access to credit and financing for housing which are not being met otherwise. Personal savings remain a significant means of financing housing, but these are not normally held in the form of cash, nor are they likely to be deposited in savings accounts. They often take the form of jewelry, which is part of the wife's dowry. This provides women with some means to finance the construction of dwellings, even in the instances where they are divorced since they are able to keep the dowry. It has been reported

that about 10% of the new dwellings in Atar, for example, are financed by women, and there is evidence that women with some access to the labor market are well represented among new home owners in Nouakchott's fifth arrondissement. The savings also can be held in the form of livestock or property, as well as resources held in the interior which the individuals no longer view as profitable and turn into real estate investment within urban centers.

Investment and sale of lots in urban centers has become highly speculative and profitable. This is particularly so within the formally subdivided traditional areas where the land has been allocated both for free, as in Nouakchott's first and fifth arrondissements, and at the normal price. Despite the prohibition against the sale of this land, and the lack of tenure, the land is considered part of the family's "savings." The subdivision and sale of parts of these lots, which cover 200 m² to 300 m² in traditional zones, is a common method by which the "owner," who actually has only an occupancy permit, finances his housing construction. While the government charges only UM/30 per square meter, or UM/6,000 to UM/9,000 per lot, portions of them of approximately 100 m² are often re-sold for as much as UM/150,000, which is an amount sufficient to finance the construction via the informal sector of a three-room unit built using permanent materials.

But regardless of the source of savings, once a sufficient amount is accumulated, it is invested almost in its entirety in the acquisition of a permanent dwelling in the urban area. This factor has encouraged the increase in the number of dwellings with shops or rooms for rental to keep a steady stream of income coming in, and to recapture some of the investment made by the family. While the rental of rooms is regarded as socially disruptive of

the family's privacy, the shortage of housing and the need to regain some of the savings invested in housing have combined to increase the practice. Thus despite the fact that low-income families express a preference for living within squatter zones rather than renting and regard the former as more private, it is evident from the amount of rent being charged for a room without utilities, which ranges from UM/1,000 to UM/2,000 within Nouakchott, that rental is lucrative and that there is a demand for these units. Even within the squatter settlements, the rental of baragues is evident. The income provided from these units or from their sale is used in part to finance the individual family's own permanent units elsewhere.

Some personal savings is obtained from workers abroad and is remitted to the family for the construction of individual housing, or housing for rental. This is the case among merchants and workers in neighboring countries, many of whom remit a portion of their earnings to urban centers. Savings, however, may also be more communally based and there is a practice of pooling resources through ton-tin, rotating credit societies, where groups form and contribute a fixed sum of UM/500 to UM/2,000 per month to a common purse with the total amount going in turn to one individual at the end of each month. This practice is the basis for the caisse populaire started by the ADAUA in Satara, which is organized at the neighborhood level and relies upon the community to collect the savings of each household with the total amount being reserved for community based projects. In the brief period of their existence, these caisses have proven that the pooling of resources is culturally acceptable even though their base is much wider than that among the membership of a ton-tin, which is limited to individuals who are closely associated. Among African tribes, pooled

resources for housing in urban centers have been used to build special units for new migrants. These communal efforts among tribes such as the Soninke, who have built a house in Nouakchott, require initial deposits of UM/1,000 for those who are employed and UM/400 among those unemployed. A monthly contribution of UM/50 is also provided by members.

While there is no reliable estimate or measure of savings capacity, there is evidence to suggest that it is not low among the urban groups. Savings of UM/1,000 to UM/1,500 per month to pay off loans, materials purchases, and other credit are reported frequently. This amount also coincides with the amount reported by the survey of Satara residents for housing payments and represents about 20% to 25% of income. Moreover, the fact that individuals with limited incomes are evidently capable of investing sums of UM/150,000 within a period of less than three years, indicates that there is some untapped savings capacity among low-income groups.

Access to credit in the informal sector is normally through personal ties from friends and relatives. Such credit is usually provided interest free, although there is evidence that interest is charged to individuals with a steady (salaried) income on cash loans made by commercants, which can be as high as 10%. Implicit interest in the form of a moudaf (additional) charge is accepted on credit provided for the purchase of materials and other goods from merchants. This practice circumvents the Islamic prohibition against usury since the loan is not made in cash. Cash loans, however, may also require collateral in the form of goods, the value of which is higher than the amount being loaned. Merchants act as the principal money-lenders and pawnbrokers to both salaried and non-salaried individuals. They also allow the individual to purchase on credit and repay in monthly

installments. Credit is available not only for the purchase of materials, but also for land, and the individual is likely to be paying off part of the land purchase price while also buying materials for construction. Payment for land can take as long as two to three years, while construction materials are usually bought on shorter terms. Thus a family earning about UM/6,000 per month can manage to pay off the price of a ton of cement costing UM/7,000 over a period of six months, if it buys on credit, while at the same time it may be making some form of payment on land.

F. Shelter Institutions

SOCOIM is the only enterprise actively involved in the construction and financing of housing on a scale which in Mauritania is relatively large. Its activities to date have tended to focus on the production of units affordable by families within the top 10% of the urban income distribution, and all 300 of the units completed or under construction are in Nouakchott. Since 1976, however, SOCOIM has retained, under contract, ADAUA to design, organize, and implement a community based up-grading project in the Satara squatter settlement at Rosso. As these two institutions are involved in a variety of the components of the shelter delivery system, they are considered separately in this section.

1. SOCOIM: Faced with a shortage of housing resulting from the rapid growth of major urban centers, the Mauritanian government established SOCOIM in 1974 as an autonomous enterprise in which the GIRM is majority stockholder. Its objectives were to study and promote the development of all ventures related to the construction of middle and low-cost housing. SOCOIM's capital was fixed at UM/151 million (US\$3.36 million), UM/121 million of which was subscribed by the GIRM and a wide variety of semi-public enterprises, with the remaining UM/30 million made up from the capital of the Société d'Équipement de la Mauritanie (SEM) which was then absorbed into SOCOIM. Its Board of Directors includes the Directors of Plan, Finance, DHU, and Labor from their respective ministries, and a variety of members representing the minority stockholders.

SOCOIM allocates its units using both rental (location simple) and lease/purchase (location vente) systems. With the first of these, SOCOIM remains the proprietor with responsibility for all maintenance. Rents are

reportedly computed on the basis of SOCOGIM's cost of funds for financing the construction, plus maintenance costs. Under the lease/purchase arrangement, SOCOGIM retains both title and responsibility for maintenance until the loan has been amortized. In both cases, SOCOGIM is authorized to charge 2% of the cost of construction as its overhead fee, 2% for maintenance, 1.0% for insurance, and 1% for a reserve to cover costs arising from a change of occupants, for a total of 6%. Purchasers under the lease purchase agreement make a downpayment of 5%, and the balance theoretically should be financed on the same terms and conditions as those applied to the source of funds with which SOCOGIM has financed the project. Priority in assigning units to qualified applicants is accorded to salaried individuals who do not own property, and applications must include verification of employment, certification from the BMDC that the applicant has not already received a construction loan, and certification from DHU that the applicant has not received an authorization to build a unit in a recognized subdivision.

To date, SOCOGIM has completed 100 logements économiques (low-cost), and has 100 similar units and 100 logements de standing (medium and high cost) under construction. Of the first 100 units, completed in 1977, approximately two-thirds were assigned as rental units, and the balance are under the lease/purchase arrangement, with the units costing an average of approximately UM/608,000 (US\$13,510) each. Rental fees have been set at UM 3,290 (US\$73) per month, while the lease/purchase payments are UM/4,368 (US\$97) per month for terms of 15 years. Assuming that SOCOGIM financed 95% of the average unit cost, the monthly lease/purchase payment would be equivalent to a loan with an interest rate of 4.3%. Similarly, if SOCOGIM expected to cover its cost of funds on the rental units within a period of

15 years, the monthly rent would amortize a loan with an interest rate of 0.3%. If it were further assumed that the monthly payments included the total of 6% for maintenance, overhead, insurance and reserves, then nothing would be left to amortize the loans SOCOGIM received for building these units, on which SOCOGIM would actually be incurring monthly losses, and subsidizing the occupants.

In fact, SOCOGIM financed these 100 units with UM/30 million from the Caisse Nationale de Sécurité Sociale (CNSS) at 5% for 15 years, plus approximately UM/14 million of its own resources and a UM/17.5 grant from the GIRM, which is not to be repaid. SOCOGIM has to date invested an additional UM/55 million in the next 100 logements économique, which have been under construction since August 1977 and are to be completed in 1979, and UM/226 million in the 100 logements de haut standing begun in August 1976 and to be completed in 1979. The total investment in units under construction of UM/281 million has been financed with UM/30 million from CNSS for 15 years at 5%, UM/152 million from local banks for 8 years at 5.75%, UM/47 million of its own funds, and an additional grant from the GIRM of UM/55 million. Another UM/58 million will need to be invested to complete construction. Both the low rental and lease/purchase payments on the completed units, and the substantial delays in construction of the remainder, have resulted in rising annual losses on SOCOGIM's overall activities. By 1977, losses had reached approximately UM/19 million, up from losses of UM/3.7 million in 1975, which have been made up through decapitalization and recourse to medium-term borrowing from commercial banks.

In addition to the obvious problems this situation raises with regard to SOCOGIM's financial condition, it should be pointed out that only the top 10% and 7%, respectively, of the households in the Nouakchott income distribution could afford to meet the rental and lease/purchase payments, if 25% of monthly income were allocated to housing expenditure. In effect, then, while incurring a substantial loss on this portion of its portfolio each month, SOCOGIM is subsidizing families whose incomes are the highest in the city.

SOCOGIM's gross assets are reported to be approximately UM/600 million (US\$13.3 million), with approximately UM/150 million from long-term loans with interest rates averaging roughly 4% and 15 year repayment terms, and UM/210 million from medium-term loans provided by local banks at 5.75% interest with eight year terms. The balance includes its initial capital, and approximately UM/90 million of construction which is yet to be completed. The building of the 200 incomplete units has been delayed by difficulties in maintaining an adequate and continuous supply of building materials, and lack of coordination with SONELEC in the installation of infrastructure. As a result, considerable cost over-runs have been experienced, and a number of otherwise completed units has yet to be occupied because of the absence of water and electrical connections. Thus SOCOGIM has had to carry the financing costs on these units for a period of nearly three years, without receiving any income on this portion of its investment, which substantially raises the real cost per unit, if the cost of financing during construction is added to the per unit cost of construction.

Annual operating expenses, net of interest payments and debt amortization,

are reported to be approximately UM/20 million (US\$440,000). If these expenses were to be met with the 2% overhead charge, SOCOGIM would need a total portfolio of UM/1.0 billion, or UM/400 million greater than its present gross assets, assuming that all of the loans made with this portfolio carried interest rates which would cover SOCOGIM's cost of funds.

In the present situation, SOCOGIM has been forced to meet its debt service and operating expenses through recourse to additional medium-term borrowing from commercial banks, and through decapitalization. Quite clearly, the institution can only continue to survive financially if it can consolidate its existing debt, and arrange for it to be rescheduled on a long-term basis. At the very least, it is essential that the lease/purchase and rental payments on the 200 units under construction be set at a level high enough to cover both the cost of financing and the maintenance, overhead and other costs which SOCOGIM will bear on these units. With only the most affluent Mauritians able to afford these units, and in light of SOCOGIM's untenable financial condition, it would appear to be unwise for it to provide a substantial subsidy on these units, unless the GIRM had the resources with which to make up the enormous arrears which SOCOGIM would incur as a result of subsidization. But given the financial austerity program recently adopted by the GIRM, and the overwhelming need for improved shelter conditions on the part of the many thousands of Mauritians living in squatter settlements, it hardly seems likely that the government would be in a position to subsidize the shelter of its highest income citizens.

SOCOGIM's newly appointed director general has reported that its initial efforts to address and evaluate its present difficulties will include an external audit of its accounts, a reorganization of its financing

arrangements to bring them into line with its lending activities, and a determination to bring expenditures into line with revenues. If SOCOGIM intends to meet the shelter needs of even middle-income urban families, no less those at low-income levels, however, it will also be necessary for it to thoroughly revise the standards at which it designs and builds in order to reduce the costs of the units it provides. In addition, SOCOGIM needs to secure a source of financing which is sufficiently long-term so that monthly payments can be reduced to levels affordable by these groups but which are high enough to cover both SOCOGIM's administrative and financing costs.

2. ADAUA: Since 1976 SOCOGIM has retained the services of ADAUA, the Swiss-headquartered association for the development of indigenous African urban planning and architecture, to design and implement an integrated community-based development project in the Satara squatter area of Rosso. ADAUA's program includes the construction of approximately 1,400 low-cost units using local materials and extensive self-help; the generation of employment for Satara residents in a variety of enterprises including several involved in the manufacture of building materials; the training of local residents in construction skills to assist in the self-help aspects of the project; the organization of indigenous community-based credit cooperatives, caisses populaires; and the establishment of a brick-making plant to furnish the bulk of the construction materials for the project. These activities have been identified and refined during the initial two-year study and research phase of the project which is now drawing to a close, under the direction of three workshops in architecture and urbanization, construction and building materials testing, and social services and community organization.

Working together, these groups have completed the design and construction of several prototype units, building on the design work of the Egyptian architect/planner, Hassan Fathy, developed in the New Gurna project in Egypt (Architecture for the Poor, University of Chicago Press, 1973). Subdivision plans take account of the widely dispersed settlement patterns in Satara, and allow for considerable in-fill with the identification of 400 parcels not presently occupied, in addition to approximately 1,400 existing lots, which are to be regularized. ADAUA proposes to build small units on the 400 lots which would be sold under a lease/purchase arrangement to low-income families in Rosso itself, who are presently living in crowded conditions in rental units. These families are paying between UM/2,000 and UM/3,000 per month, often for a one room unit housing as many as 15 people, and have both the regular incomes and the experience in meeting monthly housing payments needed to meet the obligations of a lease/purchase agreement. Their integration into the Satara area is seen by ADAUA as essential to ensure a social and economic mix in the new community. The units, to be build by ADAUA using local residents, will cost an estimated UM/300,000 each (US\$6,700) including the price of land, and could be amortized with monthly payments of UM/2,500 over 15 years at 6% interest.

ADAUA proposes to assist in the construction of approximately 1,000 additional units by squatter families now living in Satara, for a total cost of approximately UM/270,000 each, of which UM/130,000 would be the labor cost provided through organized self-help. The balance, UM/140,000 (US\$3,100) would be financed on a long-term basis with monthly payments of UM/1,500 (US\$33), which could amortize the loan over 10 years if an interest rate of only 5% were charged. (See Figures 4 and 5.) Surveys undertaken

Figure 4

RENDERING OF
TWO-ROOM UNIT PROPOSED BY
ADAUA FOR SELF-HELP CONSTRUCTION
IN SATARA

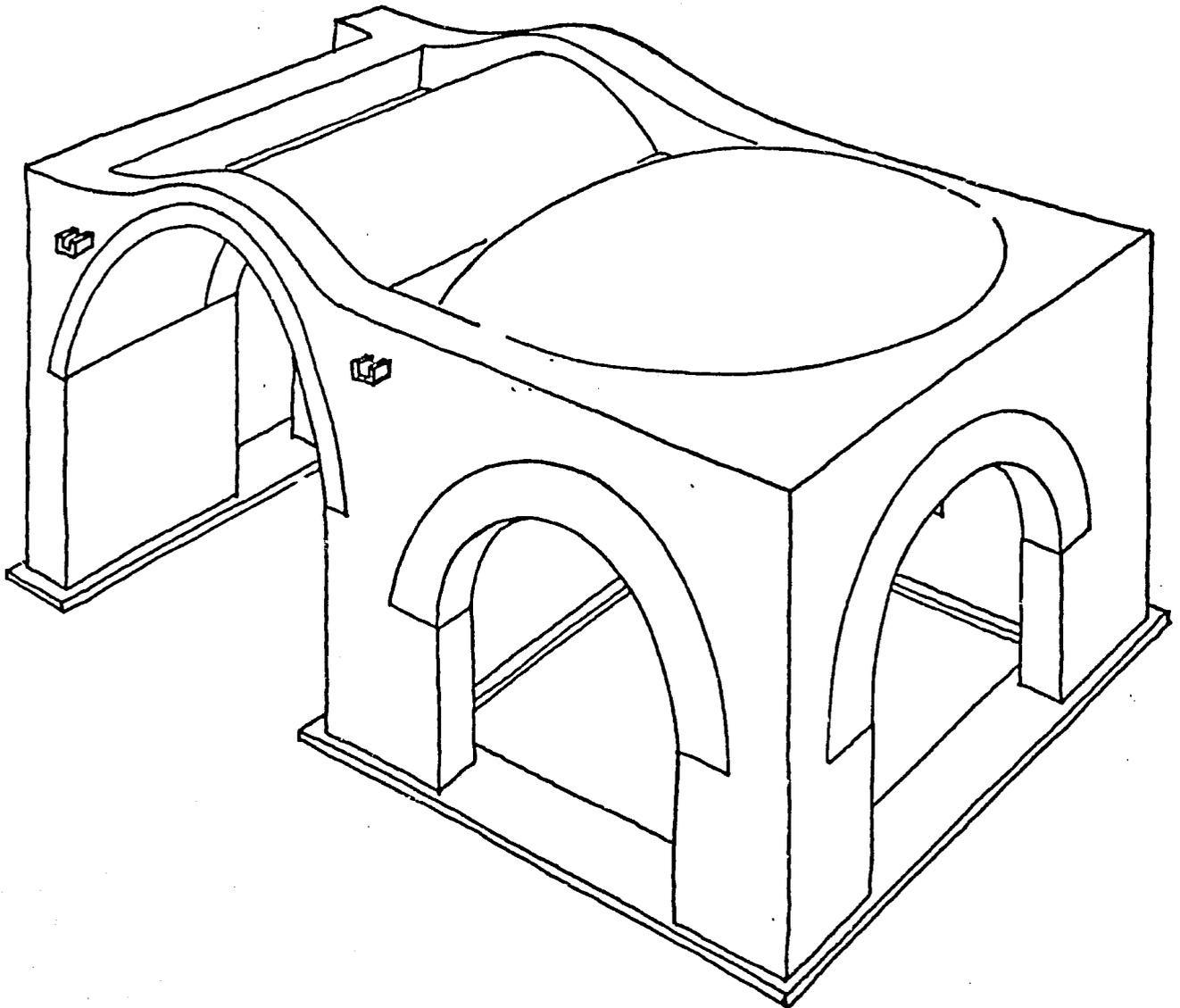
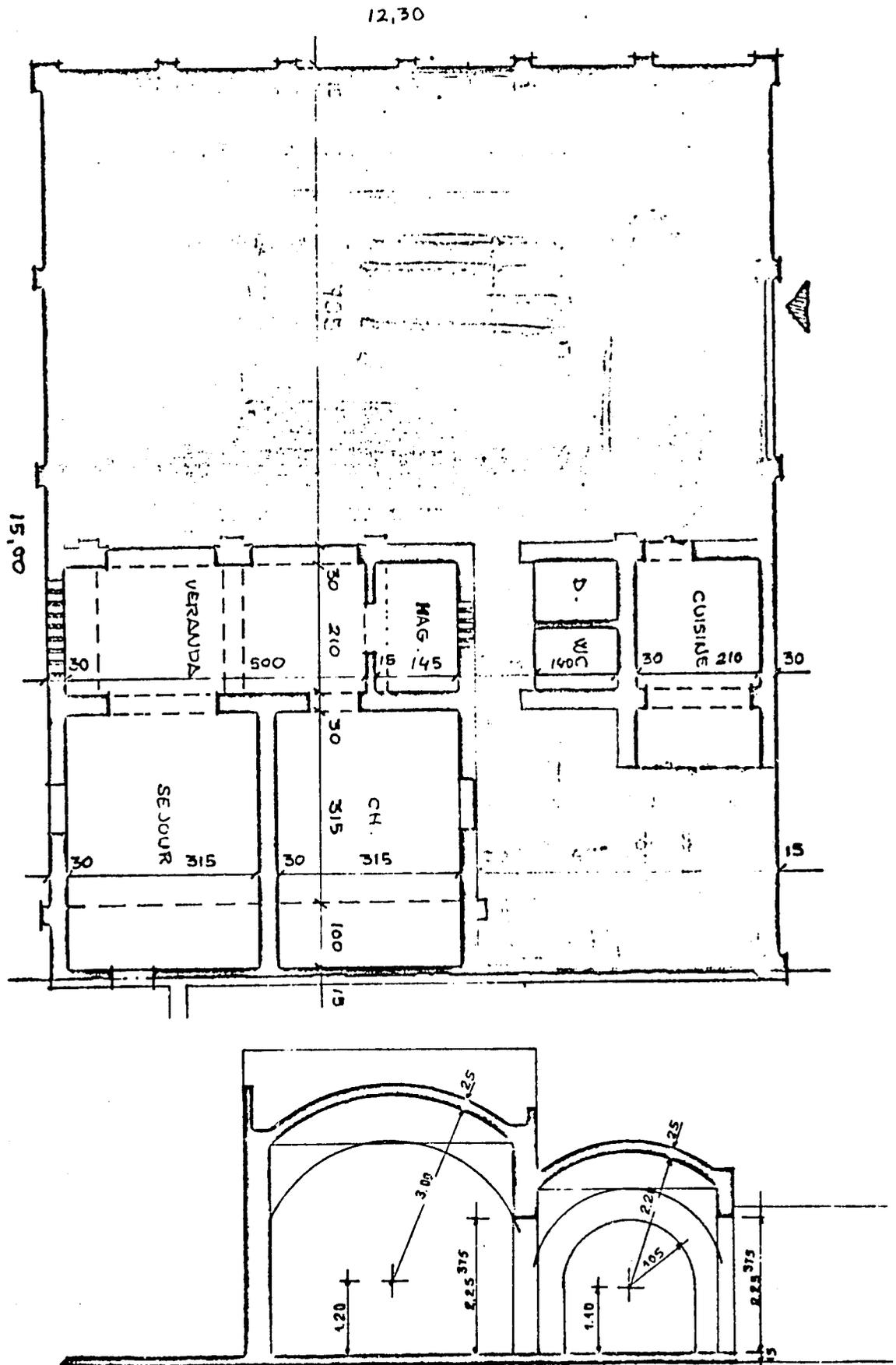


Figure 5

PLAN AND CROSS-SECTION OF
TWO-ROOM UNIT PROPOSED BY
ADAUA FOR SELF-HELP CONSTRUCTION
IN SATARA



in Satara indicate that families would be willing to pay this amount, and to work in groups of 10 households to assist each other in the construction. These units would contain two rooms, a covered veranda, a perimeter wall enclosing a courtyard, an opened kitchen, and W.C. connecting to a septic tank serving ten units and located under a central common green space. Lots would range from 180m² to 320m², and rooms would be no less than 12m² each. The unit design uses stabilized mud brick which has been tested and tailored to local conditions, and which would be produced by the common brick plant, to ensure uniform quality and provide additional employment.

ADAUA proposes to manage the collection of repayments on loans for individual housing units through the Caisse Populaire, the community-based credit cooperative formed in May 1978 with assistance from Mauritania's cooperative movement. The 250-member Caisse includes five sub-caisses, each of which has three elected officers and three members designated to assist in making collections. A deposit of UM/100 is required for membership and members are encouraged to deposit a minimum of UM/100 per month, with collections being made weekly during visits by the officers to the homes of the members. The activities of the Caisse were disrupted during July 1978 when civil disturbances associated with a change in the national government resulted in a strict dusk-to-dawn curfew and a prohibition against assemblies of more than three people. Following this, Satara was inundated by heavy rains which flooded much of the area and washed away many units built of banco. Nevertheless, the Caisse is the only organization still active in Satara, and it had collected approximately UM/80,000 by November 1978.

The objective of depositors in the Caisse is to support the development of community enterprises of benefit to the residents of the area. At present,

consideration is being given to the establishment of a motor driven grain mill, which would be operated by the Caisse and would charge members a lower price for the milling of grain than is now charged by private millers. In addition, the Caisse is investigating the possibility of purchasing a donkey cart equipped with water tanks for the distribution of water to Satara residents from the one public fountain located at the edge of Rosso. The fee paid by purchasers would be lower than the UM/1.0 per liter now charged by informal water sellers, but high enough to cover the costs of the operation and to amortize the initial investment. The Caisse is also considering the possibility of lending funds for the self-help construction of units to the entire group of ten families which would be involved in the self-help effort, with the whole group assuming responsibility for loan repayment.

Innovative techniques of this kind in finance, and those developed for low-cost self-help construction and community organization and development are indications of the thoroughly integrated approach designed by ADAUA and based as much as possible on the effective utilization of the human resources of local residents themselves. But ADAUA is faced with the general problem of securing sufficient financial resources to implement its project. As Satara is located in an area prone to flooding, ADAUA has identified as its first priority the construction of an earthen dike approximately two kilometers long across the northern edge of Satara, for which 400 residents would provide voluntary labor, with an estimated value of UM/7.4 million. The total project would cost UM/25 million (US\$555,000), including the value of voluntary labor, with the balance of UM/17.6 million (US\$390,000) needed to cover the costs of construction machinery and equipment, the building of concrete drainage canals, and three pumps to empty the water into the river.

Therefore, the proposal (included as Annex A), envisions local residents providing 30% of the total project costs, and the remaining 70% will need to be financed from other sources.

ADAUA will also need approximately UM/160 million (US\$3.5 million) for the construction of the 400 units to be built for lease/purchase by low-income residents of Rossa, and UM/140 million (US\$3.1 million) for the 1,000 self-help units. The latter could be financed with a smaller investment managed as a revolving fund. The experience in community organization and the integration of development activities to promote employment generation, make the ADAUA proposal for Satara one which offers significant potential for the upgrading of squatter settlements. ADAUA is presently trying to secure financial support from the international community, and on this difficult and critical point its future success in Satara now rests.

ANNEX I: TABLES

- Table A. Monthly Salary Levels and Steps by Sector for Workers, Laborers, and Employees
- Table B. Distribution of Income Among Salaried and Non-Salaried Employment Groups
- Table C. Percentage and Number of Urban Households in Temporary Shelter
- Table D. Estimated Representative Building Materials Prices in Nouakchott

Table A

MONTHLY SALARY LEVELS AND STEPS BY
SECTOR FOR WORKERS, LABORERS, AND EMPLOYEES
(in ouguiyas)

<u>Commerce</u>	<u>Construction and Public Works</u>	<u>Mechanics</u>	<u>Mining Industry</u>	<u>Transport</u>	<u>Banks</u>
3,312	3,312	3,312	3,312	3,312	3,576
3,342	3,342	3,576	3,576	3,576	3,717
3,576	3,576	3,717	3,717	3,717	4,131
3,717	3,717	4,131	4,131	4,131	4,556
4,131	3,816	4,556	4,556	4,556	5,213
4,556	4,131	5,213	5,213	5,213	6,841
5,213	4,291	6,370	6,370	6,370	9,141
6,370	4,556	--	--	--	--
--	4,974	--	--	--	--
--	5,213	--	--	--	--
--	6,078	--	--	--	--
--	6,370	--	--	--	--

Table B

DISTRIBUTION OF INCOME AMONG
SALARIED AND NON-SALARIED EMPLOYMENT GROUPS
(in ouguiyas and percentages)

<u>Employment Groups</u>	<u>Monthly Income Levels</u>							<u>To</u>
	<u>0-</u> <u>2,999</u>	<u>3,000-</u> <u>4,999</u>	<u>5,000-</u> <u>7,999</u>	<u>8,000-</u> <u>11,999</u>	<u>12,000-</u> <u>15,999</u>	<u>16,000-</u> <u>19,999</u>	<u>Over</u> <u>20,000</u>	
<u>SALARIED</u>								
-Unskilled Workers	4.0%	16.0%	46.0%	18.0%	8.0%	3.0%	5.0%	10
-Skilled Workers	--	--	--	7.5%	30.5%	--	62.0%	10
-Employees and Mid-level Functionaries	9.5%	25.0%	33.0%	19.5%	6.5%	2.5%	4.0%	100%
-Teachers	--	17.5%	9.0%	39.0%	21.5%	--	13.0%	100%
-Upper level Functionaries	--	--	--	--	18.5%	4.0%	77.5%	100%
<u>NON-SALARIED</u>								
-Farmers, Fishermen and Herders	47.0%	18.5%	15.0%	11.5%	3.5%	1.0%	3.5%	100%
-Traditional Artisans	35.5%	30.5%	22.0%	8.5%	3.5%	--	--	100%
-Modern Artisans	9.5%	21.0%	35.5%	24.0%	--	3.5%	6.5%	100%
-Transport & Industrial drivers	--	10.0%	--	40.0%	10.0%	10.0%	30.0%	100%
-Commercants, Proprietors, and Entrepreneurs	18.0%	15.0%	21.5%	21.0%	6.5%	3.0%	15.0%	100%
-Services	23.5%	23.0%	25.0%	15.5%	4.0%	--	9.0%	100%
-Domestic Service	56.5%	27.0%	11.5%	2.0%	2.5%	--	0.5%	100%

SOURCE: SOCOGIM/M&R: Le Logement en Mauritanie: Besoins et Ressources,
Nouakchott 1975.

Table C

PERCENTAGE AND NUMBER OF URBAN
HOUSEHOLDS IN TEMPORARY SHELTER

<u>Urban Center</u>	Total ^{1/} <u>Number of Households</u>	<u>Percent of Households in Temporary Shelter</u> <u>Huts + Tents + Baraques = Total</u>				<u>Number of Households in Temporary Shelter</u>
<u>Nouakchott</u>	<u>24,543</u>	--	<u>36%</u>	<u>22%</u>	<u>58%</u>	<u>14,235</u>
<u>River Towns</u>	<u>9,339</u>	<u>18%</u>	<u>9%</u>	<u>6%</u>	<u>33%</u>	<u>3,124</u>
Kaédi	3,791	16%	7%	--	23%	872
Rosso	2,994	7%	15%	20%	42%	1,257
Boghé	1,464	18%	9%	-	27%	395
Selibaby	1,090	53%	2%	--	55%	600
<u>Central and Eastern Towns</u>	<u>11,896</u>	<u>14%</u>	<u>23%</u>	<u>2%</u>	<u>39%</u>	<u>4,664</u>
Atar	2,968	6%	8%	--	14%	416
Kiffa	1,932	17%	31%	5%	53%	1,024
Aioun	1,596	41%	21%	--	62%	990
Néma	1,496	--	4%	9%	13%	195
Tidjikja	1,418	10%	18%	--	28%	397
Boutilimit	1,320	26%	56%	--	82%	1,082
Aleg	1,166	4%	44%	--	48%	560
<u>TOTAL</u>	<u>45,778</u>	<u>7%</u>	<u>28%</u>	<u>13%</u>	<u>48%</u>	<u>22,023</u>

Based on Liste des Habitations et des Menages Urbaines, BCR, 1975.

1/ Number of Households is based on 1977 Census of Population and excludes the 8,633 urban households in the Industrial Mining Towns (Nouadhibou, Akjoujt, and Zouerate/F'Derik).

Table D

ESTIMATED REPRESENTATIVE BUILDING
MATERIALS PRICES IN NOUAKCHOTT
(in ouguiyas)

<u>Item</u>	<u>Country of Origin</u>	<u>Unit</u>	<u>Unit Price at Nouakchott</u>
<u>Imported Materials:</u>			
Cement	Spain Senegal France	ton	4,500 - 6,300
Reinforcing Bars	France	ton	19,500 - 30,000
White Wood	France	M ³	12,000
Asbestos Cement Roofing	France	M ²	209
PVC Pipe 40m/m	Spain	meter	46
Galvanized Pipe 15/21m	Spain	meter	37
Electrical Wire	Spain	meter	3 - 5
Electrical Conduits	Spain	meter	11 - 13
Light Fixtures	Spain	each	118 - 302
Metal Sinks	Spain	each	1,706
WC with Tank (porcelain)	Spain	each	1,927
Limewash Paint	Spain	ton	14,000
<u>Domestic Materials:</u>			
Sand	--	M ³	150
Shell Aggregate	--	M ³	200
<u>Fuels:</u>			
Gasoline		liter	22
Diesel Fuel		liter	17

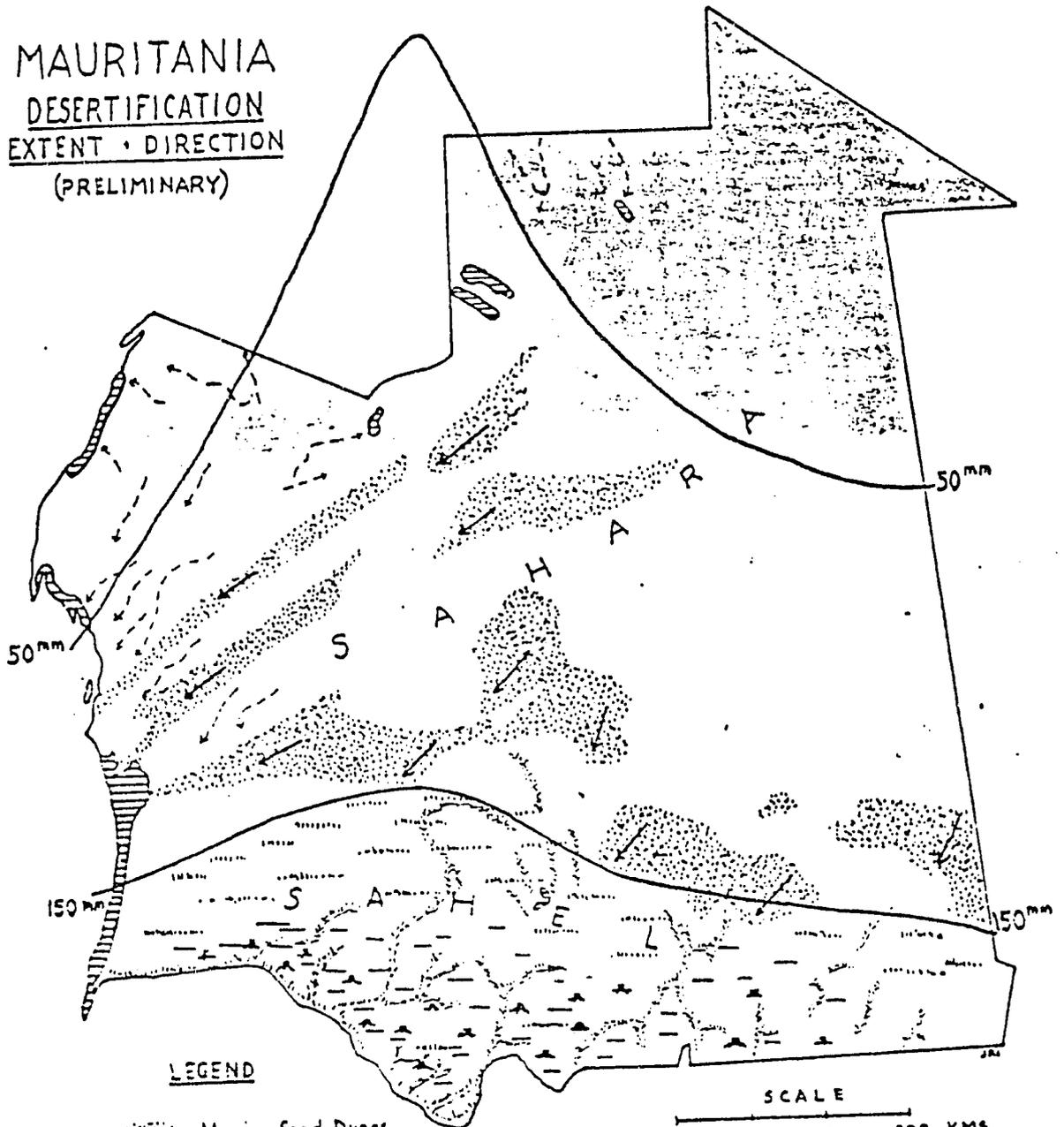
ANNEX II: GEOGRAPHIC AND CLIMATIC CONDITIONS

The Islamic Republic of Mauritania, located on the northwest coast of Africa, is bordered by the Atlantic Ocean on the west, Morocco and Algeria on the north, Mali on the east, and Mali and Senegal on the south. The total land area is approximately 1.17 million km² (450,000 square miles)(Annex II, Figure 1). Mauritania is a part of the vast western Sahara "shield of crystalline rocks," and over 60% of the country is covered by unconsolidated sand. Generally the terrain is flat, rising from the Atlantic coast and the Senegal River (on the west and south) in an eastern and northeastern direction. Several plateaux, from 200 to 650 m (650 to 2,200 feet) above sea level, are located in the central part of the country (Adrar and the Tagant) and in the south (the Assaba and Affolé).

There are four relatively distinct climatic zones which are in general characterized by minimal levels of precipitation (Annex II, Figure 2). The first of these, the Senegal River Valley, is an agricultural region along the southern tier of the country, which includes rain-fed agricultural areas from Selibaby toward the west, and "recessional" agriculture within a narrow band along the river basin. The rain-fed areas receive between 500 and 600 mm (20 to 24 inches) of precipitation annually, permitting cultivation of millet and sorghum, traditional cereals of the local diet. In the extreme south, rain-fed agricultural activity takes place from June to October when 300 to 500 mm (12 to 20 inches) of precipitation is received in the higher lands, while "recessional" agriculture is carried on in the alluvial plain along the river during the dry season as well. Recent efforts to control the annual

Figure 1

MAURITANIA
DESERTIFICATION
EXTENT • DIRECTION
(PRELIMINARY)



LEGEND

- Moving Sand Dunes (Arrow indicates Direction of Movement)
- Salt Flats • Dunes
- Intermittent Streams - Lowered Water Tables Commonplace
- Soil Erosion: [Gully Erosion Along Intermittent Streams]
[Sheet Erosion by Water and Wind]
- Feature Deterioration by Drouth • Overgrazing
- Trees Cut Burned Grazed or Dying
- Shaded Areas are Deserts:
 - Darker Shading represents Desert Heartland
 - Lighter Shading of Sand; represents invasion of Drouth • Desert.

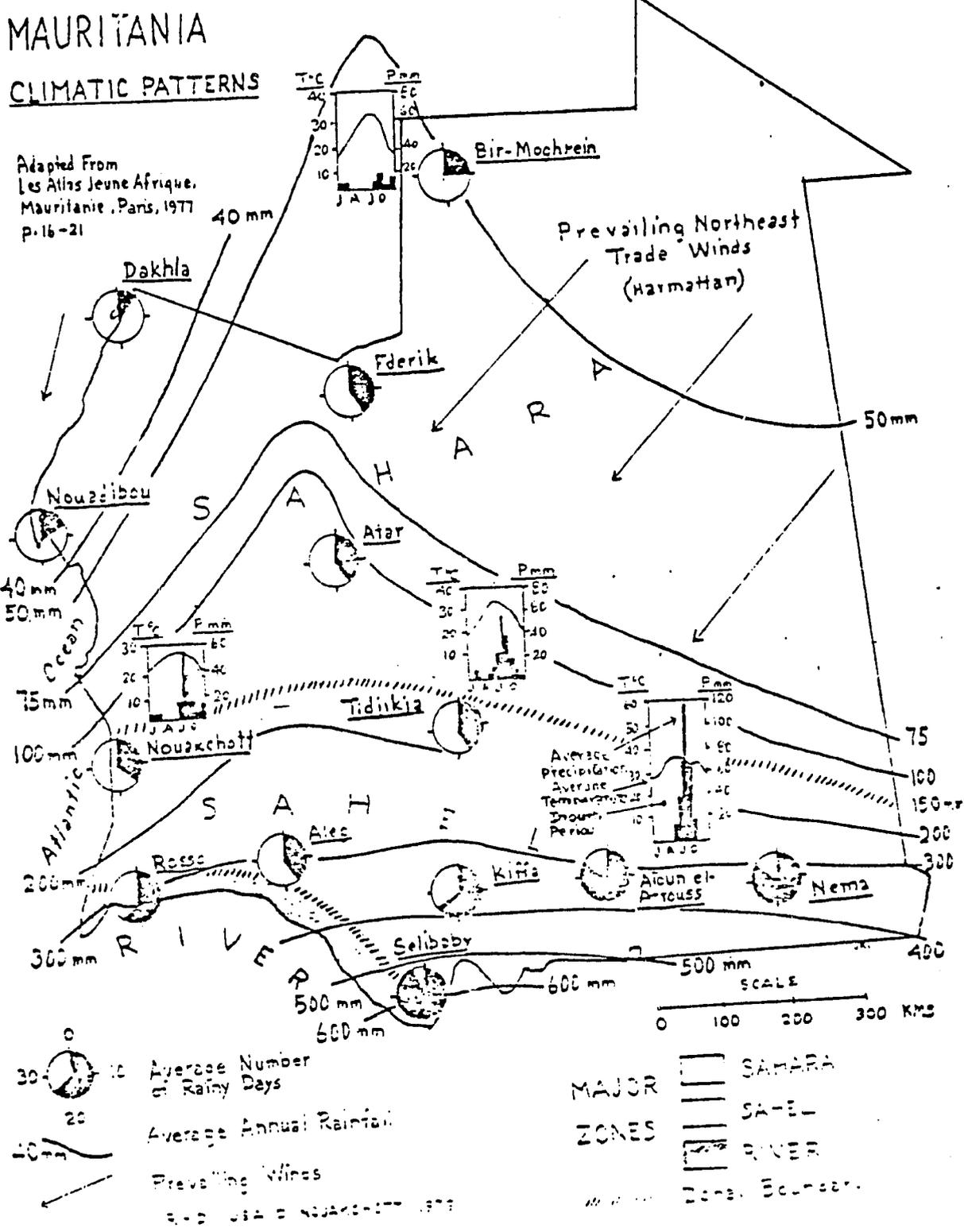
SCALE
0 100 200 300 KMS.

SOURCES

- Staff Field Observations
- Selected Physical Maps
- R+D USAID NOUAKCHOTT 1979

11/1

Figure 2



flooding and salinity of the Senegal River include the construction of several earthen dams and a major hydro-electric dam at Diama, downstream from Rosso, which is being undertaken jointly with Senegal. Combined with large-scale irrigation projects, these activities are expected to significantly improve agricultural production, especially of rice, which is increasingly important in domestic consumption. In addition to Rosso, the agricultural market towns of Boghé and Kaédi are located along the river.

To the north of this area is the Sahelian zone, a region that stretches across the southern third of the country, averaging 150 km in width, and receives up to 250 mm (10 inches) of rain per annum. While crop production is possible in this zone, yields are very low due to limited precipitation levels, and therefore pastoral operations are the zone's most important economic activity. The Sahel has traditionally provided adequate grazing for four or five months of the year in areas around Boutilimit, Aleg, Kiffa, Aioun and Néma, after which nomadic populations herding camels, cattle, sheep and goats move southward to the Senegal River Valley and across the border into Senegal to graze in better watered areas. Drought conditions which have prevailed for most of the past decade, and resultant overgrazing of the grass and scrub of the Sahel, have caused the desert to spread into this zone at the rate of approximately two kilometers per year.

The climatic zone to the north is the low lying desert of the Sahara, which covers over two-thirds of the country. The desert areas have a hot and dry climate with daytime temperatures of 10° C to 35° C (50° F to 95° F) for most of the year and relatively cool nights. Irregular rainfall of 100 to 150 mm (4 to 6 inches) per year causes the nomadic camel herders of this area to forage widely in search of food and water. Some agricultural activity

takes place in the oases of the Sahara zone, chiefly around the oasis towns of Atar, Tidjikja, and Tichit, where dates and small amounts of grains and vegetables are grown.

The fourth climatic zone is the Coastal region, classified as "Sub-Canarian," which is cooled by trade winds from the Canary Islands and has a dry season from November to July, and a period of slightly higher humidity levels from August through October. Mauritania's two largest cities, Nouakchott - the capital, and Nouadhibou - the major port of the mining industry, are located along the coast. Nouakchott receives approximately 150 mm (6 inches) of rain per year and has temperatures ranging from 14° C to 34° C (58° F to 94° F), while Nouadhibou is both cooler and drier with temperatures ranging from 16° C to 27° C (61° F to 81° F) and approximately 25 mm (1 inch) of rain annually.

These four climatic zones comprise two basic ecosystems: the Sahara and the Sahel, which in 1968-72 was hit by the worst drought in 50 years, both in duration and intensity. Drought conditions have persisted through the 1970s with another major drought occurring in 1977, and have led to a concern in all six of the countries which comprise the Sahelian zone that the Sahara is advancing southward, and that this may be adversely affecting weather patterns.

An agroclimatology survey of the semiarid areas south of the Sahara made by the World Meteorological Organization (WMO) included analyses of the thirty-year series of rainfall data from 1931 through 1960. A more complete investigation of the advancement of the Sahara in Tunisia was also conducted by WMO in 1970 in response to conditions similar to those in the Sahel. Both studies indicate that there was no discernable trend in average rainfall either north or south of the Sahara, despite the evident spread of the desert. These

investigations have led meteorologists to conclude that the desertification taking place in the Sahel is apparently not caused by climatic conditions, but rather appears to be induced by the interference of man and his animals which results from the increasing needs of growing human and livestock populations. This desertification can therefore be curtailed only through carefully designed and rigorously enforced land use programs which ensure that all activities influencing the delicate water balance in the transition zone between desert and cultivated land are carefully planned and coordinated, especially when programs involving greater use of groundwater, extension of dry land agriculture, afforestation, and increased grazing intensity are considered.

ANNEX III: OVERVIEW OF GOVERNMENT STRUCTURE

The Government of the Islamic Republic of Mauritania (GIRM) is headed by a seventeen member Comité Militaire de Redressement National (CMRN), whose president is the ruling chief of state. Four of the members of the CMRN also hold ministerial posts. In January 1979, the cabinet was reorganized and expanded and now includes the following ministers:

- Ministre d'Etat à la Présidence
- Ministre Chargé de la Permanence du Comité Militaire de Redressement National
- Ministre des Affaires Etrangères
- Ministre Chargé de l'Administration de la Défense Nationale
- Ministre de l'Intérieur
- Garde des Sceaux, Ministre de la Justice
- Ministre des Finances
- Ministre du Plan, des Etudes Economiques et des Financements
- Ministre de l'Equipement
- Ministre des Transports; des Télécommunications, de l'Artisanat et du Tourisme
- Ministre des Pêches et de l'Economie Maritime
- Ministre de l'Environnement, de l'Habitat et de l'Urbanisme
- Ministre du Commerce, de l'Industrialisation et des Mines
- Ministre du Développement Rural et des Ammnagements Agricoles
- Ministre du Travail, de la Santé et des Affaires Sociales
- Ministre des Affaires Islamique et de l'Enseignement Originel
- Ministre de la Fonction Publique, de l'Enseignement Supérieur et Technique
- Ministre de l'Enseignement Fondamental et Secondaire
- Ministre de la Culture et de l'Information
- Ministre de la Jeunesse et des Sports

Administratively, Mauritania is divided into 13 regions and the District of Nouakchott (Figure 2, page 5). Each region is divided into departments of which there is a total of 54 (Annex III, Figure 1). The latter are further divided into arrondissements -- 38 in all -- encompassing the smallest administrative units which consist of villages among sedentarized populations, and nomadic camps. The division into 106 administrative units, (regions, departments, arrondissements and the District of Nouakchott), was undertaken in 1968, and the increase in the number of units since 1960 represents an effort to

ADMINISTRATIVE ORGANIZATION OF MAURITANIA

REGION	DEPARTMENT	REGION	DEPARTMENT
Première	Amourj Bassikounou Djiguenni Nema	Septième	Aoujeft Atar Chinguetti
Hodh Orientale	Oualata Timbedra	Huitième	La Guera Nouadhibou
Deuxième	Aioun Kobonni Tamchakett Tintane	Neuvième	Moudjeria Tichit Tidjikja
Hodh Occidentale		Tagant	
Troisième	Aftout Boumdeid Guerou Kankossa Kiffa	Dixième	Culd Yenge Sélibabi
L'Assaba		Guidimaka	
Quatrième	Kaédi Maghama M'Bout Mcnguel	Onzième	Bir-Koghrein (et Ain-Ben-Tili) F'Dérick Zouérate
Gorgol		Tirizemmour	
Cinquième	Aleg Bababé Baghé Maghta-Lahjar M'Bagne	Douzième	Akjoujt
Brakna		Inchiri	
Sixième	Boutilimit Keur Massene Méderdra Cued Naga	Treisième	Aouared Tiris-el-Gharbia Dakhla El Argoub Techle
Trarza	R'Kiz Rosso	Tiris el Gharbia	
		DISTRICT	ARRONDISSEMENT
		Nouakchott	Premier Deuxième Troisième Quatrième Cinquième

localize administration further.

The administrative regionalization corresponds to the geographic, historic and social situation of the country. The regions represent decentralized administrative and juridical entities with their own seats of government. Executive authority over each of the regions is vested in a presidentially-appointed governor who is assisted by two deputies with responsibility for administrative and economic affairs. Technical representatives, chefs du secteur, of various ministries in the regions are under the control of the governors. Each department also has a departmental seat, chef-lieu, and is headed by a prefect who represents the central government. The prefect's authority extends over that of the various chefs d'arrondissement.

The District of Nouakchott, which was created in 1968, is also headed by a governor, and is divided into five arrondissements, each with its own prefect. Responsibility for some technical services such as health and education is gradually being subsumed under the governor's office, rather than being left to the ministries which are also located in the capital.

In addition to the government administration, there are numerous public and semi-public enterprises which have been formed to play a role in government direction of and participation in the national economy. These enterprises are similar to equity corporations in which the GIRM is majority shareholder. Among the most important of these are SNIM, the Société Nationale Industrielle et Minière (industrial and mining holding company); SONIMEX, the Société Nationale d'Importation et d'Exportation (import and export company); SONICOB, the Société Nationale pour l'Industrie et le Commerce du Bétail (livestock export monopoly); SONELEC, the Société Nationale

124

d'Eau et d'Electricité (public utility which produces and distributes water and electricity); and SOCOGIM, the Société de Construction et de Gestion Immobilière (low-income housing company).

ANNEX IV: ECONOMIC SITUATIONA. Overview of Current Economic Situation

The precarious situation in Mauritania's economy as reflected in the balance of payments deficit, the debt service burden, and the present state of public finances, is attributable to several independent factors whose combined effect has been particularly negative in recent years. Simply stated, the GIRM anticipated a balance of payments deficit for 1978 of US\$105 million (equal to 23% of Gross Domestic Product), debt service requirements of approximately US\$70 million (nearly 40% of projected 1978 export earnings), and a government budget deficit of approximately US\$73 million (equivalent to 45% of current expenditures). These conditions are the result of:

- the severe drought which persisted through much of the 1970s causing declines in livestock and agricultural production;
- the slackening of world demand for copper and for iron ore, whose contribution to Mauritania's GDP declined from approximately 25% in 1974 to less than 15% in 1977;
- the conflagration in the former territory of Spanish Sahara that caused a sharp drop in the volume of iron ore exports, which accounted for over 80% of annual export earnings from 1975 through 1977, but less than 60% in 1978; and
- an investment policy that resulted in the expenditure of an estimated US\$200 million on oil and sugar refineries, copper production, and an electric power plant (at Nouadhibou) -- all of which have been completed but are not yet in operation.

Despite annual investment in the economy during the 1970s of between 22% and 32% of GDP, the annual increase in GDP averaged only 1.0% to 1.5% in constant prices, which was lower than the rate of growth in population and thus led to stagnation -- or decline -- in the standard of living. These antithetical trends can be traced to the drought, to investments in relatively unproductive sectors and infrastructure that have had only limited and delayed impact on economic growth, and to investments in the major industrial projects identified above, which occasioned sharp increases in external borrowing but have as yet contributed nothing to the economy of the country.

Recognizing the overall seriousness of the economic situation, the Comité Militaire de Redressement National (CMRN) in 1978 directed the then Ministère du Plan et des Mines to draft an economic and financial rehabilitation plan, the Plan de Redressement Economique et Financier. The plan provides an integrated strategy for addressing balance of payments and debt service problems in the context of a comprehensive economic recovery and investment program and improved management of public finances. Based on a realistic assessment of the limited potential of the Mauritanian economy, the plan projects a slow and difficult process of economic recovery, which nevertheless appears feasible as evidenced by a projected decline in external capital requirements from an annual average of approximately US\$386 million during the period 1978 through 1980 to less than half of that amount during each year of the following decade. As initially conceived, the plan envisioned the following actions to improve conditions in the major problem areas of the economy.

127

1. Balance of Payments and Debt Service: In each of the past five years, Mauritania's external borrowing has averaged US\$115 million per year. Total external public debt amounted to approximately US\$711 million by the end of April 1978, broken down as follows:

	<u>External Debt as of 4/30/78</u>	<u>Debt Service Requirements (1978)</u>
Government	\$605.9 million	\$35.0 million
Banque Centrale de Mauritanie	44.1 million	22.3 million
SNIM	49.4 million	11.3 million
Other public enterprises	<u>11.3 million</u>	<u>1.1 million</u>
Total	\$710.7 million	\$69.7 million

With debt service approaching 40% of foreign exchange earnings, the GIRM determined that it was essential to postpone repayment of a large portion of the existing debt. It has arranged for approximately US\$214.5 million of the Government portion of external debt, including suppliers' credits, compensation payments to stockholders of the nationalized mines, and several bilateral loans to be rescheduled on favorable terms (interest rate of 2% over 30 years including a 5-year grace period), with repayment of principal delayed until 1983. An additional US\$50.6 million of loans from Morocco, Libya and Algeria has already been rescheduled; and US\$34.7 million of loans under contract but not yet disbursed will be frozen. Further debt service relief will be gained by postponing until 1984 the repayment of US\$20 million in monetary deposits made by the Bank of Kuwait in the Banque Centrale de Mauritanie. The balance of the government share of external debt, approximately US\$306 million owed

128

to international agencies, the Kuwait Fund and such countries as Germany, Canada, France and China, will not be rescheduled because these are "soft" loans (average interest rate of less than 2% and repayment terms of 25 to 50 years), and because the grace period on many of them has not yet expired.

Annex IV, Table 1 indicates that as a result of these measures, debt service requirements for 1978 would be reduced by US\$50 million, and that estimated debt service payments through 1983 will average approximately 15% to 16% of projected foreign exchange receipts. While the rescheduling will cover expected balance of payments deficits from 1981 through 1983, balance of payments deficits totalling US\$111.8 million are projected for 1978 through 1980, primarily because of persisting weakness in the world demand for iron ore during this period. The GIRM intends to finance part of these deficits with transfers from STABEX, the European Economic Community's commodity support fund, drawings from the International Monetary Fund's (IMF) Trust Fund, and special drawings on reserves of the Banque Centrale de Mauritanie. Financing for the balance of the projected deficits (US\$18.0 million in 1978, US\$11.5 million in 1979, and US\$7.3 million in 1980) has reportedly been secured.

2. Economic Recovery and Investment Program: With the exception of two large infrastructure projects (the expansion of Port of Nouakchott and the extension of the Kiffa-Néma portion of the major east-west highway), the public investment program is concentrated in such productive sectors as mining, agriculture, fisheries, and small and medium-scale enterprises. The Plan du Redressement envisions only limited social investment which will be financed out of external grants. The anticipated start-up of the

Table 1

ESTIMATES OF
PROJECTED EXTERNAL DEBT SERVICE REQUIREMENTS:
BEFORE AND AFTER RESCHEDULING
1978 - 1983
(in millions of US dollars)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>BEFORE RESCHEDULING</u>						
Total Debt Service	<u>71.9</u>	<u>70.9</u>	<u>87.7</u>	<u>86.3</u>	<u>102.6</u>	<u>111.9</u>
of which:						
Service on Existing Debt	69.7	60.6	67.6	55.4	54.1	66.1
Service on New Debt	2.2	10.3	20.1	30.9	48.5	45.8
Debt Service as Percentage of Projected Foreign Exchange Receipts	40%	33%	34%	26%	27%	26%
<u>AFTER RESCHEDULING</u>						
Total Debt Service	<u>21.9</u>	<u>28.6</u>	<u>42.5</u>	<u>48.9</u>	<u>61.7</u>	<u>102.4</u>
of which:						
Service on Existing Debt	19.7	22.0	29.2	28.6	27.6	56.1
Service on New Debt	2.2	6.6	13.3	20.3	34.1	46.3
Debt Service as Percentage of Projected Foreign Exchange Receipts	12%	13%	16%	15%	16%	23%
<u>DEBT SERVICE REDUCTION</u>						
of which:						
Relief on Existing Debt	50.0	38.6	38.4	26.8	26.5	10.0
Reduction on New Debt	0	3.7	6.8	10.6	14.4	-0.5

SOURCE: GIRM: Plan du Redressement

130

two infrastructure projects and the Guelbs iron mine project in early 1979 will, by themselves, give rise to an increase in the volume of public investment in the next several years, with the overall average investment rate of the public sector expected to exceed 38% of GDP between 1978 and 1980. While some delay in implementation may prove inevitable, the GIRM has determined that its investment program is essential to ensure an annual average growth rate in real GDP of 2.6% between 1980 and 1985 and 3% from 1986 through 1990.

It is anticipated that capital grants from bilateral and multilateral sources of US\$15 to \$20 million per year will be available for investments (in order of priority) in: i) livestock, ii) transportation (feeder roads), iii) agriculture (rural development in the southeast and small irrigation perimeters), iv) education and training, and v) health and nutrition. The majority of the external financing needed to implement the investment program has already been assured either by firm contracts or accords of principle, and all of the projects in the public investment program have received at least part of the financing.

3. Public Finances: A significantly faster increase in public expenditures compared to revenues resulted in substantial deficits in current operations of the government beginning in 1976, when current expenditures were over 80% higher than 1975 levels. This rapid expansion of expenditures was occasioned by the defense effort (much of which was financed by contributions from allied countries), as well as by sharp increases in civil expenditures particularly in personnel costs of government workers and increased debt service obligations. Despite a considerable fiscal effort, with the average rate of taxation amounting to approximately 23% of GDP in recent years, a

131

reduction in receipts is anticipated in 1978 due to difficulties in the collection of taxes because of the most recent drought and problems in the production and sale of iron ore. The budget deficits resulted in accumulation of Treasury arrears, recourse to advances from the Banque Centrale, and increasing difficulty in mobilizing local counterpart funds for investment projects financed from abroad.

While the GIRM has attempted to limit the growth in current expenditures, the anticipated reduction in receipts and the investment expenditures which are considered essential, will result in continued budget deficits in the next several years, as can be seen in the table below:

BUDGETARY OPERATIONS
(in billions of ouguiyas)

	<u>1976</u> (Actual)	<u>1977</u> (Estimated)	<u>1978</u> (-----Projected-----)	<u>1979</u> (-----Projected-----)	<u>1980</u> (-----Projected-----)	<u>1985</u> (-----Projected-----)
Budgetary Receipts	4.9	4.6	4.0	6.25	7.2	13.1
Current Expenditures	<u>7.8</u>	<u>8.7</u>	<u>7.3</u>	<u>9.6</u>	<u>10.8</u>	<u>13.5</u>
Current Deficit	-2.9	-4.1	-3.3	-3.35	- 3.6	- 0.4
Investment Budget	—	<u>2.4</u>	<u>1.5</u>	<u>.5</u>	<u>.6</u>	<u>1.5</u>
Cash Deficit		-6.5	-4.8	-3.85	- 4.2	- 1.9
(in millions US dollars)	(64.4)	(144.4)	(106.7)	(85.6)	(93.3)	(42.2)

Advances of the Banque Centrale were to cover approximately UM/1.0 billion (US\$22.2 million) of the 1978 deficit, leaving a cash short-fall of

132

approximately UM/3.8 billion (US\$84.4 million) which was financed externally. The GIRM expects that a detailed analysis of the tax system and its operation, and the resumption of SNIM tax payments, will allow it to increase the tax contribution to GDP from the current 22.8% (or 31% of modern sector GDP) to 23.5% by 1980, and to nearly 27% (37% of modern sector GDP) from 1985 onwards. This implies short-term annual increases of over 56% in budgetary receipts in 1979 (or UM/6.25 billion vs. UM/4.0 billion in 1978), and 15% in 1980, which will depend on the recovery of the iron mining operations and exports and on a strengthened tax collection operation.

A reversal in the past trend of rapidly increasing public expenditures will require that the GIRM limit the growth of current expenditures to a rate lower than the growth of GDP and budgetary receipts in order to absorb the present deficit in the long run. According to the projections on which the Plan du Redressement is based, this implies that growth in current expenditures be limited to between 7.5% and 8.0% until 1980 and 4.5% to 5.0% between 1980 and 1985. It is anticipated that defense expenditures will substantially decrease from 1980 onwards, and that current civil expenditures will be increased by no more than 10% per year. Among the latter, the program provides for relatively large increases in material and maintenance expenditures, and for limits in both the number of new government personnel (approximately 2.2% annually) and annual salary increases (not more than 5%). The new employment policy envisions a qualitative improvement of the civil service with emphasis on recruiting high level personnel who have completed their training abroad, which when combined with increased expenditures on materials and maintenance, is designed to provide for substantial improvement in productivity.

133

Taken together, the measures outlined in the Plan du Redressement should result in the gradual improvement in Mauritania's economy. Careful and thorough reassessment of the economic situation will be required to monitor the progress of the recovery program in order to assure its successful implementation, as present conditions allow little margin for error.

B. Structure of the Domestic Economy

Mauritania's economy has been dominated by two important sectors, live-stock production which is considered part of the traditional economy, and mining which constitutes a major share of the modern economy. From 1973 through 1976, these two sectors accounted for over 40% of GDP (Annex IV, Table 2). However, disruption of the domestic economy in the last two years has caused the combined output of these sectors to decline to little more than 30% of GDP. While considerable effort is underway to revive the two sectors, especially with investments in the mining industry due to its position as the major foreign exchange earner, there is as yet little evidence to indicate the extent of their importance (particularly that of livestock) in the economy as the recovery plan begins to take effect.

Between 1973 and 1978, the contribution of the mining sector to GDP declined from over 25% to approximately 13%, and output of the sector fell by 36% in constant 1973 prices. This has largely been the result of the drop in world demand for iron ore which coincided with general recession among industrial consumer nations in the first half of the 1970s, and the war in the north which disrupted both extraction activities and the rail link between the mines and the port of Nouadhibou. Major investments have been programmed by the GIRM for this sector, which -- along with the cessation of hostilities in the north and an increase in world demand -- should ensure the recovery of its position in the composition of GDP and its role as the primary foreign exchange earner.

Livestock production has proved to be highly vulnerable due to a variety of factors. Long a mainstay of the domestic economy, it has traditionally provided a source of income and investment for the nomadic population. With

ESTIMATED GROSS DOMESTIC PRODUCT (GDP)
By Sector of Origin at Constant 1973 Prices

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u> Provisional
	(in billions of ouguiyas)					
TRADITIONAL SECTOR	<u>3.0</u>	<u>4.3</u>	<u>4.6</u>	<u>4.6</u>	<u>4.3</u>	<u>3.8</u>
of which: Livestock	<u>1.8</u>	<u>3.1</u>	<u>3.6</u>	<u>3.7</u>	<u>3.4</u>	<u>2.8</u>
INDUSTRIAL SECTOR	<u>3.7</u>	<u>4.0</u>	<u>2.8</u>	<u>3.1</u>	<u>2.7</u>	<u>2.9</u>
of which: Mining	<u>3.1</u>	<u>3.3</u>	<u>2.1</u>	<u>2.4</u>	<u>1.9</u>	<u>2.0</u>
CONSTRUCTION AND PUBLIC WORKS	0.6	0.7	0.9	1.1	1.3	1.4
TRANSPORT, COMMERCE AND SERVICES	2.5	2.7	2.9	3.1	3.2	3.3
PUBLIC ADMINISTRATION	1.0	1.1	1.2	1.6	1.8	1.9
GDP at factor cost	<u>10.8</u>	<u>12.8</u>	<u>12.4</u>	<u>13.5</u>	<u>13.3</u>	<u>13.3</u>
Indirect taxes less subsidies	1.4	1.7	1.4	1.6	1.6	1.7
GDP at Market Prices	<u>12.2</u>	<u>14.5</u>	<u>13.8</u>	<u>15.1</u>	<u>14.9</u>	<u>15.0</u>
Average Annual Percentage Change		18.9%	(-4.8%)	9.4%	(-1.3%)	0.7%
	(in percentages)					
TRADITIONAL SECTOR (Livestock)	24.6 (14.8)	29.7 (21.4)	33.3 (26.1)	30.5 (24.5)	28.9 (22.8)	25.3 (18.7)
INDUSTRIAL SECTOR (Mining)	30.3 (25.4)	27.6 (22.8)	20.3 (15.2)	20.5 (15.9)	18.1 (12.8)	19.3 (13.3)
CONSTRUCTION AND PUBLIC WORKS	4.9	4.8	6.5	7.3	8.7	9.3
TRANSPORT, COMMERCE AND SERVICES	20.5	18.6	21.0	20.5	21.5	22.0
PUBLIC ADMINISTRATION	<u>8.2</u>	<u>7.6</u>	<u>8.7</u>	<u>10.6</u>	<u>12.1</u>	<u>12.7</u>
GDP at factor cost	88.5	88.3	89.8	89.4	89.3	88.6
Indirect taxes less subsidies	<u>11.5</u>	<u>11.7</u>	<u>10.2</u>	<u>10.6</u>	<u>10.7</u>	<u>11.4</u>
GDP at Market Prices	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

SOURCE: IMF

136

the periodic droughts of the past decade, however, the sedentarization of half of the nomadic population since 1965, and the liberation of the lower caste groups which traditionally provided the bulk of the nomadic labor force, the livestock sector appears to be undergoing significant changes. These changes in part reflect and are a consequence of the changes which have taken place in both human settlement patterns and the structure of the economy. Indeed, the 70% increase in the output of the livestock sector which occurred between 1973 and 1974 suggests that many herders sold their livestock in the aftermath of the prolonged 1968-1972 drought. The dramatic rise in the number of animals slaughtered between 1974 and 1975, moreover, when sheep and goat slaughter increased 168%, cattle 42%, and camels over 70%, suggests that substantial portions of the herds which changed hands the year before were then liquidated (Annex IV, Table 3). Much of this activity coincided with the rebuilding of herds (which was partly the result of government efforts to provide more water and fodder in order to control the rate of slaughter), from the 1973 level, the lowest of the past decade.

The livestock population is only now returning to 1968 levels, but with half of the nomadic population having abandoned this way of life since 1965, it seems reasonable to assume that both ownership and herding patterns have undergone major changes. The table below also indicates that the 1975 increase in the rate at which animals were slaughtered, when taken as a percentage of the livestock population, has persisted in the years since, suggesting a new and apparently permanent trend toward greater commercialization of herding activities. This is supported by the decline in the areas over which most herds now graze (200 kilometers or less), and the increase in the use of

Table 3

ESTIMATES OF LIVESTOCK POPULATION,
SLAUGHTER AND EXPORTS
(in thousands of head and percentages)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u> (Estimates)
<u>CATTLE POPULATION</u>	<u>1,200</u>	<u>1,236</u>	<u>1,273</u>	<u>1,240</u>
Total Slaughtered	59.6	84.4	86.9	94.5
% of Population	5.0%	6.8%	6.8%	7.6%
Total Exported	86.9	123.2	126.8	142.0
% of Population	7.2%	10.0%	10.0%	11.5%
<u>SHEEP AND GOAT POPULATION</u>	<u>7,000</u>	<u>7,448</u>	<u>7,925</u>	<u>7,950</u>
Total Slaughtered	380.9	1,019.2	1,084.4	1,142.0
% of Population	5.4%	13.7%	13.7%	14.4%
Total Exported	396.6	1,061.1	1,129.1	1,237.0
% of Population	5.7%	14.2%	14.2%	15.6%
<u>CAMEL POPULATION</u>	<u>700</u>	<u>707</u>	<u>714</u>	<u>715</u>
Total Slaughtered	27.2	46.6	47.0	43.1
% of Population	3.9%	6.6%	6.6%	6.0%
Total Exported	9.8	16.8	16.9	16.0
% of Population	1.4%	2.4%	2.4%	2.2%

SOURCE: IMF

trucks to transport livestock from one pasturage to another as seasons and rainfall levels vary.

The changes in livestock's contribution to GDP in part reflect the changes in the structure of the sector itself. By 1973, livestock had fallen to less than 15% of GDP from approximately 25% in 1970, due to the severity of the 1968-1972 drought. The recovery of the sector to 21% of GDP in 1974 and 26% in 1975 coincides with the increased sale and slaughter of herds which occurred in those years. Subsequent declines reported in the sector for 1977 and estimated for 1978 reflect the return of drought conditions in late 1977. The extent to which these changes may be permanent is difficult to determine, in part because so much of the activity in the sector is unreported; with sheep and goats, for example, an estimated 3% of the slaughter and 11% to 12% of the export was reported in 1977 and 1978, and approximately 20% of the cattle slaughtered and exported were reported in the same years. Thus while livestock production appears to be changing from a subsistence-type activity to a more commercial one, it remains largely a part of the informal sector. In response to the same forces which account for this transformation, i.e. drought, changes in settlement patterns with the decline in the nomadic population, and the loss of the traditional labor force, livestock seems to some degree to be losing its attractiveness as the investment asset which it has traditionally been among Mauritians.

Despite the creation in 1975 of SONICOB, a public enterprise with an official monopoly in meat exports, considerable illicit trade in livestock continues because of higher prices in neighboring countries, the greater convertibility of their currencies (mostly the CFA franc) compared to the ouguiya, and the difficulties of controlling long borders. In addition, the

large commercial enterprises which dominate domestic transportation appear to be buying herds before they are fattened and transporting them to better pastures and more lucrative markets. With a large part of the export receipts from the illicit livestock trade reportedly used to acquire cheaper consumer goods abroad, there appears to be a strong economic link between the changes taking place in the livestock sector and the growth of commercial activities in the urban-oriented informal sector. It seems reasonable to assume that the consumer goods purchased abroad with foreign exchange earned from the sale of illegally exported livestock are re-sold in Mauritania's large informal urban markets, without being taxed or recorded as part of imports or consumption.

The declines in livestock production and mining output have been partially offset by increases in construction and public works, which rose over 130% between 1973 and 1978 in constant 1973 prices; in transportation, commerce and services which rose 30% in the same period; and in public administration, up 90% over these years due to increased defense expenditures in connection with the conflict in the north and to increased civil expenditures. Taken together, these sectors account for 44% of GDP estimated for 1978, up from slightly over one-third of GDP in 1973. The increases in construction and public works reflect substantial public expenditures on the Nouakchott-Kiffa portion of the major east-west highway, and on the underground water reservoir and delivery pipeline for Nouakchott. All of these were considered essential for the modernization and development of the domestic economy, and in fact mirror the reorientation of the economy toward urban areas, with Nouakchott becoming increasingly identified as the country's commercial center linked via the highway to the main commercial towns across the Sahel, where the population is now concentrated.

149

The increased activity in these three sectors accounts for at least a portion of the substantial rise in imports over the past five years, as does the defense effort -- especially toward the end of the period. While export receipts were equivalent to approximately 96% of imports in 1974, they fell to 48% of imports in 1977, and are expected to continue to decline as a percentage of imports and net transfers through 1979, before the impact of the recovery plan takes effect. With well over 90% of all building materials imported, increased construction activity and construction-related public works are reflected in a rise in imports. To the extent that the construction sector continues to grow, local building materials extraction and production would have an important import-substitution effect, and conserve scarce foreign exchange.

The financing of imports is a major focus of the formal financial sector, which relies for the majority of its resources on the Banque Centrale de Mauritanie and foreign lenders. Demand deposits, mostly from large public and semi-public enterprises and private commercial firms, constitute slightly over one-quarter of the liabilities of the five commercial banks, while time and savings deposits account for approximately 12%. Over 80% of the banking sector's lending is short-term, mostly for financing imports and inventories, and less than 1% is long-term. Mauritania's ratio of currency in circulation to total liquid assets (averaging 30% over the past several years) is not unusually high compared to other African countries, but does not reflect the extent to which capital, or stores of value, are held in un-intermediated and relatively unproductive assets. Traditionally, livestock has been chief among these (along with gold and silver). While investment in the form of livestock remains considerable, both the drought and the trend toward

sedentarization and increased urbanization appear to have caused a significant change in favor of investment in urban land as an alternative. Land held as an investment good in such important urban centers as Nouakchott is not usually sold for cash, but rather is traded for other land, generally in the same or another major urban center. Transactions of this kind are part of the extensive and growing informal sector of the economy, with persons across the whole range of the income distribution apparently participating, and on which nearly all of the urban poor rely. Almost all residential construction, for example, is carried out through the informal sector, with most transactions based on verbal rather than written and/or legal agreements.

Yet domestic resource mobilization efforts, to the extent that these exist outside of government, ignore the considerable potential of the informal sector. Formal sector credit for shelter, in particular, is unavailable to nearly the entire population as the maximum financing allowed is equal to only 30% of construction costs, with repayment periods limited to five to seven years. The informal sector nevertheless does provide some shelter financing, through the sale of such illiquid assets as jewelry, or borrowing from family members, or purchasing building materials on credit at higher prices than those for cash transactions, which allows for implicit interest to be charged. In general, however, Mauritania's formal economy lacks the financial mechanisms to attract the domestic savings which exist in order to make these available to support increased development and growth, despite the apparent transformation which is taking place in the economy as a consequence of both urbanization and sedentarization.

ANNEX V

ADAUA PROPOSAL FOR SURFACE
WATER DRAINAGE IN
SATARA SQUATTER SETTLEMENT

DEMANDE
Le Ministère (France)
du Sahara
(un exemplaire de notre envoyé
spécial)

PROGRAMME D'URGENCE POUR
L'ASSAINISSEMENT DE SATARA

SEPT 1973

Une calamité naturelle, la sécheresse, a déjà contraint les populations nomades de Mauritanie à l'exode vers les villes.

A Rosso, une nouvelle calamité naturelle les frappe : l'inondation du bidonville de SATARA où ils ont trouvé refuge. La menace d'une nouvelle inondation lors du prochain hivernage reste. Dans le cadre du Programme d'Habitat Populaire de SATARA, un plan d'urgence d'assainissement de la zone est mis en place. Les populations de SATARA sont prêtes à y consacrer tous leurs efforts.

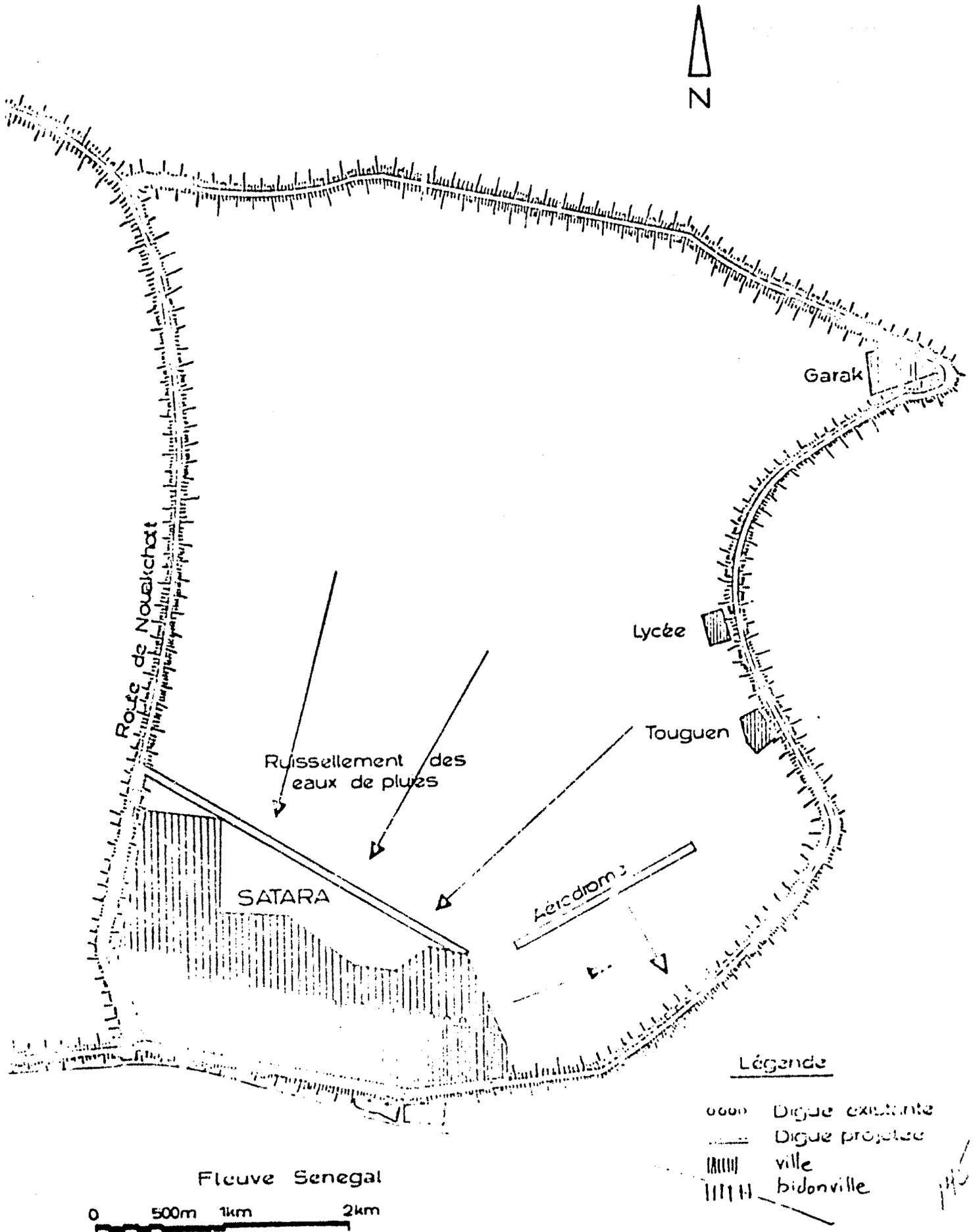
Best Available Document

Scion P. A. D. 421e 1

La cause de Satara
n'est pas perdue

ce qui aura l'inconvénient
de mettre en péril l'ensemble
tenue même de Rosso.
Car en ce
L'Association pour
le Sahara

Programme d'Habitat Populaire ROSSO-SATARA DIGUES



ASSAINISSEMENT DE SATARA
PROGRAMME D'URGENCE 1978 - 1979

CADRE GENERAL.

5 ans de sécheresse ont contraint les populations nomades de Mauritanie à venir s'agglomérer autour des centres existants constituant ainsi de vastes zones d'habitat précaire et spontané.

A Rosso, ville frontière de la Mauritanie sur le fleuve Sénégal, 9 000 personnes (1 400 familles) ont construit le bidonville de SATARA au Nord de la ville.

Longtemps menacé d'expulsion (un arrêté Gouvernemental jamais appliqué ordonnait le déplacement de ces populations pauvres de SATARA à un emplacement réservé à cet effet à 4 km de la ville) le bidonville est maintenant accepté et reconnu par l'Administration comme un établissement humain légal et respectable. L'ADAUA y conduit depuis 18 mois une action de développement communautaire en utilisant comme moteur de développement, l'habitat, revendication première de ces populations nouvellement sédentarisées.

Actuellement le bilan provisoire de l'Action de l'ADAUA est schématiquement le suivant :

- Mise au point de matériaux locaux sains et durables affranchis de toute importation.
- Mise en place d'une briqueterie artisanale produisant des briques de terre "made in Rosso" pour le projet d'habitat populaire et avec surplus commercialisable en Médina.
- Formation de maçons aux techniques appropriées aux matériaux de terre et aux conditions socio-économiques de la population (45 personnes en formation).
- Réalisation de prototypes de construction et conscientisation de la population sur les matériaux terreux, étude d'une architecture adaptée à leur mode de vie.
- Mise en place d'une Caisse Populaire autogérée par la population, regroupant 250 adhérents.
- Étude du schéma d'urbanisation du bidonville et de l'assainissement de la zone actuellement insalubre.

CONDITIONS TOPOGRAPHIQUES PARTICULIÈRES DE ROSSO SATARA.

La ville de Rosso a les pieds dans l'eau du fleuve. Une digue délimitant un périmètre rectangulaire de 5 km sur 7 met la ville et ses environs à l'abri des crues dévastatrices du fleuve (En 1946 les plus hautes eaux du fleuve avaient atteint Nouakchott à 200 km de là).

Une faible pente, régulière et continue vers le fleuve draine vers la ville les eaux pluviales provenant par ruissellement des environs de la ville sur une distance de 4 km. La ville elle-même s'est protégée sur le Nord contre l'envahissement de ces eaux pluviales de ruissellement par une diquette de 1 m suffisante à bloquer les eaux qui viennent s'accumuler de l'autre côté de cette diquette (Figure 2), là où justement s'est implanté le bidonville de SATARA.

L'INONDATION DU 17 SEPTEMBRE 1978.

Le 17 septembre 1978 une pluie de 80 mm, tombée en 5 heures a provoqué l'inondation du bidonville de SATARA sous 40 cm d'eau nécessitant l'évacuation immédiate de toute la population dans les conditions les plus dramatiques, et causant la perte d'une grande partie de leur peu de biens et de toutes leurs maigres réserves alimentaires, ainsi que de nombreux blessés et un mort.

Cette inondation, si elle a tragiquement surpris les habitants de la zone, n'était pas imprévisible. Des inondations analogues avaient déjà submergé Satara en 75 et Rosso en 1946 et 1950 (1951 création de la 1ère digue de protection de la ville). L'ADAUA avait fait l'étude dès décembre 77 des indispensables mesures d'assainissement à mettre en oeuvre pour protéger cette population déjà suffisamment éprouvée par d'autres calamités naturelles. Néanmoins, la procédure administrative nécessaire pour que se substitue à l'arrêt d'expulsion une décision d'attribution de terrain pour le projet d'Habitat Populaire, a pris également 18 mois. (septembre 1978). Ce délai a été mis à profit pour faire les études complètes, mais l'action d'assainissement sur le terrain ne pouvait démarrer qu'après l'hivernage 1978.

L'inondation de 78 a réellement mis en danger la vie et les biens des occupants de SATARA. Une inondation équivalente et pourquoi pas plus importante en 79, si rien n'est fait d'ici là, peut avoir des conséquences encore plus dramatiques (si la pluie survient de nuit par exemple) et causer de nombreuses noyades d'enfants et de vieillards.

Le pays entier a été sensibilisé au problème de SATARA et le journaliste du CHAAB (unique journal National) avait raison de dire en 1ère page, 12 jours après la pluie fatidique.

"Incontestablement l'inondation de SATARA a, ces dernières semaines dominé l'actualité nationale et a eu le mérite même porté à ses justes proportions, de tenir en haleine bon nombre de responsables locaux civils ou militaires et tous ceux que le sort de ce bidonville intéresse de près ou de loin. (CHAAB 29 septembre 1978)."

Un débat national, s'est instauré : pour ou contre l'évacuation de SATARA.

LA POSITION DES AUTORITES.

L'intérêt de cette inondation, en dépit des dommages causés à cette population déjà fortement ébranlée, a été de déclencher un vaste débat au plan national qui a conduit les autorités elles mêmes à clarifier leur position face à ce problème.

Des échanges nombreux ADAUA, - pouvoirs publics ont finalement conduit à une identité de vue avec l'ADAUA comme l'indique le P.V. de la réunion du 2 octobre 78 du Comité d'Urbanisme de Rosso à laquelle participait l'ADAUA, sous la présidence du Préfet de Rosso.

- Le déplacement forcé des populations de SATARA sur une zone naturellement non exposée mais forcément très éloignée de la ville constituerait une solution socialement, économiquement et politiquement pire que la situation actuelle.

- Le maintien des populations à leur emplacement actuel, dans le cadre du projet ADAUA-SOCOGIM de restructuration et d'auto-construction de SATARA, nécessite que soient dès maintenant prises et réalisées les mesures d'assainissement minimum pour protéger ces populations contre une calamité naturelle de même nature se reproduisant au prochain hivernage.

LE PLAN D'URGENCE D'ASSAINISSEMENT ET DE PROTECTION DES POPULATIONS CONTRE LES INONDATIONS.

Il consiste en la réalisation immédiate des ouvrages suivants dont la réalisation qui était prévue dans le Programme d'Habitat Populaire doit être accélérée en raison de la fin probable du cycle de la sécheresse et du retour des pluies.

1°)-Edification d'une digue de 1 m de haut protégeant SATARA de l'envahissement des eaux pluviales de ruissellement venant du bassin versant de 20 km² qui entoure la ville. Cette digue procure ainsi à la zone du bidonville des conditions identiques à celles de la ville (déjà protégée par le même procédé).

2°)-Creusement de 3 caniveaux principaux drainant les eaux tombant à l'intérieur de la zone ainsi protégée, vers des pompes de relevage et de refoulement dans le fleuve. Ces caniveaux traversent la ville existante sur une longueur de 400 mètres.

PARTICIPATION POPULAIRE A L'ASSAINISSEMENT.

Dès son arrivée à Rosso, plus d'un an avant l'inondation, l'ADAUA avait procédé à une enquête auprès de la population. Une des questions concernait la participation populaire à la réalisation de infrastructures.

La population de SATARA qui conservait le souvenir douloureux d'une inondation analogue survenue en 1975, s'est déclarée prête à 72 % à participer bénévolement à la réalisation de l'assainissement.

Aujourd'hui, la mobilisation est générale et les divers quartiers viennent proposer leurs bras à l'ADAUA.

ASSAINISSEMENT = SECURITE FONCIERE.

La population de SATARA a été déjà une fois en 1975 expulsée par les autorités à cause d'une inondation. Dès la disparition des eaux, les familles sont immédiatement revenues occuper leurs emplacements et y réimplanter leurs baraques. En septembre 1978, chassés par les eaux, les habitants de SATARA, redoutant une expulsion définitive ont campé au bord de leur quartier transformé en lac, regardant jalousement l'oeil sur leur baraque noyée, pour être en mesure de défendre leur "concession" contre quiconque manifesterait l'intention de les en chasser.

Les habitants de SATARA ont vécu dans l'angoisse que l'inondation serve de prétexte à leur déportation à 4 km de la ville. Aujourd'hui rassurés, ils restent tout de même fortement conscient que seul un assainissement réel peut leur assurer la sécurité foncière. Et ils sont prêts à y contribuer.

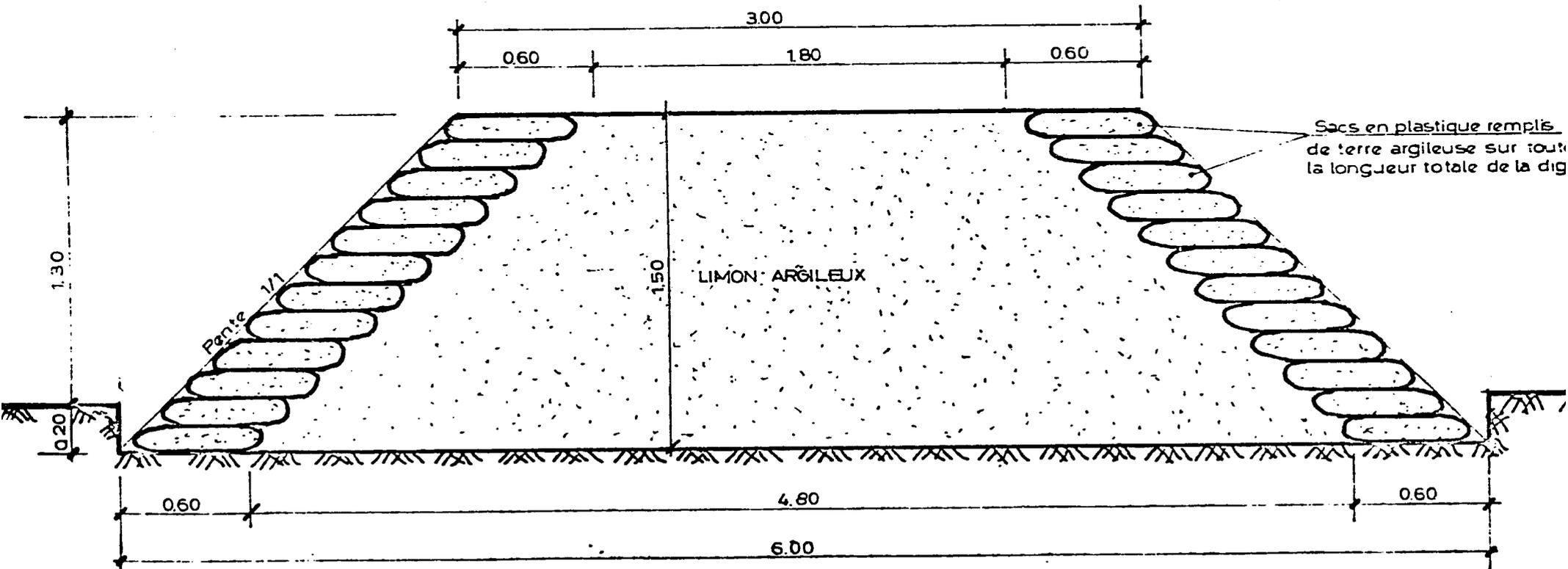
ADAUA
Rosso

ASSAINISSEMENT DE SATARA

ATEM

DIGUE DE PROTECTION

PROFIL EN TRAVERS TYPE



ECH 1/25°
Date 9-11-78

149

Pg. 1

ESTIEMENT HUMAIN : LA DIGUE.

La construction d'une digue protégeant au Nord SATARA contre l'invasion des eaux sera l'oeuvre de la population elle-même.

Les membres de la Caisse Populaire de SATARA, structure autogérée de solidarité sociale, ont assuré l'Atelier d'Etudes Sociales de l'ADAVA qu'il pouvait compter sur la participation bénévole de près de 400 des leurs soit 50 à 60 par quartier.

400 personnes peuvent réaliser la digue de terre de 1,50 m de haut sur 2 000 mètres de long en 100 jours. Les talus seront protégés par des sacs de plastique remplis de terre argileuse. La participation populaire permet d'effectuer les travaux suivants :

- extraction des terres (22 500 m³ à déplacer)
- transport par brouette sur les distances faibles et par charrettes à cheval sur les distances moyennes.
- mise en sacs (120 000 sacs)
- repandage des terres par couches de 25 cm et mise en place des sacs.

Il reste que les travaux suivants nécessitent un soutien mécanisé inévitable :

- transport de l'eau par citerne et arrosage des remblais
- compactage des remblais ne pouvant se faire que par un compacteur de 20 tonnes.

RACCORDEMENT AU RESEAU EXISTANT A REAMENAGER.

3 des caniveaux existants de la ville doivent être réaménagés pour recevoir l'apport supplémentaire des eaux pluviales tombant dans la zone même de SATARA, et l'évacuer dans le fleuve.

Ces caniveaux traversent de la ville dans le sens de sa largeur soit près de 400 mètres et doivent être réalisés "en dur" compte tenu des contraintes des voiries existantes.

Une station de pompage supplémentaire doit être créée au débouché d'un des caniveaux, et les deux stations existantes doivent être renforcées pour faire face aux nouveaux débits.

Ces travaux nécessitent une main d'oeuvre qualifiée, du matériel sophistiqué (pompes). De plus, ils sont situés en zone urbaine hors du bidonville lui-même et doivent être réalisés pour ces multiples raisons en entreprise. L'investissement humain est ainsi limité à l'édification de la digue, qui demandera déjà à elle seule un effort immense à la population de SATARA.

Programme d'Habitat Populaire ROSSO-SATARA

PROGRAMME D'URGENCE D'ASSAINISSEMENT DE SATARA

N

Digue à créer

Route de Nouakchott

ZONE D HABITAT SPONTANEE

LEGENDE

○ Station de pompage à renforcer

○ Station de relevage à créer

▣ Aménagement de caniveaux existants

══ Digue projetée

0 100 500m

Fleuve Sénégal

151

BUDGET GENERAL DU PROGRAMME D'URGENCE
POUR L'ASSAINISSEMENT DE SATARA

I.-INVESTISSEMENT HUMAIN : CONSTRUCTION DE LA DIGUE.

Participation populaire à l'édification d'une digue de 2 kilomètres :

- extraction des terres
- transport des terres par brouettes et charrettes à cheval
- ensachage
- épandage des terres

VALEUR DE L'INVESTISSEMENT HUMAIN

- 335 manoeuvres (bénévoles)
x 100 jours 5 360 000 UMI
- 65 chefs d'équipe (bénévoles) x 100 jours 2 080 000 UMI

TOTAL VALEUR INVESTISSEMENT

7 440 000 UMI

II.-OUTILS POUR MAIN D'OEUVRE BENEVOLE.

NOTA.-Une fois la digue terminée ces outils continueront à être utilisés dans le Programme d'Habitat Populaire en autoconstruction.

	Nb.		
- brouettes	50	150 000 UMI	
- pelles	150	60 000 UMI	
- pioches	50	20 000 UMI	
- charrettes	12	420 000 UMI	650 000 UMI

III.-FOURNITURE DE SACS DE POLYETHYLENE.

- 120 000 sacs à 20 UMI/sac

2 400 000 UMI

IV.-COMPLEMENT DE TRAVAUX MECANISES POUR EDIFICATION DE LA DIGUE.

- transport de terres spéciales par camion	500 000 UMI
- chargement	300 000 UMI
- arrosage par citerne	552 000 UMI
- compactage des terres par compacteur	460 000 UMI
- consommation carburant	192 000 UMI
- consommation eau	18 200 UMI

1 922 200 UMI

V.-AMENAGEMENT DE TROIS CANIVEAUX EXISTANTS

- reprofilage	105 000 UMI
- revêtement intérieur des caniveaux	6 930 000 UMI

- construction de 3 abris pour pompes 300 000 UM 7 335 000 UMI

VI.-FOURNITURE ET POSE 4 POMPES DE 0,3 m³/s. 4 000 000 UMI

VII.-ENCADREMENT TECHNIQUE.

- 1 ingénieur 130 jours 468 000 UM
 - 1 équipe topographie 130 jours
 - un topographe 260 000 UM
 - deu. aides 260 000 UM

- ouvriers qualifiés pour encadrement de la population 100 jours

- extraction 3
 - remplissage 1
 - transport 2
 - épandage 4 } 400 000 UM

1 388 000 UMI

Cours de change en novembre 1978

1 Dol US	45,57	UMI
1 Dol CAN	38,77	"
1 D.M	24,47	"
1 FLH	22,56	"
1 FB	15,6	"
1 FF	10,00	"
1 FS	28,42	"

Rosso, le 15 novembre 1978

153

BIBLIOGRAPHY

BOOKS

- Downs, R. E., and Reyn, G. P. Socio-Economic Report on 10th Region of Mauritania. 1976 (mimeo).
- Les Atlas Afrique: Republique Islamique de Mauritanie.* Paris: Editions Jeune Afrique, 1977.
- Toupet, Charles. *La Sedentarisation des Nomades en Mauritanie Centrale Sahelienne.* Paris: Libraire Honoré Champion, 1977.

REPORTS AND OTHER DOCUMENTS

AGENCY FOR INTERNATIONAL DEVELOPMENT

- Annual Budget Submission FY 1980: Mauritania.*
- Mauritania Country Development Strategy Statement (CDSS).* 1978.
- Mauritania Rural and Manpower Survey (RAMS).* Project Paper. 1978.
- Office of Housing. *Preliminary Report on Methodology for Indirect Estimation of Median Family Income.* 1978.
- _____. *Preparing a National Housing Policy (Revised).* 1977.

BANKS (MAURITANIA)

- Banque Arabe Africaine en Mauritanie. *Rapport du Conseil d'Administration: Bilan.* 31 December 1977.
- Banque Centrale de Mauritanie. *Bulletin Statistique,* vol. 3, no. 12. September 1978.
- Banque Internationale pour la Mauritanie (BIMA). Assemblée Générale Ordinaire, *Exercice 1977.* 18 July 1978.
- Banque Mauritanienne de la Developpement et du Commerce (BMDC). Assemblée Générale Ordinaire, *Exercice 1977.* 21 July 1978.

154

Société Mauritanienne de Banque. *Assemblée Générale Ordinaire et Extraordinaire.* 11 June 1976.

_____. *Assemblée Générale Ordinaire et Extraordinaire.*
14 June 1977.

GOVERNMENT OF ISLAMIC REPUBLIC OF MAURITANIA (GIRM)

*GIRM. *Enquête sur les Prix a la Construction en RIM (Provisoires),*
vols. 1, 2. September 1978.

_____. *Guide de l'Investisseur Industriel en Mauritanie.*
July 1977.

_____. *Rapport National sur les Etablissements Humaines*
"Habitat." 1976.

_____. *Statutes du Groupement de la Caisse Populaire*
de Satara.

Ministry of Finance. *Communication en Conseil des Ministres:*
Revision des Prix de Cession de Terrains à Nouakchott et
Nouadhibou.

_____. *Decret No. 60-151 [Instituting a Housing and*
Savings System].

***Ministry of Plan and Mines.** *Economic and Financial Rehabilitation*
Plan (Draft). September 1978.

_____. *Seconds Resultats Provisoires du Recensement*
General de la Population. January 1977.

_____. *Third Plan for Economic and Social Development.*
October 1976.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

Current Economic Situation and Prospects in Mauritania. 1974.

Report on the Mauritanian Economy. 1976.

International Development Agency. *Mauritania: Sonader Technical*
Assistance Project. March 1977.

* **Confidential**

INTERNATIONAL LABOR ORGANIZATION (ILO-BIT)

Feral, Gabriel. *Esquisse sur la Situation de l'Emploi en Mauritanie: Situation Presente et Perspectives.* 1977.

Jourdain, Robert. *Analyse Preliminare des Resultats du Recensement du Secteur Non-structuré de Nouakchott, RIM.* 1977.

Niban, George. *Resultats de l'Enquête sur le Secteur Non-structuré de Nouakchott.* 1978.

INTERNATIONAL MONETARY FUND (IMF)

Mauritania: Recent Economic Developments. May 1976.

**Mauritania: Recent Economic Developments.* July 1978.

SOCOGIM

Analyse des Comptes des Premiers Exercices Sociaux, 1974-1977.

Charges Financieres: Tableau Amortissements Cout 3 Pieces Eclate en 10 Ans.

Construction de Cent Cinquante Logements Moyen Standing en Zone Residentielle Secteur A à Nouakchott: Demande de Financement. October 1976.

Construction de 90 Logements "Economiques au Sud de l'Ilot R": Devis Descriptif. October 1976.

Contract d'Adhesion à l'Epargne Logement.

Exercice 1974, Bilan. 31 December 1974.

Exercice 1975, Bilan. 31 December 1975.

Exercice 1976, Bilan. 31 December 1976.

Exercice 1977, Bilan. 31 December 1977.

Le Logement en Mauritaine: Besoins et Ressources (with M & R International). 1975.

Le Projet Soumis à l'IDA. March 1978.

Note d'Information sur la SOCOGIM.

Programme Quadriennal (1977-1980): Le Contexte Socio-economique.

*Confidential

15/6

Projet de Reforme du Systeme Test d'Epargne Logement SOCOGIM.

Propositions pour Une Politique Efficace de Logement.

Protocole d'Accord entre SOCOGIM et ADAUA.

Rapport d'Activité 1977.

*Reglement Interieur pour la Construction et la Gestion des Logements
(SOCOGIM): Exercice 1974.*

SOCOGIM/ADAUA

Enquête sur le Zone du Satara.

Habitat Populaire en Republique Islamique de Mauritanie. 1976.

Programme d'Habitat Populaire a Rosso: Chartier d'Essais. October 1977.

Programme d'Urgence pour l'Assainissement de Satara. November 1978.

*Projet d'Habitat Populaire en Mauritanie: L'Urbanisation de la
Zone Satara à Rosso. April 1978.*

Stabilisation au Ciment. September 1978.

Stabilisation des Matériaux.

SONELEC

Resultats de l'Exercice 1976.

Resultats de l'Exercice 1977.

UNITED NATIONS

Renforcement du Service des Eaux Souterraines. 1977.

WORLD HEALTH ORGANIZATION

*Appromisionement Public en Eau et Assainissement: Evaluation Rapide
du Developpement Actual et Futur du Secteur.*

Etude de Tarification Eau et Assainissement de Nouakchott. 1975.

Hygiene de l'Environnement.

Profile de la Republique Islamique de Mauritanie.

Situation Alimentaire et Nutritionnelle en Mauritanie.