ISLAMIC REPUBLIC OF MAURITANIA

Honor — Fraternity — Justice

Ministry of Economy and Finance

Directorate of Studies and Programming

RAMS PROJECT

Rural Assessment and Manpower Surveys

Annotated Statistical Compendium

Volume 1

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Annex A: RAMS Survey

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A.1 Overview

RAMS baseline studies (see list of RAMS studies in Introduction) have been based on three main sources: previous reports, field observations and surveys. From September 1979 to November 1980, RAMS organized a series of surveys as a means of gathering new information where previous data did not exist, updating previous research where data were either incomplete or outdated, and testing on a wider scale field and on-site observations. In sum, the surveys were to constitute one part of the data base on which sectoral analyses were to be made.

Four principal categories of surveys were conceived, some with several components:

1. Household Revenue/Consumption/Nutrition consisting of
   - Revenue
   - Consumption
   - Nutrition
   - Food Preference
   - Market Prices and Child Nutrition
2. Labor and Manpower including
   - Employment (urban and rural)
   - Business establishments
   - Non-structured sector
3. Professional Skills for
   - Cultivators
   - Herders
   - Fishermen
   - Craftsman
   - Women
   - Shopkeepers
4. Rural Production divided between
   - Crop by land form and
   - Livestock by animal herd

1.1 Preparation of Survey Questionnaire

Analysis plans and questionnaires were formulated by the various research units of RAMS, to some extent in collaboration with certain government services: Agriculture, Livestock, Social Welfare, Statistics.

Questionnaires were field-tested and revised, and a preliminary set was established for a training seminar. An instruction manual for enumerators was also devised with a general explanation of survey techniques and instructions and a sampling procedure for each questionnaire.

1.2 The Sample

The survey was based on a two-stage sample. The first stage consisted of a random sample of 45 villages (primary units) based on the list of more than 2,300 villages compiled by the National Census Bureau (BCR) and used for the 1977 national census. These villages covered only the sedentary population.

The primary units were stratified by agro-ecological zones and organized by population size.

The second stage consisted of drawing individuals or households (secondary units) within the sample villages by methods adapted to each questionnaire (see sections below for description). The random selection was considered representative because every statistical unit, primary and secondary, had an equal chance of being selected.

1.2.1 Village Stratification and Selection

Five basic steps were followed in the village selection process:

1. Villages in the rural sector were arranged into 5 agro-ecological zones (AEZ), as defined by RAMS in the third quarter of 1979.
2. Villages were listed on cards by agro-ecological zone and therein by population size with the smallest villages first.
3. A "sampling interval" of 1,000 was retained.
4. A number between 1 and the total number of villages was selected, representing the first village in the sample. This card was withdrawn from the pack. Beginning with this village, the population was totalled until the village that had the 1,000th person was reached. The village card was pulled. This procedure was repeated until villages had been selected for each 1,000th person in the zone. These villages constituted the "pre-selected list".
5. Villages were randomly selected from the pre-selected list for each zone in proportion to the total number of villages in the zone. Due to a shortage of vehicles and other logistical problems faced by RAMS, the resulting 45 villages were reduced to 32 by random elimination. Later, in April 1980, well after the survey had been completed, the agro-ecological zones were revised.

   The stratification was nevertheless retained, for it was determined that both the old and modified AEZ showed sufficient internal homogenity and had enough differences among them to make the stratification exercise meaningful.(1)

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(1) As the project progressed, it became apparent that for planning purposes stratification could have been more meaningful had it been conducted along Departmental and Regional lines, since the Administrative Region, and not the agro-ecological zone, is the basic planning unit.

While zonal conclusions/extrapolations were possible, the small number of sample villages accounted for in each zone rendered these tenuous. On a national scale, however, it was possible to locate both structure and tendencies within the base population.

Village Sample by Revised Agro-Ecological Zone and Population Size

Village Population	Zones						
	1	2	3	4	5	6	Total
1 - 500	1	4	3	2	7	0	17
501 - 1000	2	0	1	1	4	0	8
1001 - 5000	1	2	1	1	0	0	5
Over 5000	1	0	0	0	0	0	1
Total	5	6	5	4	11	0	32

1.2.2 Selection of Secondary Units

Each questionnaire-type had its own manner of selecting the households, individuals or consumption units within the villages. These are discussed in the respective questionnaire sections.

Before the survey began, a RAMS reconnaissance team visited each locality in order to sensitize the population to the purpose of the survey and to establish the list of households or individuals to be surveyed.

Two adjustments resulted from this exercise. One village in the Hodh Charqui could not be located at the position given by the census. However, a village of the same name, with a roughly similar population and belonging to the same zone was found some 80 km away.(2) This village was retained. In the Gorgol, one village was logistically inaccessible. It was decided to apportion the scheduled secondary units between two neighboring survey villages, one in the same AEZ, the other in an adjacent zone.

1.3 Enumerators

Several sources were tapped to recruit enumerators: various government services (Agriculture, Labor, etc...), secondary level home-economics students at the ENECOFAS, and former enumerators from the 1977 census and from the OMVS socio-economic survey. Of 70 original participants in the first training seminar, 54 were selected on the basis of language requirements and performance in pilot tests.

One enumerator was expected to complete an average of 3 questionnaires per day, although the actual number varied according to the type of survey conducted in each locality.

The following table and map illustrate the distribution of questionnaire types by villages and by agro-ecological zone.

(2) The census village files have not been systematically updated. Not infrequently, old 'villages' (see definition in Section 2.3) have subsequently disappeared, and new ones created.

Exhibit A-1a

Distribution of RAMS Survey Questionnaire by Location and Type

Village	Department	1977 Village Population[a]	A. E. Zones Old	A. E. Zones New		Questionnaire Type Qual.	Prod.	Empl.	R/C/N[b]	Hous R.[b]	C
H. Charqui										12	2
Diama Mali	Djigueni	132	2	4	6	6	1	0			
Timbedra	Timbedra	5,104	3	4	53						
H. Charbi											
Hassi El Barka	Aioun	134	2	3	23	6	1	2			
Aweinatt	Koboni	181	2	2	6	3	1	0			
Goguizemal	"	233	3	4	16	3	1	2			
Ain Farba	Kintane	515	2	4	22	8	2	2			
Touil Lebyad Relle	"	214	2	2	7	6	1	0			
Assaba										1	2
Legleib	Koumdeid	448	4	5	19	6	1	2			
Guérou	Guérou	3,636	3	4	45	3	0	0			
Gorgol											
Kaédi	Kaédi	20,221	1	1	193	32	56	12			
Garley	"	761	1	1	31	6	1	4			
Yona	Magama	224	2	2	5	6	1	0			
Monguel	Monguel	1,666	3	3	60	18	6	12			
Brakna											
Aleg	Aleg	5,185	4	5	37	0	0	0			
Beli Poumedji	Boghé	59	4	5	1	6	1	0			
Silbé	"	199	4	5	13	6	1	0			
Tacnett	Magta Lahjar	120	3	3	3	6	1	0			
Dionaba	"	957	3	3	25	6	3	0			
Ferrala	M'Bagne	943	1	1	54	6	3	6			
Trarza											
N'Diago	Keur Massène	1,438	1	1	23	10	4	2			
Tagui Lallet	Méderdra	595	4	5	13	5	2	2			
Jedida	"	933	6	5	14	5	3	0			
Hassi El Ghoula	"	47	6	5	6	5	1	0			
Afadjiar Zebde	Oued Naga	210	4	5	4	6	1	0			
Simou	R'Kiz	370	4	5	12	5	1	0			
Jeder El-Mohguen	Rosso	493	1	1	3	5	1	0			
Abadah	"	826	4	5	28	5	2	2			
El Aedi	"	581	4	5	17	5	2	2			
N'Welki	Rosso	327	6	5	6	5	1	0			
Adrar										8	4
Atar	Atar	11,873	3	4	55	18	0	0			
Ksar Torchane	"	910	3	4	6	8	0	0			
Tagant										13	4
Nimlane	Tidjkja	1,214	3	4	39	6	3	2			
Ghoudiya	"	1,142	3	3	32	3	1	0			
Guidimaka											
Boguenza	Ould Yenge	1,808	2	2	4	12	5	2			
Selibaby	Selibaby	5,872	2	2	50	0	0	0			
Hassi Chegar	"	1,724	2	2	50	12	5	2			
Gourel Adama	Selibaby	136	2	2	4	6	1	0			
Inchiri											
Akjoujt	Akjoujt	6,706	6	6	81	18	18	8			
			Total		272	132	64	64		34	12

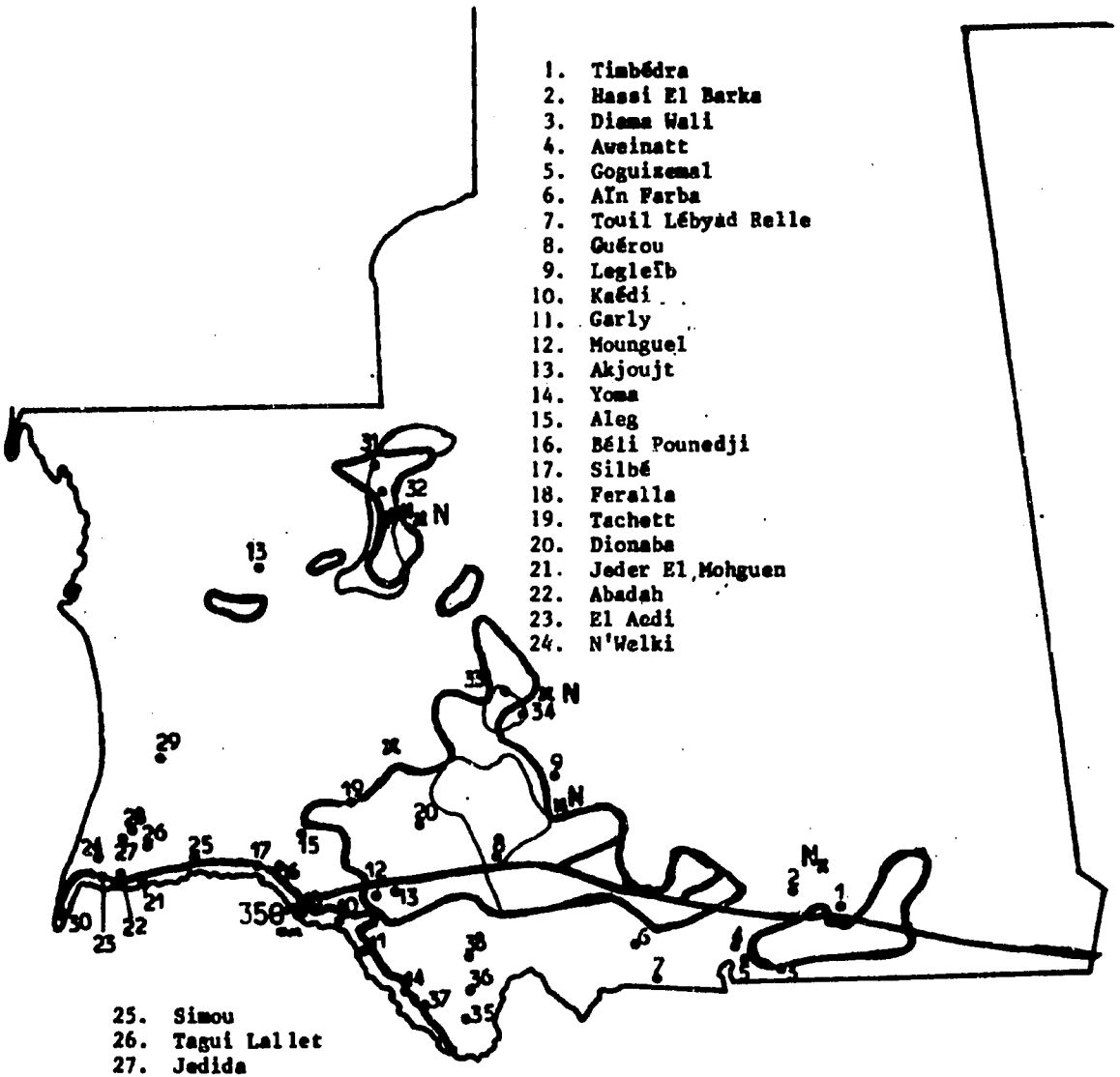
a) BCR, 1977 Census Provisional figure

b) R = Revenue; C=Consumption; N= Nutrition

Exhibit A-1b

Geographical Distribution of RAMS Survey

1979-1980



A.2 Household Revenue/Consumption/Nutrition (R/C/N) Survey

The objective of the survey was to collect data on income structures, modes of food and non-food consumption and budget patterns among the rural population. Additional information sought concerned market price fluctuations, nutritional levels and foodstuff demand.

Data gathered from this survey are analyzed in the following RAMS reports: Rural Household Consumption (AS-5), Rural Income (AS-6) and Nutrition (FSI-1). (For summary tables consult Chapter 4 of this report.)

2.1 Localities

For the Revenue/Consumption/Nutrition survey the initial group of 32 villages had to be reduced in half; thus, one out of 2 villages was randomly selected. This procedure was necessary due to the difficult nature of the survey. It required women enumerators in the four language groups (Hassaniya Wolof, Soninke, Poular) and it required 4 separate observations spread over the course of a year.

2.2 Secondary Units: Budgetary Units

Sixty four Budgetary Units (BU) were sampled recurrently during the course of a year which represented a sampling of approximately 1 in 1000 of the rural BU's.

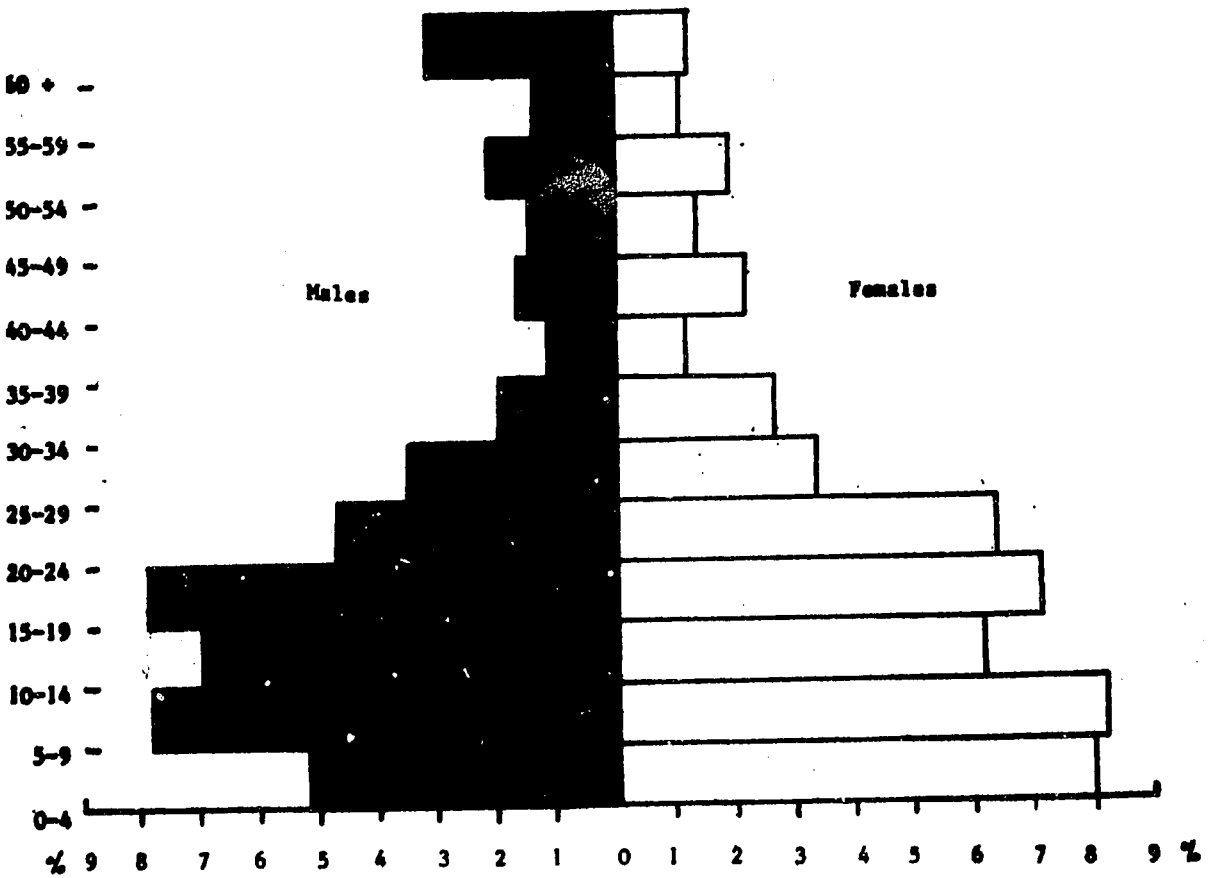
A minimum of 2 units were surveyed per village. In villages with large populations (over 1000), a proportionally greater number of consumption units were polled (See Exhibit A-1). Individual units were selected as follows:

> With the oldest mosque of the village to his back and facing north, the supervisor would walk five units north (blocks in towns, living units in villages), turn right and select the fifth unit on the right. Next, he would walk south and select the seventh unit on the right. Next, the supervisor turned west and selected the ninth unit on the right. This expanding spiral pattern of selection continued until the required number of households had been selected. In larger places like Kaedi, the sampling procedure was used on a ward basis.

Exhibit A-2 reconstructs the age pyramid of the sample population. It compares favorably with the national age distribution found in Chapter 2.

Exhibit A-2

Age Distribution of Individuals in RAMS Revenue/Consumption/Nutrition Household Survey (Sedentary and Nomad Population)



Total number of Males - 392
Females - 409

Total number of households - 76
Average size of households - 10.6

Source: RAMS 1979/1980 Revenue/Consumption/Nutrition Survey, 4th Observation including nomads.

2.3 Survey Organization

In order to gauge fluctuations in consumption and revenue patterns, four observations at approximately 3-month intervals (December 1979; March/June/July, and October/November 1980) were carried out within the same consumption units.

The enumerator spent 6 consecutive days per observation with each unit, allowing for a total of 24 days observation period during the course of the year.

At each observation, PAMS' enumerators found a small percentage (3 to 5 %) of budgetary units which had either moved to another location or had consolidated into larger units. In the former case, if the unit had moved more than 10 km, a replacement household was located by respecting size, ethnic grouping and type of housing. The supervisor located a surrogate by continuing on an easterly course until the unit with appropriate characteristics was selected.

In the second case, when the unit either increased considerably in size (due to the arrivals of extended family during the dry season) or decreased because of members moving on or getting married, no effort was made to find surrogates.

A nomad component was added to the fourth observation, surveying 34 revenue units and 12 consumption units in the Tagant, Adrar, Assaba and Hodh Charqui regions.

Encampments were selected randomly from a compass reading starting from a pre-determined site in each region. Each area selected represented a distinct type of nomadism based on predominant herd composition. Adrar for camel herding (long distance nomadism), Tagant and Assaba for goat herding (short distance nomadism) and the Hodh for cattle herding (medium distance nomadism).

2.4 The Questionnaires

The Revenue/Consumption/Nutrition Survey contained 5 essential components and supplementary sections. The main parts included:

1. Human Description of the Budgetary Unit (Exhibit A-4, Identification de l'Unité Budgetaire).
2. Meal Participants List (Exhibit A-5, Liste des Commensaux).
3. A Daily Acquisition Record (Exhibits A-6a through A-6f, Relevé Journalière des Acquisitions).
4. Meal Preparation List (Exhibit A-7, Repas Préparés dans la Concession).
5. Income (Exhibits A-8a through A-8f, Revenues des Ménages).

The three supplements included:

6. Food Preference Questionnaire (Exhibits A-9a & A-9b, Habitude Alimentaire).

7. Market-Price Survey (Same as Exhibit A-6, Enquête Marché).

8. Child Nutritional Level (Exhibit A-10a through A-10c, Fiche Alimentation des Jeunes Enfants).

A copy of each is included at the end of this section. A brief description follows:

1. A description of the Budgetary Unit lists in logical order the relatives who are dependents of the unit head. This situates members by age, sex, ethnic grouping, principal and secondary activity, and presence or absence at time of survey.

2. A meal-participant list required the name of each of the unit's members 2 years and older, plus visitors, and a place to mark their presence or absence at each of the 18 meals (morning, noon and evening) served during the six-day observation period. Nomads usually consumed one meal per day. Figures were adjusted accordingly. The purpose of this list was to determine per capita consumption and nutritional intake. The number of individuals participating in each meal varied daily and varied at each passage. Except for special occasions, there were fewer meal participants than members of the Budgetary Unit. Exhibit A-3 shows the variations in the number of meal participants and the size of the Budgetary Unit by ethnic grouping.

3. A Daily Acquisition Record consisting of 6 pages listed all food and non-food items generally consumed, their mode of acquistion (purchased, traded, received as gifts or home-produced), the quantity acquired, and the total price. Six sets of the list accompanied each questionnaire, one each for each day of observation. Enumerators were equipped with light-weight Roman scales for weighing. For goods obtained through non-monetary operations, a market price study (see below) allowed enumerators to calculate a unit price. The Acquisition Record adequately gauged the flow of consummables obtained on a daily basis. However, it tends to seriously bias one-time or episodic expenses such as rent, transport, taxes, luxury items and clothing, for which a 24-day observation period is too short. Since the nomad component was conducted but once, expenditures were obtained on a recapitulative basis, e.g., number of veils purchased since the last Moslem New Year. This produced results for major items but is inconclusive for less significant goods.

4. The Meal Preparation List accounted for each meal during the 6-day observation period and the nutritional elements which went into cooking pots. The enumerator had to weigh each product, describe its form at the time of weighing (e.g., grain with husk, goat meat with bone) and define its mode of acquisition. This exercise required the presence of the enumerator at each meal preparation. After each meal, left-overs were measured and recorded.

Other food items, such as zrig (a form of diluted and sweetened sour milk) and tea consumed at irregular intervals, were not recorded on this form. Frequency and approximate amounts consumed were entered into an Observation Notebook which was kept by each enumerator. These were compiled and used by the RAMS nutritionist to estimate average per unit consumption of these products.

5. The Revenue Survey required a separate questionnaire specifically designed to derive income data for all major rural occupations. By inference, the respondent was asked the occasion for selling agricultural products and the frequency. For those with livestock, a recapitulative table was used to establish the size of the herd and the frequency of off-take. Respondents were questioned on barter habits and savings techniques. While this may have been the most delicate part of the survey (parts were addressed to the women of the Budgetary Unit, parts to the men), a cross-verification of information and data obtained during successive observations permitted the reconstruction of revenue per unit compatible with expenditures. Sedentary and nomad revenue patterns are summarized in Chapter 4 of this report.

6. The Food Preference Questionnaire was a separate sheet whose objective was to survey the reasons and motivations for consuming certain products. Respondents 15 years and older in the BU were asked to choose products they desired to consume more of, if they had the income or if the product was more readily available. See Chapter 4 for the findings of this component.

7. Market Price Survey. For each of the villages a market survey was conducted, using a set of Daily Acquisition Records. The enumerator used the village market (or small shops) as reference points for current prices. Each enumerator conducted the survey during the 2nd, 3rd and 4th observations.

8. Child Nutritional Level. A separate three page questionnaire directed to mothers of children three years and under. Its objective was to help determine age of weaning, types of supplementary foods and frequency of feeding. The questionnaire was repeated during the second and third observations.

9. Others. Several additional components were included in the Household Revenue/Consumption/Nutrition Survey. These include data on occupational changes, on individual displacements (temporary and permanent), and on the nature of the rural habitat. The latter two are summarized in Chapter 4. Questionnaires are available at the Direction des Etudes et Programmation of the Ministry of Economy and Finance and at the USAID Nouakchott library.

Note: The questionnaires below are reproduced in their original French form.

Exhibit A-3

Fluctuation in the Size of the Budgetary Unit and Meal Participants During the Year for Selected Number of Surveyed Units

1979/1980

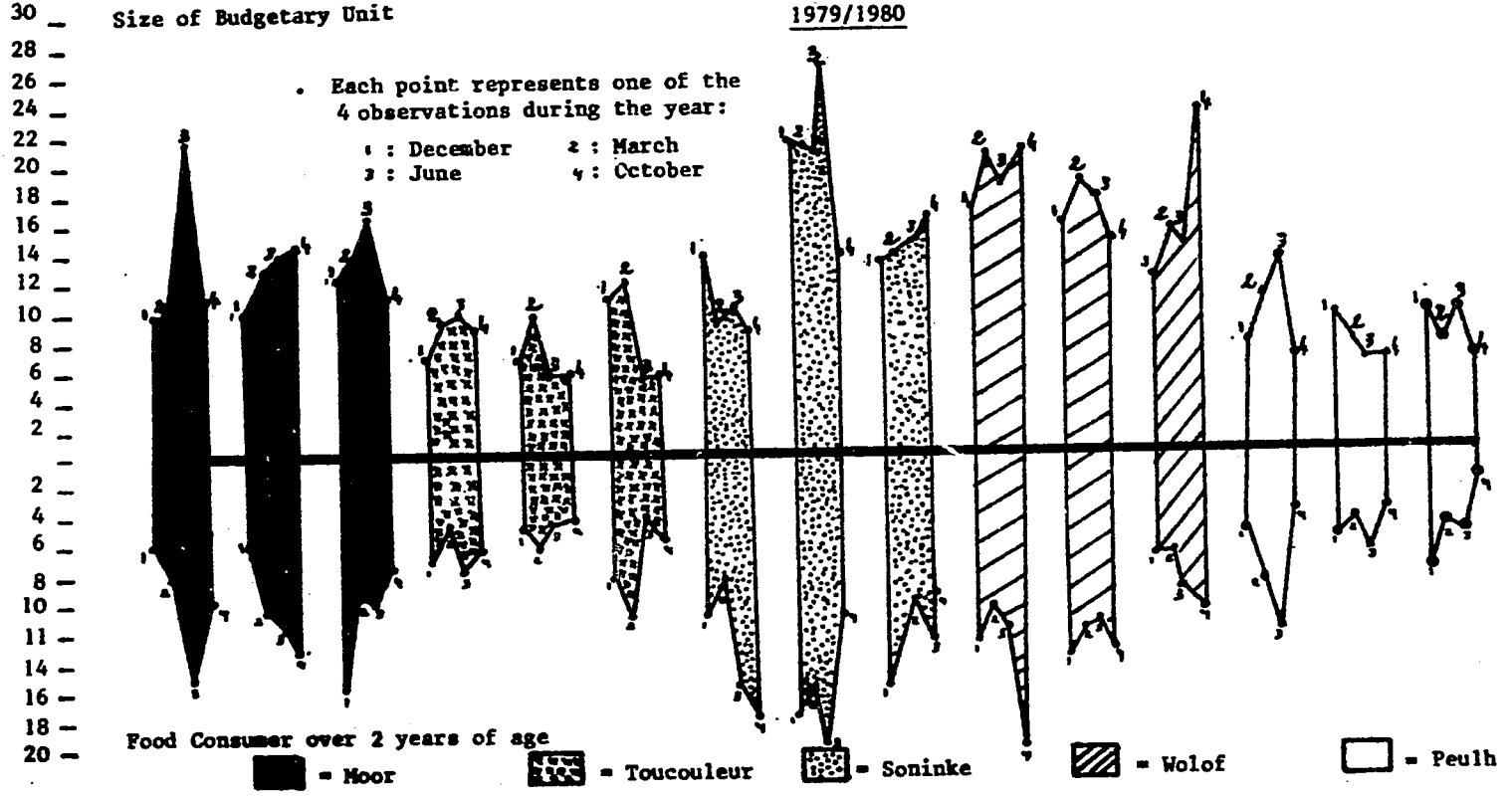


Exhibit A-4

1 - IDENTIFICATION DE L'UNITE BUDGETAIRE

1 - N° d'identification ____________ Semaine du ______________ au ____________ Village ____________

Chef de concession ____________________ Enquêteur ________________ Contrôleur ____________________

2 - Nom du chef de ménage ____________________________ Nom du chef de concession/campement ____________

Lien de parenté entre le chef de ménage et le chef de concession/campement ____________________

3 - Composition de la famille

N° de la personne	Nom de la personne	Lien de parenté	Sexe	Age	Etat Civil	Ethnie	Occupation ou activité principale	Occupation ou activité secondaire	Présente	Absente	Remarques particulières
1	2	3	4	5	6	7	8	9	10	11	12

Exhibit A-5

Liste DES COMMENSAUX : toutes personnes plus de 2 ans ayant participé au repas

Semaine du ____________ au ____________ N°. du ménage ______________ Ethnie ____________

ENQUETEURS ______________________ VISA du contrôleur ____________________

N°. d'ordre 1	Nom 2	AGE 3	SEXE 4	1er jour			2e jour			3e jour			4e jour			5e jour			6e jour			Observation
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	

Exhibit A-6a

Relevé Journalière des Acquisitions Produit Alimentaire I

Jour 1, 2, 3, 4, 5, 6 Journée du _____ No du Ménage _____

Enquêteur _____ Visa du Contrôleur _____

Code	Désignation des Produits	Quant. en grs litre	Valeur Monétaire	Mode d'Acquisition				
				Achat (A)	Troc (T)	Cadeau (C)	Autre (O)	Auto-conso (P)
01100	Céréales Transformées							
01	Pain							
02	Pâte alimentaire							
03	Semoul blé							
04	Couscous blé							
05	Farine blé							
06	" maïs							
07	" sorgho							
08	" riz							
11	Biscuits							
12	Patisserie							
13	Beignet							
14	Kseur et laïche							
01200	Céréale en Graines							
15	Mil							
16	Sorgho							
17	Maïs							
18	Blé							
19	Orge							
20	Riz décortiqué							
21	Riz brizure							
01300	Légumineuses							
22	Pois chichi							
23	Petits pois							
24	Haricots verts							
25	Lentille							
26	Niébé, haricots secs							
27	Arachide décortiqués							
28	Arachide coque							
01400	Legumes							
29	piment frais							
30	piment sec							
31	tomate fraiche							
32	Concentré de tomate							
33	Oignon frais							
34	Oignon sec							
35	Ail							
36	Navet							
37	Carotte							
38	Radis							
39	Betterave rouge							
40	Poireaux							

Relevé Journalier des Acquisitions — Produits Alimentaires II

Jour 1, 2, 3, 4, 5, 6, — Journée du _____ No. du Ménage _____

Enquêteur _____ Visa du Contrôleur _____

Code	Désignation des produits	Quant. en grs ou lit.	Valeur Monétaire	Mode d'Acquisition: Achat (A)	Troc (C)	Cadeau (C)	Autr. (A)	Auto cons. (P)
01400	(suite) Légume							
01441	Epinards Hako feuilles							
	Haricots frais							
98	Hako feuilles sechs							
42	Choux							
43	Salade							
44	Persil							
45	Pomme de terre							
46	Aubergine							
47	Courge							
48	Courgette							
49	Concombre							
50	Tamarin							
51	Combo frais							
97	Combo seché							
52	Patate douce							
53	Lalo sec							
99	Lalo frais							
54	Manioc							
55	Oseile							
01500	Fruits							
56	Mandarine							
57	Orange							
58	Citron							
59	Lime							
60	Figue seche							
61	Raisin							
62	Raisin sec							
63	Pomme							
64	Melon/Pasteque							
65	Pasteque/Graine entie.							
66	Figue de Barbarie							
67	Datte verte blah							
68	Datte noire sechée							
69	Olive verte							
70	Olive noire							
71	Amande							
72	Carroube							
73	Banane							
74	Jujube							
75	Pain singe							
76	Miro blane							
96	Mangue							

Relevé Journalier des Acquisitions — Produits Alimentaires III

Jour 1, 2, 3, 4, 5, 6, journée du _____ No du Ménage _____

Enquêteur _____ Controleur _____

Code	Désignation des Produits	Quant. en grs ou lit.	Valeur Monétaire	Mode d'Acquisition				
				Achat (A)	Troc (T)	Cadeau (C)	Aut. (O)	Auto-consom. (P)
01600	Viande avec os							
77	Mouton							
78	Boeuf							
79	Caprin							
80	Chameau							
81	Volaille/Lapin							
82	Gibier							
90	Viande sèche							
	Viande sans os							
01641	Mouton							
42	Boeuf							
43	Caprin							
44	Chameau							
45	Viande sèche							
01700	Animaux vivants							
83	Mouton							
84	Bovin							
85	Caprin							
86	Chameau							
87	Volaille							
88	Lapin							
89	Gibier							
01900	Poisson							
A1	Seché							
A2	Frais							
A3	Thon en conser.							
A4	Sardine en conser.							
A5	Fruit de mer							
A6	Crustacés							
19100	Produits Laitiers							
B1	Lait vache frais							
T1	caillé							
B2	chèvre frais							
T2	caillé							
B3	brebis frais							
T3	caillé							
B4	chamelle frais							
T4	caillé							
B5	Petit lait vache							
B6	" " chèvre							
B7	" " brebis							
B8	" " chamelle							
B9	Lait conden.sucré							
C1	Lait poudre sucré							
C2	" " non sucré							
C3	Yaourt							
C4	Fromage							
C5	Beurre							
C6	Oeufs							

Relevé Journalier des Acquisitions — **Produits Alimentaires**

Jour 1, 2, 3, 4, 5, 6 journée du _____ No du Ménage IV _____

Enquêteur _____ Contrôleur _____

Code	Désignation des Produits	Quant. en gramme ou l.	Val. monétaire	Mode d'Acquisition				
				Achat (A)	Troc (T)	Cad. (C)	Aut. (O)	Autoons. (P)
19200	Sucre et Produits Sucrés							
C7	Sucre morceaux							
C8	" poudre							
C9	" pain							
D1	" glacé							
D2	Bonbon							
D3	Confiture							
D7	Miel							
D8	Chocolat							
19300	Huile et Corps Gras							
E1	Huile d'olive							
E2	" d'arachide							
E3	" de palme							
E4	" mélangé							
E5	Graisse animale							
19400	Sel et Condiments							
G1	Sel							
G2	Poivre							
G3	Camou/cumin							
G4	Vinaigre							
G5	Menthe							
G6	Cube Maggie							
19500	Boissons							
H1	Thé							
H2	Café							
H3	Boisson gazeuse							
H4	" non gazeuse							
H5	Eau minérale							
H6	Jus de fruit							
H8	Bonbon glacé							
H9	Zrig							
I1	Tajmoukht							
19600	Divers							

Relevé journalier des Acquisitions — Produits d'hygiène Energetique Eau Potable V

Jour 1, 2, 3, 4, 5, 6 journée du _____ No du Ménage _____

Enquêteur _____ Contrôleur _____

Code	Désignation des produits	Quant. en grs ou lit.	Valeu. Monétaire	Mode d'acquisition A	T	C	a	Auto-conso p
02100	Médicament moderne							
	Médicament traditionnels							
02200	Soins corporels							
J1	Coiffure							
J2	Bain-douche							
J3	Produit beauté							
J4	Dentifrice							
J5	Crème à raser							
J6	Brosse à dent							
J7	Savon toilette							
J8	Shampooing							
J9	Lames à raser							
K1	Rasoir							
K2	Eau de cologne							
K3	Henné							
K4	Savon noir							
K5	Karité							
02300	Entretiens							
L1	Savon de Marseil							
L2	Détergent							
L3	Cristeaux							
L4	Eau de javel							
L5	Insecticide							
L6	Balai							
L7	Brosse							
L8	Cirage							
L9	Teinture							
03100	Produits Energetique							
M1	Eau potable							
M2	Electricité							
M3	Gaz en bouteille							
M4	Pétrole							
M5	Charbon bois							
M6	Bois							
M7	Mazout							
M8	Alcool à brûler							

Exhibit A-6f

Relevé journalier des Acquisitions — Produits et Services Divers — VI

Jour 1, 2, 3, 4, 5, 6 journée du _____ NO du ménage _____

Enquêteur _____ Contrôleur _____

Code	Désignation des produits	Quant. en grs ou lit	Val. Monétaire	Mode d'Acquisition				
				Achat A	Troc T	Cadeau C	Aut. C	Auto-consom.
04100	Logement							
N1	Loyer							
	Charge d'habitat							
04200	Transport							
Ø1	Taxi							
Ø2	Autobus/car							
Ø3	Camion							
Ø4	Véhicule privé							
Ø5	Carburant							
Ø6	Lubrifiant							
04300	Loisirs							
P1	Cinéma							
P2	Autres spectacles							
P3	Journeaux							
P4	Livres							
P5	Jouets							
P6	Photo							
P7	Disques							
P8	Poste radio							
P9	Poste télé.							
Q1	Tourne disque							
Q2	Tabac							
Q3	Cigarettes							
Q4	Allumettes							
Q5	Briquets							
Q6	Cadeaux							
Q7	Pierre à feu							
04400	Divers							
R1	Scolarité des enfants							
R2	Bijoux							
R3	Montre							
R4	Impôts							
R5	Taxes							
R6	Cotisation							
R7	Don en espèces							
R8	Dons en nature							
R9	Prêts d'argent							
S1	Remboursement							
S2	- de dettes privées							
S3	- d'emprunts							
04500	Habits/chaussures							

A.20

Exhibit A-7

6. Repas préparés dans la concession

Semaine du au Village Chef de concession

Jour repas cuisine Enquêteur :
Visa contrôleur :

Nom du plat	Produits ; espèce, type	Poids en grammes			Origine	Mode d'utilisation
		brut	tare	net		
1	2	3	4	5	6	7

REVENUS DES MENAGES

Chef de Ménage _____

Village _____ Enquêteur _____

Région _____ Visa du Contrôleur _____

ZAE _____

Le Questionnaire a 8 Sujets Principaux

Cette partie intéresse les cultivateurs, les éleveurs et autres. Il a pour objectif de reconstituer les revenus des unités budgétaires à travers les produits vendus, leur quantité et leur prix unitaire.

- Pour les agriculteurs ou cultivateurs les produits peuvent être mil, sorgho, maïs, ... Il suffit de compléter le tableau;
- Pour les éleveurs, le questionnaire permet de reconstituer les revenus à travers les ventes d'animaux par espèce et aussi les produits dérivés depuis une date déterminée (en général depuis le Ramadan).

Au No. 3 : Le questionnaire interroge si les membres de l'unité budgétaire ont des revenus secondaires comme: salariés, pêcheurs, commerçants, transferts d'argents;

Au No. 4 : Le questionnaire essaie d'estimer le revenu des unités budgétaires à travers le troc et d'en estimer la valeur;

Au No. 5 : Le questionnaire essaie d'estimer le revenu des unités budgétaires par les opérations en nature;

Au No. 6 : Le questionnaire interroge si l'unité budgétaire ne fait pas d'épargne à travers les bijoux, les dépenses de mariage, achat de radio, tente, nattes, etc.

---

1. Quelles sont les raisons essentielles pour lesquelles vous vendez une grande partie de votre recolte? (Crochez a, b, c ou d)

a) /__/ Fêtes? Pour les /__/ /__/ /__/ fêtes de l'année.
1 2 3

b) /__/ Mariages? Avez-vous eu depuis le dernier Ramadan? /__/ /__/
Oui Non

c) /__/ Autres raisons essentielles? Préciser /_____/

d) /__/ Ne vend jamais.

1.2 Pouvez-vous évaluer les quantités que vous avez vendu?

a) Type et quantité vendu pour raison de fête?

b) Type et quantité vendu pour raison de mariage?

c) Type et quantité vendu pour autres raisons?

	Quantité	Prix
Mil		
Riz		
Maïs		
Dattes		
Autres		

(Préciser l'unité de mesure) pour a)___, b)___ c)___

2. Quelles sont les raisons essentielles pour lesquelles vous vendez une partie de votre bétail? (Crochez a, b, c ou d)

a) ☐ Fêtes? Pour les ☐ ☐ ☐ fêtes de l'année.
1 2 3

b) ☐ Mariages? Avez-vous eu depuis le dernier Ramadan? ☐ Oui ☐ Non

c) ☐ Autres raisons? Préciser ☐

d) ☐ Ne vend jamais.

2.2 Pouvez-vous évaluer le nombre de bêtes vendu depuis le dernier Ramadan?

	Nombre	Valeur/Tête
Chameaux		
Vaches		
Chèvres		
Moutons		
Autres		

2.3 Pouvez-vous évaluer la somme reçue depuis le dernier Ramadan en vendant

	Quantité/an	Prix
Lait, Beurre		
Peaux		
Poils (Oubar)		
Laine		
Autres		

3. Vous ou les membres de votre famille pratiquent-ils une autre activité? ☐ Oui ☐ Non Combien de personne? ☐

Si oui, laquelle?

	Combien rapportent-elles/mois/an
Pêche	
Artisanat	
Eleveurs	
Commerçant	
Autres	
	Argent envoyé de l'étranger

4. Faites-vous du troc? ⌊_⌋ Oui ⌊_⌋ Non

Entre quoi et quoi? ⌊_____⌋ et ⌊_____⌋

Combien de fois par an? ⌊_____⌋

4.2 Pouvez-vous évaluer la valeur du troc? ⌊_____⌋ (mois/an)
(Rayez un)

5. Recevez-vous des produits pour motifs de cadeau ou de charité?

⌊_⌋ Oui ⌊_⌋ Non

Si oui, lesquelles?	Quantité	Valeur	Nombre de fois/jour/mois/an (Rayez un)

6. Demander à l'homme (sans la présence de la femme)

6.1 Avez-vous acheter des bijoux depuis le dernier Ramadan? ⌊_⌋ Oui ⌊_⌋ Non

Si oui, pour combien? ⌊_____⌋ UM

6.2 Demander à la femme (sans la présence de l'homme)

6.2.2 Portez-vous des bijoux? ⌊_⌋ Oui ⌊_⌋ Non

Si oui, donner la valeur des bijoux. ⌊_____⌋ UM

6.2.3 Recevez-vous des bijoux depuis le dernier Ramadan? ⌊_⌋ Oui ⌊_⌋ Non

Si oui, combien de fois? ⌊_⌋ Valeur totale ⌊_____⌋ UM

7. Combien avez-vous dépensé pour votre mariage? ⌊_____⌋ UM
(quelle année? ⌊_____⌋

Combien avez-vous dépensé pour le mariage de:
votre fils? ⌊_____⌋ UM Quelle année? ⌊_____⌋
votre fille? ⌊_____⌋ UM Quelle année? ⌊_____⌋

8. Avez-vous acheter des objets de valeur (bicyclette, radio, voile, tente) depuis le dernier Ramadan? ⌊_⌋ Oui ⌊_⌋ Non

Si oui, quoi? ⌊_____⌋
Combien? ⌊_____⌋ UM

40

Question Elevage : Cheptel Enquête B 4

	Effectif au début	Effectif à la fin	Effectif acheté (12mois)	Effectif vendu (12mois)	Effectif décédé (12mois)	Observations
Bovin						
Ovin						
Caprin						
Camelin						

2) Naissance

	Effectif femelle dans le troupeau	Effectif né vivant	Effectif né mort	Effetif né mort pendant les 6 premiers mois	Observations
Vache					
Brebis					
Chèvres					
Chamelles					

3) Produits consommés et vendus

	Bovin		Ovin		Caprin		Camelin		Observations
	Consommé	Vendu(kg)	Cons	Vendu	Cons	vendu	Cons	Vendu	
Lait(L)									
Viande(kg)									
Autres									

4) Vente et Prix

	Prix/litre	Prix/tête	lieu vendu (distance de la résidence)	période	Observations
Bovin					
-Lait					
-Viande					
-Autres					
Ovin					
Caprin					
Camelin					

5) Main d'oeuvre

	Nombre	Salaire/ jour/mois/ an	Salaire en (quoi)	Nature	Autres
Famille					
salariés					

Question agriculture : Culture

No de la parcelle	Surface (ha)	Culture	Production (kg)	Autoconsommation (kg)	Semences égrenées (kg)	Vente (kg)

Produits vendus	Quantité (kg)	Prix/unité (UM)	Marché (distance km)	Vente à intermédiaire ou vente directe	Observations

3) **Statut de la Terre et Crédit**

Modèle de faire valoir — direct ☐ indirect ☐

Statut de la terre — ☐ oui ☐ non

si oui — paiement ☐ nature ☐ combien/mois/an ; ☐ argent ☐ combien/mois/an

Crédit — emprunt ☐ oui ☐ non

si oui montant emprunté ☐ Durée ☐

montant rendu ☐

autres formes de crédit ☐ tontine ☐ autres

4) **Coût**

	Main d'oeuvre total journée/hommes (1)	jour/salarié (2)	Coût total (1)X(2)=	(engrais insecticide semence) Q	C	Equipement Q	C	Observations
Preparation du sol								
Binage								
Semis								
démariage								
Saclage								
Irrigation								
Fertilisation								
Récolte								

Nutrition

Habitudes Alimentaires

Nom_____
Prénom_____
Sexe M ou F /____/
Age an /____/
Ethnie_____

Zone Agro-Ecologique_____
Village_____
No . Ménage_____
Date_____
Enquêteur_____
Visa Contrôleur_____

1 Code	2 Aliments	3 Raisons pour lesquelles l'aliment est consommé	4 Désir d'en consommer plus
01	Boeuf		
02	Mil sorgho		
03	Patate		
04	Pain		
05	Sucre		
06	Riz		
07	Lait frais Lait caillé		
08	Mouton		
09	Maïs		
10	Poisson frais		
11	Chameau		
12	Beurre		
13	Thé		
14	Légumes frais		
15	Niébé		
16	Pomme de terre		
17	Poisson séché		

Exhibit A-9b

Nutrition

1 Code	2 Aliments	3 Raisons pour lesquelles l'aliment est consommé	4 Désir d'en consommer plus	
18	Poulet			
19	Fruits			
20	Huile			
21	Arachide			

Note d'Instruction

1. Questionnaire à utiliser dans chaque famille en interrogeant tous les membres de la famille hommes et femmes de plus de 15 ans.

2. Dans la colonne trois, il s'agit d'inscrire les réponses à la question : "Pourquoi consommez-vous du bo , du mil ou du sorgho... ?"

3. Dans la colonne quatre, il faut inscrire en chiffres de 1 à 5 par ordre de préférence les cinq aliments dont la personne enquêtée désire augmenter la consommation.

Nutrition Exhibit A-10a Alim. Enf.

FICHE ALIMENTATION DES JEUNES ENFANTS

Remarques

1. Ce questionnaire ne concerne que les enfants âgés de moins de trois ans, bien entendu les questions seront posées à la mère de l'enfant.
2. Age au sevrage (question No. 6) il faut comprendre l'âge de l'enfant au moment ou il ne tête plus du tout sa mère

Date :
Enquêteur :
Visa Contrôleur :

Zone Ecologique :
Village :
No. Ménage :

ENCART IDENTITE

Date de naissance :
Prénom :
A-t-il d'autres prénoms ?
A-t-il des surnoms ?
Nom de la mère :
Nom du père :
Ethnie :

Date de la fin de grossesse |__.__|__.__|__.__|
jour mois an

Issue de la grossesse

avortement ☐ mort né ☐ né vivant ☐ jumeaux ☐ 40

(prévoir un questionnaire intercalaire pour l'autre)

Exhibit 10b

1) Aujourd'hui l'enfant est vivant ☐ décédé ☐

(passer en 4)

2) Date du décès ¦__,__¦__,__¦__,__¦ âge ☐

jour mois an " précisez: mois, années

NSP ☐

3) Quels symptômes présentaient l'enfant avant le décès

diarrhée ☐ fièvre ☐ rougeole ☐ infection respiratoire ☐

autre ☐ accident ☐

4) L'enfant est-il nourri au sein ? oui ☐ non ☐

(passer en 6)

5) Est-il nourri au sein par sa mère ? ☐ par une autre personne ☐

laquelle ?_____

6) Si l'enfant n'est plus nourri au sein, à quel âge a-t-il été sevré?

¦__¦__¦ âge en mois NSP ☐ (*)

☐ n'a jamais été nourri au sein

Si la mère est enceinte actuellement

7) Avez-vous sevré cet enfant avant ou après vous être aperçue que vous étiez enceinte ?

avant ☐ au même moment ☐ après ☐

(passer en 9)

8) Combien de mois après ¦__¦__¦ mois

9) Comment l'enfant est-il nourri ?

à la demande ? ☐ à heure fixe ? ☐

10) Si l'enfant est nourri au sein, d'autres aliments sont-ils utilisés ?

oui ☐ non ☐ ⟶ (fin)

47

a) Lait maternel seul ☐
b) Lait maternel et jus de fruit ☐
c) Lait maternel et de temps en temps d'autres aliments ☐
d) Lait maternel et aliment supplémentaire chaque jour ☐

11) Si des aliments complémentaires sont donnés, quel âge avait l'enfant lorsque la mère a commencé à donner des aliments autres que le lait maternel ?

a) âge en mois |___|___|

b) combien de fois par jour l'enfant bénéficie-t-il d'aliments complémentaires ? ☐

12) Aliments donnés à l'enfant

a) lait frais de vache ☐ de chèvre ☐
b) lait caillé de vache ☐ de chèvre ☐ de chamelle ☐
c) lait conservé acheté, lait en poudre ☐ lait concentré sucré ☐
d) céréales : riz ☐ millet ☐ sorgho ☐
sous quelle forme ? _____
e) aliments riches en protéines,
viande Nbre fois par semaine ☐
poisson Nbre fois par semaine ☐
oeufs Nbre fois par semaine ☐
f) légumineuses (arachide) Nbre fois par semaine ☐
g) tubercule, patate douce, manioc Nbre fois par semaine ☐
h) autres aliments, lesquels ? _____

13) Utilisez-vous des aliments pour enfant, achetés dans le commerce ?

oui ☐ non ☐

4.3 Labor and Manpower Survey

3.1 Employment

The survey collected information from four categories of workers:

- self-employed
- non-paid family workers
- salaried non-domestic workers
- unemployed workers.

The major data elements collected from each worker were:

- occupational history
- secondary economic activity
- number of job changes in the last 5 years
- urban/rural job 5 years ago
- urban/rural job now.

RAMS reports which analyze the data gathered in this survey are: Employment Situation (FS 2-1) and the Employment Supplement (FS 2-2). For summary tables consult Chapter 3, Human Resources, of this report.

3.1.1 Localities

Seven urban centers, Zourate, Rosso, Nouakchott, Atar, Akjoujt, Kaedi and Nouadhibou, were surveyed, in addition to the 32 rural villages, this in recognition of the importance of the urban labor market in relation to rural/urban migration.

3.1.2 Secondary Units: Households

This survey consisted of a random sampling of 800 households, of which 132 were in the rural sector and 668 in urban centers.

The selection process in rural villages was similar to that used in the Revenue/Consumption/Nutrition surveys, using the locality's mosque as a point of departure (see Section 2.2 of this Annex).

For Nouakchott the first step was to number each house, except for the shanty area. Maps for central Nouakchott were obtained from the Division of Statistics at the Ministry of Economy and Finance and from SONELEC (the national water and electricity distribution company). Once the houses were numbered, a random sample of 240 houses was taken of the central portion of the city. When a house was found to contain more than one household, the first household on the right of the entrance was selected for the study.

For the "external portion", defined as areas that contain residential tents and shanties not recorded on available maps, a different technique was used. The population was estimated to be half as large as the population in central Nouakchott, so the sample size was set at 120.

Households were selected for the sample in the external portion of the city in the following manner:

All water distribution points were located. In Nouakchott, the survey supervisor stood at each water point with his back towards the central mosque. He walked forward five houses and selected the fifth house on the right until he reached the desert. Next, he returned to the starting point and walked towards the central mosque, again selecting every fifth house on the right until he reached the edge of town. Next, he returned to the water distribution point, again with his back to the central mosque in the city, turned 90 degrees to the left and repeated the same procedure. If he had not selected 10 houses when he reached the desert, he returned and continued in a straight line in the opposite direction until a total of 10 houses were selected.

For Nouadhibou, maps existed for the central permanent portion of the town and for the mining company section referred to as Cansado, located about 10 kilometers to the south. Houses were numbered in Cansado and a random sample of 32 households was selected. The remaining portions of Nouadhibou, mapped and unmapped, were divided into seven neighborhoods. Judgements were made about the relative size of the seven neighborhoods. These proportions were used to distribute the remaining sample of 88 households.

Central points such as schools, major stores and mosques were selected and used as the starting location for the selection of households. The method of household selection was the same used in Nouakchott.

For all of the other urban towns in Mauritania, that is, Atar, Rosso, Kaedi, Akjoujt and Zouerate, the same system was used.

3.1.3 Questionnaire

A sample copy of the questionnaire is included in the Employment Supplement Report (FS 2-2).

3.2 Employment in Business Establishments

The survey was a census of the 199 businesses employing 5 or more persons in the six largest cities and towns in Mauritania: Nouakchott, Nouadhibou, Zouerate, Rosso, Kaedi and Kiffa.

Information collected included:

- Number of firms by size of labor force (1-14, 15-49, 50-99, and 100+ employees)
- Employment by sector/size/% male/% Mauritanian/% other foreigner
- Salaries by occupational group and grade
- Apprentices by trade
- Actual education, training and experience by occupational group
- Total average turn-over of workers
- Forecast of manpower shortage by occupational group
- Minimum desirable education, training and experience by occupational group
- Means of recruitment by occupational group

The Ministry of Employment & Professional Training's role in the Establishment Survey was to supply labor inspectors who assisted with the distribution and collection of the questionnaires.

3.2.1 Survey Organization

The survey was conducted during the period March through June 1980. Questionnaire distribution and responses are summarized below:

	Number of Questionnaires Distributed	Number of Questionnaires Returned	Rate of Response	Number of Partial Responses a)	Number of Non-Responses
Nouakchott	144	100	69%	36	8
Nouadhibou	29	29	100%		
Zouerate	13	13	100%		
Rosso	4	4	100%		
Kaedi	7	7	100%		
Kiffa	2	2	100%		
Total	199	155	78%	36	8

a) Employers refusing to complete the questionnaire but submitting a list of their employees by occupation.

3.3 The Non-Structured Sector Survey

This survey consisted of a census of all business establishments in Nouakchott employing less than five workers. It was undertaken in mid-1980.

A total of 11,677 establishments were identified, of which 80% were located in the central portion of town and the rest in the shanty and tent peripheries.

3.3.1 Methodology

Members of the study team drove or walked through all streets in Nouakchott listing the establishments they saw that might be considered as part of the non-structured sector. The economic activity of each establishment was recorded.

Interviews were not conducted, however, with members of these establishments. Consequently, the specific number of employees in each is unknown; some may actually have had more than five; however, no establishment was counted in both this survey and the Establishment Survey.

Data gathered in this survey are analyzed in RAMS' Employment Situation Report (FS 2-1). A summary table is in Chapter 3, Human Resources, of this report.

A.4 Professional Skills Survey

The 1979 RAMS skills survey gathered data to help develop a strategy to improve and create employment in towns and rural areas. Most employment generation efforts to date have centered on the urban modern sector.

Consequently, there is a lack of data on the traditional rural sector, particularly as concerns types of skills needed to increase productivity and expand employment.

The survey consisted of six questionnaires designed to assess skills and qualifications of the following categories:

Questionnaire	Numbers in sample
Herders	107
Cultivators	389
Shopkeepers	62
Craftsmen	181
Fishermen	22
Women	318
	1,079

Data elements gathered for all groups (except women) were:

- Occupational shifts of father/son
- Time in occupation
- Functional description of occupation
- Manpower employed
- Duration of apprenticeship without pay
- Number of apprentices trained
- Number and reasons for trainee turn-over
- Business/work-related difficulties
- How knowledge was acquired
- Secondary activities
  - why practiced
  - how learned

Data elements analyzed for women were:

- Number of children by age/sex
- Responsibility for childrens' education
- Types of schools
- Family education
- Secondary activity
- Commercial activity
- Acquisition of trade

Information gathered in this survey is analyzed in the report on Non-formal Education (SS-3). For summary profile tables, consult Chapter 3, Human Resources, of this report.

4.1 Localities

For this survey a purposeful sample of 7 villages was added to the original 32, since not all the professions and types of agriculture practiced in Mauritania were sufficiently represented in the original group. Specifically the original list lacked representation in the number of workers in the following professions:

- Craftsmen
  - metal
  - leather
  - textile
- Traders
- Cultivators practicing
  - oasis farming
  - irrigated agriculture

The seven villages were selected from a list of ninety-five with a population of 1,000 or more, whose professional population equaled or exceeded the regional average for the five professional groups under study and whose type of agricultur was insufficiently represented in the earlier sample.

The increase in the sample is not considered to have significantly disturbed the randomness of the total sample. Moreover, the skills assessment was intended to provide primarily indicative trends, useful for follow-up studies.

Exhibit A.1 lists the sample villages, their 1977 population and the distribution of questionnaires by type.

4.2 Secondary Units: Individuals

It was decided that approximately 1,000 individuals could be sampled within the primary units retained for this survey.

Using 1977 census village figures on total individuals in the five professional groups, 867 interviews were distributed in proportion to the size of each group in the primary units.(3)

In each village the enumerator conducted an interview with the wife of every third respondent. Thus, a total of 1,079 questionnaires was processed.

Specific individuals were selected as follows: the central village authority (chief or elder) was asked to help establish a list of individuals using criteria such as

- Members of existing cooperatives
- Beneficiaries of a food aid program
- Members of a professional group.

From this list names were taken randomly to obtain the appropriate number of persons in each group.

The households interviewed for the Rural Production survey were randomly selected from the Professional Skills listings in accordance with the number of Production Questionnaires require' from each village. Under these circumstances, some individuals were surveyed twice in a locality, once as individual professionals, and secondly as members of the Production Unit.

---

(3) A total of 119 individuals either could not be reached or provided insufficient information.

4.3 The Questionnaires

Copies of the six skills questionnaires are not reproduced in the Annex due to their size. Bound copies are available at the Ministry of Economy and Finance Documentation Center and at the AID Library in Nouakchott.

A.5 Production Survey

The objective of this survey was to gather data on modes of crop and animal production. Given the multi-occupational nature of the rural Mauritanian, it was decided at the outset to combine, in one questionnaire, sections on the five basic types of crop agriculture (Oualo, Fondé, irrigated, recessional, oasi and every type of animal farming -- cattle, camel, sheep and goat, donkey and poultry. This explains in part the complexity of the questionnaire. No single production area was found to practice all types of agriculture, although nearly 50% of the surveyed units practiced combined crop farming with some form of animal herding.

Data elements analyzed for all groups included a composite of the production unit. For animal production, key elements for each type of herd included:

- size, composition and movement
- production
- auto-consumption
- marketing
- modes and costs of herd up-keep

For crop production, key elements for each type included:

- surface cultivated and method of cultivation
- investment and tools
- labor use and costs
- auto-consumption and marketing

Information gathered in this survey is analyzed in all sub-sectorial studies, except the Fisheries (SS1-4). Unfortunately, the reliability of some responses was insufficient. It was evident that there had been inadequate questionnaire preparation and testing, and some questions were not well suited for the single observation model adopted.

5.1 Localities

The Rural Production survey was conducted in each of the 32 sample villages. In order to obtain better representation in oasis production, two villages in the Adrar, Atar and Ksar Torchane, were added. These two villages figured into the sample of the Professional Skills survey.

5.2 Secondary Units: Production Units

RAMS decided that 6 production units (PU) could be interviewed within each of the 34 sample villages.

An additional 63 units were surveyed in 8 of the largest towns, giving a total of 267 surveyed production units. The distribution of PUs are shown in Exhibit A.1 of the Annex.

Production Units were selected from the list of individuals established for the Professional Skills survey (see Section 3, Professional Skills, of this Annex). The number of individuals in the Skills survey was divided by six. The resulting quotient was used to count off every n-th individual. The PU of which that person was a member became the selected secondary unit.

A.6 General Remarks

1. On the whole, RAMS met little resistance by local authorities to having their area surveyed. In fact, the opposite was often the case; a village tended to feel honored at being especially selected for attention by "Nouakchott". On occasion, the village head personally demanded that his family be included as a condition for undertaking a survey in his area. In certain isolated areas, the nutrition surveyors tended to be associated with anticipated food distribution programs. This perception may have caused a few households to modify their consumption downwards during the survey period.

2. The generally positive attitude towards participation in surveys was evident at the individual level as well, once people recognized their selection was entirely on the random basis. This is a traditionally familiar concept.

3. Nomads, however, tended to be considerably more uncertain. even apprehensive, their experience with outside elements having been generally negative. Accurate information on revenue and wealth were markedly more difficult to obtain.

4. It should be emphasized that all of the findings of the survey should be considered as indicative, and subject to further detailed investigations.

Production Units (PU) and Numbers of People by Region and Agro-Ecological Zones

	Zone I		Zone II		Zone III		Zone IV		Zone V		Zone VI		Total	
	PU	No. of People	PU	No. of People	PU	No. of People	PU	No. of People	PU	No. of People	PU	No. of People	PU	No. of People
Hodh Charqui							6	41					6	41
Hodh Gharbi			11	72	5	22	8	41					24	135
Assaba					1	5	2	22	8	111			11	138
Gorgol	37	352	6	28	17	125							60	505
Brakna	5	30			12	138			9	59			26	227
Trarza	17	182					43	247					60	429
Adrar							26	254					26	254
Tagant					3	21	5	25					8	46
Guidimaka			30	303									30	303
Inchiri											16	181	16	181
Total	59	564	47	403	38	311	90	630	17	170	16	181	267	2259

Chapter 0: Introduction

Table of Contents

0.1 General Overview

A major task of the Rural Assessment and Manpower Surveys (RAMS) project was to produce baseline studies of the rural sector and other functional areas as tools for development planning. Compared to many other developing countries, reference material on Mauritania may seem somewhat limited. In RAMS' experience, however, a good deal of information was uncovered. It was more often than not laborious to track down, incomplete and, for lack of critical source reference, of unknown accuracy and relevancy.

This Compendium has a twofold purpose: (i) to distill the mass of data collected in the course of RAMS' research into a succinct and presentable format for the use of researchers, technicians, planners and students alike, and; (ii) to lead readers who may wish to locate in-depth studies on subjects briefly treated herein by providing annotated bibliographies for each section.

Since RAMS' focus was on the rural sector, so is the content of this Compendium. There is no pretense, however, that the material herein provided is complete. It is hoped, therefore, that the process of data collection and assimilation will be continued.

0.2 Selected Annotated References

Mauritania

Analyse de Situation de la Region du Tagant (RIM), avec Attention Particulière aux Aspects Socio-Economiques, Seminar fur Landwirtschaftliche Entwicklung, Tech. Univ. Berlin, 1979 (354 pp.)

Area study on the Tagant region and parts of the Brakna and Assaba regions. Covers history, agricultural production, social analysis, current trends, constraints and strengths, as well as development possibilities and strategies. Annexed are case studies and miniature snapshots of 14 localities. Supplement to the master plan of the Tagant.

Atlas de la République Islamique de Mauritanie, Edition Jeune Afrique, 1977 (64 pp.).

A basic introductory synthesis. Contains maps and a page or two of text on topography, geology, hydrogeology, climate, soils, vegetation, history, ethnic groups, population, agriculture, livestock, industry, towns, education, health and trade. Geographical aspects are the best.

Bibliographie Mauritanie, B.V. Maele, Vol. 1, Ministry of Information and Culture/ Ministry of Planning and Research, ed. prov., 1971 (108 pp.)

Covers some 1,400 titles grouped under the headings of social sciences, Islam, archeology and pre-colonial history, later history and contact with Europeans, descriptive geography and general (excludes technical studies).

The Economy of Mauritania, R.M. Westebbe, Praeger Special Studies, New York, 1977 (171 pp.)

Now dated but presents a good summary of the Mauritanian economy and its structure (which remains essentially unchanged) up to 1970 from a World Bank perspective. Summarizes then available statistics.

L'Elevage au Sud-Est Mauritanien, Pâturage Situation Actuelle, Programme de Développement, Fredet et al, SCET, FED, 1976. (unnumbered)

Four volume study (including Annex and Development Programs) of livestock herding in the southeast of the country. Includes inventory of physical resources, pasture carrying-capacity, animal production, consumption. Topographic maps 1:200,000.

The Guidimaka Region of Mauritania - A Critical Analysis Leading to a Development Project, War on Want, London, 1977 (166 pp.)

A thorough, well-written synthesis of the social and natural resources of the Soninke-inhabited region. Particularly strong on the relation between geographic environment and modes of production.

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Introduction à la Mauritanie, Centre National de la Recherche Scientifique, Paris, 1979 (421 pp.)

Chapters on history, society, political economy, foreign relations. Good historical chronology.

Majabat al-Koubra-Contribution à l'Etude de l' "Empty Quarter" Ouest Saharien, Th. Monod, Mem. IFAN no. 52, Dakar 1958 (406 pp.)

Geographical study in the grand classical tradition, summarizing just about everything known on the Empty Quarter, from Ibn Battuta in 1352 to 1957. Covers climate, biology, history, voyages, toponymy, geomorphology.

Mauritania, A. Gerteiny, Praeger, N.Y., 1967 (243 pp.)

Constitutes the only overall socio-economic survey of Mauritania in English. Dated, but useful general review of physical, historical, social economic, political and linguistic aspects of country. Excellent glossary and selected annotated bibliography.

La Mauritanie, C. Toupet, Que sais-je?, Paris, 1977 (125 pp.)

Short narrative chapters on the various aspects of Mauritania in the "Que sais-je?" tradition (text only).

Nouakchott-Capitale de la Mauritanie J-R Pitte, Paris 1977 (198 pp.)

Wide-ranging, solid and readable description of Nouakchott, in all its diversity. Although city's rapid growth has made certain points somewhat dated, it conveys a "feel" for the dynamics of urban life that still rings true.

Le Palmier Dattier en Mauritanie, P. Munier, Ann. IFAC no. 12, Paris, 1955 (66 pp.)

Includes all aspects of date-culture, agronomic, geographical, historical. Technical but rewarding for non-specialists.

3e Plan de Developpement Economique et Social, 1976-1980, Ministère du Plan et des Mines, Nouakchott (180 pp.)

Summary of 2nd Plan and performance of economy, including analysis of socio-economic situation up to 1975. Emphasis on sectoral approach to national planning combined with policies to improve the general well-being of the individual for the 1976-1980 period. Assesses human and national resources. Useful maps.

La Sedentarisation des Nomades en Mauritanie Centrale Sahelienne, C. Toupet, Paris, 1977 (490 pp.)

Covers the central area bounded by Atar, Tichitt, Aioun and Selibaby. Thorough analysis of ecological data. Describes pastoral life and organization, livestock, agriculture and irrigation, as well as transformations caused by drought and modern society. Extensive bibliography.

0.3 Selected Documentation Centers with Reference Material on Mauritania

Bureau de Documentation et des Archives (BDA), Direction des Etudes et de la Programmation, Ministère de l'Economique et des Finances, Nouakchott.

Some 3000 titles, currently being organized under RAMS auspices. The RAMS collection (600 titles) is being incorporated. Quite complete for technical studies and reports including specialized sub-reports up to about 1973. Incomplete for more recent work.

Centre Culturel Saint-Exupéry (French Cultural Center), Nouakchott.

Maintains a good, wide-ranging collection of several hundred titles, including major technical studies which are difficult to find elsewhere. Published bibliography available:

Catalogue des Ouvrages Concernant la Mauritanie, Panorama no.28, Nouakchott. Jan. 1980 (70 pp.) Author and subject index.

Meteorological Reference Center for the Sahel, Niamey (Niger).

Regional data analysis, training and coordination center.

Musée National, Nouakchott.

Small, but well-organized displays on the history and culture of Mauritania. A guided, convenient one-hour introduction to Mauritania.

OMVS Centre de Documentation pour le Programme de Developpement du Bassin Flueve Sénégal, St.Louis (Senegal)

Complete collection of documents on the Senegal valley. Publishes voluminous computerized bibliographical listings. (OMVS office in Dakar also has similar reference material).

Sahel Documentation Center, Mich. State Univ., East Lansing, Mich. (USA)

Large collection. Publishes quarterly Sahel bibiliographic bulletins. Xerox or microfiche copies of titles can be supplied. Microfiche/paper copy selection of about 1000 titles has been distributed to Sahel institutions including BDA.

SONADER, Nouakchott.

Single most important source of technical material in Mauritania on irrigated agriculture.

USAID Library, Nouakchott.

Maintains about 1000 listings, principally recent studies.

In addition to the above, various international aid organizations and specialized government services in Nouakchott have collections of varying sizes of reference material within their respective fields of interest. There are also several French research and study organizations in Paris, often with regional offices in Dakar (e.g. ORSTOM, Institut Geographique National). More details on these and others are referred to in:

J.M. Heyman, Report on Literature Search, Documentation and Related Information on Mauritania (for RAMS). AID/Afr-C- 1428. Agency for International Development, Washington, D.C., 1978 (57 pp.)

Exhibit 0-1

0.4 Administrative Regions and Departments

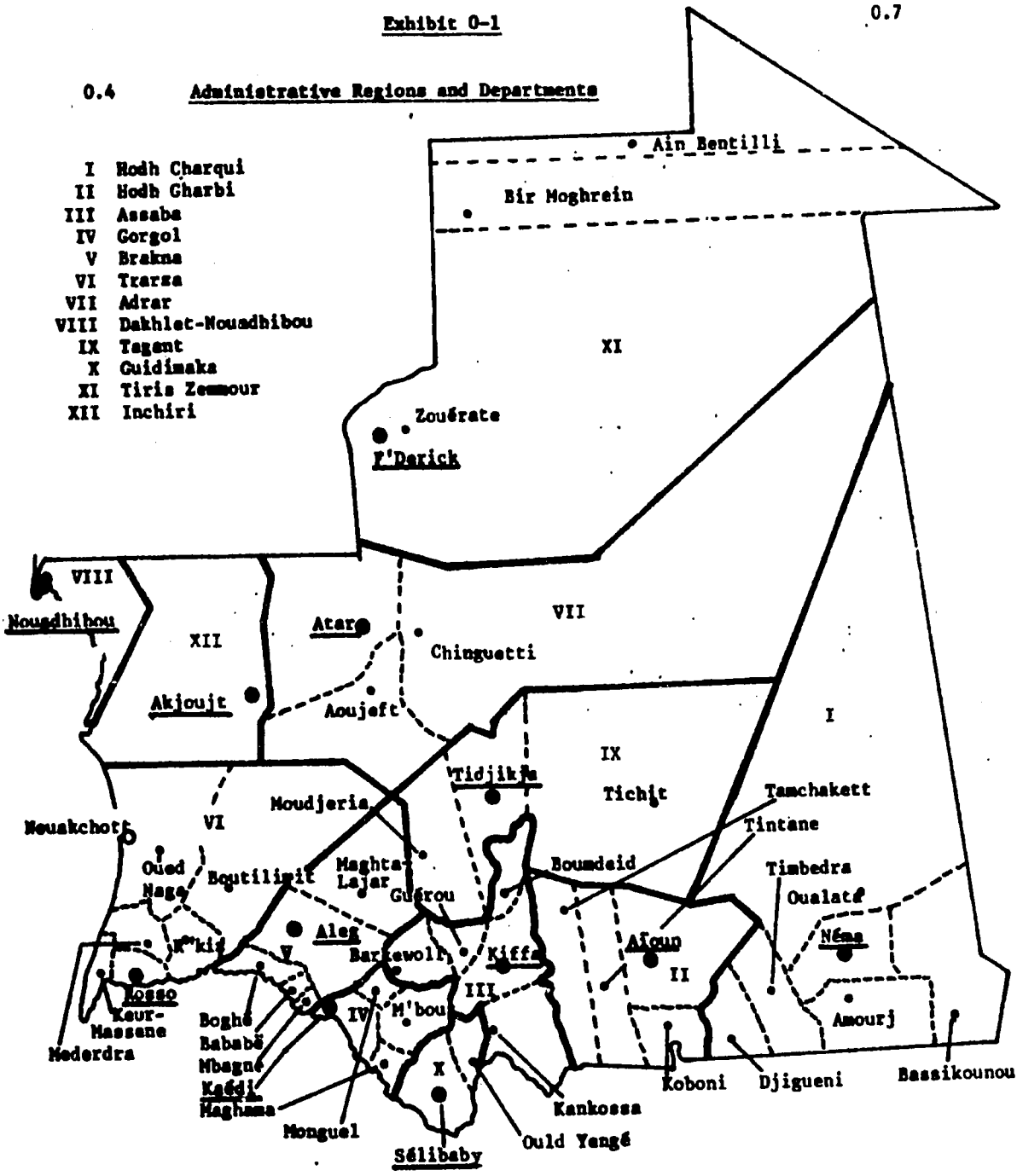

Exhibit 0-1

Administrative Regions and Departments[a] and their Abbreviations

00 Nouakchott[b] (Nktt)

Tayaret
Ksar
Tevragh Zeina
Sebkha
El Mina
Toujounine

01 Hodh Charqui (H. Chr)

011 Amourj
012 Bassikounou
013 Djigueni
014 Nema
015 Oualata
016 Timbedra

02 Hodh Gharbi (H. Ghb)

021 Aioun el Atrouss
022 Koboni
023 Tamchakett
024 Tintane

03 Assaba (Assb)

031 Barkewoll
032 Boumdeid
033 Goŕrou
034 Kankossa
035 Kiffa

04 Gorgol (Gorl)

041 Kaédi
042 Maghama
043 M'Bout
044 Monguel

05 Brakna (Brak)

051 Aleg
052 Bababé
053 Boghé
054 Maghta Lajar
055 M'Bagne

06 Trarza (Trar)

061 Boutilimit
062 Keur Massene
063 Mederdra
064 Oued Naga
065 R'Kiz
066 Rosso

07 Adrar[c] (Adr)

071 Aoujeft
072 Atar
073 Chinguetti

08 Dakhlet Nouadhibou (Ndb)

081 Nouadhibou

09 Tagant (Tagt)

091 Moudjeria
092 Tichit
093 Tidjikja

10 Guidimaka (Guid)

101 Ould Yenge
102 Selibabi

11 Tiris Zemmour[d] (T.Zem)

111 Bir Moghrein
112 F'Derick
113 Zouérate

12 Inchiri (Inch)

121 Akjoujt

a) Numbers correspond to codes used in the 1977 census and are used herein for ease of presentation.
b) Until mid-1980, wards in Nouakchott were referred to by numerical order but this is now abolished. (See Chapter 2.)
c) Excludes Ouadane because area is not treated as a separate Department in national census but as a prefecture of Chinguetti
d) Excludes Ain Bentilli because town is uninhabited and 1977 national census did not recognise its existence.

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0.5 List of Acronyms and Commonly Used Abbreviations

AID	Agency for International Development
AMP	Agence Mauritanienne de Presse (RIM)
ASECNA	Agence pour la Sécurité de la Navigation Aérienne en Afrique (RIM)
BCR	Bureau Central de Recensement (RIM)
BDPA	Bureau pour le Développement de la Production Agricole (Paris)
BMDC	Banque Mauritanienne pour le Développement et le Commerce (RIM)
BRGM	Bureau de Recherche Géologique et Minière (Paris)
BURGEAP	Bureau d'Etude de Géologie Appliquée et Hydraulique Souterraine (Paris)
BAAM	Banque Arabe Africaine en Mauritanie
BIMA	Banque Internationale pour la Mauritanie
BCM	Banque Centrale de Mauritanie
CAA	Commissariat à l'Aide Alimentaire (RIM)
CEAO	Communauté Economique de l'Afrique de l'Ouest (Dakar)
CEDES	Centre d'Etude de Développement Economique et Sociale (Dakar)
CILSS	Club Inter-Etat pour la Lutte contre la Sécheresse au Sahel (Bamako)
CNERV	Centre National d'Elevage et de Recherche Vétérinaire (RIM)
CFPP	Centre de Formation et de Perfectionnement Professionnel (RIM)
CNFCJS	Centre National de Formation des Commissaires de la Jeunesse et du Sport (RIM)
CNH	Centre National d'Hygiène (RIM)
CNRADA	Centre National de Recherche Agronomique et de Développement Agricole (RIM)
CNROP	Centre National de Recherche Océanographique et de Pêche (RIM)
CNSS	Caisse Nationale de Sécurité Sociale (RIM)
CRM	Croissant Rouge Mauritanien
ENECOFAS	Ecole Nationale d'Etudes Commerciales, Familiales et d'Affaires Sociales (RIM)
ENFVA	Ecole Nationale de Formation et de Vulgarisation Agricole (RIM)
ENA	Ecole Nationale d'Administration (RIM)
ENI	Ecole Normale des Instituteurs (RIM)

ENISF	Ecole Nationale des Infirmiers et Sages-Femmes (RIM)
ENS	Ecole Normale Supérieure (RIM)
FAC	Fond d'Aide de la Coopération (France)
FED	Fond Européen de Développement
FND	Fond National de Développement (RIM)
IFAN	Institut Fondamental de l'Afrique Noire (Dakar)
IGN	Institut Géographique National (Paris)
IMRS	Institut Mauritanien de Recherche Scientifique (RIM)
IPN	Institut Pédagogique National (RIM)
LNTP	Laboratoire National des Travaux Publics (RIM)
MDR	Ministère du Développement Rural (RIM)
OMA	Office Mauritanien d'Artisanat (RIM)
OMC	Office Mauritanien des Céréales (RIM)
OMVS	Organisation pour la Mise en Valeur du Fleuve Sénégal (Dakar and Saint-Louis, Senegal)
ONPP	Office National pour la Promotion de la Pêche (RIM)
ORGATEC	Société Africaine d'Etude Technique (Dakar)
ONC	Office National de Cinéma (RIM)
OPT	Office des Postes et Télécommunications (RIM)
OTM	Office du Tapis Mauritanien (RIM)
PAM/WFP	Programme Alimentaire Mondial, World Food Program, (UN)
PMI	Protection Maternelle et Infantile (RIM)
PHARMARIM	Pharmacies de la République Islamique de Mauritanie
RIM	République Islamique de Mauritanie
SEDAGRI	Société d'Etude et de Développement Agricole (Paris)
SMAR	Société Mauritanienne d'Assurance et de Réassurance (RIM)
SMB	Société Mauritanienne de Banque (RIM)
SNIM	Société Nationale Industrielle et Minière (RIM)
SONADER	Société Nationale pour le Développement Rural (RIM)
SONELEC	Société Nationale d'Eau et d'Electricité (RIM)
SONICOB	Société National pour l'Industrialisation et la Commercialisation du Bétail (RIM)
SONIMEX	Société Nationale d'Import et d'Export (RIM)
SAMIN	Société Arabe des Mines de l'Inchiri (RIM)
SMPI	Société Mauritanienne de Presse et d'Impression (RIM)
UM	Unité Monétaire - Ouguiya (45 UM = $1.00 in 1980)

0.6 RAMS Reports

RAMS (Rural Assessment and Manpower Surveys) has had three principal objectives: (a) Baseline inventory and analysis of the main sectors of the rural economy, manpower and demography (28 reports); (b) elaboration of development strategy options for medium and short-term (8 reports); (c) identification and formulation of projects (2 reports); and (d) several others (4 reports). An Annotated Statistical Compendium also was produced. The nearly two and one-half year; 396 man-month project was conducted in collaboration with the "Direction des Etudes et de la Programmation" of the Ministry of Economy and Finance.

The following is a list of reports produced and a short summary of contents of these reports.

I. Phase I

(a) Baseline Studies:

AS 1 Agro-Ecological Zones of Mauritania

Compilation of data and information on climate, water, soils vegetation, types of cultivation and pasture lands. Introduces and defines Agro-Ecological Zones. Many tables and maps.

AS 2 Environmental Regeneration of Southern Third of Mauritania (Including Appendix)

Raw data collected of selected areas around towns and villages, around pastoral wells, rangeland, , forest preserves and oasis, totalling about 100 observation points. State of degradation and various causative factors presented.

AS 3 Demographic Projections

Preliminary analysis of 1977 official data. Discussion of various factors affecting population growth. Regional and overall national population projections. Growth scenarios until year 2000.

AS 4 Agricultural Production: Analysis of Selected Aspects of Mauritanian Agriculture

Summarizes RAMS agricultural production surveys, farm budgets. Presents cost and price data on livestock, rice production, processing, etc.

AS 5 Rural Sector Consumption Patterns in Mauritania

Summarizes results of RAMS Household Survey (consumption component). Calculates demand elasticity and projects food and non-food demand to the year 2000. Survey methodology explained.

AS 6 Rural Income in Mauritania

Summarizes results of RAMS Household Survey (revenue component), cash income structure among rural, sedentary and nomad population groups, income distribution and Lorenz curves. Survey methodology explained.

AS 7-1 Sociological Profiles: Black Africans Mauritania

Reviews social organization of Toucouleur, Peulh and Soninké populations.

AS 7-2 Sociological Profiles: The Moors

Socio-economic organization of the Moors in an historical context. Bibliography.

AS 8-1 Social Change: The Future of Pastoralism

Case-study vignettes (Maghta Lahjar, Néma and Kankossa) on problems of adaptation to drought conditions.

AS 8-2 Social Change: Social Organization of Agricultural Production

With traditional land tenure as a background, discusses changes in agricultural production and social classes for Moor and riverine groups. Social constraints, positive and negative impact of change. Bibliography.

AS 8-3 Social Change: Population Movements and Migrations in Mauritania

Discusses from an historical perspective population mobility in response to changing patterns of trade and economic development. Establishment of modern sector and its effects.

AS 8-4 Social Change: The Evolution of Modes of Accumulation and Social Change in Mauritania

Concentrates on role of trade and commerce from pre-colonial days onward. Some analysis of historical price data.

AS 9 Overall Synthesis of Sociological Studies

Synthesizes major themes of sociological reports above.

(b) Sub-sectoral Studies:

SS 1 Irrigated Agriculture

Presentation of main factors governing development of irrigated agriculture. Discusses Senegal valley as well as traditional irrigation in the interior. Data on cultivated surfaces, production and farm budgets for various crops.

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SS 2 Dryland Agriculture

Analysis in some detail of production for the various types of dryland agriculture (recessional, rainfed and walo). Covers crops, present and potential zones, production methods, labor, capital, land tenure, products and marketing, extension services and research facilities. Environmental impact noted. Cites current and on-going projects.

SS 3 Livestock Sub-sector Study

Presentation of main factors affecting livestock production. Includes camels, cattle, goat, sheep and poultry. Excludes donkeys and horses. Discusses resources, marketing and production systems. Details provided on herd production forecast through year 2000 using RAMS rainfall model.

SS 3a Supplement to Livestock Study: Range Management

Discusses present and prospective grazing resources. Discusses Mauritanian rangelands, reviews major land management constraints to increase livestock production and formulates range management development alternatives.

SS 4 Oasis Agriculture

Wide-ranging detailed review and analysis of date-growing and oasis crops. Covers production methods, labor, capital, land tenure, marketing, extension and research services, environmental impact and current on-going projects. Bibliography.

SS 5 Inland Fisheries

Compilation of existing data.

SS 6 Traditional and Maritime Fisheries

Compilation of existing data. Discussion of cooperatives with particular emphasis on the Imraguens.

(c) Functional Studies:

FS 1-1 Food and Nutritional Situation in Mauritania

Summarizes results of RAMS Household Survey (nutrition component). Also discusses food distribution programs, cereal balance and nutritional status.

FS 1-2 Rural Health: Outline of the Mauritanian Health Sector

Briefly outlines national health system of Mauritania with its emphasis on curative medicine. Discusses organization of health delivery system.

FS 2-1 Employment Situation

Presents data on labor stock, labor force and Employment Survey based on 1977 census data. Modern and informal sector based on RAMS surveys. Annex has data broken down by region and nomad/sedentary types.

FS 2-2 Supplement to the Employment Situation

Summary and analysis of RAMS Employment Survey with particular emphasis on activity and employment status.

FS 3-1 Manpower Skills

Similar to Employment Situation (FS 2-1) but with emphasis on education skills.

FS 3-2 Evaluation of the Formal Education System in Relation to Development Objectives (Including Appendix)

Exhaustive, in depth description and analysis of primary, secondary, technical and vocational education system. Regional education statistics for 10-year period.

FS 3-3 Non-Formal Education

Pioneering synthesis and analysis of institutions and programs in non-formal education, their relation to production and development discussed under headings: Traditional and Modern Agriculture, Herding, Fishing, Management, Non-Structured, Crafts, Heal[illegible] Literacy, Culture. Also summarizes and analyzes resul[illegible] of RAMS Skills Qualification Survey of farmers, herders, fishermen, artisans, shopkeepers and women.

AE 4-1 Economic Activity of the Rural Private Sector

Discussion and analysis of private and parastatal sectors, with emphasis on role and function of cooperatives. Operating budget for selected small-scale family enterprises (shops, baker, butcher, etc.). Estimates transport flux and trucking costs.

AE 4-2 The Public Sector: Organization and Operation of Rural Development Activities

Analysis of selected government departments and public sector institutions as they apply to rural development. Provides in historical context evolution of the government's organization composition and in a functional context its policy formulation, planning, budgeting and implementation activities.

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AE 4-3 Annotated Statistical Compendium

Distills data from RAMS studies, presenting them in annotated form. Also includes information obtained from census, and information available on geology and climatology.

II. Phase II

(a) Option Papers:

1 Consolated Statement on Overall Development Strategies

Draws on the analysis of the other seven Phase II RAMS papers and describes within the Mauritanian setting the methodology followed in reviewing rural development and manpower options and the major development alternatives that emerge for the GIRM's consideration. A listing of general issues for decision and action is provided if the development options presented are to be pursued.

2 Macro-Economic Simulation Model for Assessing Development Priorities

Describes and demonstrates a macro-economic simulation model which establishes the relationship between the financial constraints to development, particularly the debt service ratio, the government budget and the balance of payments, and investment and output. The Mauritanian experience since independence is analysed in these terms and Gross Domestic Product by major sector is projected on the basis of three sets of output/investment assumptions through the year 2000.

3 Framework for Calculating Rural GDP from Basic Production Data

Gross Domestic Product for the rural sector for the period 1967 through 1980 is derived by aggregating the available crop and animal production series. These data are compared with annual rainfall figures and three 20-year rainfall production patterns are selected. These patterns are then used to project three rural production possibilities through the year 2000. In addition, the disaggregate production series are used to compile and demonstrate a modified input-output table for the Mauritanian rural sector. This innovation should prove useful in helping to identify and analyze specific investment decisions in the rural sector.

4 Basic Human Needs

Discusses the need and desirability of incorporating the BHN concept into Mauritanian development planning, while at the same time emphasizing the growth required to finance BHN. The major individual needs, including health and nutrition, education, shelter and energy, are analyzed in light of the Mauritanian scene. In addition, estimates are given of the costs that would be required to provide the lower 20% of the population with the basic minimum BHN.

5 Rural Production Options

Presents the rural setting in Mauritania and examines production/investment possibilities for the various subsectors of the rural sector: rainfall, recessional, irrigated and oasis agricultural, livestock, inland (river and pond), and maritime (artisinal/ and semi industrial) fishing. Options are presented for maximizing output, tracing current trends, and finding intermediate possibilities to achieve food self-sufficiency. Rainfall is explicitly examined as a constraint, as is manpower. From these components three options are compiled for the entire sector showing investment, production, value-added and manpower for each. This paper is the keystone to the other rural sector Option Papers.

6 Agricultural Institutional Framework

Describes the need for State-supported service institutions to help remove the constraints and bottle-necks to increased agricultural production and income. It examines both the physical and human constraints. On the basis of this analysis, costs are derived and manpower and organizational requirements are compiled. The options range from a nationwide coverage of a full integrated system, to a series of regional centers of influence, to a continuation and growth of the present set of services now in existence.

7 Employment Implications of Alternative Development Strategies

Analyses both the supply and demand for labor, reaching the conclusion that 70,000 new jobs are now needed to reach full employment without solving the problem of under-employment particularly prevalent in the rural areas. Employment opportunities are limited due to the small internal market and the lack of skills including literacy among the labor force. Projections to the year 2000 are made, indicating that if present policies do not change there could be 400,000 unemployed. The several options set forth are those which give different emphasis to the promotion of labor-intensive activities, particularly in regional centers, and to the

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design of an entrepreneurial code to replace the present investment code which favors capital-intensive activities. The need to organize a program to promote general educational levels and teach specific skills is emphasized.

8. Public Health and Nutrition

Part I of this paper, (Health System in Mauritania: Analysis of Problems and Alternative Solutions) presents and discusses a three-stage program of providing public health care to Mauritanians. It consists of reorienting the present largely curative Nouakchott-based system to future needs while meeting present commitments. Subsequent phases involved improving program management. reorientation towards preventative medicine, expanding services to rural areas and eventually making health part of an integrated rural development program. Part II (Food Requirements and Nutrition Strategy - Estimates for year 2000) examines in detail the present state of nutrition in Mauritania and sets objectives and standards which are incorporated in the public health option paper.

(b) Project Identification and Formulation:

1 Project Dossier

Contains over 10 descriptions of proposed projects in environmental, including rangeland management, and employment-generation activities. These are presented as illustrative projects, some described more fully than others, using the CILSS project format. Costing is provided for most of the proposals. These projects flow from discussions in the Option Papers.

2 Education As a Development Tool

An outgrowth of the Phase I RAMS report on Evaluation of the Formal Education System in Relation to Development Activities. This special report recommends a thorough reform and decentralization of Mauritania's education system. Specific proposals range from elementary through professional and technical training. Its central theme is the need to readapt teaching to be more responsive to the development needs of the country.

(c) Other:

1 Seminar Evaluation

A special report, this evaluation puts into perspective the meaning and outcome of the seven seminars organized by RAMS under the sponsorship of the GIRM's planning authority.

Each seminar is reviewed in relation to the objectives established by the government, with copies of each final report being enclosed. Recommendations for the continuation of the seminar program are made.

2 Regional Profiles

In connection with the GIRM's effort to decentralize the planning process, RAMS has proposed a series of 10 regional profiles, each providing basic economic and social data collected in the course of RAMS' research. (Two of the country's 12 regions are not covered because they are considered more a part of the modern rather than rural sector.) The profiles were drafted with the intention of giving each of the 10 regions basic data to use, and to up-date periodically, as they elaborate their ideas for the Fourth Economic and Social Development Plan.

3 Synthesis

As the term implies this report is intended to encapsulate RAMS' two and one-half year experience, put it intc perspective and glean the results. The operation is cast in an historical perspective to provide an appreciation of the context in which the project operated. The project's phases are discussed separately and integrally. The theme which emerges demonstrates that RAMS has been a part of a continuing planning process of the Mauritanian Government which will continue indefinitely. The data, findings and observations of RAMS will hopefully have provided a sounder and firmer basis of national planning for the future.

Final Report

Provides a record of the project from the standpoint of its origins, its operation and its ending, covering essentially the manpower, and budgetary and organizational aspects. Comments are also made on project designs. A special section covers the project's institutionalization and the measures taken to continue the type of planning effort undertaken by RAMS.

Chapter 1: Geography

Table of Contents

1.1 Overview

This chapter presents in some depth the basic technical sources for the study of Mauritania's physical geography. For a more general introduction refer to the excellent series of annotated thematic maps in the Atlas Jeune Afrique (see Section 0.2 Selected Annotated Bibliography).

1.2 Topographic Maps

The basic map is the 1:200,000 Institut Géographique National (IGN, Paris) series covering the whole country (Exhibits 1-1, 1-2). The southern and the coastal areas are also covered by 1:500,000 sheets (Exhibit 1-3). The Senegal Valley from Bakel to Rosso is covered by 1:50,000 sheets (Exhibit 1-4).

There is also an IGN older series, without altimetry, at 1:100,000 (Exhibit 1-5). For the unified sheet designation system see Exhibit 1-6. Other series, dating from before 1960, have been completely superseded by the above. IGN also publishes a 1:2,500,000 general map (2nd ed. 1980).

The official Mauritanian repository is the Service de la Topographie et de la Cartographie at the Ministry of Equipment and Transport.

In preparation for the 1977 census, the Census Bureau (BCR) during 1974-75 exhaustively up-dated the IGN 1:200,000 maps for localities. Further up-dating was done at the time of the actual census (December 1976/January 1977) but without cartographic precision.

About half the localities thus identified were not marked on the then available IGN sheets. The BCR has a series of blue-print departmental maps at scale 1:200,000[a] with all 2,300 or so localities marked with name and census number. There have been further changes since, especially in the Hodhs (where villages have disappeared) and the Gorgol and River areas (where new villages have appeared). Some localities in the north have also disappeared.

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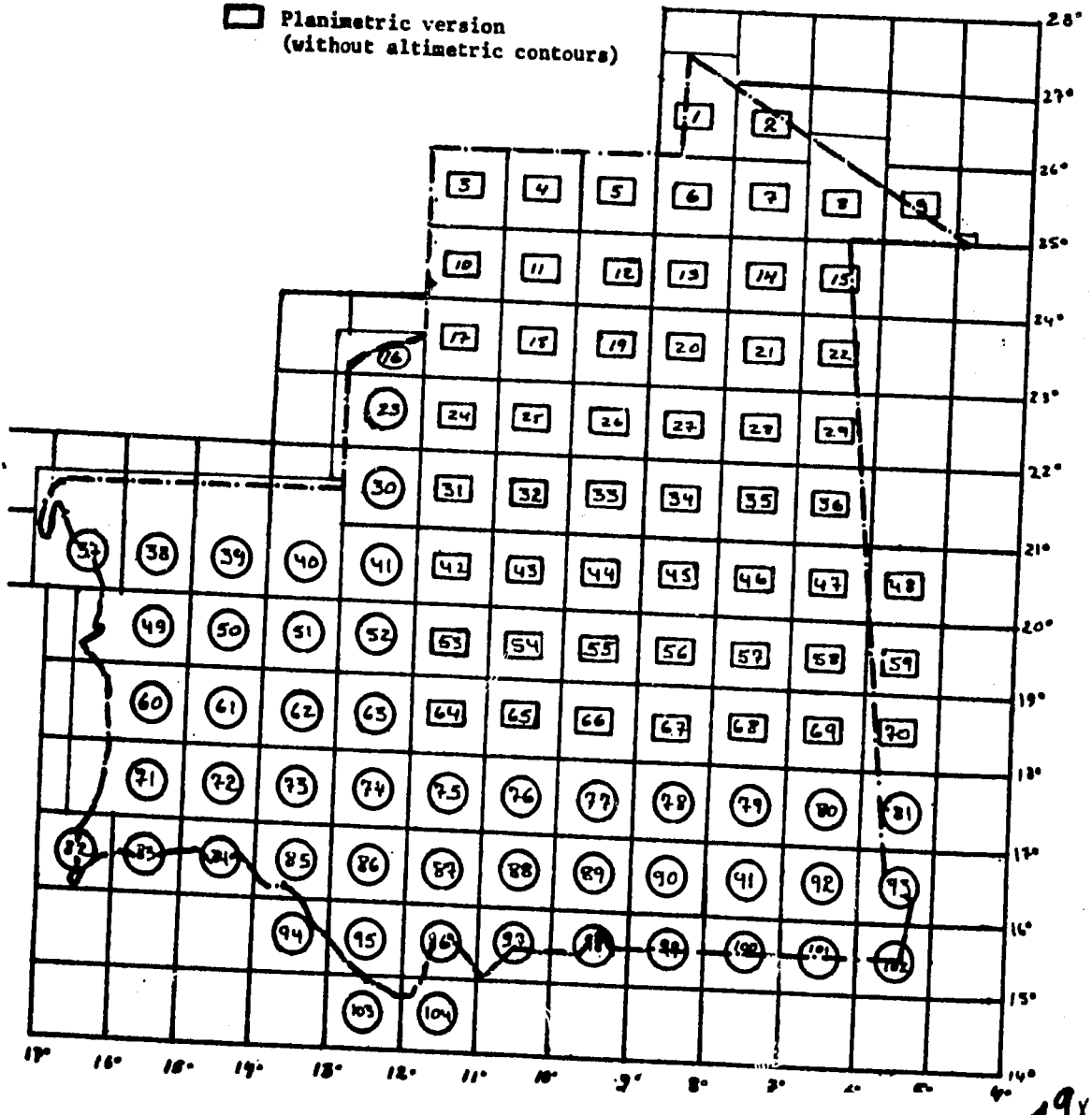
a) Except Oualata, Chinguetti, Bir Moghrein and F'Derick at 1:1,000,000, and Tichitt, Inchiri and Adrar at 1:500,000.

Exhibit 1-1

Topographic Map IGN 1:200,000
(Status as of 1980)

Numbers refer only to accompanying sheet list



19X

Exhibit 1-2

Topographic Map IGN 1:200,000 - list of sheets

No. on Index Map	Name	Latest Edition/ Updated From			
1	Oued el Hamra	69/62	52	Far'aoun	74/67
2	Hassi Djebilet	69/62	53	El Moînan	63/60
3	Bir Moghrein	60/59	54	Adâfer El Abiod	67/65
4	Bel Guerdan	60/59	55	Hofrât Sardoûn	67/65
5	Aîn Ben Tili	60/59	56	NE-29-XXII	67/65
6	El Hassan o/Hamed	60/59	57	NE-29-XXIII	66/65
7	Bir Lemjed	64/62	58	NE-29-XXIV	66/65
8	'Aguelt El Habîb o/Brâhîm	69/62	59	NE-30-XIX	66/64
			60	Nouakchott	69/67
9	Chegga	64/62	61	Aguilâl Faï	69/67
10	Tourassin	60/59	62	Bir Allah	69/67
11	NG-29-11	65/62	63	Ksar El Barka	75/67
12	NG-29-111	65/62	64	Tidjika	64/59
13	NG-29-IV	65/62	65	Ganeb	65/62
14	NG-29-V	65/62	66	Tîchît	65/62
15	El Mzereb	65/62	67	Aratane	70/69
16	Oumm Dfeïrât	70/67	68	NE-29-XVII	66/65
17	Oumm Roueïssine	63/60	69	NE-29-XVIII	66/65
18	Zednas	68/64	70	NE-30-XIII	66/64
19	Rhall Amane	68/64	71	Nimjat	69/67
20	Ti-N-Bessaïs	68/64	72	Boutilimit	69/67
21	El Mreïti	68/64	73	Aleg	69/67
22	Agâraktem	65/61	74	Moudjéria	70/67
23	Fdérik	70/67	75	Boûmdeïd	79/71
24	Tourine	63/60	76	Tâmchekket	79/71
25	Tenoûmer	68/64	77	Boû Derga	79/71
26	'Aguelt El Mabha	68/64	78	Oûtfene	79/71
27	Bir 'Amrâne	68/64	79	Oualâta	79/71
28	Mejaouda	68/64	80	Nkhaïlé	79/71
29	'Oglât Hameïdnat	68/64	81	Zouîna	78/71
30	Châr	75/73	82	St Louis	57/57
31	Guelb Er Richât	63/60	83	Dagana	57/57
32	El Ghallâouîya	79/79	84	Podor	68/67
33	Boû Jertala	79/79	85	Kaédi	69/69
34	El Mrâyer	79/79	86	M'Bout	69/69
35	NF-29-XI	69/64	87	Kiffa	78/71
36	'Oglat El Fersîg	69/64	88	Tîntâne	78/71
37	Nouadhibou	69/67	89	'Ayoûn El 'Atrous	78/71
38	Châmi	70/67	90	Timbedgha	78/71
39	Ahmeyim	70/67	91	Néma	78/71
40	Atar	72/67	92	Nioût	78/71
41	Chinguetti	75/67	93	Hassi Touîl	78/71
42	Ouadane	63/60	94	Matam	71/70
43	Tacârât	79/79	95	Sélibabi	56/55
44	Toueyyirât El Hamrâ	79/79	96	Kankossa	69/69
			97	Yélimané	56/55
45	NF-29-IV	79/79	98	Nioro	56/55
46	NF-29-V	69/64	99	Ballé	61/60
47	NF-29-VI	69/64	100	Nara	61/60
48	NF-30-I	69/61	101	Ségé	61/60
49	Nouâmghâr	69/67	102	Nampala	56/55
50	Akjoujt	69/67	103	Bakel	56/55
51	El Gleïtât	74/67	104	Kayes	55/55

80

Exhibit 1-3

Topographic Map IGN 1:500,000

(Year denotes latest edition)

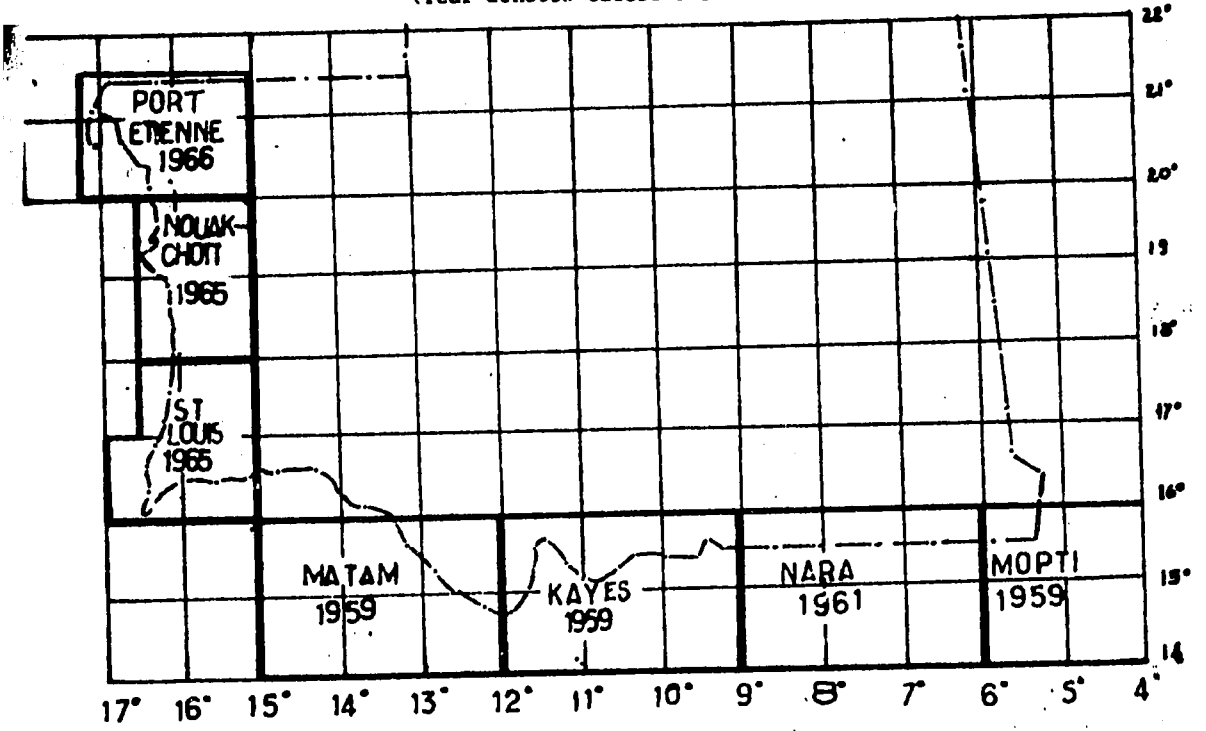


Exhibit 1-4

Topographic Map IGN 1:50,000

Designation with 1:50,000 sheet indicated for published sheets (provisional edition)

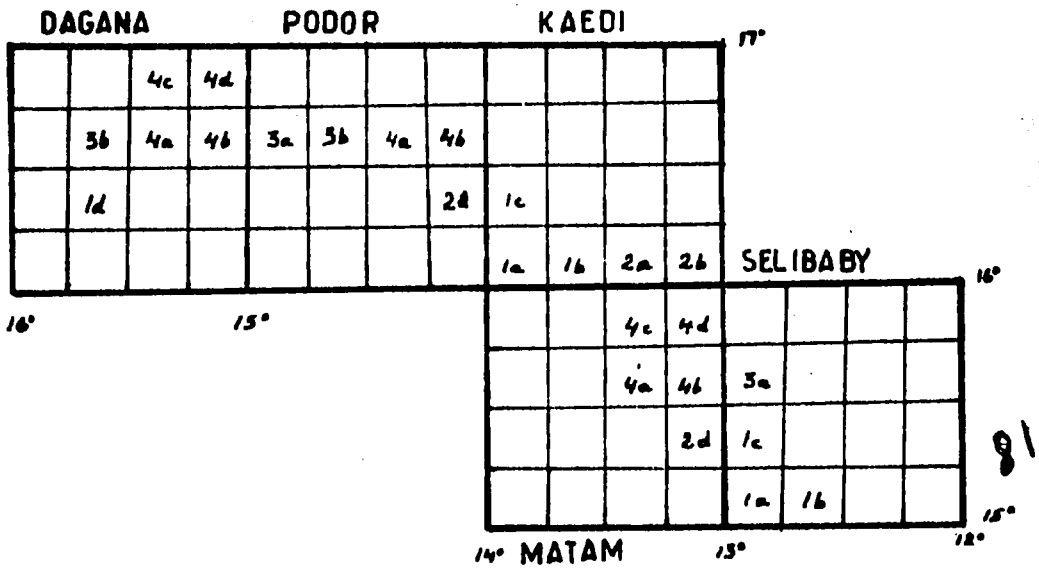


Exhibit 1-5

Topographic Map IGN 1:1,000,000

Sheet Number, Name and Year of Latest Edition

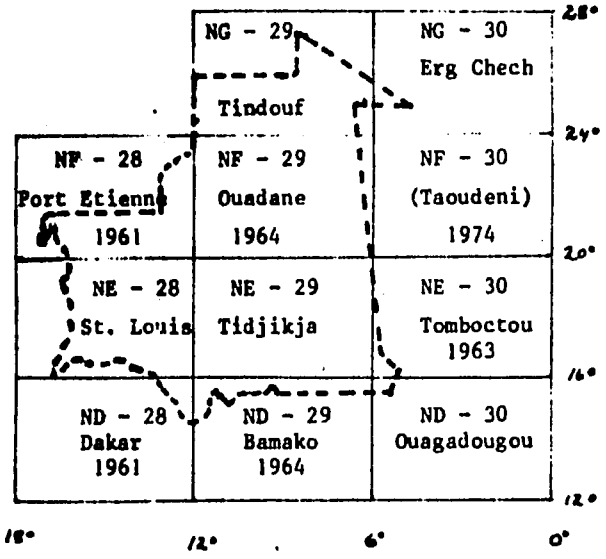
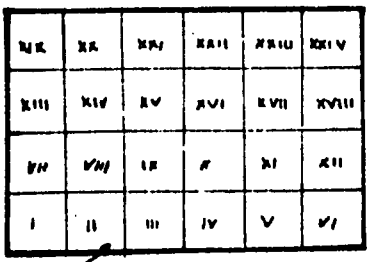


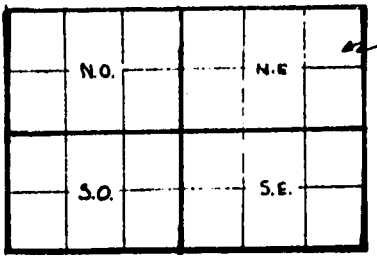
Exhibit 1-6

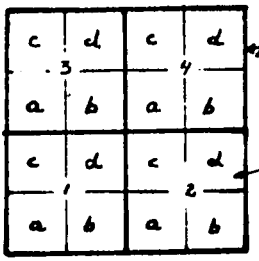
Topographic Map IGN Sheet Designation System

1:1,000,000 sheet (e.g. ND - 28)



1:1,000,000 sheet (e.g. ND - 28)





1.3 Aerial Photography

The entire country is covered by high quality panchromatic aerial photos at a scale of 1:50,000 (occasionally larger; see Exhibit 1-7 for details) taken by the Institut Géographique National (Paris) between 1952 and 1973. Longitudinal overlay is 60%, lateral band overlap 15%. These form the basis for the IGN 1:200,000 topographic maps. Recently (1980), the southwestern part of the country including the Senegal river basin, has been covered by 1:50,000 color photos taken by Teledyne Geotronics (California) under OMVS auspices (Exhibit 1-8). These are, however, not always of the same high quality as the IGN photos.

For the Senegal Valley proper there is also 1:15,000 coverage from 1960 and 1:25,000 coverage of the delta (1958/1964), all by IGN. Besides these systematic regional series, there are various localized coverages, mainly by IGN, such as valleys and oases in the Adrar at 1:15,000 (1958, in conjunction with date palm inventory) and regional capitals (1958-1964 at 1:15,000).

The census bureau (BCR) took non-standard photos of several towns in 1974-1975. There is also a mid-1980 coverage of Nouakchott at 1:20,000a)

The official Mauritanian Government repository is the "Service de la Topographique et de la Cartographie" at the Ministry of Equipment and Transport. However, their collection, especially of miscellaneous older material, may not be complete.

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a) For other photos of Nouakchott see also Pitte, Nouakchott-la Capitale de la Mauritanie, Paris, 1977.

Exhibit 1-7

Aerial Photography IGN 1:50,000

Year indicated is date of latest take. Degree-square designation as for the 1:200,000 sheets:

a) Scale 1:65,000

b) Scale 1:92,000

c) New coverage in preparation

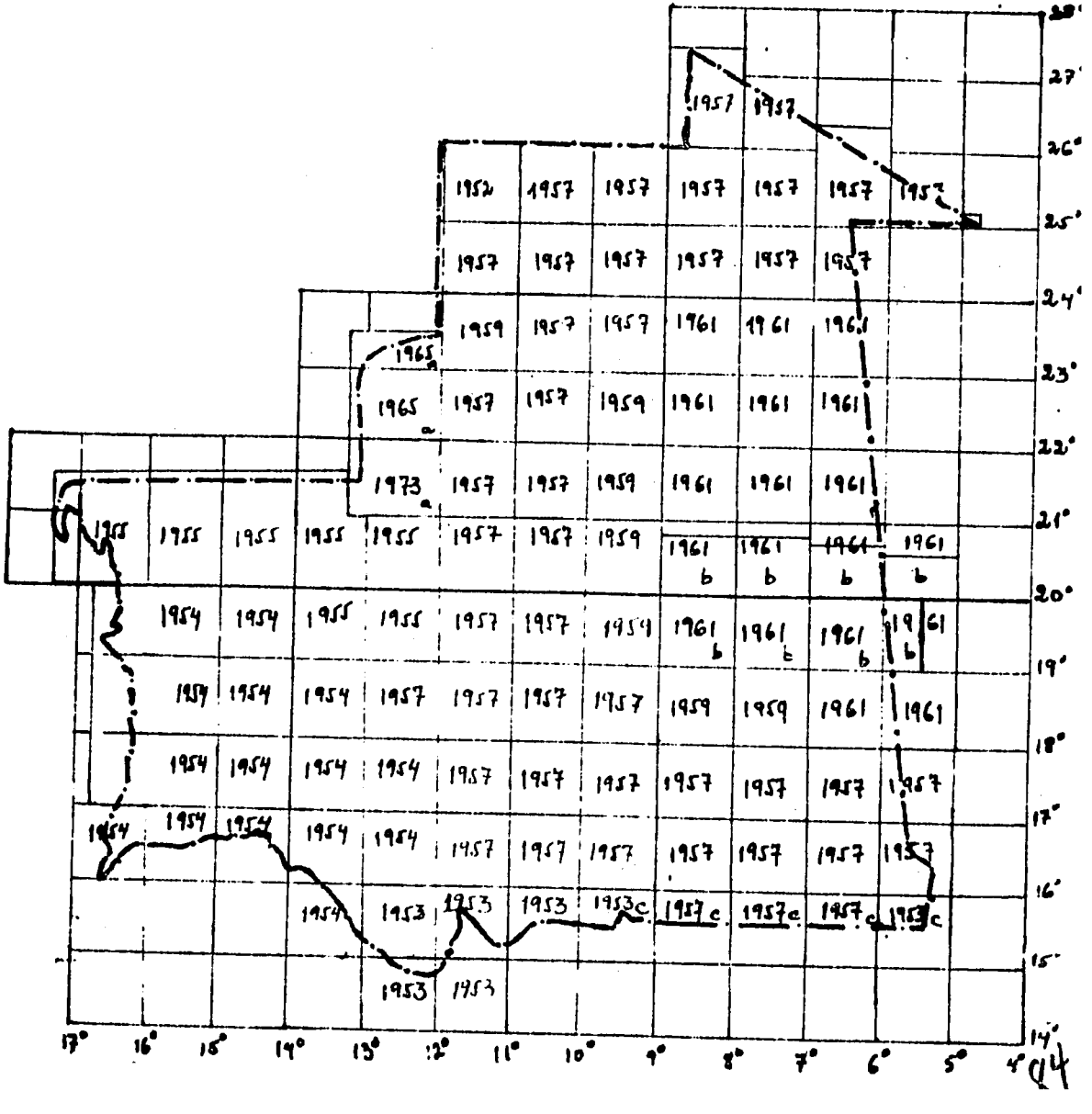
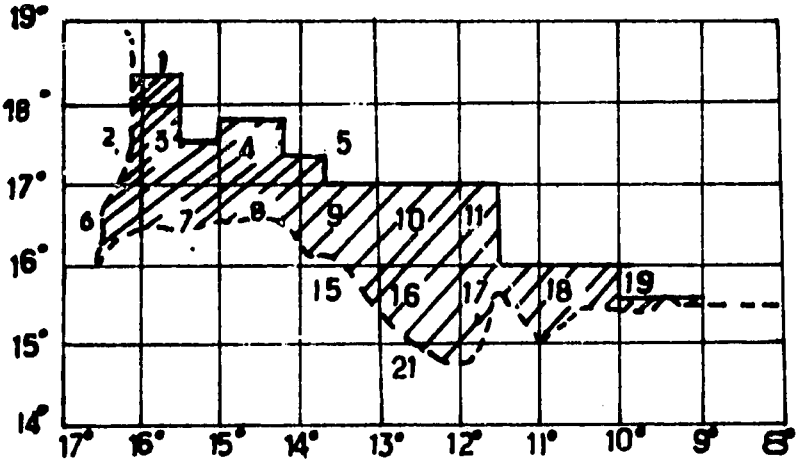


Exhibit 1-8

Aerial Photography 1:50,000 OMVS/Teledyne 1980

Numbers designate degree-square zones. Coverage along the borders is shown somewhat schematically. Series also covers the Senegal and Mali portion of the Senegal basin (not marked).



1.4 Geology

The basic document is the 1:1,000,000 Carte Géologique de la Mauritanie of June 30, 1968, published in 1969 by the BRGM (Bureau des Recherches Géologiques et Minières, Paris) for the Direction des Mines of the Mauritanian Government. The companion descriptive volume (Notice Explicative de la Carte Géologique a 1:1,00,000 de la Mauritanie, BRGM, Paris 1975, 255 pp.), summarizes the state of knowledge in the form of a general overview together with regional monograph chapters. It also contains a summary up-dating to the end of 1973. Subsequently, a major report was published on the Tiris Zemmour area. (See map J, Exhibit 1-9.)

The official Mauritanian Government repository is the "Service Géologique" of the "Direction des Mines et de la Géologie". Apart from a map collection, it has a well-organized, almost complete collection of geological studies, as well as all published hydrological ones. The "Notice Explicative" contains a bibliography of more than 400 titles on geology and hydrology. A certain amount of geophysical surveying, notably in the coastal zone, the Inchiri-Adrar-F'Derick area and in the South-East also exists.

Regional Geological Maps - Description

Reference to Index Map Exhibit 1-9		Title and Comments
A1 A2 A3 A4 A5 A6	St. Louis Dagana Podor Kaedi Matam Selibaby	Carte géologique du Sénégal de la RIM 1:200,000, 1967. Prepared by the BRGM, using the IGN 1:200,000 topographic sheets as background. Description for each sheet by M. Pascal & P. Michel, BRGM-DMG Senegal/MTN, Dakar, 1967.
B		Carte géologique de la region M'Bout-Selibaby 1:200,000 par R. Lille/RIM 1966. 2 sheets. IGN 1:200,000 topographic background. For description see Mém. BRGM n°. 55, 1968, (397 pp.).
C1 Pt. Etienne Est 1951 C2 Pt. Etienne Ouest 1951 C3 Atar Est 1954 C4 Akjoujt Ouest 1952 C5 Atar Ouest 1952 C6 Idjill Est 1953		Carte géologique de reconnaissance 1:500,000 Government General de A.O.F./Direction des Mines, Dakar. There is a 30-page explanatory "notice" for each sheet by T. Monod & A. Blanchot. These maps are now dated.

Mém = Memoire

D

Formations sedimentaires de la Mauritanie méridionale et du Mali nord occidental 1:500,000 / par C. Bense / 1962. 2 sheets.

For description see Mém. BRGM no. 26, 1964, (270 pp.).

E

Carte géologique de reconnaissance du nord du bassin de Taoudenni 1:500,000 / par J. R. Villemur / 1962.

For description see Mém. BRGM no. 51, 1967, (151 pp.).

F

Carte géologique de l'Amsaga 1:200,000/ par J. Barrere / 1964. 2 sheets.

For description see Mém. BRGM No. 42, 1967, (275 pp.). IGN 1:200,000 topographic background

G

Carte géologique de la région d'Akjoujt 1:50,000. Granite des Hajar Dekken / par R. Giraudon / BRGM 1963, et Guelb Moghrein-Legleiht el Kheda / par J. G. Michaud, 1963.

H

Carte géologique du Tasiast 1:200,000 / R. Giraudon et al, / 1962.

I

Carte géologique 1:200,000. Développement Rural de la Région du Tagant.
Plan Directeur. RIM/SONADER- AAF/INSTRUPA/GTZ (West Germany) 1979.

Established from LANDSAT imagery supported by field work and available documentation. See Annex 1 of the report for commentary.

J

Carte géologique de la dorsale Réguibat et de ses bordures sédimentaires (partie orientale) 1:500,000
Project Renforcement du service géologique et prospection minière 1971-73. MAU-69-504, RIM-Nations Unies.

Includes older work as well.

Carte géologique du Zemmour paléogoique (Mauritanie septentrionale) 1:50,000 / par J. Sougy / Dakar 1964.

For description see Annales de le Faculté des Sciences, Université de Dakar, 15, 1964, (695 pp.).

Carte géologique de l'arc des Mauritanides Bakel-Moudjéria, 1:50,000 / par J. C. Chiron / RIM-BRGM 1971.

For description see Mém. BRGM no. 84, 1974, (284 pp.). 81 X

Exhibit 1-9

Regional Geological Maps at Various Scales

Index letters refer only to the preceding list. Only published maps are noted. Various older or localized maps are not included, as well as those odd unavailable ones with unclear reference (most of these are mentioned in the Notice Explicative for the 1:1,000,000 map).

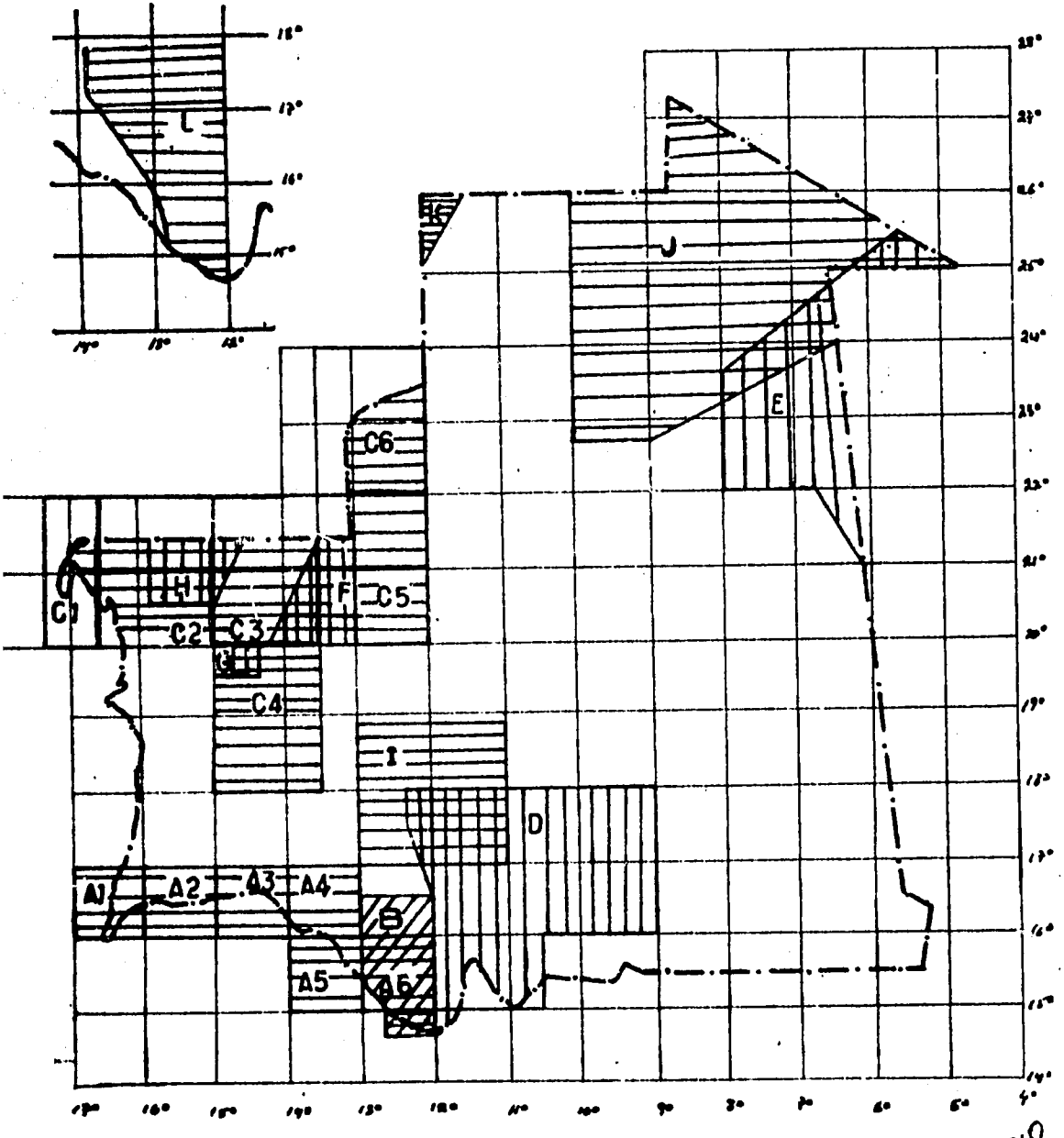
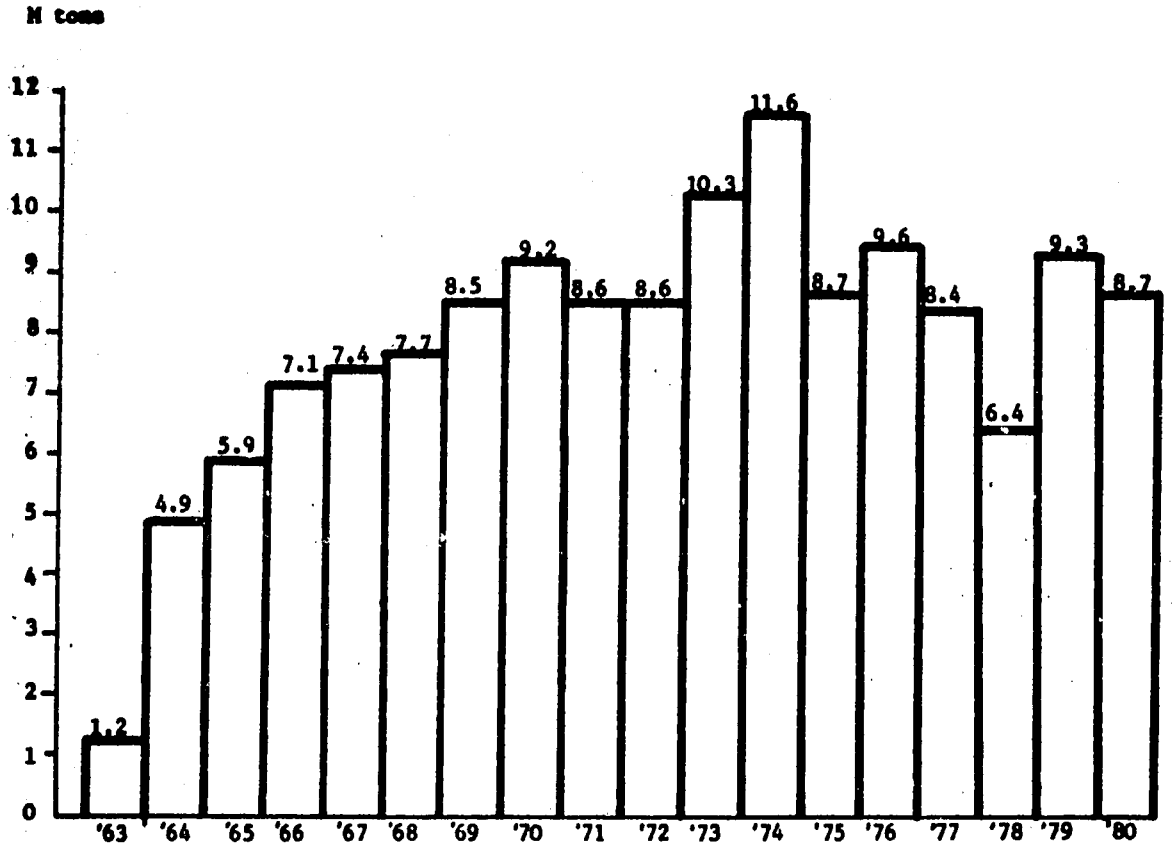


Exhibit 1-10

Mineral Production

Export of Iron Ore 1963-1980



The iron ore exports of the Kediet el Jill in the Tiris Zemmour, geologically studied since the first quarter of the century[a], have been exploited since 1963. The high-grade (average 64% iron) ore currently extracted consists essentially of hematite in the form of pockets or lenses and is evacuated 650 km to Nouadhibou by train, reportedly the longest in the world (2 km, 20,000 tons). The deposits will be worked out in some 5-6 years at current rates, by which time the "Project Guelbs" should have come on line. The Guelbs in question are situated within a 50 km radius to the northeast and west of Zouerate. The main ore is magnetic. The much lower iron content (average 37%) necessitates enrichment - dry magnetic separation before evacuation.

a) The "mountain of iron" mentioned by the Arab writer El Bakri in 1067 may be an early reference.

Source: SNIM

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Other Mineral Deposits

Copper

The copper deposits of the Guelbs Moghrein by Akjoujt, worked since pre-historic times, was exploited industrially between 1970 and 1978. The deposits are of two types, oxides (2.7% copper, 4 gr/t gold), and sulfides (1.8% copper, 1 gr/t gold). The oxides ore, enriched by a complex process to 60% before evacuation by truck to Nouakchott, is now practically worked out. Preparations are currently under w for exploiting the remaining sulfide ores (approximately 0.3 M ton m al).

Gypsum

Very pure (94%) eolian deposits - current extraction around 10,000 t/yr., and somewhat less pure (92%) marine deposits in the Sebkha N'Drhamcha 70 km north and northeast of Nouakchott. Reserves of the latter estimated at around 17 M ton.

Limestone

Consisting of layers of unconsolidated fossil shells from the quarterly marine transgression ("le falun Nouakchottien"). Small-scale exploitation for use of road fill, gravel, mortar, etc. Reserves around Nouakchott estimated at 5-8 M tons. Suitable for cement production.

Salt

Found in numerous Sebkhas as well-crystallized compact 10-20cm thick rock salt layers, notably at N'Terert south of Nouakchott and in the Sebkhet ej Jill, north of F'Derik, where artisanal exploitation continues, though on a reduced scale compared to pre-colonial days (1967:1,200 tons, mid-1970s, approximately 600 tons/year). Reserves are estimated at about 10 M tons.

Phosphates

Minor but exploitable deposits (ca. 150 K ton, under investigation) at Sive on the river

Future hopes for mineral finds are concentrated on the pre-cambian granite and metamorphic basement rocks of the "Dorsale R bat" covering most of the Tiris Zemmour as well as parts of Inchiri and Adrar. Some oil exploration has been conducted along the coast and in the Empty Quarter. Interest seems currently in abeyance.

Source: Notice Explicative de la Carte Géologique a 1:1,000,000 (BRGM 1975) and miscellaneous sources.

1.5 Geomorphology

The only major area covered in a systematic fashion is the Senegal valley, which was mapped at 1:50,000 for the OMVS by SEDAGRI (Societe d'Etudes et de Developpement Agricole, Paris) in 1969 on IGN topographic background. Soils and geomorphology are mapped together (see Exhibit 1-11).

There is also a monograph study by P. Michel, Les Bassins du Fleuve Senegal et Gambie-Etude Geomorphologie, ORSTOM, Paris, 1973, (752 pp.).

Reference: Carte pedologique et geomorphologique de la Vallee et du Delta du Senegal. Etude hydro-agricole du bassin du OMVS/ PNUD/FAO. AG:DP/RAF/65/061, Rome; 1975.

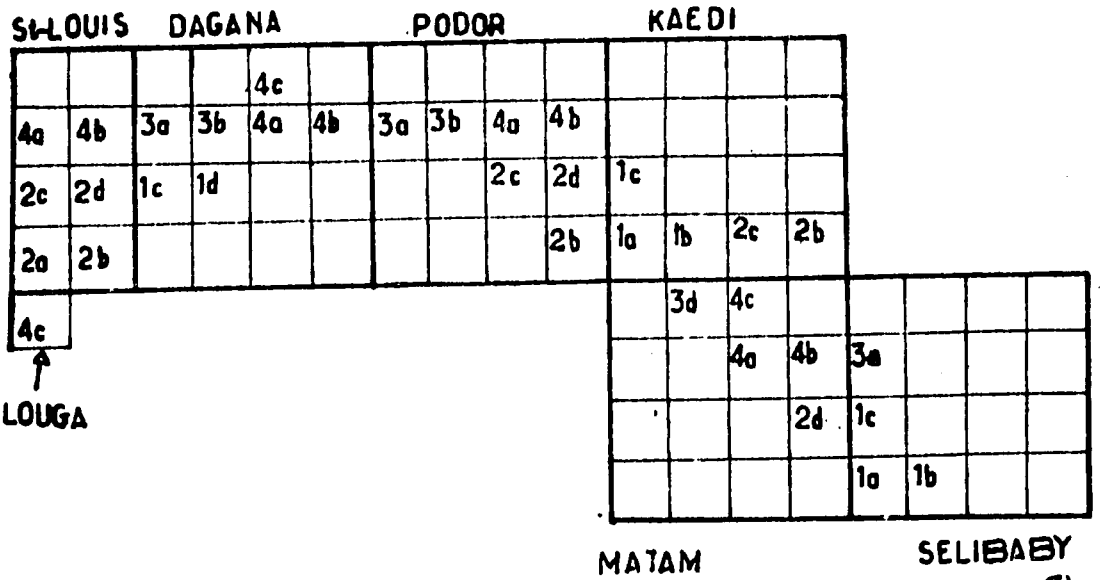
For explanatory details refer first to the Rapport de synthese des etudes et travaux, Rome, 1977, (320 pp.), and then to its bibliography of specialized sub-reports (Annex 1).

Exhibit 1-11

Pedological And Gromorphological Maps - Senegal Valley 1:50,000

Etude Hydro-Agricole/SEDARGI

Sheet designation similar to the IGN topographic maps



1.6 Soils, Land Use and Vegetation

The Etude Hydro-Agricole is the major document for the Senegal valley. Soils are mapped with geomorphology notations (cf. above). In addition, SEDAGRI prepared in 1969 a 1:50,000 set in the same format (see Exhibit 1-11 for sheet designation) on irrigation suitability and land use: Carte d'Aptitudes Culturales des Terres de la Vallée et du Delta du Sénégal. Soils are grouped into 6 classes: easily irrigable, irrigable, rice-cultivable (2 sub-classes with/without salt problem) and non-irrigable (2 sub-classes not irrigable at all and irrigable with difficulty). The area in each class is tabulated for each sheet.

Soil deficiency classification is also made (salt, other mineral, topographic, drainage). There is also land use mapping (gonakiers, bush, vetiver, grasses, cultivation, termite mounds). The soil and geomorphological units are repeated as background contours.

The Gorgol valley has been extensively studie' in connection with the Foum Gleita dam project:

- Carte Pédologique du Oualo du Gorgol, ca 1:15,000.
- Carte de Classifications des Sols du Oualo du Gorgol en Fonction de leur Aptitude pour le Riziculture, ca. 1:15,000.

  (Categories: suitable, suitable with improvement, less and not suitable).
- Carte Pédologique du Oualo du Gorgol en Aval de Lexeiba, 1:50,000.

Text in Etude Pédologique du Oualo du Gorgol. Rapport technique, No. 5, (44 pp.) plus annex (143 pp., soil profile analysis), 1971.

- Carte Pédologique Semi-détaillée de la Vallee du Gorgol Noir entre Lexeiba et les Monts Wa-Wa, ca. 1:50,000.

  (Also some reconnaissance with main categories only.)
- Carte des Aptitudes à l'Irrigation de la Vallée du Gorgol Noir entre Lexeiba et les Monts Wa-Wa, ca. 1:50,000.

  (Categorizes rice, maize/groundnuts, sugarcane/cotton.)

Text in Etude Pédologique de la Vallée du Gorgol Noir entre Lexeiba et les Monts Wa-Wa. Rapport technique, No. 4 (24 pp.) plus annex (52 pp., soil profile analysis), 1970.

- Carte Pedologique de Reconnaissance Cuvette de Foum Gleita, ca. 1:50,000.

Text in Cuvette de Foum Gleita - Etude Pédologique de Reconnaissance. Rapport technique, No. 3 (19 pp.), 1971.

Topographic background for maps IGN aerial photos. Part of the Etude pour la Mise en Valeur du Basin du Gorgol, AGL:SF/MAU 3 PNUD/FAO-SCET/SEDES, 1970-71.

The only other area for which something similar exists is the Tagant, or more accurately the departments of Tidjikja, Moudjeria, Maghta Lahjar, Boumdeid and Guerou (same coverage as geological map "I" of Exhibit 1-9):

- Carte des Sols, 1:100,000;
- Carte de la Végétation, 1:100,000;
  Oases, Cultivated Areas and Pasture Land also delineated
- Carte des Potentialités Agricoles, 1:200,000;
  8 Classes: Intensive/Extensive Pasture with Various Assorted Crops, Rainfed Cultivation, Reforestation, Wasteland.

These are all based on LANDSAT imagery interpretation, supplemented by field checks and available documentation.

Reference: Développement Rural de la Région du Tagant. Plan Directeur RIM/SONADER - AAT/INSTRUPA/GTZ (West Germany), 1979. See Annex 1, "Ressources Naturelles", for description.

The USAID-funded project "Renewable Resources" is currently preparing "agro-physical" land classification maps based on LANDSAT imagery interpretation, schematically at a scale of 1:1,000,000 for the whole country, and more detailed at 1:500,000 for the south and southwest, roughly south of a line between Nouakchott and Tamchakett. These will cover soils, vegetation, pasture, forestry and other land use, geology, surface hydrology and land fragility. They are expected to be ready towards the end of 1981.

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1.7 Water Resources - Hydrogeology

Not surprisingly, given the importance of the subject, there are a comparatively large number of studies, both published and unpublished, concerning the hydrogeology of Mauritania (see Exhibit 1-12, and 1-13). Nevertheless, information is far from complete, even for shallow aquifers. Very little is known, for example, about long-term potential yield capacities. Fossil water seems to dominate some important aquifers. Even less is known about deep aquifers (more than 100 m), although there is reason to believe that they may be quite significant in some parts of the country, such as the Trarza (Maestrichtian) and the Taoudeni bassin/Empty quarter (Continental Intercalaire - Nubian Sandstone similar to the rest of the Sahara).

The government service responsible for water resources investigation is the Direction de l'Hydraulique of the Ministry of Rural Development, which should be consulted for detailed studies on particular areas. Two major nation-wide syntheses exist, one from 1965 and now somewhat dated, and a more recent one from 1975:

(1) Ph. Roussel Carte de reconnaissance hydrogeologique de la Mauritanie, au 1,000,000 BIM - Bureau Hydrogeologique, 1968. Note explicative (100 pp. plus annexes and maps).

The narrative descriptively summarizes the state of knowledge by region. There is also a discussion of climatological data and surface hydrology. The main map shows geological series, water sources (static water level, yield class <1,1-3, >3m^3/h, salinity >2 g/l) and delineates hydrological provinces, sterile and brackish zones. However, the technical quality (manuscript, blueprints) is such that the use of the map is very difficult.

(2) Reinforcement du service des eaux souterraines, Mauritanie. Conclusions et recommendations du project. DP/UN/MAU-67-502/2. RIM-PNUD. N.Y. 1975/113 pp. plus annexes and maps).

The study was conducted from 1968 to 1975. Some 16 zones all over the country, covering about 180,000 km^2 were explored by drilling and geophysics (detailed map for each area). A classification and inventory were also prepared (see Exhibit 1-14 and 1-15).

The report also assesses the well inventory established by Ph. Roussel, systematically kept up to 1968, with only sporadic up-dating thereafter. This contained approximately 3,500 entries classified by map sheet and number as well as name. Project work and consultation of later reports lead to new estimate of approximately 9,500 wells for 1974, of which roughly 1/3 were useable. Boreholes account for 6% of the total, modern (improved) wells 21%, oglats and traditional wells 70% and natural sources 3%. Of the boreholes, very roughly 1/3 were estimated to be useable, of the modern wells 3/4 and of the oglats 1/6.

Exhibit 1-12

Regional Water Resources: Hydrogeological Maps - Description

Reference to Index Map (Exhibit 1-12)	Title and Comments
A 1	Carte hydrogéologique de la région d'Ouma DFerat-Fort Gouraud 1:200,000. RIM-BRGM 1965. Notice explicative by H. Plote, RIM-BRGM, Dakar 1966, 42 pp. Field work from 1963. IGN 1:200,000 topographic background. Contains 1:50,000 insets for Kediet ej Jill and F'Derick (ex-Ft. Gouraud).
A 2	Carte hydrogéologique. Atar 1:200,000. RIM-BRGM 1966. Notice explicative by H. Moussu & R. Trompette, RIM-BRGM, Dakar 1966, 28 pp. IGN topographic background. 1:25,000 insets of Atar.
A 3	Carte hydrogéologique - Chinguetti 1:10,000. RIM-BRGM 1966. Notice explicative by Moussu et Trompette, RIM-BRGM, Dakar 1966, 22 pp. IGN topographic background.
A 4	Carte hydrogéologique - Faraoun 1:200,000 RIM-BGRM, 1966. Notice explicative by Moussu et Trompette, RIM-BRGM Dakar, 1966, 20 pp. IGN topographic background. The sheets of this set of maps show geological structures and series, oases by size group (excl. A 1) cultivated areas (excl. A 1), alluvial aquifers, ground water basins, run-off frequency zones (A 1 only) and water sources by type (oglat, wood-lined and stone-lined wells, ponds and springs). There are also data on static water-level and salinity (<2,2-8 and >8 g/l) where available. Yields are not indicated (only whether dry or in water). A typical profile showing the geological strata is also given. There are minor variations between the maps.
B	Carte hydrogéologique 1:400,000 Carte de l'infrastructure hydraulique t physique 1:400,000

95x

Reference to Index Map (Exhibit 1-12)	Title and Comment

Développement rural de la région du Tagant. Plan Directeur. RIM/SONADER-AAT/INSTRUPA/GTZ (W. Germany) 1979.

Refer to Annex 1 (Resources Naturelles) and Annex 6 (Infrastructure hydraulique) of the report for detailed comments.

The hydrogeologic map shows aquifers and strata, boreholes, wells and springs with depth, static water level, salinity and yield, where available.

The infrastructure map indicates water sources, dams and oases. For the dams information is provided on catchment area, volume and flooded area.

H. Paloc, Carte hydrogéologique du bassin Sud-ouest Mauritanie au 500,000 et notice explicative. RIM-BRGM Dakar 1962, 35 pp.

Apart from the geological series, this source consists essentially of a well map. Each well is marked with inventory number, static water level; salinity, aquifer type (sandstone, clayey, etc.) and hexagonal diagram of chemical composition (Na, Ca, Mg, HCO3, SO4, Cl) as available. Contour lines for piezometry and salinity are drawn. Water sources are however, not classified by type as on the other maps.

D 1 - D 16 Hydrogéologie et aménagement hydraulique du sud-est Mauritanien 1:200,000. RIM-BURGEAP 1966.

Sheet 1: Mejriya-Mboud
2: Bou Mdeyd-Kiffa
3: Tamchakett-El Beyedh
4: Bou Derga-Aioun El Atrous
5: Outfen-Timbedgha
6: Oualata-Nema
7: Mboud-Selibaby
8: Kiffa-Boully
9: El Beyedh-Yelimane
10: Aioun El Atrous-Nioro
11: Timbedgha-Balla
12: Nema-Nara
13: Niout-Chegue
14: Hassi Touil-Nampala
15: Selibaby-Boully-Bakel-Kayes
16: Esquisse hydrogeologique du sud-est Mauritanien 1:1,000,000

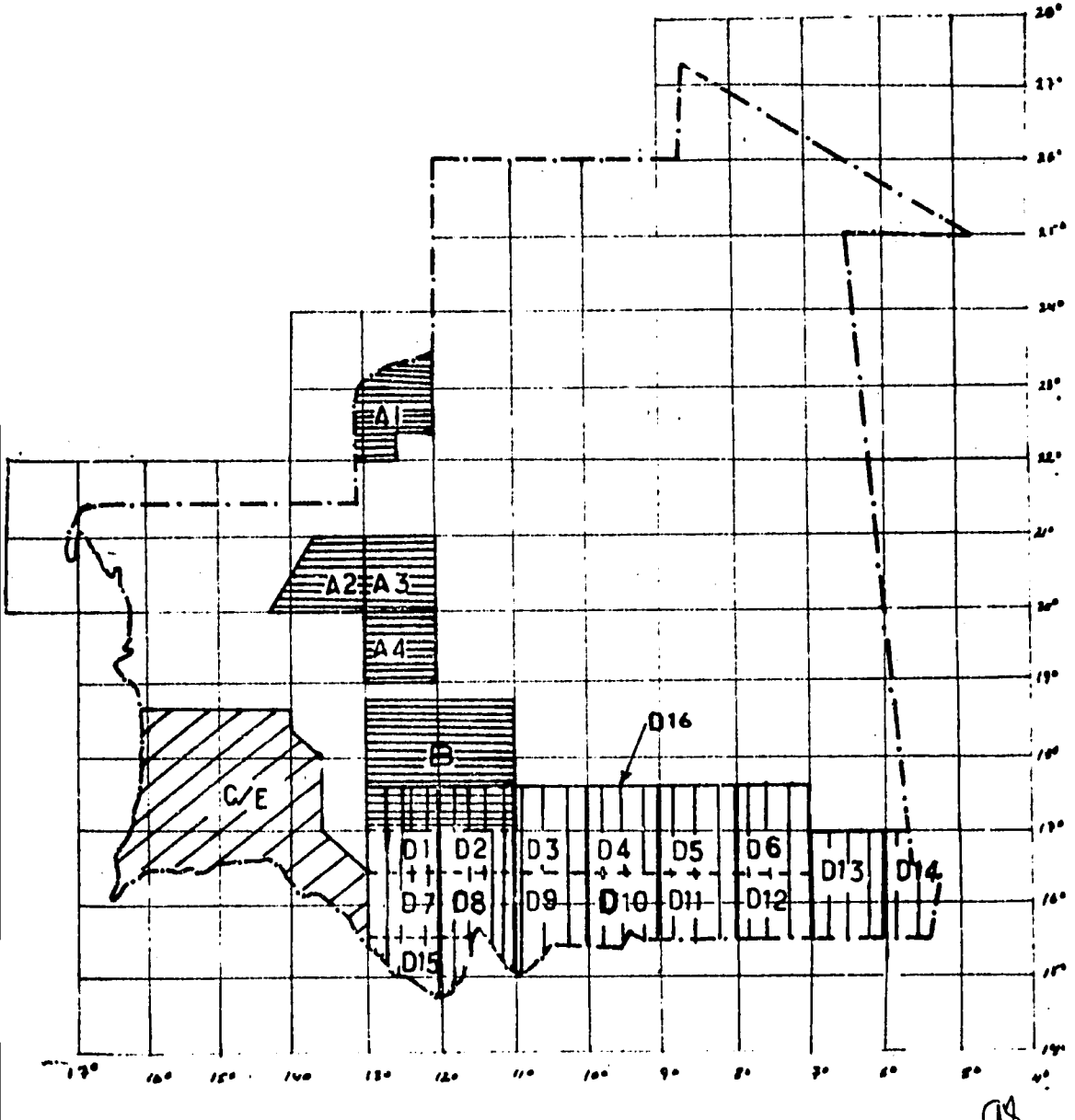
Reference to Index Map (Exhibit 1-12)	Title and Comment
	For detailed description refer to main report (and its bibliography of specialized reports):
	(L. Bourget), Synthèse hydrogéologique et aménagement du sud-est Mauritanien. RIM-BURGEAP. Neuilly-sur-Seine 1966. Tome 1, 88 pp. (Tome II are the maps)
	The field work for these maps was conducted during 1956-61 by BURGEAP (Bureau d'Etudes de Géologie Appliquée et d'Hydraulique Souterraine).
	Apart from geological formations these maps contain a wealth of information on dams (state of repair, local or government) and water sources. These are classified as cement-well, oglat or unimproved well, spring, ponds. They are further identified as being permanent/temporary and saline (>2 g/l). Yields, where known, are classified as <1.5, 1.5-3 and >3 m^3/h. Type of aquifer strata, static water level and reference number are also given. Oases - existing and potential - with size estimates and approximate cultivated area by village are also indicated, as well as pasture zones unutilized because of lack of water (>5 km from well).
	The 1:1,000,000 sketch map shows the major aquifer formation and piezometric contours.
	BURGEAP continued and up-dated this study in 1974-75 (i.e., after the drought), the results of which were published as:
	Development de l'élevage dans le sud-est Mauritanien-étude hydrogéologique et implantation de puits nouveaux. RIM-BURGEAP 1976. Vol. I: report (including bibliography of detailed sub-reports). Vol. II annex (Hydrogéology and géophysics, borehole and site description for selected areas).
	Water sources were systematically reinventoried. Of the total 1,530 visited, 34% were new, and 13% dry or had disappeared compared to the previous survey. The rainfall deficit had caused some lowering of the static water-levels but by no means in any catastrophic manner; wells were abandoned because of reduction in livestock numbers. Taken as a whole, there was no significant variation in the pasture area lacking water points, although a fair amount of local change had occured.
	Carte hydrogéologique et structurale du sud-ouest Mauritanien-zone du lac R'Kiz. Essai de synthèse des données anciennes et nouvelles 1:500,000 RIM-PNUD 1975.
	Commentary Renforcement du Service des eaux souterraines. Shows shallow and deep aquifers. Piezometric contours. Wells are not mapped.

97X

Exhibit 1-13

Regional Water Resources: Hydrogeological Maps at Various Scales

Index letters refer to preceding list (Exhibit 1-12)



Main Characteristics of Aquifer Groups[a)]

A - Superficial Aquifers

Very numerous, but localized, in alluvial or sand formation. Shallow (<10m) with water table at a few meters, generally limited to Oueds or topographic depressions between dunes. May be more extensive in sandy zones, especially in the south. Depend directly on rainfall for recharge. Exploited by thousands of low-yielding but functionally appropriate oglats. Also tapped directly by roots of date palms. Total production 25,000 m^3/day.

B - Generalized Shallow Aquifers

Cover large areas (100,000 km^2 for the Trarza aquifer), continuous in one or more aquifer strata, generally 10-100m below surface. Yields up to 20-100 m^3/h possible but depend on variation in hydraulic parameters. Largely exploited by traditional wells tapping only 1-2m of the aquifer and yielding 3-10 m^3/day. Also by boreholes for towns (Idini for Nouakchott, Bou Lanouar for Nouadhibou). About 50% of production for towns, 40% for rural wells, total 50,000 m^3/day.

C - Localized Shallow Aquifers

Associated with various localized geological structures (fissures, alterations, fractures, faults, Karsit, etc.). Characterized by hydraulic discontinuities, thus fragile when not located in good recharge zone. Yields often small, but highly variable 0-50 m^3/h, though more typically <3m^3/h. Difficult to find if the structure does not outcrop at the surface. Salinity also varies greatly <0.5-30 g/l. Total production is small, perhaps 7,000 m^3/day, mainly for pastoral and village wells in southern regions.

D - Others

Aquifers for which data are generally lacking are still numerous. Classification is very tentative. All deep aquifers fall into this category.

Note: Production totals represent estimates of order of magnitude.

Source: Renforcement du Service des eaux souterraines. PNUD 1975. Refer to pp. 69-78 for more detailed comments on the major subgroups.

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a) See Exhibits 1-14 and 1-15.

99 X

1.8 Hydrology

Hydrology studies are few and far between, except for the Senegal river (the only permanent stream). The few sparse studies that exist (only 3 before the mid-60s, mainly by ORSTOM) deal with rainfall/runoff and have only lasted 1 or 2 seasons which, given the highly variable and intermittent flows, is insufficient. The observed run-off coefficients vary greatly between areas, between years and between individual floods. There are no studies on infiltration for estimating ground-water recharge).

During 1964-66 a fairly ambitious rainfall/runoff investigation (some 50 rain gauges) was conducted in the Ghorfa and Niorde bassins (5,000 and 1,600 km^2), covering a major part of Guidimaka.

Results are published in:

> G. Jaccou et H. Camus, Etude Hydrologique des Oueds Ghorfa et Niorde et les oualos en amont de Kaédi. Rapport définitif 1964-66, ORSTOM, Paris 1967 (127 pp.).

An attempt at mathematical modelling of the Oued Ghorfa was also attempted (deterministic, grid-distributed rainfall/runoff model):

> G. Girard, Application du modèle a discrétisation spatiale à un bassin versant semi-désertique, in Appl. of mathematical models in hydrology and water resource systems. Proceedings of Bratislava Symposium, September 1975 (IAHS-UNESCO-WMO).

The Gorgol has also been studied in connection with the dam project:

> Etude hydrologique du Gorgol. Rapport technique no. 1 (71 pp. total with annex + graphs). (Part of the Etude pour le mise en valeur du bassin de Gorgol, AGL:SF/MAU 3, PNUD/FAO-SCET/SEDES, 1971.)

Studies were conducted in 1970-71; earlier data are also analyzed but they are rather scanty. Contains discharges for Foum Gleita in the Gorgol Noir 1955-65 and 1970-71, and for Agueilat on the Gorgol Blanc for 1959 and 1971. Also daily discharges of the Senegal at Kaédi 1903-65, as well as corresponding statistical distribution of stages for the first and fifteenth days between July and January.

There is a summary of available hydrological data for the area covered by the "Tagant" study (Annex 1, also a special supplement suggesting an extensive hydrological network). For area covered and reference see Exhibits 1-12, 1-13 and Map B.

100

Recently, the WMO project AGRHMET at the Direction de l'Hydraulique constituted a hydrological section which is gradually :ting up a more premanent series of study areas. So far work has irted at:

Gorgol Noir at Foum Gleita - flows (discontinued)
Gorgol Blanc at Agueilat - flows from 1975
Sénégal at Boghé - flow from 1979 (1978)
Oued Ghorfa - basin study, from 1980 (for SONADER)
Niorde - basin study, to start 1981
Lac d'Aleg - water levels and water balance (suspended)

There are plans to extend work to Atar and Kankossa. Two annual "rapports de campagne" have been published so far. A global inventory of hydrological data by station to date was recently published by the Bureau Hydrologique de la Mauritanie, Atlas Hydrologique (1981, 40 pp.)

Senegal River

The hydrology of the Senegal river is quite well known, having been extensively studied in connection with the OMVS dam projects. Hydrometric observations on river stages started as early as the turn of the century for river navigation purposes. However, the quality and coverage (generally high water, August-December only) leave a lot to be desired and even more so as concerns discharge. Only since the early 1950's, have there been regular and generally accurate observations covering the whole year. There are several gauging stations with long, more or less continuous records along the Mauritanian and Senegalese portion of the river. However, at Matam, Kaédi and Salbé, set up in 1903, and Boghé from 1908, measurements as a rule only pertain to the minor bed. At Podor and Dagana from 1908, tide effects obscure low flows from January to July. This leaves only Bakel, about 800 km upstream from St. Louis, catchment area 218,000 km^2, where a complete, good-quality series exists from 1903 onwards (up to 1950 July-November, thereafter all year round) (see Exhibit 1-16 to 1-18). Bakel is a key station in another sense also, since downstream there is essentially no further significant regular inflow, the intermittent contribution from the Gorgol being relatively very small. However, there is a net loss of about 3% between Bakel and St. Louis due to evaporation and infiltration.

The basic data source is the monumental ORSTOM monograph, in which all available data have been collected and critically edited. Several daily discharge series have been completed and reconstructed through correlation with other stations, the most important being Bakel.

101 X

Monographie hydrologique du fleuve Sénégal, ORSTOM, Paris 1965-1968.

Part 1: les facteurs conditionnels du regime. 1968 (123 pp.)

Part 2: C. Rochette, les données d'observation hydrologiques.
Vol. 1: Stations du haut-bassin, 1966 (119 pp.);
Vol. 2: Stations de la vallée, 1966 (143 pp.)

Part 3: C. Rochettee, Analyse de éléments du régime hydrologique, 1967 (108 pp.)

Part 4: C. Rochette, Recueil de données numeriques. Vol. 1: Hauteurs limnimétriques Bakel-Kaédi, rev. ed. 1966;
Vol. 2: Diorbivol-Podor, rev. ed. 1966;
Vol. 3: Delta et Dome, rev, ed. 1966;
Vol. 4: Débits journaliers aux stations du haut-bassin, 1965;
Vol. 5: La vallée, rev. ed 1966.

A detailed presentation and analysis of the Bakel and upper basin data (including rainfall) are available in:

Etude de préinvestissement pour la régularisation du fleuve Sénégal - Projet d' un système de controle des débits dans le bassin du Haut-Sénégal.
Nations Unies-Sénégal-Consult; Génève 1970. Vol. 3A: Hydrologie; Vol. 3B: Hydrologie-annexes (data listings):

The discharge figures by Senegal-Consult differ somewhat from ORSTOM data, certain adjustments having been made in the upper part of the rating curve. Further discussion and critique of the rating curve anomoly,[a] as well as an estimate of long return period floods, can be found in:

Etude des crues-types du Sénégal à Bakel. Etude du barrage du delta-Etude hydro-agricole du bassin du fleuve Sénégal. SF/AFR/REG 61-10 AGL. FAO-SOGREAH, Grenoble, 1972. Rapport final, Vol. II, Annexe 1 (22 pp.)

As part of the "Etude hydro-agricole", a compartmentalized numerical model of the river was developed and used to test various dam operation scenarios. This model is described in detail in a 3-volume report "Modèle mathématique de le vallée du Sénégal" (SOGREAH, 1970, 384, pp + annexes).

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a) The ORSTOM curve is considered an under-estimate.

1021

Use of the model is also made in the environmental impact study:

Partial report for river and estuary regimes (140 pp.)

This study, conducted in 1977-78 (Assessment of Environmental effects of the proposed developments in the Senegal river basin, OMVS, Garnet, Fleming, Corddry & Carpenter Inc. Harisburg, Pa/ORGATEC, Dakar, n.d.) also includes the only major study on water quality available.

Partial report for water quality (98 pp + annexes).

Synthesizes available literature, as well as field work undertaken on nutrient concentration, salinity intrusion and dissolved oxygen (for which little previous work existed). Two mathematical models - for dissolved oxygen and for estuary salt intrusion - were applied to assess effects of developments. Tributaries are not covered.

CLASSIFICATION ET CARACTERISTIQUES
…ES DES RESSOURCES EN EAU SOUTERRAINES DE MAURITANIE - 1975

…IRE …IFÈRE	NOMBRE DE POINTS D'EAU Puits cimentés	Oglats	Forages Sondages	Sources Mares	TOTAL	PROFONDEURS (m) du Niveau piézométrique (min-max)	de la Couche aquifère (min-max)	EPAISSEURS (m) de la Couche (min-max)	Aquifère utile (min-max)	DEBITS ponctuel exploitable (m³/h) (min-max)	total exploité (m³/j)	SALINITÉ (g/l) (min-max)	PERMÉABILITÉ Nature	Qualité	FORME ET EXTENSION DE L'AQUIFÈRE
…s à grave…	130	200	45	75	420	2.15	2.15	5.40	5.25	3-30	4000	01.05	int	B	C R
…ib Argiles en	35	2000	50	43	2173	1.40	1.10	2.30	2.25	01.80	10000	01-3	int	B	C L
[illegible]	38	755	37	0	830	1-5	1-5	1.10	1.5	0-25	5000	01.45	int	M	C L
[illegible]	0	90	10	10	110	0.3	0.3	1-10	1.2	0-04	100	01-4	int	F	C R
[illegible]	0	60	0	15	75	0-3	0-3	1-40	1-3	0-02	50	05.4	int	F	C L
[illegible]	70	1200	0	12	1.282	0-5	0-5	1-30	1-25	01-10	6000	01.05	int	M	C L
[illegible]	0	70	0	0	70	2.10	2.10	5-40	5.10	01.02	100	01.05	int	F	C L.
[illegible]	500	1200	66	0	1766	5.80	5.35	15.250	10-150	15-100	30.000	01-2	int	B	C R
[illegible]	20	10	13	0	43	50.60	50.60	100.200	80.150	50-70	2500	02.8	int	B	C R
[illegible]	20	50	22	0	92	20.35	20.50	50-150	10-80	10-50	5000	05.2	int	B	C R
[illegible]	100	10	1	0	111	20.80	20.60	0-0	0.20	5-20	500	02-3	fiss	M	C R.
[illegible]	200	20	2	0	222	10.60	10.60	0-60	10.80	15.50	2500	02.15	int	B	C R
[illegible]	23	0	0	0	23	50.75	50.75	5-900	5.?	5-30	300	05.1	int	M	C R
[illegible]	44	0	0	0	44	40-65	40.65	0-100	0.100	20-400	4000	05.5	int	B	C.R.
[illegible]	150	200	0	8	358	10-40	10-40	15.60	5.20	1-3	2000	05.1	int	F	C R
[illegible]	474	292	12	3	781	5.15	5.15	10.270	15.25	05.3	3500	05.2	fiss	F	C R
[illegible]	47	56	1	31	135	0.35	0.100	40.200	20.100	02.2	1200	01.05	int	F	C R
[illegible]	1	30	0	47	78	0.10	0.10	60.100	5.20	05.3	4000	04.05	fiss	F	D L
[illegible]	10	0	8	0	18	3.15	10.15	30.200	20.50	10-50	50	15.5	fiss	M	D R
[illegible]	5	0	5	3	13	5.15	10.30	25.60	10.50	10.400	100	[illegible]	fiss	B	D ?
[illegible]	2	14	0	5	21	4.10	4.10	100.550	2.15	01.1	50	[illegible]	fiss	F	D L
[illegible]	11	36	2	0	49	3.20	3.20	15.70	5.25	0-3	50	05.2	fiss	F	D L
[illegible]	2	2	3	0	7	1-20	0.20	5.50	2.15	01.1	5	01.05	fiss	F	D L
[illegible]	15	1	0	0	16	5.35	5.35	0.150	1.5	01.05	5	01.3	fiss	F	D L
[illegible]	5	16	20	0	41	5.15	5.15	100-650	10.60	0.10	10	05.1	fiss	M	D R
[illegible]	14	8	2	0	24	6.35	6.35	20.120	5-30	01.3	20	1-3	fiss	F	D L
[illegible]	60	120	34	0	214	5.30	5.30	10.80	5.40	01.5	1500	05.1	fiss	F	D L
[illegible]	0	0	3	0	3	30.40	30.50	[illegible]	0.10	01.05	0	1-4	fiss	F	D L
[illegible]	0	0	10	0	10	40.50	40.50	>200	0.25	10.20	4000	05.15	fiss	M	D L
[illegible]	0	0	26	0	26	25.40	20.40	>200	20.60	10.20	1500	05.11	fiss	M	D L
Sable	3	5	0	0	8	10.25	10.25	20.60	5.15	0.1	25	1.3	fiss	F	D L
[illegible]	5	0	1	0	6	15.10	15.40	20-30	5.20	[illegible]	25	1-5	fiss	?	D L
[illegible]	9	5	9	0	23	10.15	10.15	15.30	5.15	1-3	100	06.6	fiss	F	D L
[illegible]	23	0	48	0	71	3.30	9.45	15-60	0.15	0.5	300	05.15	fiss	F	D L
[illegible]	51	17	24	0	92	1-30	1.30	5-50	1-10	0.15	1500	1-20	fiss	M	D L
[illegible]	20	50	5	0	75	5.20	5.25	10-30	1.10	0.3	200	1-5	fiss	F	D L
[illegible]	0	0	3	0	3	10-30	100-600	0-500	100-300	100-300	0	1-2	int	B	C R P
[illegible]	0	0	7	0	7	10.80	120.200	10-50	5.25	20.50	0	01.2	int	B	C R P
[illegible]	0	0	11	0	11	?	?	0.800	?	?	0	?	int	?	C R P
[illegible]	0	0	0	0	0	?	?	100-300	?	?	0	?	fiss	?	?
[illegible]	0	0	0	0	0	?	?	200.200	?	?	0	?	fiss	?	?
[illegible]	1	0	2	10	13	20-?	10.350	50.500	?	01.?	50	06-?	int	?	C R P
[illegible]	0	0	0	2	2	0-?	?	0.100	?	?	5	?	fiss	?	?
[illegible]	0	10	0	0	10	5.10	5.10	135	5.20	05.3	0	01.05	fiss	?	D L
[illegible]	12	0	5	5	22	1-10	1-15	200	20.50	01.30	600	2-5	fiss	B	D R
[illegible]	5	0	0	10	15	1-5	1.10	30	5.20	01.0	200	1.4	fiss	M	D R
[illegible]	3	0	11	0	14	5.10	5.10	8.20	5.20	01.30	250	05.2	fiss	B	D R
[illegible]	0	0	0	5	5	0-?	?	1.49	?	?	50	?	fiss		?
[illegible]	0	0	0	0	0	?	?	0.25	?	?	0	?	fiss		
[illegible]	0	0	0	0	0	?	?	30?	71	?	0	?	fiss		
[illegible]	1	0	12	12	25	10-50	50.200	100.350	10.50	20-50	4000	2-7	fiss	B	D R
[illegible]	0	0	2	6	8	10.20	10.250	110	50-100	1-30	1000	?	fiss	B	D R
[illegible]	0	0	0	12	12	0-?	?	0-?	?	?	400	?	fiss		?
[illegible]	0	0	5	9	14	10.30	10-150	270.300	10.50	1-10	20	1-3	fiss	M	D R
[illegible]	0	0	2	4	6	10.30	100.300	50.200	50.200	1-40	1000	1-3	fiss		
[illegible]	0	0	0	0	0	?	?	50	?	?	0	?	fiss		
[illegible]	0	0	0	5	5	0-?	?	0-15	?	?	20	?	fiss		
[illegible]	0	0	0	2	2	0-?	?	30	?	?	5	?	fiss		
[illegible]	0	0	0	0	0	?	?	360	?	?	0	?	fiss		
[illegible]	0	2	1	0	3	5-?	?	500.1000	?	?	5	?	fiss		
[illegible]	0	2	1	0	3	5-?	?	10.400	?	?	5	?	fiss		
[illegible]	0	0	2	0	2	?	?	0-12	?	?	0	?	fiss		
[illegible]	0	0	0	0	0	?	?	0-360	?	?	0	?	fiss		
→	2.169	6.511	513	334	9.527	→					85000				

…ne, F : Faible . **FORME ET EXTENSION** . C : Continue, R : Régionale, L : Localisée, D : Discontinue, P : Profonde.

104

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Exhibit I-14

MAURITANIE
PROGRAMME DES NATIONS UNIES POUR LE DEVELOPPEMENT
NATIONS UNIES
PROJET DE RENFORCEMENT D'UN SERVICE DES EAUX SOUTERRAINES

DES

CLASSIFICATION DES NAPPES OU AQUIFERES

PAR LOGIE	PAR GROUPE	PAR UNITE HYDROGEOLOGIQUE		SIGLE	PAR LOCALISATION	NATURE DE L'AQUIFÈRE
NAPPES CONNUES ET CLASSÉES	A NAPPES SUPERFICIELLES	A1. NAPPES ALLUVIALES A EAU DOUCE ET RENOUVELLEMENT	Continu.	A11	Chemama - Gorgol	Alluvions fines à grossières. Bancs Grès Argile en formations lenticulaires.
			Régulier	A12	Sud Tagant Zone ouest	
			Irrégulier	A13	Nord Tagant Zone ouest	
		A2. NAPPES ALLUVIALES A EAU SALÉE ET LENTILLES D'EAU DOUCE	Sans alluv.	A21	Vallée Affolé et Sebkha	Argiles Sableuses, Sol gypseux Croûte - Conglomérats - Calcaires
			Salée	A22	Nord du Tagant vallée	
		A3. NAPPES DE SABLES ÉOLIENS A EAU DOUCE ET RENOUVELLEMENT	Régulier	A31	Sud Tagant Zone ouest	Sables fins plus ou moins argileux ou limoneux à compacités
			Irrégulier	A32	Nord Tagant Zone ouest	
	B NAPPES PEU PROFONDES GÉNÉRALISÉES	B1 NAPPES DU BASSIN SÉDIMENTAIRE CÔTIER		B11	Trarza S.O. Atlantique - Tamchekett Ile d'Arguin - Tiviret N.	Grès argileux Sables argileux Sables fins à grossiers Lentilles d'argiles
		B2 NAPPES DU BASSIN SECONDAIRE DE TAOUDENNI		B12	Amatlich	Calcaires dolomitiques
				B13	Brakna	Sables fins jaunes ou gris
		B3 NAPPES DE LA FENÊTRE DE L'AOUKÉR-HODH		B21	Dakar Nouma - Oualata	Grès grossiers ? argileux
				B22	Foum Gleita Tamchekett	Grès blancs argileux
				B31	Aoukar	Sables calcaires ? non indurés
				B32	Hodh	Sables - Grès indurés
				B33	Aioun (Hodh oriental)	Grès tendres Grès indurés
	C NAPPES PEU PROFONDES LOCALISÉES	C1 NAPPES DU BASSIN PRIMAIRE DE TAOUDENNI		C11	Akjoujt - Tagant	Grès quartzeux
				C12	Diouk - Akjoujt	Grès Marnes ? argileux
				C13	Achram - Akjoujt	Calcaires dolomitiques supérieurs
				C14	Aire droite Kankossa	Grès à passées argileuses
				C15	Kiffa	Jaunes - Siliceux
				C16	Aire gauche Kankossa	Calcaires dolomitiques inférieurs
				C17	Akjoujt Septentrional	Grès de Nouakchott ou du Tamchekett
		C2 NAPPES DE L'ARC DES MAURITANIDES		C21	Akjoujt - Tamchekett - Aoukar	Grès Jaunes - Dolomies
				C22	Guelb Moktar Nord Aoukar	Grès fins argileux - Grès dolomitiques
				C23	Affolé - Inchiri	Grès fins argileux - Quartzites
		C3 NAPPES DE LA REGIET IDJIL		C31	Tiviret - Zouerate (Tirés)	Grèzes
				C32		Micaschistes
				C33		Quartzites ferrugineux
		C4 NAPPES DU SUBSTRATUM CRISTALLIN		C41	Affolé Guelbs Moktar Nord	Roches de socle (granites - gneiss - amphibolites - leptynites) Sirop de roches basiques (gabbros - Dolérites)
				C42	Tasiast	
				C43	Tyjirt	
				C44	Amsaga	
				C45	Tirés	
				C46	Dorsale Reguibat	
	D NAPPES PEU CONNUES OU PRÉSUMÉES INDIFFERENCIÉES	NAPPES DU BASSIN SEDIMENTAIRE CÔTIER		D11	Ouest dorsale de R'Kiz	Sables grossiers ? argileux
				D12	Est dorsale de R'Kiz	Sables argileux roux Grès quartzeux
				D13	Centre du Bassin	Grès quartzeux ? argileux
		NAPPES DU BASSIN SECONDAIRE	ASSABA - AFOLLE - TAGANT	D14	Nord Tagant	Grès quartzeux
				D15	Ouest Tagant	Grès Fins du Tamgak
				D16	Akjoujt occidental	Grès tendres d'Assaba Grès calcaires
				D17	Plateau d'Adrar	Calcaires du Dekkan et Eocène
				D18	Centre Adrar	Grès quartzeux
				D19	Ilot noir de Bleue	Grès fins marneux à argileux
				D20	Bofor Chinguetti	Grès marneux fins Dolomies
				D21	Foum d'Amogjar	
				D22	Falaise d'Adrar	Grès quartzeux du Tagant
				D23	Affolé Tagant	Jaunes - Calcaires du Dekkan
				D24	Rkiziat et Nouamsa	Blocs Calcaires du Maestrichtien
				D25	Atar	Calcaires à Lamellibranches
				D26	Char	Grès calcaires Alluvions d'Amogjar
				D27	Nord Khat	Grès quartzeux
				D28	Centre Khat	Calcaires - Grès
				D29	Sud Khat	Dolomies - Grès grossiers
				D30	Ley Chah	Calcaires
				D31	Aslat	Calcaires
				D32	Ile Amsaga	Calcaires dolomitiques
				D33	El Mreiti - Dendi	Calcaires - Grès
				D34		Calcaires - Grès
				D35	Nouamsa Nord	Calcaires - Grès - Grès quartzeux
				D36	Nord Tafli	Grès quartzeux Calcaires Grès
				D37		Calcaires et Dolomies d'El Rhlig
		NAPPES DU SYNCLINAL DE TINDOUF		D38		Dolomies et Grès Maestrichtien
				D39		
		TOTAUX →		61	→	21

104A

104A

PERMEABILITE : ut : Utilisations, Rm : Réserves, Al : alluvions, G : Gravier, Ma Moyenne, F : Faible, E

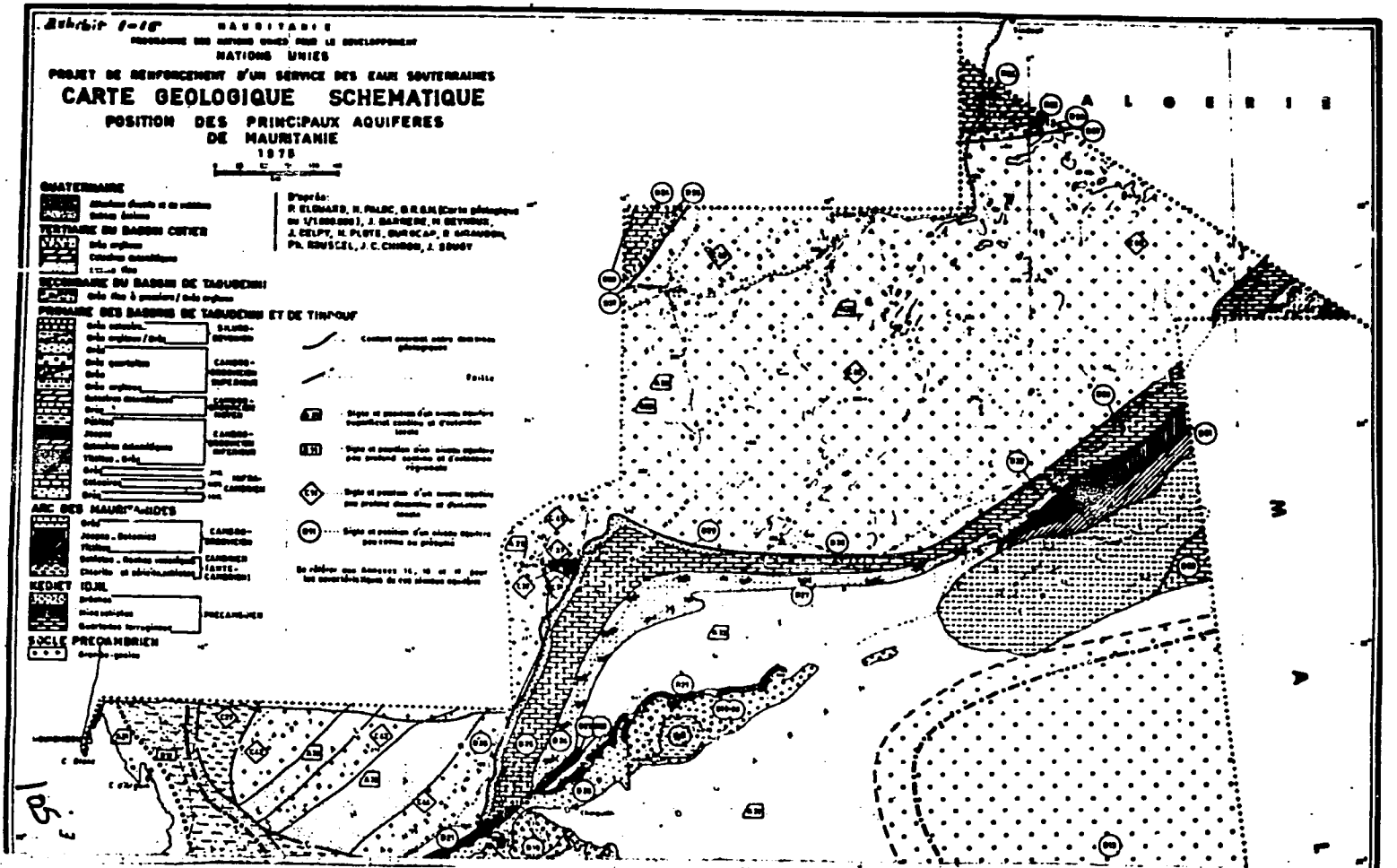
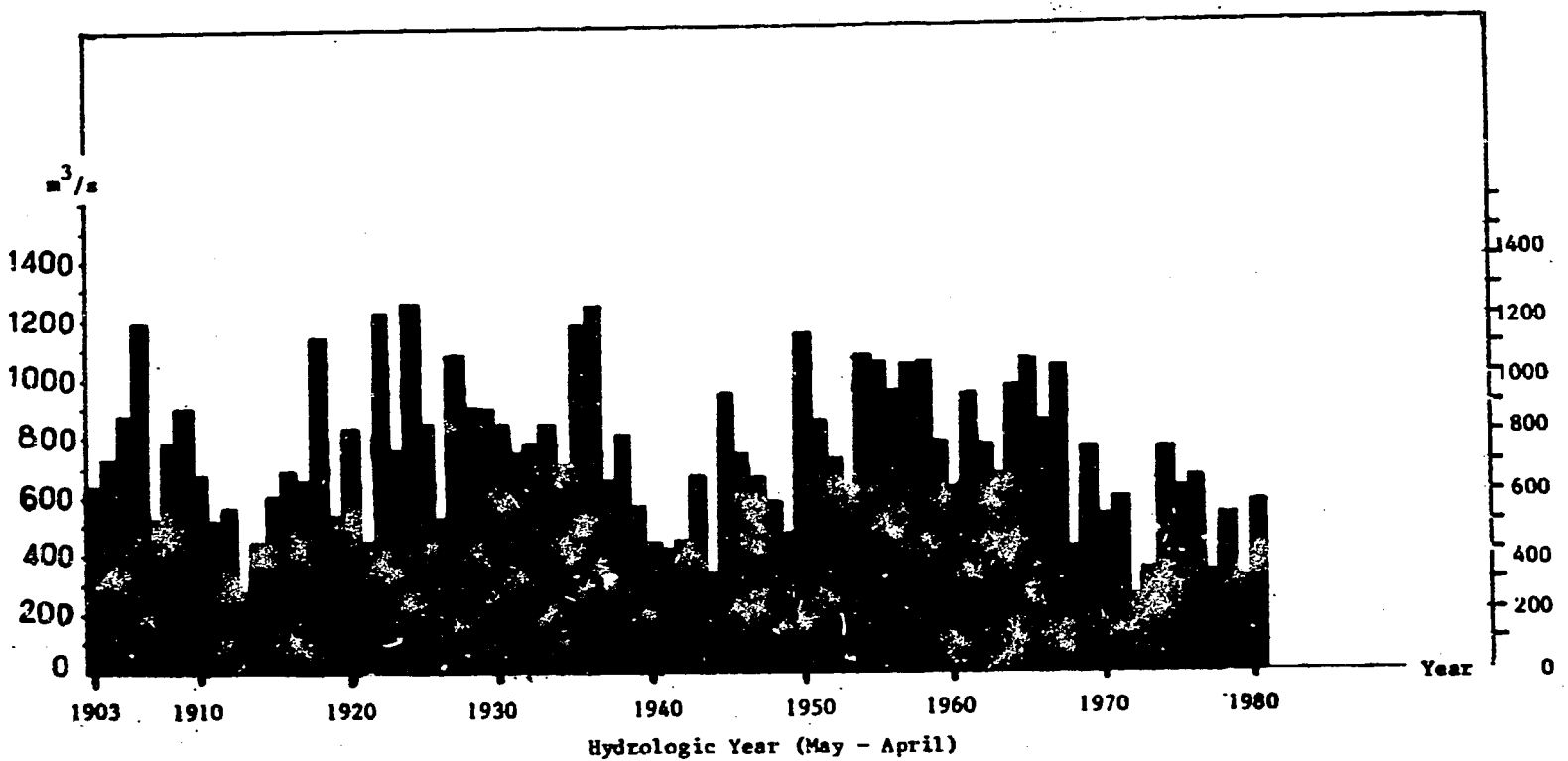

Annexe I-15
MAURITANIE
NATIONS UNIES
PROJET DE RENFORCEMENT D'UN SERVICE DES EAUX SOUTERRAINES
CARTE GEOLOGIQUE SCHEMATIQUE
POSITION DES PRINCIPAUX AQUIFERES
DE MAURITANIE
1975
QUATERNAIRE
TERTIAIRE DU BASSIN COTIER
SECONDAIRE DU BASSIN DE TAOUDENNI
PRIMAIRE DES BASSINS DE TAOUDENNI ET DE TINDOUF
ARC DES MAURITANIDES
KEDIET IDJIL
SOCLE PRECAMBRIEN
ALGERIE
MALI

Fig. 1

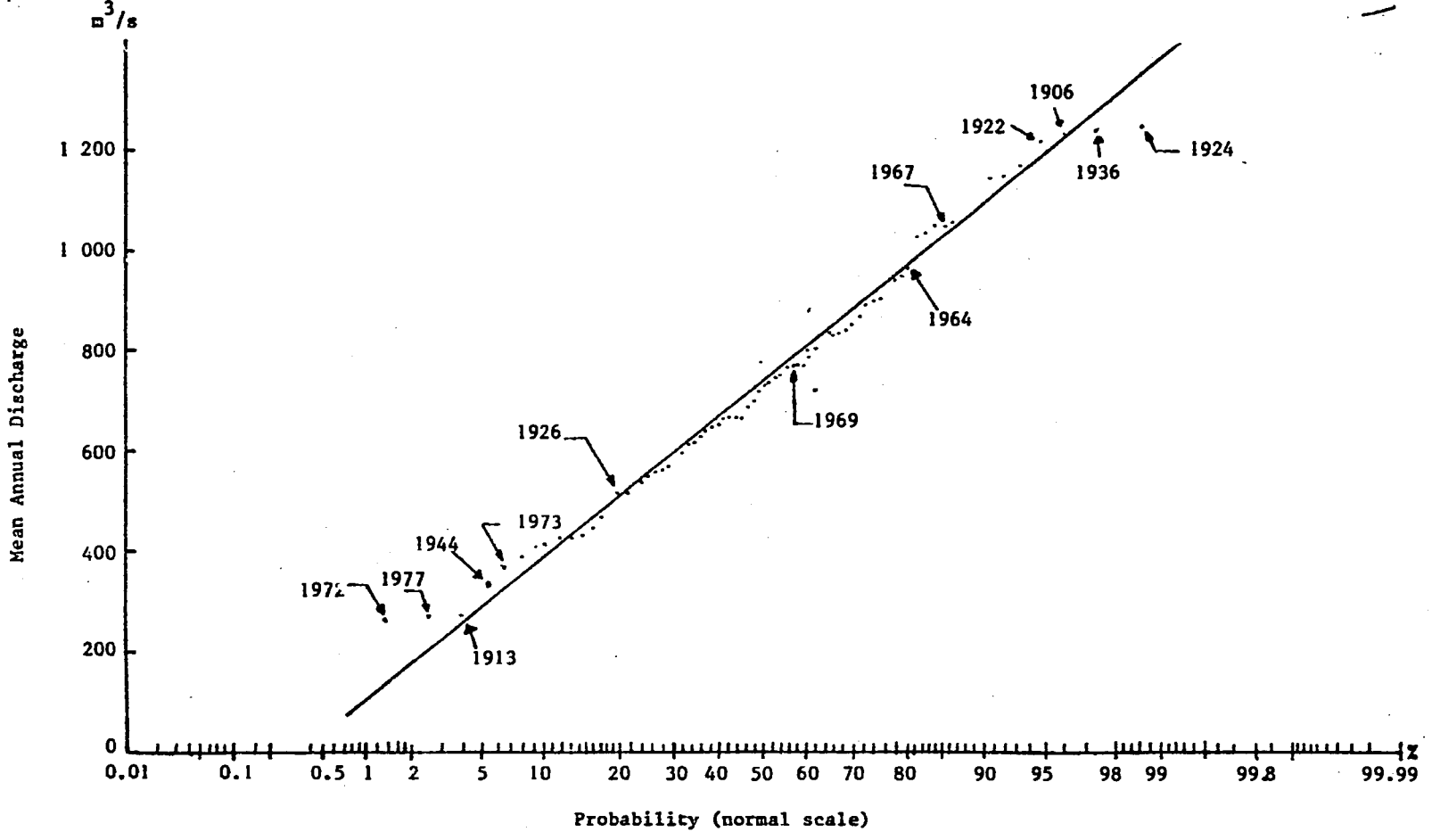
Mean Annual Discharge of the Senegal at Bakel, 1903-1980



Source: ORSTOM for 1903-1973; OMVS for 1974-1980.

Exhibit 1-17

Probability Distribution of Mean Annual Streamflow at Bakel, 1903-1978

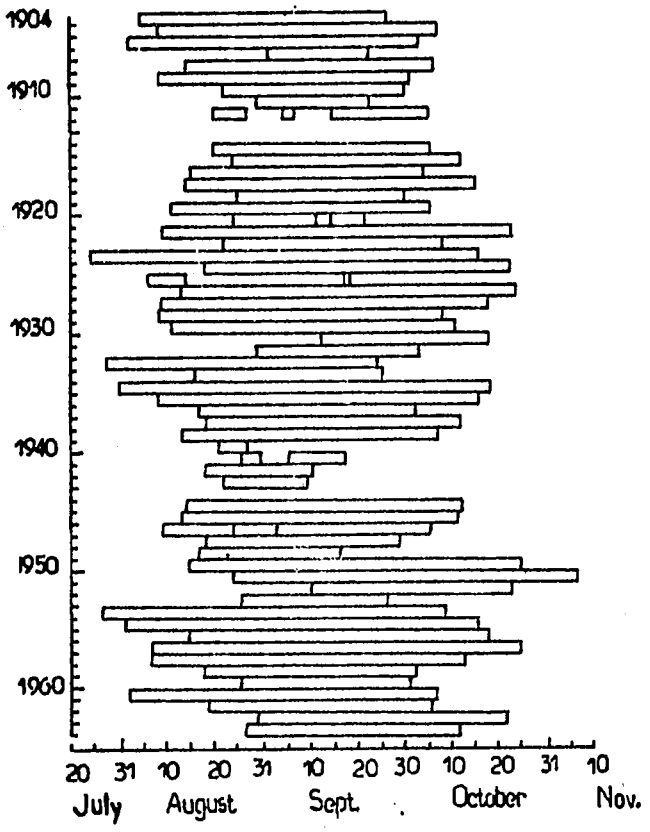


The straight line represents the best normal distribution fit.

Source: Adapted from partial report for river and estuary regime, Assessment of Environmental Effects OMVS. 1978.

Exhibit 1-18

The Duration of Active Flooding of the Senegal River at Bakel 1904-64



Active flooding is assumed to commence when discharge exceeds 2,000 cubic meters per second and is portrayed by the bar.

Source: The Guidimaka Region of Mauritania (1977).

1.9 Rainfall and Climate

Systematic collection of meteorological data dates back to about 1920; earlier data is unreliable. However, this concerns rainfall; other variables are much more recent. The first synoptic stations opened in the 1930's in response to the growing needs of aviation. The full complement of measurements actually start during the 1950's. At present, there are 12 synoptic stations, 7 recently established agrometeorological stations and 45 simple rainfall gauges, of which 30 are very recent (1978-1980). See Exhibits 1-19 to 1-23 for details of data available.

There are currently two organizations actively collecting meteorological data in Mauritania, ASECNA (Association pour la Securité de la Navigation Aérienne) and, since 1977, the AGRHYMET project under the Direction de l'Hydraulique. An official meteorological service exists, but its functions are assured by ASECNA, whose chief focus, quite naturally, is in the requirements of aviation. AGRYMET, on the other hand, has concentrated on micro-meteorological data of agricultural interest and improvement of rainfall coverage, as well as hydrology per se. At present, neither has the capacity to analyze data. All resources are devoted to network operation and data collection and verification. ASECNA sends its data to the regional center in Dakar where it is checked, computer-processed and disseminated. AGRHYMET relies on the regional meteorological center in Niamey, Niger, but plans eventually to have its own micro-computer in Nouakchott. However, transcriptions of available data (daily, monthly, yearly) are readily available upon request.

The archives of ASECNA contain the daily journals organized by month, as well as a secondary file with monthly and annual values. These, however, are not wholly free from occasional transcription and summation errors. ASECNA also receives copies of AGRHYMET data.

Exhibit 1-24 presents annual rainfall series for the long-term stations according to the ASECNA secondary file. Exhibits 1-25 to 1-25J presents isohyetal maps for the last 10 years, as well as the 30-year average, based on the same data.

Exhibit 1-19

Older Meteorological Stations

Initiation of Data Collection [a]

Name		Lat. (N)	Long. (W)	Altitude	Rain	Air Temp.	Humidity	Evaporation	Pressure	Wind	Insolation	Cloudiness	Ground Temp.	Soil Temp	Phenomena
Aioun el Atrouss	S[b]	16°42'	9°36'	223	1946	1953	1953	1953	1953	1960	1953	1953	1953		1953
Akjoujt	S	19°45'	14°22'	118	1931	1938	1949	1946	1949	1960	1956	1949	1955		1949
Aleg		17°03'	13°55'	45	1922										
Atar	S	20°31'	13°04'	226	1922	1926	1949	1941	1949	1960	1950	1931	1955	1955	1931
Amourj		16°01'	7°12'		1967										
Bir Mogrein[c]	S	25°14'	11°37'	359	1951	1956	1956	1956	1956	1960	1959	1956	1959		1956
Boghé		16°34'	14°17'	11	1921										
Boutilimit	S	17°32'	14°41'	77	1931	1931	1949	1941	1949	1960	1957	1940	1956		1940
Chinguetti		20°27'	12°22'	500	1931										
F'Derik[d]	S	22°41'	12°42'	297	1938	1938	1949	1943	1949	1960	1954	1939	1955		1939
Kaédi		16°08'	13°31'	33	1919										
Kankossa		15°57'	11°30'	70	1953	1953-61	1953-61	1953-61				1953-61			
Kiffa	S	16°38'	11°24'	115	1922	1938	1954	1955	1954	1960		1954	1956		1954
M'Bout		16°02'	12°37'	44	1921-31, 1944-	1953-61	1954-61	1955-61							
Mederdra		16°55'	15°40'	25	1931										
Moudjeria		17°56'	12°21'		1945-58, 1961-	1951-61	1951-61	1952-61							
Nema	S	16°36'	7°16'	269	1923	1934	1949	1945	1949	1960	1953	1931	1956		1931
Nouadhibou[e]	S	20°56'	17°02'	2	1922	1926	1939	1939	1949	1960	1950	1931	1954	1954	1931
Nouakchott	S	18°06'	15°57'	1	1931	1935	1949	1942	1949	1960	1954	1931	1955	1955	1931
Ouàlata		17°17'	7°01'	266	1936-50, '64-										
Rosso	S	16°30'	15°49'	5	1934	1942	1949	1943	1949	1960		1944	1954		1944
Sélibabi		15°14'	12°10'	60	1933										
Tamchakett		17°16'	10°43'		1933										
Tichit		18°27'	9°31'		1921-45, '64-69, 72-										
Tidjikja	S	18°34'	11°26'	396	1922	1945	1949	1949	1949	1960	1964	1949	1955		1949
Timbedra		16°17'	8°12'		1929-76, 1979-										
Tintane		16°23'	10°11'		1971										

a) Only longer gaps have been noted. Data before dates noted sometimes exist but should be treated with caution.
b) S = Synoptic Station (ASECNA). c) Previously Ft. Trinquet. d) Previously Ft. Gouraud
e) Previously Ft. Etienne.
Source: ASECNA summary and archives, ACTEC

Exhibit I-20

Older Meteorological Stations

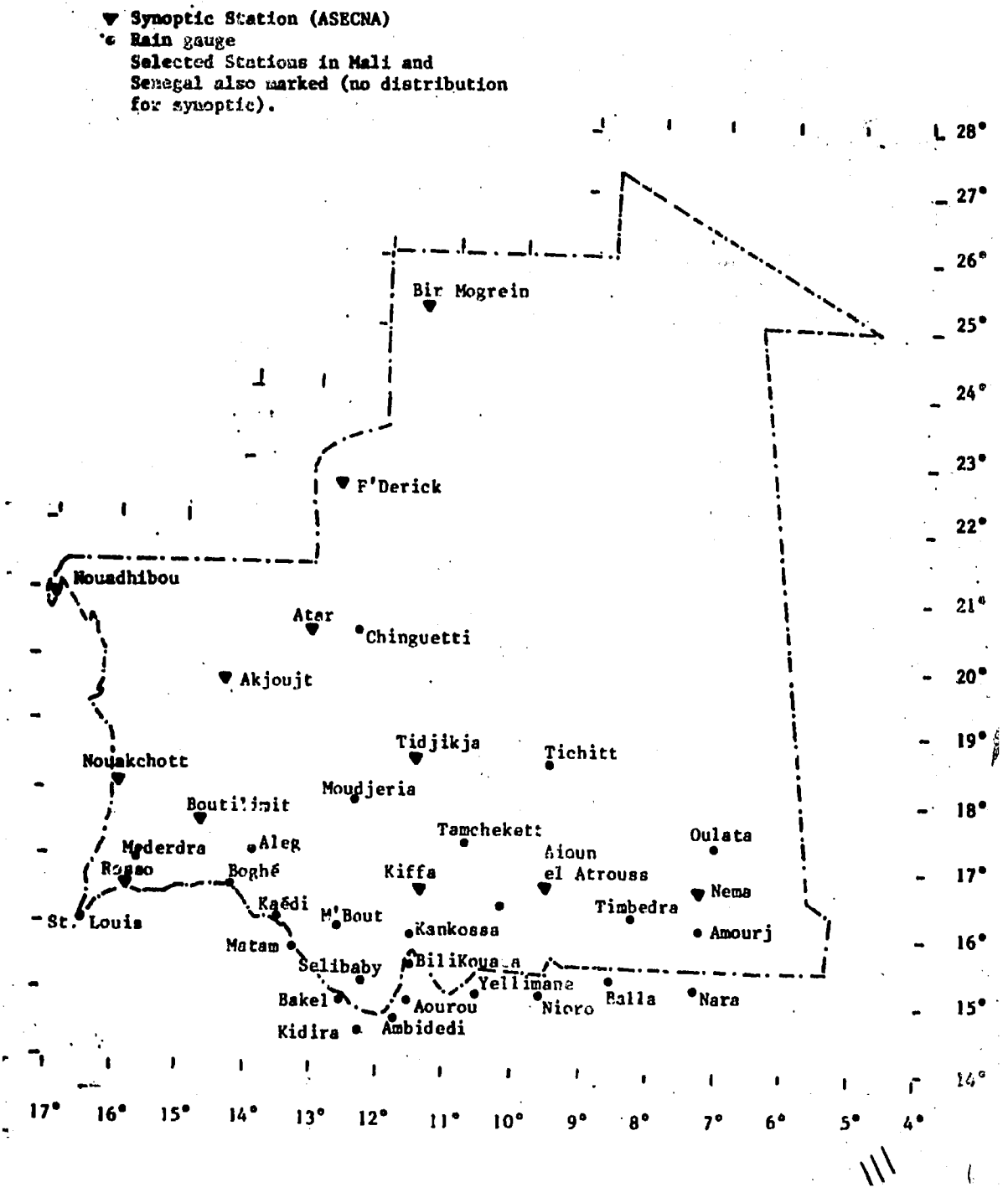


Exhibit 1-21

Recent Meteorological Stations (AGRHYMET project)

Name	Latitude	Longitude	Altitude (m)	Year of Opening[a]
Aleg A/M[b]	17°03'	13°55'	45	1977
Ain Farba	12°23'	15°56'		1978
Aouinata Zbel	16°23'	8°54'	200	1978
Adel Bagrou	15°33'	7°01'		1978
Agouenitt	15°34'	12°20'		1980
Agueilat	16°27'	12°48'		1977
Boghé A/M	16°34'	14°17'	11	1977
Bababé	16°21'	15°58'	82	1978
Bassikounou	15°52'	5°57'	261	1978
Bousteilla	15°35'	8°05'	274	1980
Boumdeid	17°26'	11°21'		1980
Barkeol	16°38'	12°30'		1978
Belonguélitama	15°41'	12°45'	38	1980
Dionaba	17°06'	12°38'		1978
Djiguenni	15°44'	8°40'	222	1979
Diadjibiue	15°45'	12°29'	41	1979
Dafort	12°09'	15°40'	68	1980
Fassala Nôré	15°33'	5°31'	261	1978
Foum Gleita	16°10'	12°40'	25	1977
Ghorfa Aval	15°31'	12°42'		1979
Guerrou	16°48'	11°50'		1978
Hassi Chems	15°57'	12°16'		1980
Kaédi A/M	16°08'	13°31'	33	1971[c]
Kamour	17°05'	12°02'		1978
Keur Macène A/M	16°33'	16°14'		1977
Lexeiba	16°13'	13°08'		1978
M'Bout A/M	16°02'	12°37'	44	1978
M'Bagne	16°09'	13°47'	15	1978
Maghama	15°31'	12°51'	21	1978
Magta Lahjar	17°31'	13°06'	53	1978
Monguel	16°26'	13°10'	43	1978
N'Beika A/M	17°59'	12°16'		1979
Ould Yenge	11°43'	15°32'	57	1980
Selibabi A/M	15°14'	12°10'	60	1978
Souffa	15°56'	12°01'	73	1980
Touil	10°08'	15°31'		1978
Zravia	16°28'	10°42'		1978

a) First complete year usually following the year indicated.

b) A/M = agro-meteorological station (separate from ASECNA stations where such also exist). All others are rainfall gauges only.

c) Old OMVS station.

Source: AGRHYMET

112X

Exhibit 1-22

Data Collected at Synoptic Stations[a)]

Maximim/minimim air temperature (standard cage)	Every third hour (not all stations do 00 and 21h.).
Vapor tension/relative humidity/ dew point	As for air temperature. Wet/dry bulb method. Calculations checked in Nouakchott.
Minimim/maximum ground and soil (10 cm) temperature	06, 12, 18h. Soil temperature only a few stations.
Pressure	00, 06, 12, 18h. (not all do 00h.)
Insolation	Hours - AM and PM.
Cloudiness	Octets, times as for air temperature.
Wind direction and average speed	At 12m, direction to nearest 10 degrees. Times as for air temperature.
Evaporation	Piche evaporimeter. Per calendar day (previously day and night). Nouakchott also has a class A pan (variable data quality).
Rainfall amount and duration	Day (06-18h.) and Night (18-06h.). Not all do duration.
Narrative and Phenomena	Clouds, visibility, thunder, sand, etc.[b)]
Global radiation	Hourly totals from recorder. Nouadhibou, Nouakchott and Kaédi. Processed by AGRHYET. Gaps due to instrument problems.
Atmospheric profile (high altitude wind)	Atar, Nouakchott, Nouadhibou, Kiffa, Nema (00, 05, 12, 17h.) and Bir Moghrein (12h.) Manual tracking. Nouadhibou also has facilities for radio and radar tracking.

---

a) Reflects the current (maximim) program. It shortens as one goes back in time. There is also some variation between stations. Older observations are usually 3 times a day at varying times (06, 13, 18h; 08, 13, 17h; 08, 16, 22h). Gaps of longer or shorter duration are not uncommon. The simple rain gauge stations report rainfall by day/night, as well as duration and phenomena. However, the supplementary data are of dubious reliability, except recently for the AGRHYMET-supervised stations.

b) It is not known how complete and accurate recording of phenomena are, especially in the older records. There are 3 official categories for sand: "brume sèche" - dust in suspension, "chasse sable" - wind greater or equal to 7 m/s, and "vent de sable" - wind greater than 16 m/s and visibility less than 1 km. However, it is probably safer to subsume all 3 under the general label of "sandy days" for statistical use.

Exhibit 1-23

Data Collected at AGRHYMET Agro-Meteorological Stations

Maximin/minimum air temperature[a]	3 times daily (08, 12, 18h).
Maximum/minimum ground temperature (+10, +50, at -10 cm)	
Vapor pressure/relative humidity (dry/wet bulb)	
Cloudiness	
Insolation	
Evaporation	Class A pan, day (08-18h) and Night (18-08h)
Wind direction and average speed	At 12m, hourly (from recorder)
Rainfall amount and duration[b]	Day and night
Phenomena	Daily

---

a) Thermographs installed.

b) Pluviographs have been installed, but no usable records have been produced due to sand clogging.

Equipment for soil moisture and wilting point measurements are available, but such data are only collected on demand.

STATIONS	Alsau	Akkajt	Alej	Arkajm	Alik	Anjuj	Bukchara	Bokau	Bukchara	Chigaetai	Chokpak	Ekaterinb	Ekaterinb	Kabul	Kabul	Karaganda	Kazal	Kokchetav	Kustanai	Magnitka	Makat	Moskva	Novosibirsk	Omsk	Orenburg	Petropavl	Rostov	Semipalat	Tashkent	Tashkent	Tselinograd	Tselinograd	Turgai	Uralsk	Ural'sk	Ufa	Chelkar	Chelkar	Chimkent	Chimkent	STATIONS
1980																																								1980
79																																								79
78																																								78
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56	603	161.5		379.2	740.0	2470		185.7	24.1	506.2	356.6	287.4	562.2	423.3	511.4	346.5	55.7	21.5	207.6	276.2	66.8	9.8.3		307.4	178.4	162.9					56
53	467.2	156.6		293.2	770.5	392.4		134.6	102.8	480.0	134.9	198.0	376.5	282.7	583.5	332.0	40.2	106.9	133.9	349.7	72.6	106.9		157.9	198.2	648.2					53
52	362.4	131.7		367.9	328.4	462.6		236.7	24.6	352.8	279.9	260.4	436.4	448.1	413.0	616.4	81.8	102.8	268.9	382.6	36.5	168.1		432.4	124.3	187.1					52
51	361.8	169.2		278.8	643.0	297.3		96.2	72.5	358.9	241.8	224.3	654.7	482.4	634.0	639.5	183.5	121.8	166.5	346.9	122.7	214.2		180.3	129.0	217.3					51
1950	520.5	241.1		265.3	971.1	287.6		182.4	23.0	345.1	282.9	328.2	611.3	606.6	630.0	502.5	41.3	51.0	184.8	351.8		285.0		266.2	136.9	540.2					1950
49	216.5	566.0		226.4	614.1	384.9	61.6	119.8	98.1	186.0	196.3	323.0	356.4	296.3	370.0	266.2	61.6	33.5	208.8	285.0		97.6		133.4	632	224.1					49
48	778.0	169.4		222.5	1180	247.1	132.6	41.6	8.6	231.5	187.4	162.0	238.1	462.7	410.0	419.2	22.5	64.3	128.8	331.0		96.8		328.9	607	215					48
47	246.1	161.2		332.0	820.0	611.8		83.7	5.8	246.7	252.1	316.1	361.7	263.9		615.0	33.8	56.9	216.9	652.0		161.2		252.8	1107	211.8					47
46	374.9	61.6		134.2	631.0	86.5		128.1	7.3	279.0	118.7	116.0	430.0	211.6		248.5	55.8	25.6	82.0	216.0		72.7		243.7	556	317.0					46
45	610.5	160.2	403	246.6	310.0	186.5	98.6	106.8	2.8	238.6	223.3	119.0	671.0	320.0		503.4	20.5	65.6	82.3	366.0		72.3		303.0	80.7						45
44	278.0	154.0	77.3	219.0	346.3	366.1	122.2	263.0	1.0	283.9		318.1	535.1	162.1		380.3	56.0	122.4	213.5	366.0		76.8		256.0	137.6						44
43	296.0	248.0	121.9	221.6	702.2	314.3		241.3	38.7	298.5		400.5	495	632.5		537.2	75.6	77.4	332.5	283.0		140.0		246.9	70.7						43
42	354.6	33.8	169.2	96.7	362.5	276.5	85.7	59.5	45.5	269.1		106.0	218	152.0		232.6	71.0	17.0	53.5	268.0		122.2		106.3	61.7						42
41	232.0	63.0	100.0	116.2	642.0	186.0	78.0	118.4	28.5	299.0		163.7	235	156.2		265.0	23.0	6.0	161.5	263.0		38.2		133.6	64.2						41
40	323.7	163.0	72.8	276.5	532.0	376.7	161.0	102.1	16.3	278.5		362.0	305	351.1		408.8	5.1	62.0	189.1	462.0		662		370.5	853						40
39	306.0	39.0	63.5	212.0	305.6	162.5	126.0	138.8	5.6	398.9		276.0	288	170.0		513.5	15.1	62.0	264.5	332.0		90.4		302.5	662						39
38	261.5	132.1	116.2	222.3	623.0	362.9		140.6	106.4	135.5		276.0	292	298.3		522.8	99.6	55.0	168.7	620.0		108.7		312.5	221.6						38
37	339.0	96.5	132.6	233.5	621.8	291.1	166.5	142.9	2.6	137.6		196.5	278	322.1		406.0		82.5	155.0	376.0		115.2		311.3	177.2						37
36	321.5	133.0	86.0	186.0	169.9	241.5		96.6	162.1	261.0		289.5	390	577.3		742.0		64.5	332.0	350.0		350		410.1	89.9						36
35	262.5	192.5	130.1	283.5	648.3	116.9		93.0	3.8	282.0		213.7	285	390.0		501.0		24.5	138.0	237.0		117.8		318.5	180.2						35
34	276.0	200.0	31.4	116.6	691.1	135.1		62.6	55.2	346.3		160.2	250	367.0		276.6		66.0	309	272.0		81.3		203.5	62.3						34
33	201.5	180.0	88.3	266.0	593.0	186.5		86.0	65.5	224.7		281.3	325	562.8		514.9		61.0	280.0	389.5		103.6		293.0	130.4						33
32	396.5	193.0	84.3	177.1	482.0	177.2		202.4	23.7	668.5		263.5	301	662.3		273.3		65.2	671	378.1		13.6		257.0	11.6						32
31	142.6	108.0	111.1	166.9	623.5	130.9		87.0	36.0	252.6		368.0	260.9	394.7		393.2		31.4	269.9	282.5		36.5		188.2	150						31
30	256.0	242.0	32.8					0.2	301.0			466.7	211.7			314.5		260.0	344.4			151.8		239.1							1930
29		283.0	83.5					5.1	213.0			226.6	336.0			341.4		155.8	301.0			122.6		333.3							29
28		108.0	11.2					65.4	166.5			296.6	378.5			526.0		318.9	316.0			30.8		611.8							28
27		116.5	60.5					176	228.5			383.7	251.3			467.8		692	181.0			44.1		619.4							27
26		105.5	10.1					26	267.6			226.8	681.5			250.0		254.9	263.0			68.5		385.3							26
25		104.2	86.3					11.5	208.2			384.0	195.8			192.0		150.4	214.0			133.3		468.6							25
24		116.5	56.0					28.0	282.0			380	256.5			652.0		635	260.6			122.7		369.0							24
23		70.9	10.3					8.4	276.0			379.8	763.5			584.4		1206	222.4			35.9		108.7							23
22		185.5						.2	264.0			268.9	610.4			465.9		361.0	323.4			102.9		110.5							22
21												432.6	361.8			293.3			224.1												21

MAURITANIE/MAURITANIA

RECORDED RAINFALL FIGURES FOR EXISTING STATIONS 1921-1980

LA PLUVIOMETRIE POUR LES STATIONS EXISTANTES 1921-1980

ESTIMATIONS/ESTIMATES

SOURCE: ASECNA, STATIONS, AGRYMET

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Some Useful References

Ph. Roussel, Eléments Statistques pour une étude de la pluviométrie en Mauritanie, Bureau Hydraulique, Nouakchott, 1969.

Daily rainfall data up to December 1968.

Ph. Roussel, Données Climatologiques en Mauritanie, Bureau Hydrogéologique, Nouakchott, 1968 (35 pp.)

Mean monthly and annual values for rainfall, rain days, max. and min. temperature relative humidity (at 06, 12, 18 h) and Piche evaporation for all 26 stations up to 1967. For rainfall, also frequency of rains greater than 10, 20, 50 mm, and intensity above 50 mm/h, as well as 24 h maximum rain.

The validity of Piche data as a measurement of evaporation is debatable. A correction factor of 0.6, based on Sahel experience, is normally applied to obtain estimated free-surface pan evaporation. However even these values should be treated with caution. Typically, the instrument is placed in the thermometer cage, thus reducing influence of wind and sun. Apart from instrument limitations (small area), handling problems are common.

Y. Brunet-Moret, Etude générale des Averses Exceptionnelles en Afrique Occidentale - Mauritanie, ORSTOM, 1964.

Also contains discussion of rainfall data reliability. As might be expected there are various types of errors in the data, both systematic and random. Some stations are non-representative for their areas because of proximity to topographic anomalies (Moudjeria, Tamchakett). Other gauges are badly placed (close to trees, houses) or otherwise improperly set up; changes in location, sometimes a kilometer or more, have occurred without being noted. Before 1930, equipment was variegated and generally non-standard. The most common observation and recording errors are systematic recording of next higher full millimeter and confusion between 1/10 and 1/1 millimeter units. Small rainfalls tend to be ignored and are usually totalled with the next substantial rain, with evaporation loss in between, thus reducing the number of raindays and rains less than 10 mm. Morning dews have sometimes been reported as precipitation. Except at synoptic stations, standard measurement times have not generally been adhered to, the observer rarely venturing out before the end of the rain, thus introducing errors in day/night distribution,. However, all things considered coverage and validity on the whole is good, especially after 1930, excepting major gaps during the war and just after independence.

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Rainfall - Transcription of ASECNA Records of Precipitation in Key Stations (Synoptic and Others), World Food Program, Nouakhcott, 1974 (40 pp.)

Monthly mean rainfall series to 1973 for Aïoun, Aleg, Atar, Akjoujt, Bir Moghrein, Boghé, Boutilimit, F'Derick, Nouadhibou, Nouakchott, Nema, Kiffa, Kaédi, Rosso, Selibaby and Tidjikja.

République du Mali. Precipitations Journalières de l'Origine des Stations à 1965, Comité Interafricaine d'Etudes Hydrauliques, Ministère de la Cooperation, ORSTOM, Paris, 1974 (1081 pp.)

Daily, monthly and annual totals. Rainfall data for Mali are relevant to studies concerning southeast Mauritania. Similar volumes exist for several other francophone countries in West Africa. Station locations and opening years are summarized and mapped for the zone of the Senegal basin (including Mali) in the Senegal - consult upper basin hydrology report (see Hydrology Section).

J. Sircoulon, Les Données Hydropluviométriques de la Sécheresse Récente en Afrique Intertropicale. Comparison avec les Sécheresses "1913" et "1940", Cahiers ORSTOM 12:2, Paris, 1976 (174 pp.)

Detailed, thorough discussion. Selection of reliable long-term rain and discharge series included. Concludes that the 1968-74 drought was more severe than the 1940-44 drought but somewhat less severe than the 1910-14 one, which it otherwise resembles.

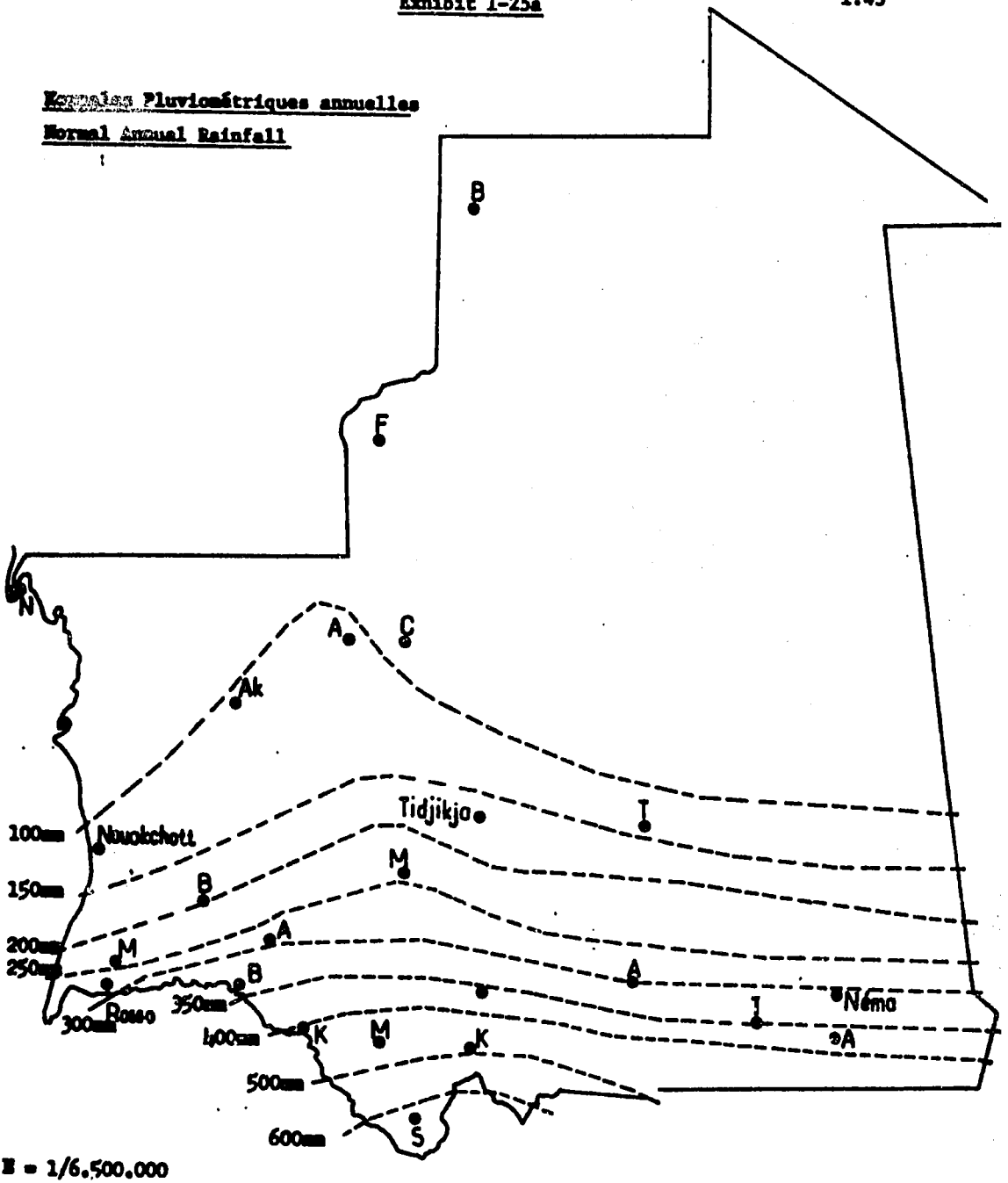
S.E. Nicholson, Climatic Variation in the Sahel and Other African Regions During the Past Five Centuries, Journal of Arid Environments 1:1978, (22 pp.)

Analyzes all types of disparate climate proxy information from historical sources (including Mauritanian chronicles) and compares with pleistocene conditions. It seems that in Mauritania and Senegal wetter conditions prevailed during the 16th and 18th centuries, though several severe droughts are recorded since about 1680. This was followed by a marked trend to increased aridity from the late 18th century, inturrupted by increased rains in the late 19th century.

The rainfall data presented as annual isohyet maps are necessarily very schematic and should be treated as such. The number of stations is very small and their areal representativity is not always good. Spatial variability is very high; differences up to 200 mm within less than 30 km are quite possible.

Normales Pluviométriques annuelles

Normal Annual Rainfall



E = 1/6.500.000

Source: ACRHYMET

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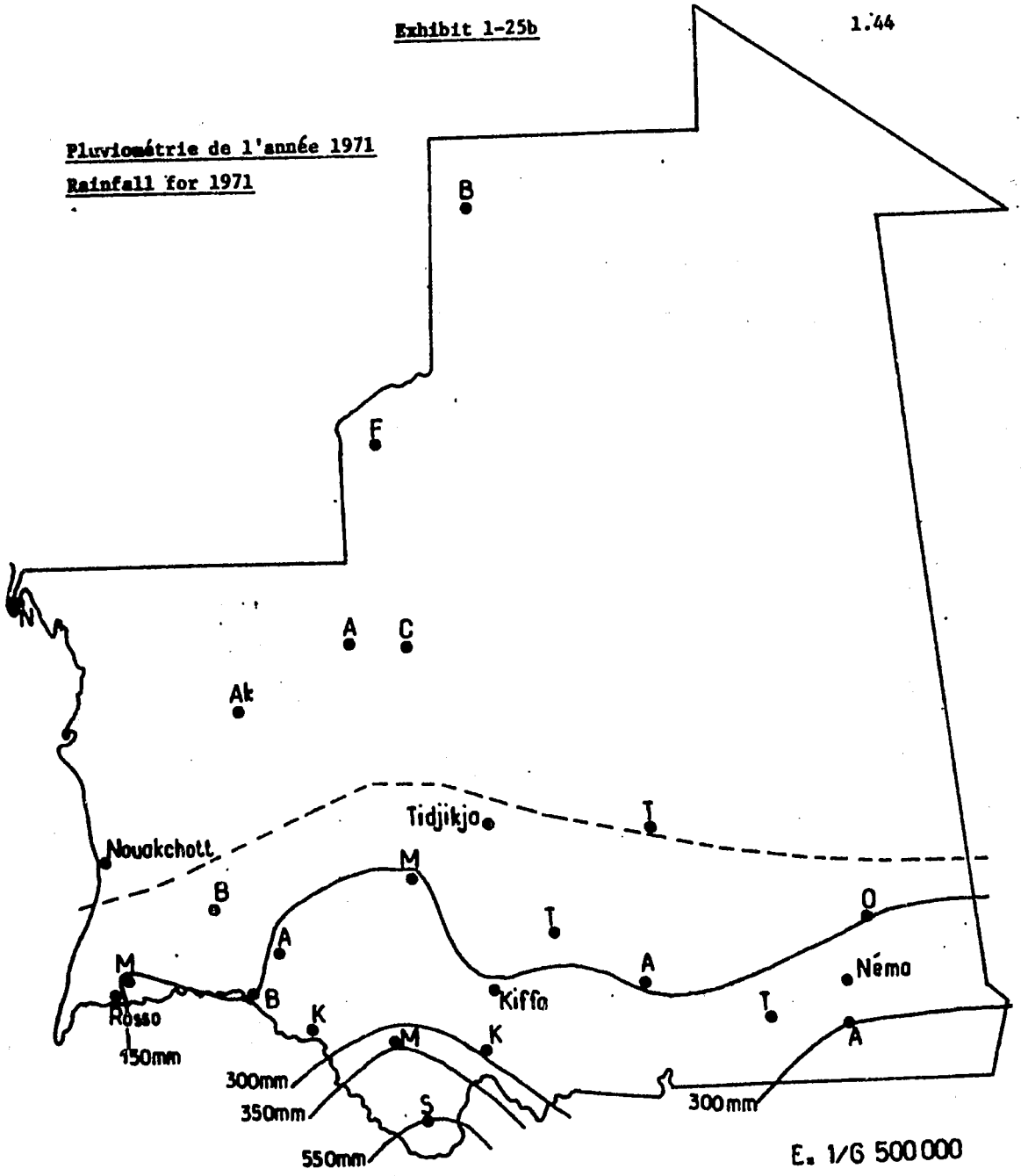
Pluviométrie de l'année 1971

Rainfall for 1971



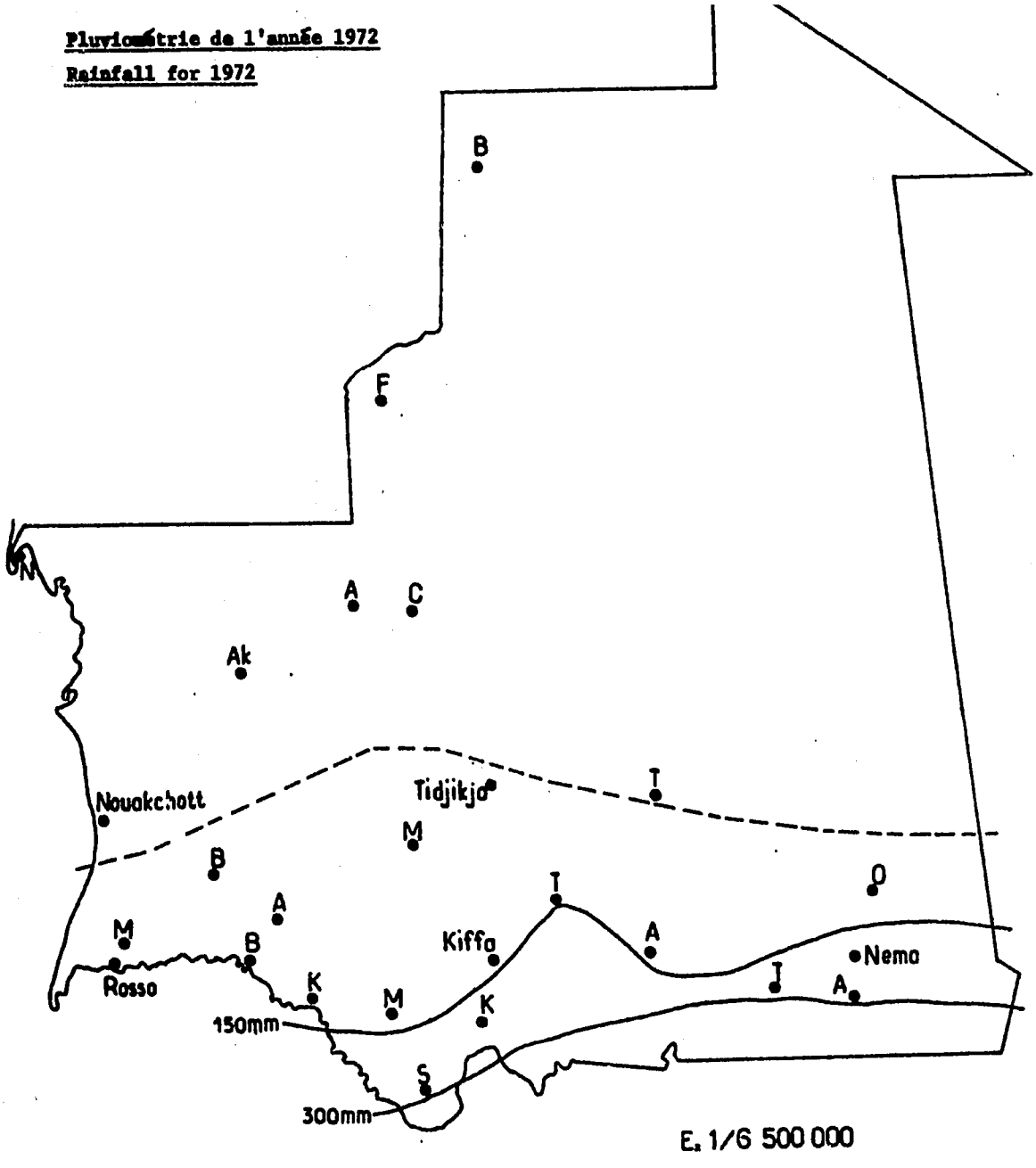
_____ Isohyète 150mm (moyenne 1941_1970)
150 mm Isohyet (1941-1970 average)

_____ Isohyètes de l'année 1971
1971 Isohyet

Source: R A M S_1981

Pluviométrie de l'année 1972

Rainfall for 1972



Source: R A M S _ 1981

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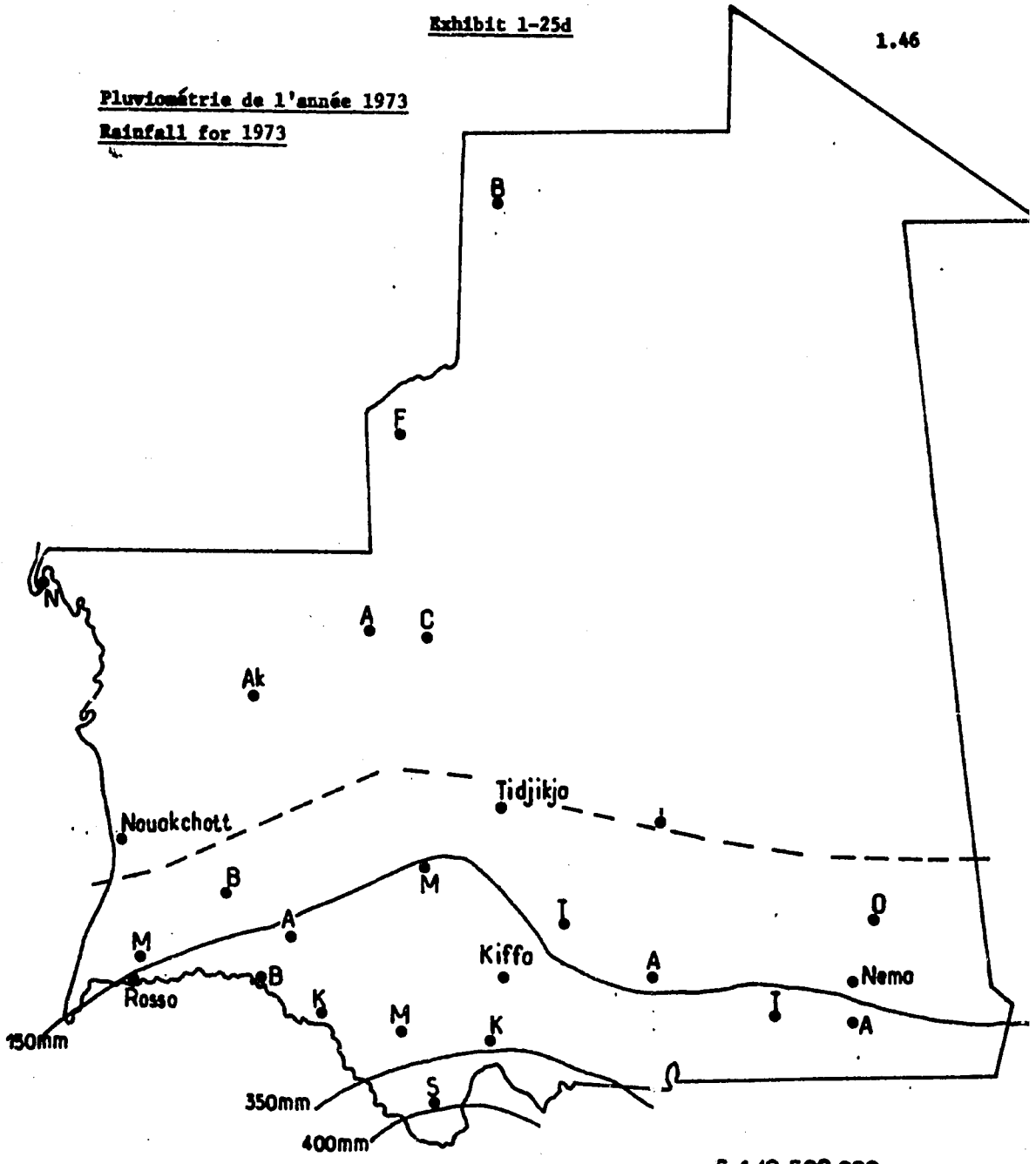
Pluviométrie de l'année 1973

Rainfall for 1973



E. 1/G 500 000

Isohyète 150mm (moyenne 1941_1970)

150 mm Isohyet (1941-1970 average)

Isohyètes de l'année 1973

1973 Isohyet

Source: R A M S_1981

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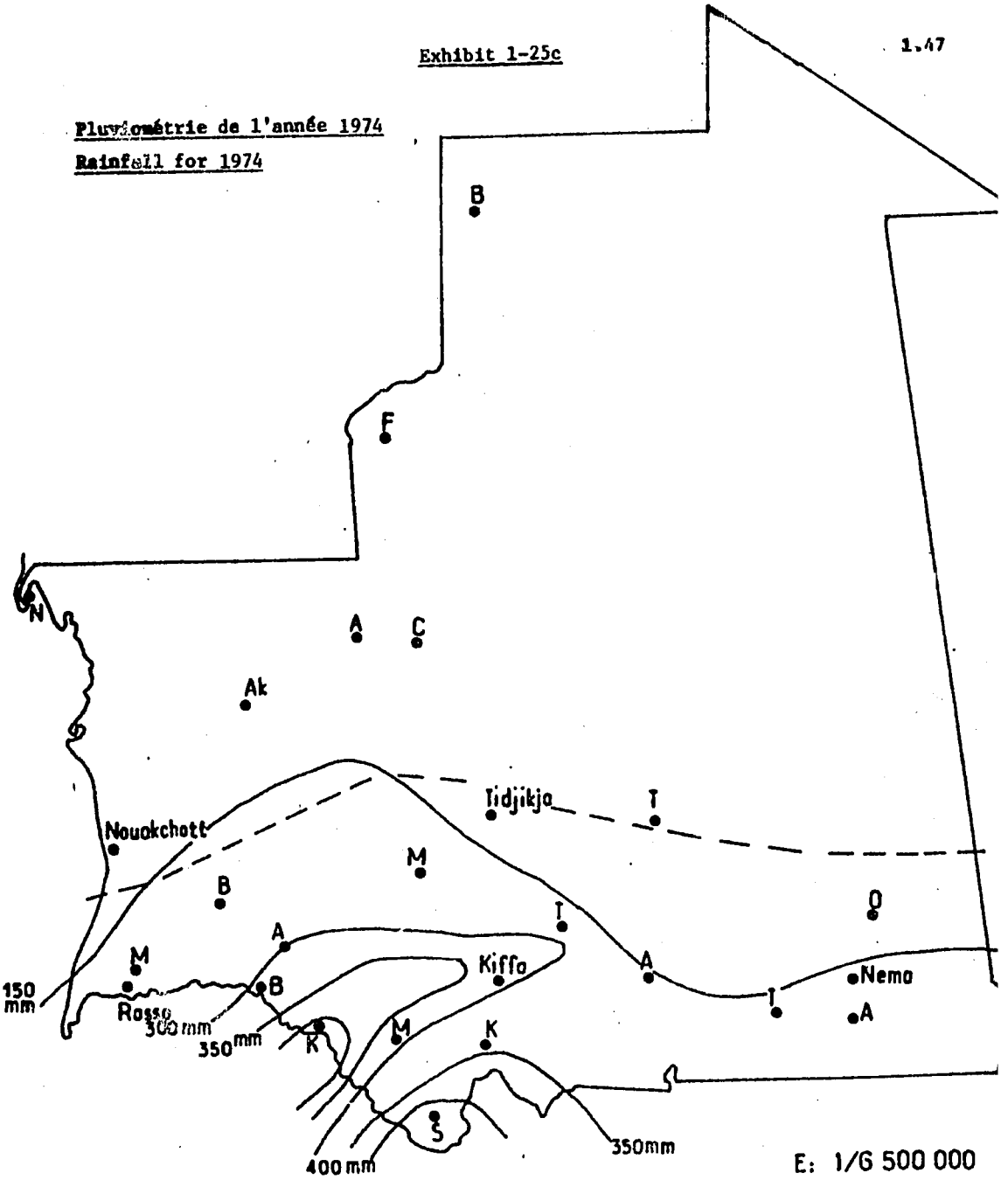
Exhibit 1-25c

Pluviométrie de l'année 1974

Rainfall for 1974



Isohyète 150mm (moyenne 1941_1970)

150 mm Isohyet (1941-1970 average)

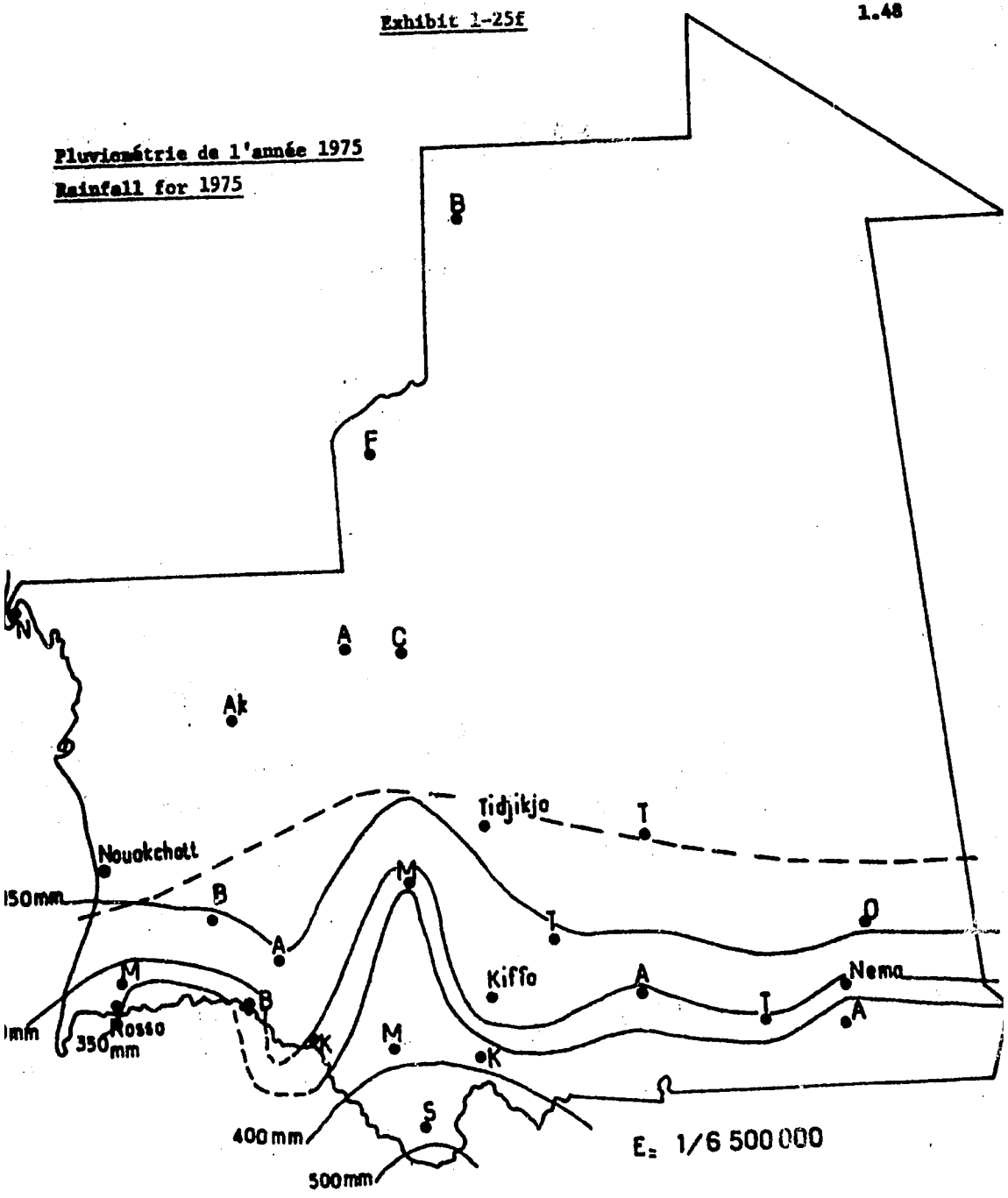
Isohyètes de l'année 1974

1974 Isohyet

Source: R A M S_1981

Pluviométrie de l'année 1975

Rainfall for 1975



Isohyète 150mm (moyenne 1941_1970)

150 mm Isohyet (1941_1970 average)

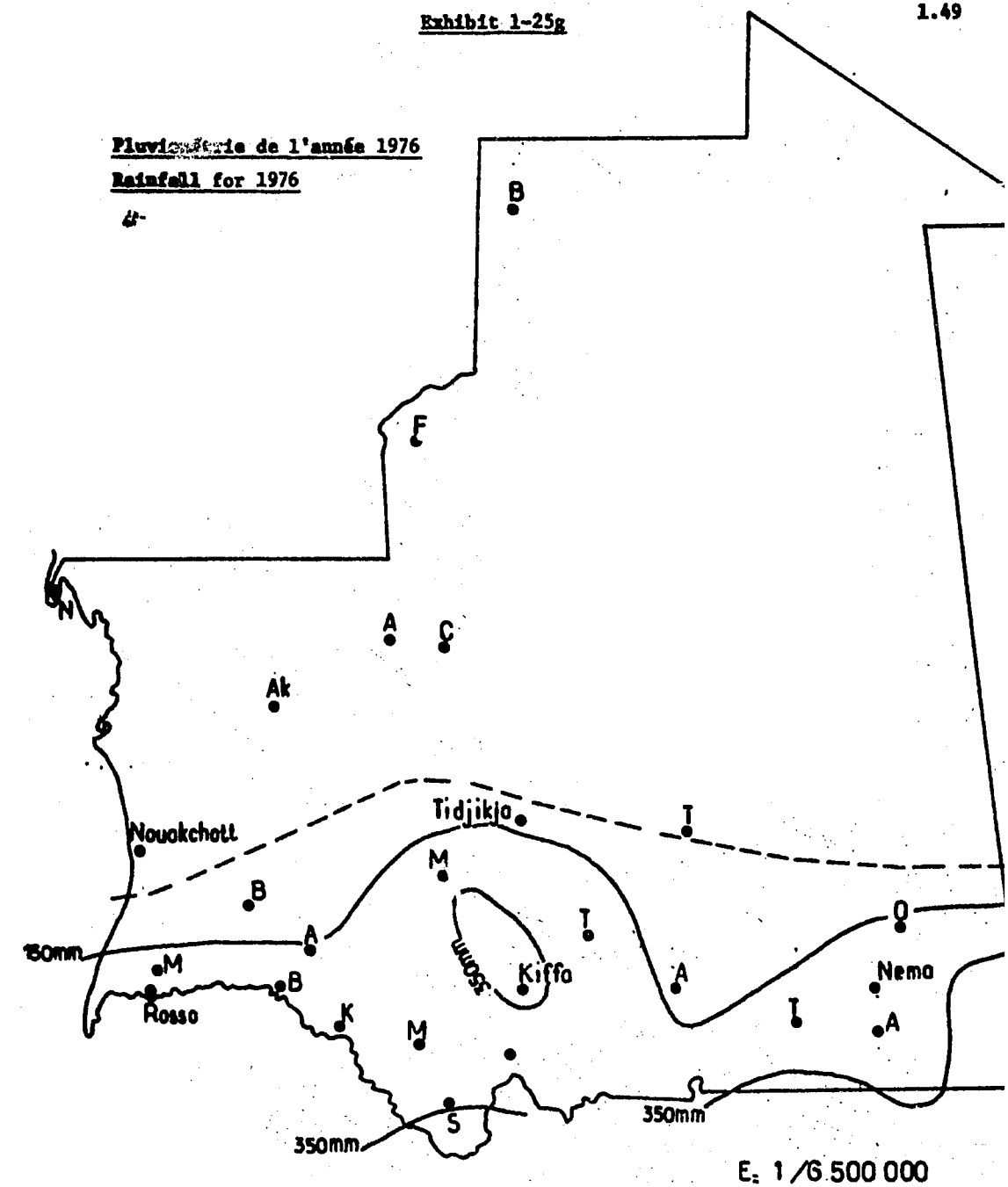
Isohyètes de l'année 1975

1975 Isohyet

Source: R A M S _ 1981

Pluviométrie de l'année 1976

Rainfall for 1976



E: 1/6 500 000

_____ Isohyète 150mm (moyenne 1941_1970)
150 mm Isohyet (1941-1970 average)

_____ Isohyètes de l'année 1976
1976 Isohyet

Source: R A M S_ 1981

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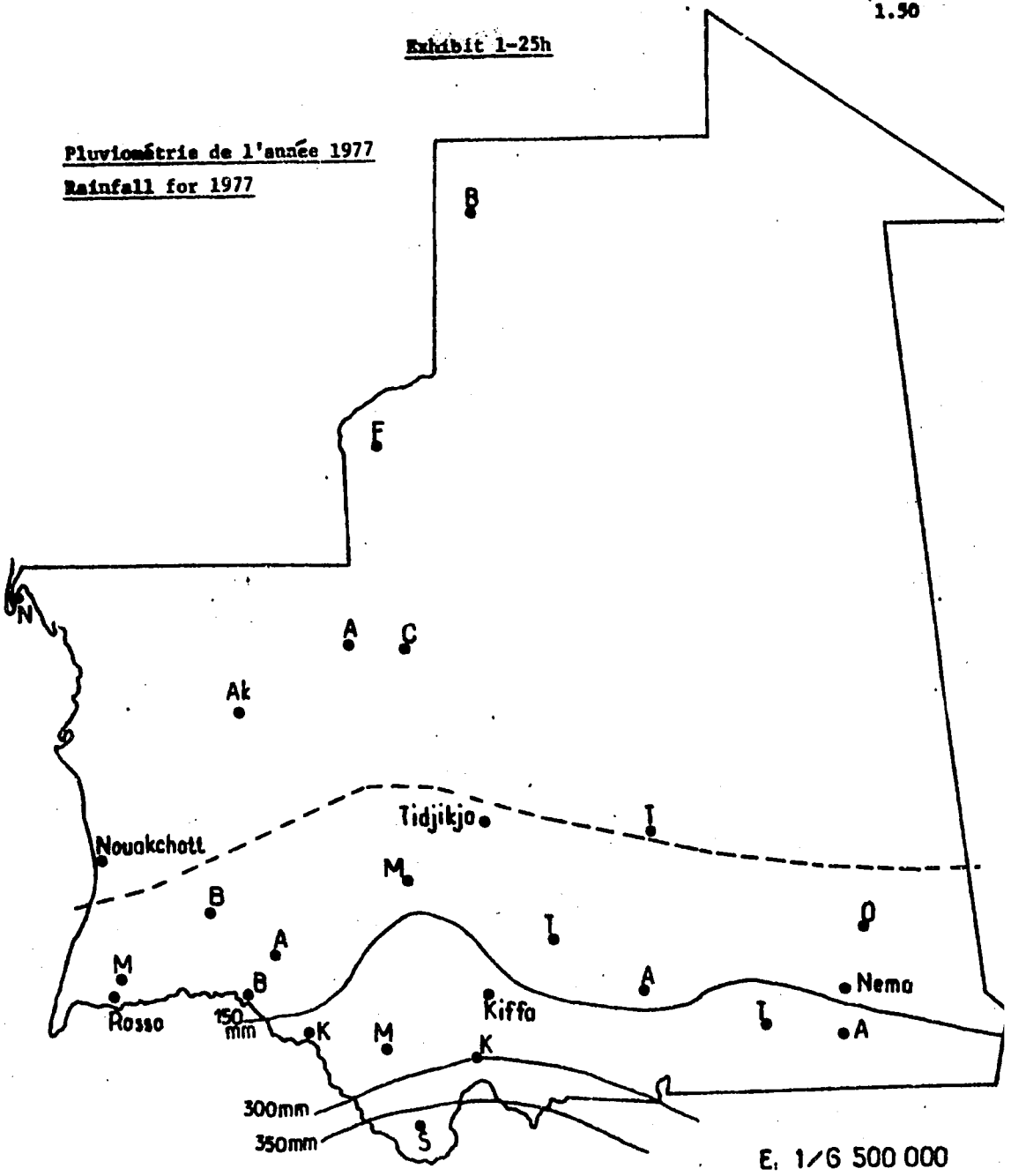
Exhibit 1-25h

Pluviométrie de l'année 1977

Rainfall for 1977



Isohyète 150mm (moyenne 1941..1970)

150 mm Isohyet (1941-1970 average)

Isohyètes de l'année 1977

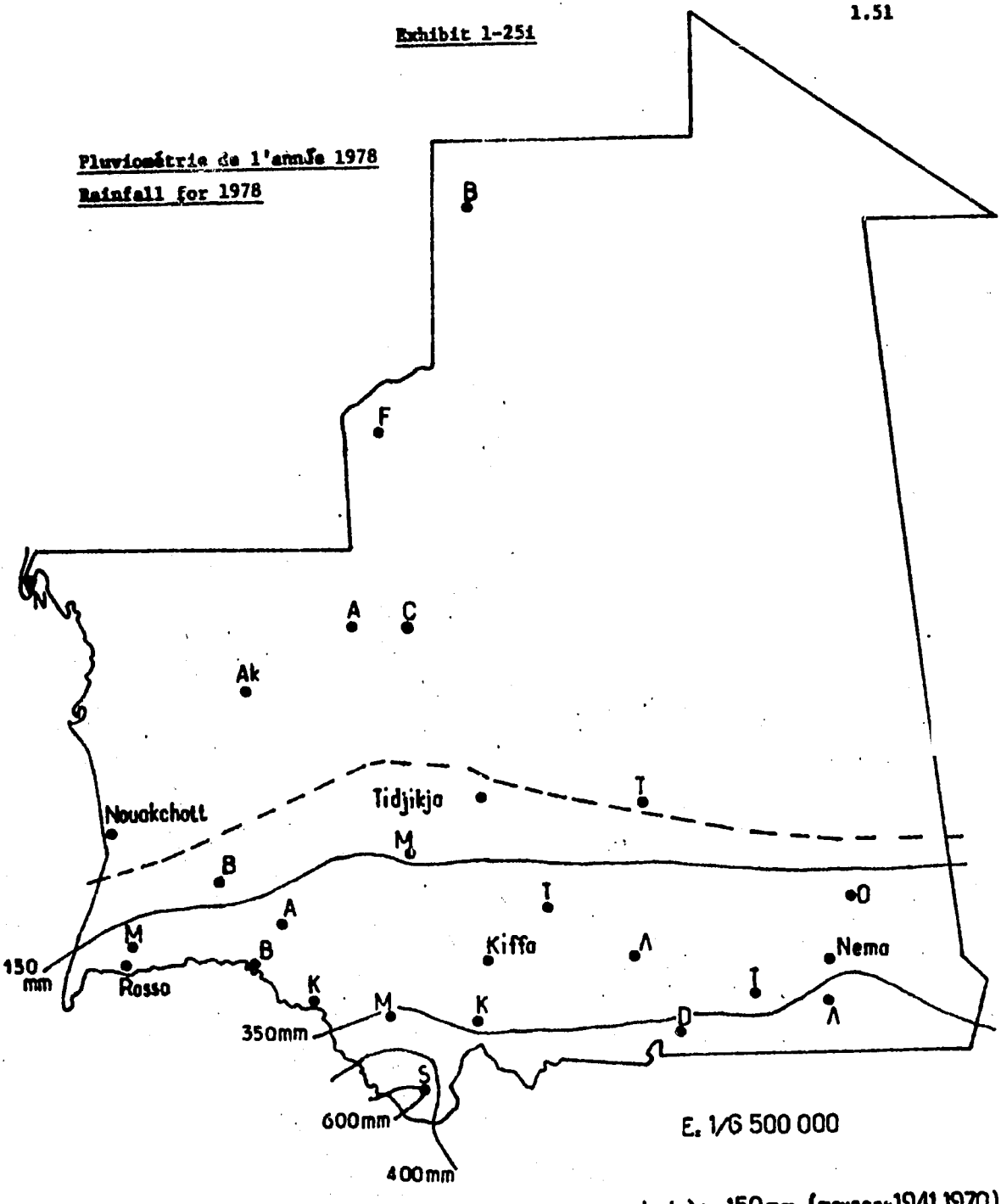
1977 Isohyet

Source: R A M S 1981

Exhibit 1-25i

Pluviométrie de l'année 1978

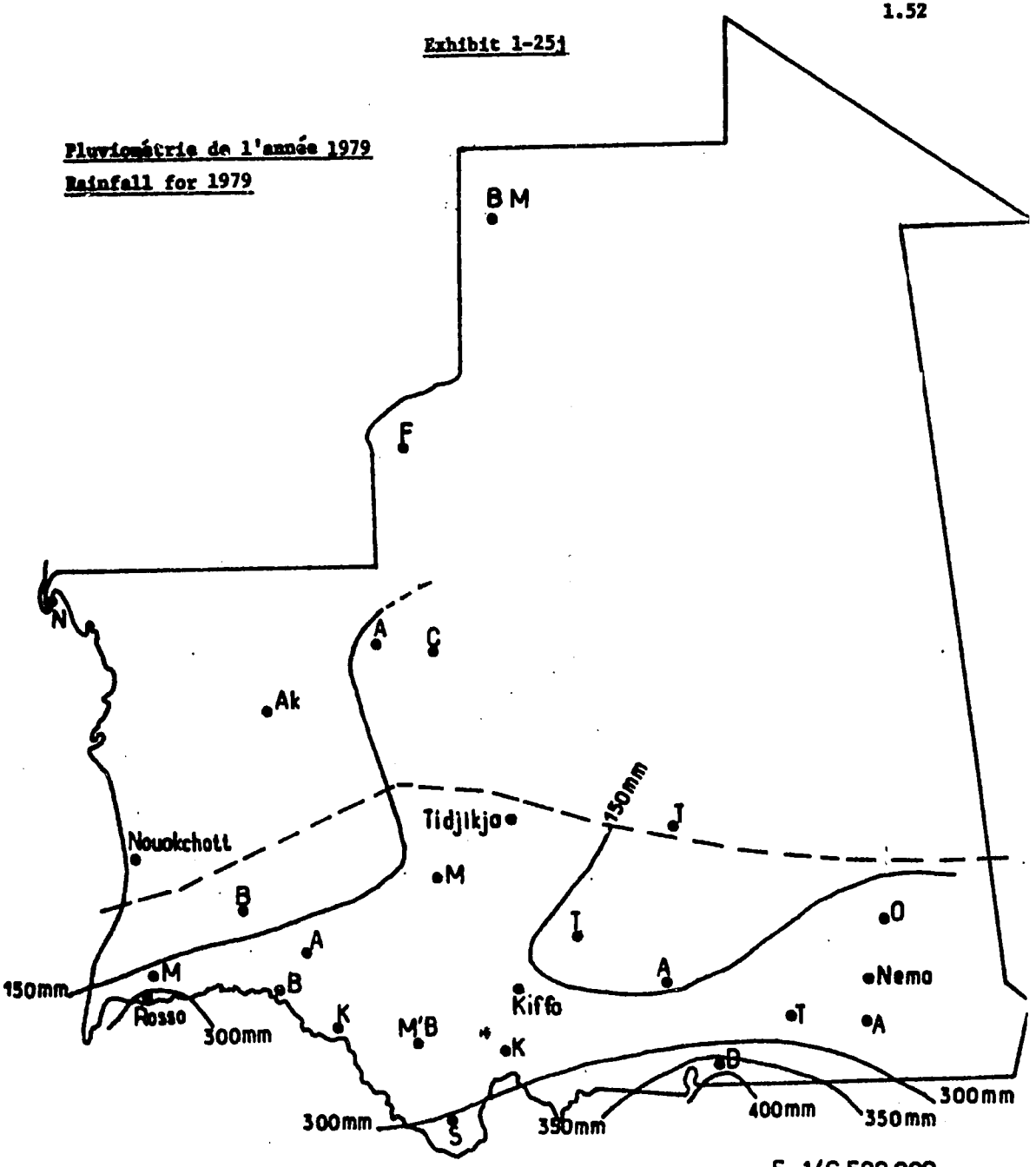
Rainfall for 1978



Source: R A M S 1981

Exhibit 1-25j

Pluviométrie de l'année 1979
Rainfall for 1979



E= 1/6 500 000

Isohyète 150 mm (moyenne 1941_1970)
150 mm Isohyet (1941-1970 average)

Isohyètes de l'année 1979
1979 Isohyet

Source: R A M S 1981

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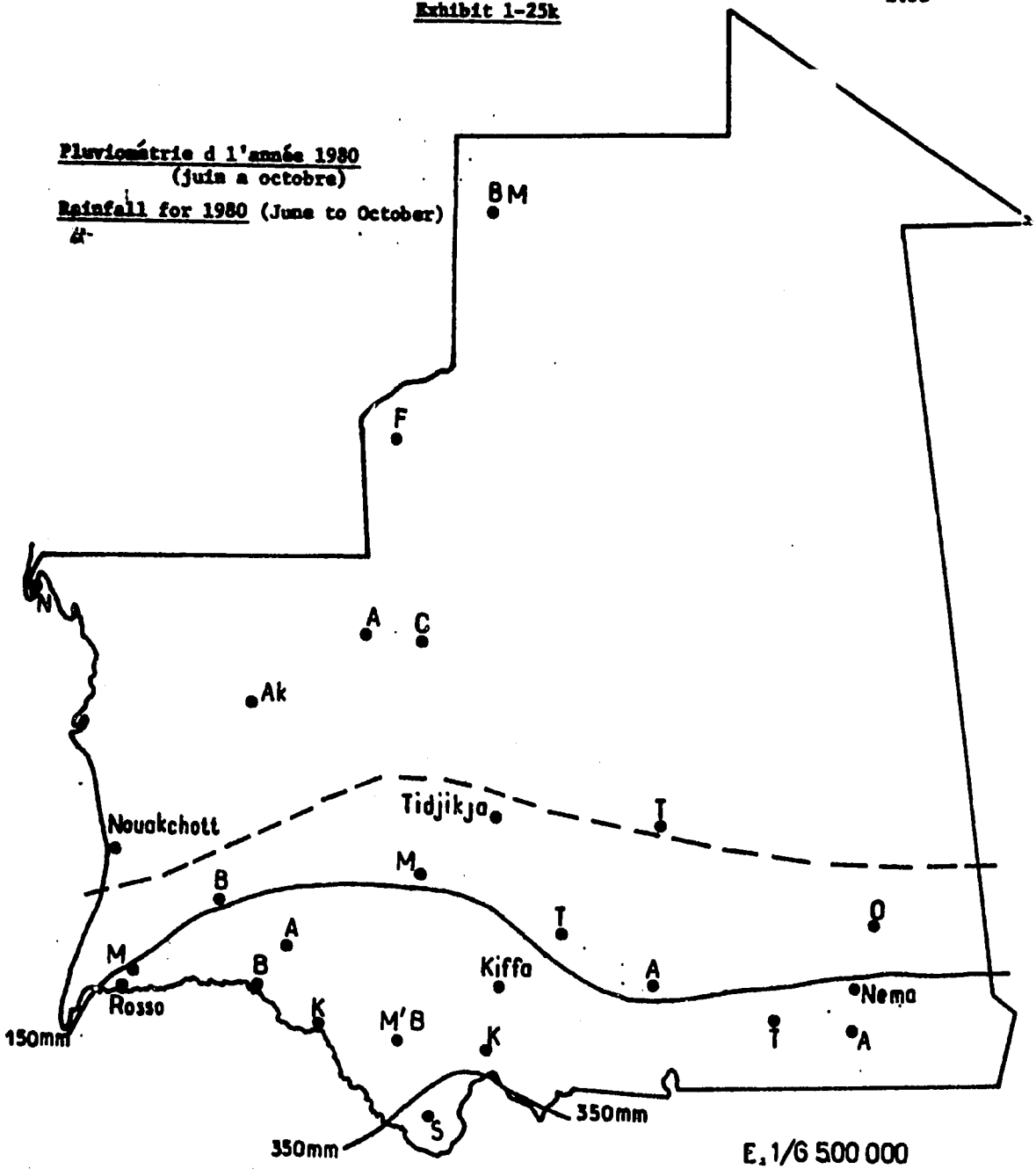
Exhibit 1-25k

Pluviométrie d l'année 1980
(juin a octobre)

Rainfall for 1980 (June to October)



E. 1/6 500 000

Isohyète 150mm (moyenne 1941_1970)
150 mm Isohyet (1941-1970 average)
Isohyètes de l'onnée 1980
1980. Isohyet

Source: R A M S 1981

1.10 Selected Moor Geographical Terms

adrar	- mountain range
aftout	- long, wide valley; by extension enlarged area with little sand
ain	- spring or masonry-lined well
aouinet	- small spring or well (diminutive)
ajar	- resident pond from oued flow at foot of slope or bank
aklé	- continuous field of live dunes
aouligue	- residual pond, particularly behind a dam
archane	- small water hole, particularly in the bed of an oued or pond. By extension well dug in such a spot
barkhane	- crescent-shaped, highly mobile dune with horns facing down-wind
baten	- plain or depression, generally at foot of escarpment. Often generously covered with sand
batha	- sandy bed of an oued
bir (bouir)	- well, particularly a lined well
chelkha	- wooded depression, often site of pond during rainy season
chig (chgneig)	- cleft in rock, typically with a spring
dahr	- escarpment. By extension the plateau bordered by the escarpment
daya	- small, temporary pond formed on impermeable ground during rainfall
erg	- dune field
foum	- passage between or across a dune
grara (plural grair)	- cultivable, low-lying area flooded by oued flow
guelb	- isolated peak

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guelta	- well
hassei	- small well
hofrate	- extensive basin collecting surface inflow
iriji	- spring
kedia	- isolated mountain
khat	- long straight depression separating two areas. By extension oued without visible flow
melzem	- backwater (marigot)
oglat (plural ogol)	- hand-dug shallow well tapping superficial aquifers (as in oases)
oued	- intermittent stream
sebkha	- depression containing salt or gypsum, deposited by evaporation. Often ancient lake bed
tamourt	- closed depression lacking outflow, generally wooded
tayaret	- long, fairly wide depression marking ancient river bed, often meandering

Further reference:

A. Leriche, Terminologie Géographique Maure.
Etude Mauritanienne No. 6
IFAN-Mauritanie. St. Louis 1955 (70 pp.)
Defines about 400 terms.

1.11 Selected Agro-Geomorphological Terms in the Senegal Valley

(mostly of Toucouleur origin but used generally)

walo - alluvial basin behind levee, flooded yearly. Recessional agriculture

hollalde ranere - upper segment of walo. Also hollalde "blanc"

hollalde wallere - lower segment of walo. Also hollalde "noir"

falo - upper segment of river bank. Recessional agriculture

fondé - river levee (top of bank). Dryland cultivation

Note: The distinction between falo and fondé is not always clear, and they are often grouped together.

diéri - general term for non-alluvial areas. Culture zone not reached by flood-water; by extension rain-fed, dryland agriculture in general.

P. Bradley, C. Raynant, J. Torrealba,
The Guidimakha Region of Mauritania.
A Critical analysis leading to a
development project.

War on Want. London 1977

Contains inter alia a thorough discussion of the intricacies of the above terms, as well as other more specialized expressions pertaining to soils and minor topographical variations.

Chapter 2: Population Profile

Table of Contents

2.1 Overview

This section presents a selection of basic population and settlement data on Mauritania as they exist in preliminary and official form.

Any demographic analysis must essentially rely on national census data. In Mauritania, the most recent was undertaken over a four-month period from December 1976 to March 1977. It was carried out in two stages by the Bureau Central de Recensement (BCR or BCRP) at the Direction de la Statistique (Ministry of Finance), which is officially responsible for the collection and publication of population data. The first was exhaustive and concerned the sedentary population, considered by definition as people residing in a locality with at least one permanent structure used as dwelling or service activity. The second stage was a sample survey of the nomad population (covering approximately 12%) which classified as nomad any person who spent more than 6 months each year in a locality devoid of permanent physical structure (as defined above). The sedentary census distinguished between rural and urban sedentary and included, in addition to residential information, data on migration, language, literacy, skills and occupational status. For the nomads, the questionnaires added limited questions about fertility and mortality, movements and composition of herds.

The 1977 survey also included a village file (fichier village) which aggregates individual-level data (sedentary population) and village-level data for some 2,340 villages.

Demographic information is also available from a 1965 rural survey (approximately 10% sample). It was conducted over an entire year and includes fertility data The excluded urban population was surveyed in 1961-62 as well as in 1975.(1) At the time of the 1965 survey, the nomad population was defined as persons not residing in a town or a village. It should be noted that, as a result of the dramatic changes in the sedentarization pattern which evolved during the 60's and 70's, the definition of nomad was altered in 1977; nomads were defined as (and limited to) individuals living in moveable encampments, thereby for example, allowing transhumant Peulhs to be counted as nomads. (See "Definition of terms used in 1977 Census" below.)

Earlier data are limited to the classic "Recensement Administratif" conducted regularly for fiscal purposes (see list of reference). However, the quality of these data is such that detailed demographic analysis is extremely difficult. These were discontinued in the early 1970's because of the drought.

On the whole, the RAMS has found that the 1977 census data are quite cohesive and can be trusted. Caution should, however, prevail regarding fine-line data, including detailed age-breakdowns, detailed professional categories (especially when the number of individuals falling into separate categories is small), and individual settlement data.

The Direction de la Statistique has experienced delays in compiling and publishing final tables of the 1977 census. In 1979, realignment of the administrative boundries which existed at the time of the survey caused part of the delay. Data processing is still under way. The information which follows summarizes the tables made available to RAMS by the BCR as of March 1981 and draws on earlier censuses.

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(1) Nouakchott was also covered in June 1964 as part of the pilot exercise for the 1965 survey. For a detailed summary of all population data for Nouakchott see Pitte, Nouakchott - Capitale de la Mauritanie, Paris, 1977.

2.2 Selected Annotated References

Censuses and Major Socio-Economic Surveys

Enquête démographique 1965. Vol. 1: Methodologie. Vol: II Resultats définitifs. Secretariat d'Etat aux Affaires Etrangères/INSEE/SEDES, Paris, 1972 (190 + 330 pp.).

Vol. I also contains a detailed discussion of the procedure used to extrapolate to total population and to adjust age-sex data. The use of the administrative registers of nomad fractions is extensively discussed, since it was the base for the sample census-taking. Vol. II contains, apart from standard tabulations, detailed data of tent/concession and household composition and structure. There are also data on activities, occupation and enrolment, as well as a substantial section on fertility and other demographic parameters. The data are often broken down by Moor social categories and ethnic groups (or at least nomad/sedentary).

Etude socio-économique du bassin du fleuve Sénégal, Rapport général, OMVS, Etude provisoire, aout 1980, 7 vol.

The field work for this study, which covers both the upper and the lower valley, was conducted in 1977-79 and consisted of a year-long qualitative observation part, as well as a series of quantitative surveys up-dating and expanding the MISOES study. The survey covered the following subjects:

- irrigated yields on some 900 fields in relation to agronomy, work budgets, social situation. A specialized study to identify socio-economic factors behind very high and very low yields is planned for separate publication.
- revenue/consumption budget survey of farmers cultivating traditionally or irrigated land.
- production system and cost of irrigated agriculture. To be published separately.
- construction and start-up of irrigation schemes. Problems of land tenure, organization and introduction of new techniques.
- production and consumption of wood and charcoal. Survey of actual family consumption (2 villages on Mauritanian side) as well as profile of professional charcoal makers. Detailed results to be published separately as a special report.
- urban environment and relation town/country. Four towns and some 420 families in 20 villages on the Mauritanian side. Also a smaller survey on village traders, as well as urban markets.
- artisanal and industrial activities. To be published as a special report.

The individual volumes are as follows:

- Avant-propos (16 pp. + maps). Includes bibliography.
- Partie A: Présentation générale du bassin du fleuve, (ca. 120 pp.) In addition to a short review of climate, hydrology, etc., presents historical, anthropological resumés and fairly detailed estimates of net irrigable areas (schematic map in the Foreword).

- Partie B: Le milieu traditionnel, (ca. 120 pp.)
  Main results (not covered by other parts) of the OMVS work, ORSTOM study (see below), as well as older work. Includes section on migration and on land tenure in the Soninké country. Also chapter on wood and charcoal (33 pp.).
- Partie C: L'introduction de la culture irriguée, (ca. 200 pp.)
  Results of the surveys.
- Partie D: Le milieu urbain et les relations ville/campagne
  Results of the surveys.
- Partie E: Interprétation des résultats dans le domaine du développement rural, (ca. 100 pp.)
- Partie F: Interprétation des résultats dans les autres secteurs. Les problèmes intersectoriels

  These last two parts contain syntheses, conclusions and proposals for action. Part E has an assessmant of wood/charcoal production and consumption (11 pp.).

Partly in coordination with the above study, ORSTOM, under the direction of A. Lericollais, conducted an exhaustive survey (1970-74) of the population and areas concerned with recessional agriculture (up to Bakel). Some of the results have been incorporated in the above report, others have been published in various ORSTOM publications. Final report is being prepared.

Manuel de l'agent recenseur - Recensement des populations sedentaires, Recensement National de la population, 1976 (85 pp.)

In the absence of a definitive methodological description, this manual is the most detailed description of the census procedures available. Particularly useful for the operational discussion of the individual questions.

Le Moyenne Valée du Sénégal - étude socio-économique, Ministére de la Coopération/ INSEE, Paris, 1962 (368 pp.)

This is a well-known pioneering MISOES study, conducted in 1957-58 and covering the valley up to Demba Kane (area of the Dagana Dam), includes most of the Soninke country. Subjects covered in an exhaustive fashion by various surveys include demography, migration, agricultural production nutrition, health, family budgets (revenue/consumption), as well as schooling, dwelling and work budgets. The sample size varies according to survey and strata between 1/5 and 1/100, but generally 1/50 or 1/100.

Recensement démographie des agglomerations, (enquête 1961 - 1962), Bulletin statistique et economique, No. 3. Direction de la Statistique, Nouakchott, 1964

Covers 27 localities: urban centers as well as all then-existing chefs-lieux and some other administrative centers. Conducted between November 1961 and August 1962. Includes family and household socio-economic data, ethnic and professional breakdowns. Also fertility data (though of questionable quality). Summary tables of "recensements administratifs" population figures for the whole country 1944 - 1959.

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Le Recensement des nomades mauritaniens, Y. Paccou, Groupe de Demographie Africaine, Paris 1979 (71 pp.)

Methodological description of 1977 nomad census. Also contains short discussion of the old "recensements administratifs".

Résultats de l'enquête sur la population et l'habitat dans les principaux centres urbains de la Mauritanie, Mars, 1975, (also titled: Rapport sur le stage effectué a la Direction Statistique . . . par . . . J. M. Dzouali . . . BCRP), Direction de la Statistique, Nouakchott/Centre Européen de Formation Statistique Economique des Pays en Voie de Developpement, Paris, 1975 (67 pp.).

The survey, actually a census, conducted during January - March 1975, covered 17 urban centers (5,000 + population and other regional capitals). Results were presented on population structure (child/adult, sex, size of household), as well as on dwellings and other structures (type and size of dwelling by size of household, functional use).

Seconds résultats provisoires du recensement général de la population, (Population au les Janvier, 1977). BCRP, Nouakchott, 1978) (54 pp.)

So far the most recent published results. Data on sex-age distribution, literacy, economic activity for sedentary population based on 5% sample. Total population figures are based on enumerated presence at the time of census. Also contains definitions of key census concepts.

Various computer print-out tabulations of the final figures are available at the BCR. Since complete census data are stored on the Government computer (Direction de l'Informatique), it is possible, at least in theory. to run tailor-made tabulations. Publication of final results is awaited.

2.3 Definition of Terms Used in 1977 Census

(1965 survey terms given in parentheses where substantially different)

Camp (campement)	Group of households normally staying together all year long. (1965: similar to encampement but may include permanent houses, "non-villages").
Encampement (aire de campement)	Inhabited place composed exclusively of moveable dwellings (tents, huts).
Household	Group of people economically interdependent and living together. (1965: implicitly based on family connection, e.g., some servants considered as distinct households even though living completely together with their employer).
Nomad	Person staying more than 6 months per year in a camp. (1965: person, essentially Moor, not living in town or village).
Place of census/ administrative affiliation	For nomads: Place of census is department at time of census. Place of administrative affiliation (rattachement administratif) is traditional administrative point of registration with the authorities of tribal fractions (fakhad).
Present resident	For sedentary: present pertains to actual place (locality/department/region) at census time but also includes residents temporarily in the field or abroad for less than 6 months; resident living in village more than 6 months per year. For nomad: presence is taken at household level (short absences and visits ignored). Resident is nomad who spends whole or major part of year within Mauritania. Non-resident (nomad abroad) is nomad administratively affiliated to Mauritanian department but spends major part of year abroad (essentially Mali). These may be included in total population figures (presence = affiliation) but not in structural analysis of nomads.

Profession	Principal profession which represents most important source of revenue, occupies largest portion of time, or last profession exercised and or which unemployed received training.
Sedentary	Person staying more than 6 months per year in a village or town. (1965: person living in village).
Town/urban center	Locality with 5,000+ inhabitants or regional capital. (1965: 27 administrative centers which had been studied in 1961/62
Village	Inhabited locality not being a town, containing at least one permanent structure for use as dwelling or service activity (school, mosque, etc,.). Starting from center, all dwellings visible to naked eye from another dwelling in village were considered as belonging to the same village, except where two groups of dwellings traditionally considered distinct (different name, chief), (1965: locality defined as "village" according to administrative classification and local custom).

Source: BCR, Manuel de l'agent recenseur, 1976.

2.4 General Census Data

Exhibit 2-1

Summary Results of Rural Demographic Survey, 1965

	Moor Region	River Region	Total[a]
Estimated population of Mauritania, 1/1/66 (000)	770.0	160.0	930.0
Percentage increase over 1962 administrative census	48%	40%	46%
Average number of persons per tent of concession	5.7	6.1	5.8
per size of household	4.2	4.8	4.3
Birth rate: observed[b]	39.6‰	43.5‰	40.2‰
adjusted[c]	42.2‰	46.8‰	43.0‰
Mortality rate	26.7‰	28.7‰	27.0‰
Natural growth rate			1.6%
Fertility (15-49 yrs) observed[b]	173		176
adjusted[c]	190	193	190
Gross reproduction rate observed[b]	2.5	3.0	2.6
adjusted[c]	2.8		2.8
Net reproduction rate observed[b]	1.41	1.60	1.46
adjusted[c]	1.59	1.65	1.60
Life expectancy	35	33	34
Estimated Mauritanian population 1980 (000)	840.0	170.0	1,010.0

a) Excludes urban population (estimated at 100,000 in 1965).
b) As recorded by enumerators.
c) Upon examination of recorded data, some information could not be verifie
As a result, data were adjusted according to UN tables.

Source: SEDES, 1965 Demographic Survey.

Exhibit 2-2

Population Growth, 1965-1977

	Region	Mid-1965[a] (000)	1/1/1977 (000)
00	Nouakchott	15.5	134.7
01	Hodh Charqui	168.9	156.7
02	Hodh Gharbi	87.4	124.2
03	Assaba	100.8	129.1
04	Gorgol	82.0	149.5
05	Brakna	123.9	151.4
06	Trarza	99.5	216.0
07	Adrar	64.7	55.4
08	Dakhlet-Nouadhibou	10.8	24.4
09	Tagant	74.8	75.0
10	Guidimaka	63.4	83.2
11	Tiris Zemmour	15.8	22.5
12	Inchiri	24.6	17.6
	Total	1,029	1,339.7

a) 1965 figures adjusted to correspond to 1977 regional divisions. The 1965 survey was not stratified by region; therefore regional breakdowns should be treated as estimates (+/-5% to 7%). The 1965 report variously gives the census epoch as mid-1965 and January 1, 1966. Mid-1965 is retained as being the most cor correct since the survey lasted throughout 1965. The report estimates the coefficient of variation for the population as a whole (sedentary + nomads) at 3.6%. This gives a range of 995,000 - k,kk0,GC0 total population at 95% confidence level, with corresponding growth rates 1965/77 of 2.1-3/4% per year. This does not take into account any systematic error in either estimates.

b) Nouakchott 1965 extrapolated from 1964 SEDES census.

Source: 1965 demographic survey, Seconds Resultats Provisoires and BCR 1977 census final figures.

Exhibit 2-3

Resident Population by Region and Department as of January 1, 1977[a]

(000)

Region/ Department	Area[b] Km²	Total Population	Urban Total	Rural		
				Total	Sedentary	Nomad
Mauritania	1030.0	1338.8	303.8	1035.0	591.0	444.0
00 Nouakchott	1	134.7	134.7	0	0	0
001 1st Arrond.	n.a.	26.1	26.1	0	0	0
002 2 nd Arrond.	n.a.	11.9	11.9	0	0	0
003 3 rd Arrond.	n.a.	20.2	20.2	0	0	0
004 4 th Arrond.	n.a.	21.3	21.3	0	0	0
005 5 th Arrond.	n.a.	55.2	55.2	0	0	0
01 Hodh Charqui	182.7	156.7	13.2	143.5	57.8	85.7
011 Amourj	9.3	27.2	0	27.2	13.1	14.1
012 Bassikounou	16.5	18.0	0	18.0	6.2	11.8
013 Djigueni	3.9	22.4	0	22.4	14.5	7.9
014 Nema	9.9	42.5	7.9	34.6	12.2	22.4
015 Oualata	134.0	16.3	0	16.3	2.9	13.4
016 Timbedra	9.1	30.3	5.3	25.0	8.9	16.1
02 Hodh Gharbi	53.4	124.2	8.5	115.7	51.7	64.0
021 Aioun el Atrouss	17.9	33.3	8.5	24.8	11.9	12.9
022 Kobonni	9.5	28.3	0	28.3	17.0	11.3
023 Tamchakett	14.6	35.7	0	35.7	7.1	28.6
024 Tintane	11.4	26.9	0	26.9	15.7	11.2
03 Assaba	36.6	129.2	10.3	118.9	75.5	43.4
031 Barkewoll	6.7	31.7	0	31.7	22.6	9.1
032 Boumdeid	4.5	12.5	0	12.5	7.9	4.6
033 Guerou	2.8	16.4	0	16.4	10.8	5.6
034 Kankossa	11.7	26.9	0	26.9	20.3	6.6
035 Kiffa	10.9	41.7	10.3	31.4	13.9	17.5
04 Gorgol	13.6	149.4	20.7	128.7	112.3	16.4
041 Kaedi	4.0	55.4	20.7	34.7	29.9	4.8
042 Maghama	2.6	25.1	0	25.1	25.1	0
043 M'Bout	5.2	48.4	0	48.4	41.5	6.9
044 Monguel	1.8	20.5	0	20.5	15.8	4.7
05 Brakna	33.0	151.3	13.1	138.2	87.6	50.6
051 Aleg	16.3	42.8	5.3	37.5	15.7	21.8
052 Bababe	.9	16.9	0	16.9	15.2	1.7
053 Boghe	1.6	35.7	7.8	27.9	22.0	5.9
054 Maghta Lahjar	13.6	34.1	0	31.1	13.9	20.2
055 M'Bagne	.6	21.8	0	21.8	20.8	1.0

Resident Population by Region and Department (Cont'd)

Region/ Department	Area[b] Km²	Total Population	Urban Total	Rural		
				Total	Sedentary	Nomad
06 Trarza	67.8	216.0	23.8	192.2	86.1	106.1
061 Boutilimit	28.4	55.8	7.3	48.5	15.0	33.5
062 Keur Massene	2.8	21.6	0	21.6	8.8	12.8
063 Mederdra	7.7	43.0	0	43.0	18.3	24.7
064 Oued Naga	19.8	12.7	0	12.7	3.9	8.8
065 R'Kiz	7.7	46.4	0	46.4	26.2	20.2
066 Rosso	1.4	36.5	16.5	20.0	13.9	6.1
07 Adrar	215.3	55.4	16.2	39.2	21.5	17.7
071 Aoujeft	25.4	15.2	0	15.2	8.4	6.8
072 Atar	23.9	30.1	16.2	13.9	9.2	4.7
073 Chinguetti	166.0	10.1	0	10.0	3.9	6.2
08 Nouadhibou	17.8	23.5	21.9	1.6	1.6	0
081 Nouadhibou	17.8	23.5	21.9	1.6	1.6	0
09 Tagant	95.2	75.0	7.9	67.1	24.6	42.5
091 Moudjeria	11.8	31.8	0	31.8	8.5	23.3
092 Tichitt	68.2	5.6	0	5.6	1.4	4.2
093 Tidjkja	15.2	37.6	7.9	29.7	14.7	15.0
10 Guidimaka	10.3	83.2	6.0	77.2	68.1	9.1
101 Ould Yenge	3.7	23.3	0	23.3	20.2	3.1
102 Selibaby	6.6	59.9	6.0	53.9	47.9	6.0
11 Tiris Zemmour	252.9	22.6	19.5	3.1	2.4	.7
111 Bir Moghrein	85.8	1.7	0	1.7	1.7	0
112 F'Derick	167.0	3.5	2.1	1.4	.7	.7
113 Zouerate	.1	17.4	17.4	0	0	0
12 Inchiri	46.8	17.6	8.0	9.6	1.8	7.8
121 Akjoujt	46.8	17.6	8.0	9.6	1.8	7.8

a) Figures exclude Mauritanian nomads abroad, estimated at approximately 67,000 attached to the following regions:

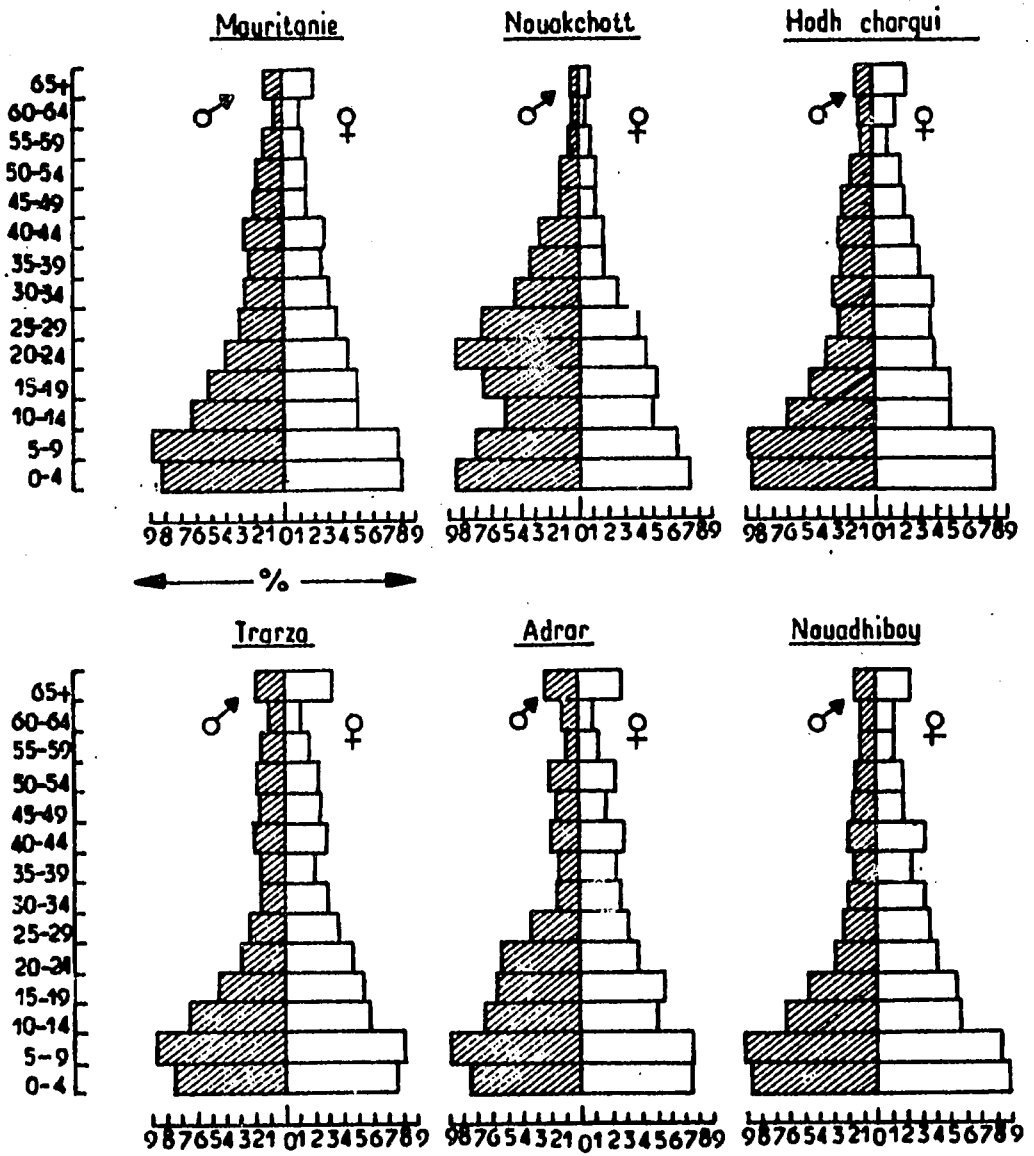
01: 49.200, 02: 9.800; 03: 1.700, 04: 900, 06: 1.600, 10: 3.800.

b) Not official figures, estimated by planimetry to about +/- 5%
Source: BCR, 1977 census, final figures.

Exhibit 2-4

Population Pyramids Nation-wide and by Region

January 1, 1977



1444

Population Pyramids

Cont'd)

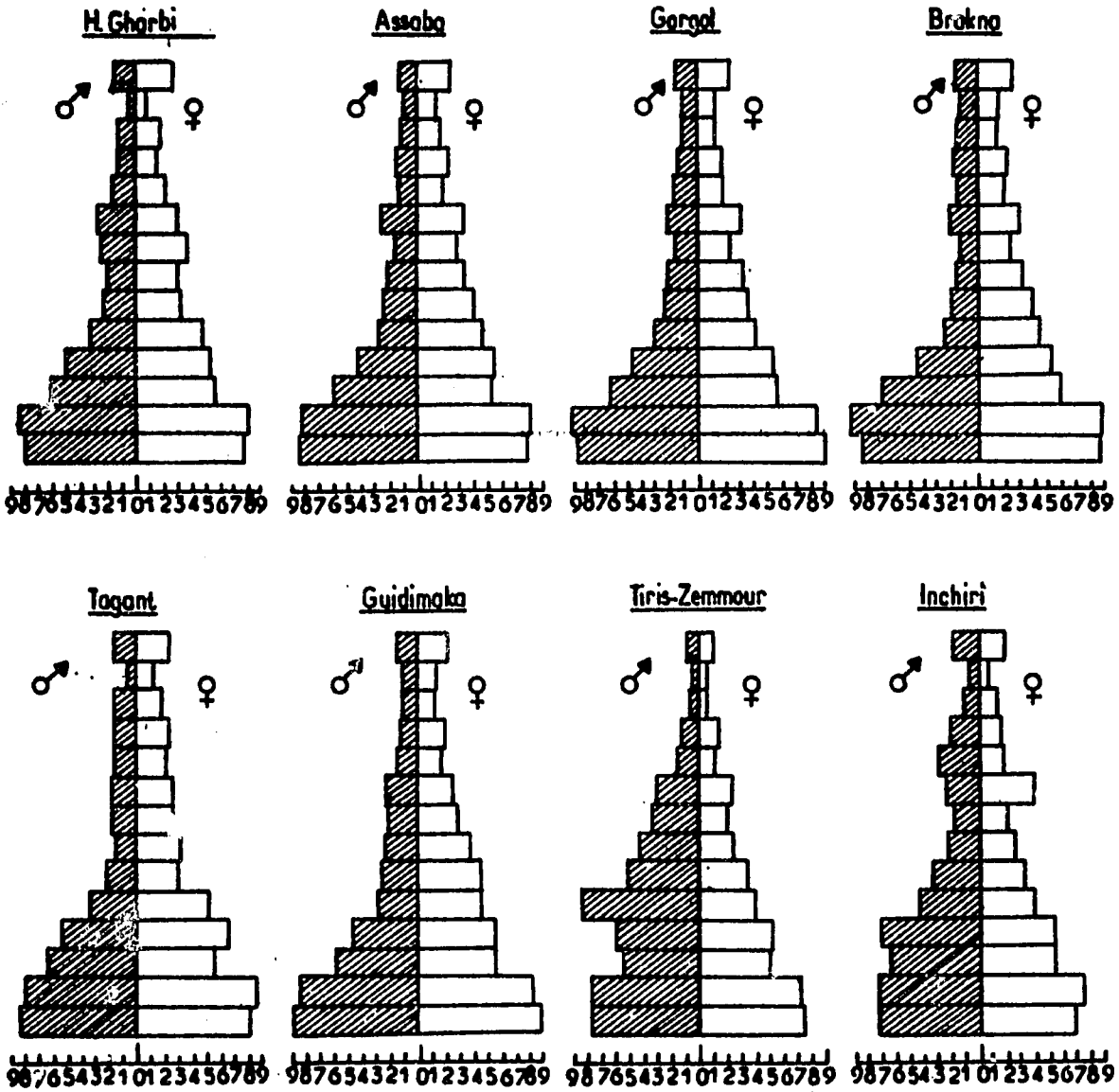


Exhibit 2-5

Population by Age Group, Male Ratio and by Region - Total 1/1/1977

(000)

Region		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
Metr	T	21.5	19.1	12.6	15.7	17.9	14.4	9.2	6.9	6.4	3.7	3.3	2.0	1.3	1.8	134.7
(00)	M	.513	.516	.513	.545	.643	.625	.619	.622	.581	.573	.521	.513	.496	.442	1.5c7
N. Chr	T	25.7	25.1	17.0	14.3	11.2	9.7	11.0	8.3	8.3	6.5	5.8	3.1	3.7	5.4	155.7
(01)	M	.517	.595	.553	.495	.443	.407	.434	.45c	.487	.517	.435	.423	.423	.384	.436
S.Chb	T	19.4	20.3	14.6	12.9	9.7	6.5	6.1	7.9	6.8	4.9	3.8	4.1	1.7	5.4	124.2
(02)	M	.503	.510	.512	.435	.404	.415	.412	.413	.513	.495	.433	.444	.455	.381	.473
Assb	T	21.3	21.1	14.4	13.1	9.6	8.5	7.0	5.7	7.3	4.3	4.8	3.7	3.1	4.6	129.2
(03)	M	.519	.513	.539	.433	.399	.400	.414	.402	.467	.432	.435	.453	.457	.391	.456
Corl	T	26.1	26.0	17.7	15.3	10.6	8.2	8.0	5.9	7.7	5.2	4.8	3.6	3.6	5.7	149.4
(04)	M	.498	.522	.52c	.477	.435	.414	.417	.454	.432	.511	.46c	.516	.433	.450	.482
Brak	T	25.6	27.1	13.9	14.7	10.5	8.7	7.3	5.6	7.7	4.6	5.7	4.3	4.1	6.3	151.4
(05)	M	.502	.522	.531	.475	.386	.342	.378	.331	.421	.465	.46c	.534	.462	.426	.465
Trar	T	32.6	30.3	20.4	21.1	16.4	12.9	10.1	3.4	10.6	9.0	9.1	7.1	4.9	11.3	216.0
(06)	M	.498	.525	.529	.457	.398	.424	.390	.471	.455	.451	.50c	.509	.465	.380	.474
Adr	T	8.3	8.1	6.3	6.3	5.2	3.6	2.4	2.1	2.7	1.9	2.4	1.2	1.2	2.9	55.4
(07)	M	.509	.542	.5c2	.514	.c02	.541	.449	.431	.440	.515	.514	.440	.593	.492	.522
Ndb	T	3.5	2.8	1.9	2.2	3.2	3.0	2.2	1.7	1.2	0.7	0.5	0.2	0.2	0.2	23.5
(08)	M	.525	.506	.508	.55c	.c57	.713	.712	.744	.670	.674	.627	.565	.512	.525	1.617
Taqt	T	12.1	12.3	9.1	9.0	6.5	3.6	3.4	3.3	3.4	2.8	2.3	2.5	1.2	2.3	73.0
(09)	M	.509	.489	.533	.464	.414	.428	.348	.42c	.427	.470	.440	.485	.378	.450	.4c7
Guid	T	14.5	14.0	9.4	8.4	6.2	5.9	4.8	3.9	3.9	2.5	2.8	1.8	1.9	3.2	83.2
(10)	M	.513	.523	.531	.480	.42c	.388	.408	.450	.475	.529	.433	.543	.514	.463	.433
T.Zem	T	3.4	3.4	2.4	2.5	2.8	1.9	1.5	1.3	1.2	0.7	0.5	0.3	0.2	0.4	22.c
(11)	M	.517	.520	.540	.545	.c83	.617	.646	.651	.588	.611	.512	.567	.506	.471	.574
Inch	T	2.5	2.6	2.1	2.2	1.6	1.1	0.8	0.7	1.1	0.8	0.6	0.4	0.2	0.7	17.c
(12)	M	.527	.519	.552	.533	.554	.512	.507	.507	.373	.466	.590	.462	.534	.508	.53o
Total	T	216.3	219.2	152.7	138.3	111.3	89.0	73.7	61.7	68.7	47.6	47.1	34.4	27.3	50.8	1331.3
	M	.509	.519	.531	.442	.474	.460	.443	.4c3	.47o	.498	.481	.492	.463	.416	.492

T = Total
M = Male

Source: BCR, 1977 census, final figures (rounded to nearest hundredth)

Exhibit 2-6

Population by Age Group, Male Ratio and by Region - Nomad 1/1/1977

(000)

Region		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
Pktt	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(00)	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H,Chr	T	13.9	14.3	9.1	7.8	6.0	5.1	6.0	4.8	4.4	4.2	3.0	1.9	2.0	2.9	85.7
(01)	M	.524	.519	.569	.518	.459	.396	.449	.459	.509	.536	.536	.461	.412	.392	.497
S.Ghb	T	10.2	10.3	7.5	6.3	5.8	3.4	2.6	4.4	3.2	3.1	1.9	2.3	0.6	3.1	64.0
(02)	M	.511	.499	.479	.499	.383	.404	.400	.377	.576	.517	.533	.453	.547	.398	.472
Assb	T	7.3	7.1	4.7	4.3	2.9	3.3	1.9	1.9	2.4	1.6	1.8	1.4	1.2	1.7	43.4
(03)	M	.526	.495	.561	.385	.335	.377	.441	.324	.496	.376	.434	.427	.435	.396	.454
Gorl	T	2.7	3.0	1.9	1.4	1.1	0.9	0.8	0.7	1.0	0.8	0.5	0.4	0.4	0.9	16.4
(04)	M	.413	.514	.494	.453	.450	.467	.496	.342	.251	.491	.432	.509	.604	.330	.450
Brak	T	9.2	9.5	6.3	4.2	3.2	2.9	2.4	1.7	2.9	1.7	2.2	1.5	1.4	1.8	50.6
(05)	M	.487	.507	.543	.504	.376	.251	.355	.304	.438	.485	.519	.616	.488	.373	.463
Trar	T	15.5	13.7	12.2	9.4	7.3	6.2	4.9	4.3	5.3	5.0	4.8	4.1	2.1	6.5	105.1
(06)	M	.491	.519	.523	.442	.363	.433	.356	.481	.458	.434	.564	.540	.493	.367	.468
Adr	T	2.0	3.0	1.9	1.9	1.3	1.2	0.6	0.8	0.7	0.7	0.7	0.5	0.4	1.0	17.7
(07)	M	.500	.575	.665	.547	.559	.454	.418	.376	.410	.569	.616	.352	.713	.532	.535
Ndb	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(08)	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taet	T	7.1	6.7	5.0	5.0	3.8	2.2	1.6	2.3	1.8	1.7	1.6	1.6	0.6	1.6	42.5
(09)	M	.511	.474	.539	.459	.422	.442	.333	.431	.411	.490	.431	.509	.313	.460	.467
Guid	T	1.5	1.6	0.7	1.1	0.6	0.7	0.4	0.5	0.4	0.2	0.3	0.3	0.2	0.3	9.1
(10)	M	.506	.535	.512	.505	.347	.357	.494	.406	.573	.553	.244	.370	.649	.316	.473
T.Zer	T	0.1	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
(11)	M	.473	.426	.488	.619	.552	.635	.743	.633	.455	.360	.409	.500	.250	.467	.518
Inch	T	1.1	1.1	0.9	1.2	0.6	0.5	0.2	0.2	0.6	0.5	0.3	0.2	0.1	0.3	7.3
(12)	M	.569	.475	.567	.666	.566	.503	.386	.388	.242	.756	.711	.426	.663	.521	.545
Total	T	70.8	74.6	50.5	42.6	33.1	26.5	21.5	21.7	22.6	19.7	17.1	14.3	8.9	20.2	444.0
	M	.505	.510	.537	.498	.405	.398	.404	.409	.469	.491	.520	.497	.485	.394	.476

T = Total
M = Male

Source: BCR, 1977 census, final figures (rounded to nearest hundredth).

Exhibit 2-7

Population by Age Group, Male Ratio and by Region - Urban 1/1/1977

(000)

Region		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
Natt	T	21.5	19.1	12.6	15.7	17.3	14.4	9.2	6.3	6.4	3.7	3.3	2.3	1.3	1.8	134.7
(09)	M	.518	.517	.513	.571	.643	.625	.619	.622	.581	.578	.521	.518	.496	.442	.507
N. Chr	T	2.0	2.2	1.6	1.3	1.0	0.8	0.9	0.7	0.7	0.5	0.4	0.2	0.2	0.5	13.2
(01)	M	.518	.522	.521	.495	.457	.416	.419	.445	.446	434	.3oo	.402	.443	.3oo	.472
N.Ghb	T	1.3	1.4	1.1	0.9	0.7	0.5	0.5	0.6	0.5	0.2	0.3	0.2	0.1	0.2	8.5
(02)	M	.521	.515	.561	.432	.439	.467	.457	.472	.4oo	.5o6	.453	.385	.444	.314	.487
Assb	T	1.6	1.6	1.2	1.1	0.8	0.6	0.6	0.5	0.7	0.3	0.3	0.2	0.2	0.3	10.3
(03)	M	.505	.508	.548	.434	.404	.360	.334	.382	.404	.440	.499	.408	.400	.343	.451
Gorl	T	3.5	3.5	2.5	2.3	1.6	1.3	1.1	0.8	1.0	0.7	0.6	0.4	0.4	0.7	23.7
(4)	M	.519	.515	.538	.513	.431	.436	.411	.4oo	.470	.496	.494	.433	.437	.42o	455
Penk	T	2.3	2.3	1.7	1.5	0.9	0.9	0.7	0.5	0.6	0.4	0.4	0.4	0.2	0.4	13.2
(05)	M	.513	.523	.559	.436	.467	.509	.442	.479	.470	.493	.453	.458	.41o	.4o5	.456
Trar	T	3.3	3.7	3.2	2.7	2.1	1.7	1.3	1.0	1.1	0.7	0.8	0.5	0.4	0.6	21.8
(06	M	.500	.539	.537	.518	.513	.471	.673	.532	.482	.515	.455	.535	.46o	.447	.5o6
Adr	T	2.4	2.7	1.9	2.0	1.7	1.0	0.8	0.5	0.8	0.5	0.6	0.3	0.3	0.7	15.2
(07)	M	.517	531	.528	.514	.628	.615	.467	.478	.454	.477	.447	.477	.513	.4o1	.524
Ndb	T	3.3	2.5	1.8	2.1	3.0	2.8	2.1	1.6	1.2	0.6	0.4	0.2	0.1	0.2	21.9
(08)	M	.528	.5o6	.505	.55o	.581	.712	.717	.744	.679	.687	.656	.617	.535	.49o	.629
Tast	T	1.2	1.4	1.0	1.0	0.7	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.1	0.4	7.0
(09)	M	.511	.493	.555	.435	.371	.440	.359	.401	.492	.423	.36o	.351	.461	.4o8	.4o4
Guld	T	1.0	1.0	0.7	0.6	0.4	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.2	6.0
(10)	M	.532	.520	.529	.431	.4o4	.444	.431	.483	.514	.519	.513	.527	.528	.545	.502
T.Zem	T	3.0	3.0	2.1	2.2	2.2	1.6	1.3	1.1	1.1	0.6	0.5	0.2	0.2	0.3	19.5
(11)	M	.515	.519	.545	.532	.551	.601	.545	.638	.590	.619	.517	.55t	.495	.455	.5o6
Inch	T	1.2	1.3	1.0	0.9	0.7	0.5	0.5	0.4	0.4	0.2	0.3	0.2	0.1	0.3	8.2
(12)	M	.437	.525	.547	.439	.515	.538	.534	.5o6	.537	.683	.500	.494	.5o1	.51o	.533
Total	T	48.3	44.8	32.4	36.2	33.8	27.2	19.8	15.2	15,1	8.9	8.4	5.2	3.9	6.4	303.6
	M	.516	.519	.528	.536	.602	.537	.567	.573	.540	.543	.489	.489	.477	0.432	541

T = Total
M = Male

Source: BCR, 1977 census, final figures (rounded to nearest hundredth).

2.16

Exhibit 2-8

Population by Age Group, Male Ratio and by Region - Rural Sedentary 1/1/1977

(000)

651

Region		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
Nott	T	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
(00)	M	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H. Chr	T	9.7	9.6	6.2	5.8	4.2	3.7	4.0	2.7	3.1	1.8	2.4	1.9	1.5	2.1	57.3
(01)	M	.506	.535	.533	.473	.419	.420	.416	.469	.465	.497	.440	.416	.433	.376	.476
N.Ghb	T	8.0	8.6	6.0	5.6	4.0	2.7	2.9	2.9	3.0	1.6	1.7	1.6	1.0	2.1	51.7
(02)	M	.502	.512	.544	.471	.425	.421	.415	.455	.455	.450	.432	.438	.400	.362	.473
Assb	T	12.3	12.4	8.5	7.8	5.9	4.5	4.5	3.3	4.3	2.3	2.7	2.0	1.7	2.7	75.5
(03)	M	.517	.524	.525	.459	.413	.423	.407	.451	.463	.471	.439	.477	.445	.393	.475
Gorl	T	19.8	19.5	13.3	11.6	7.9	7.0	6.1	4.4	5.3	3.7	3.7	2.7	2.7	4.1	112.4
(04)	M	.503	.333	.529	.473	.422	.402	.408	.479	.456	.519	.462	.525	.471	.480	.484
Brak	T	15.1	15.4	10.3	9.1	5.7	4.3	4.2	3.4	4.2	2.9	3.1	2.1	2.4	4.0	87.6
(05)	M	.509	.531	.521	.461	.381	.365	.380	.405	.403	.454	.432	.493	.451	.452	.469
Trar	T	13.3	14.5	11.0	8.9	6.5	5.0	3.7	3.1	4.2	3.2	3.4	2.5	2.4	4.2	85.1
(06)	M	.505	.529	.534	.453	.406	.397	.402	.487	.445	.465	.437	.453	.438	.391	.471
Adr	T	3.0	3.4	2.4	2.4	2.2	1.8	1.9	0.7	1.2	0.6	1.1	0.4	0.8	1.2	21.5
(07)	M	.519	.522	.536	.483	.389	.565	.455	.454	.447	.431	.486	.530	.531	.478	.511
Nlb	T	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	1.6
(08)	M	.472	.521	.556	.519	.637	.719	.630	.725	.554	.542	.532	.486	.424	.581	.577
Tapt	T	4.0	4.3	3.0	2.9	2.0	1.1	1.4	0.8	1.2	0.8	1.0	0.7	0.5	0.9	24.6
(09)	M	.504	.513	.515	.495	.412	.397	.361	.420	.433	.444	.477	.435	.436	.449	.485
Guid	T	11.8	11.4	7.9	6.8	5.2	4.7	4.9	3.1	3.2	2.1	2.4	1.4	1.6	2.6	63.2
(10)	M	.513	.521	.532	.475	.425	.387	.396	.454	.349	.527	.459	.576	.493	.475	.483
T.Zem	T	0.3	0.3	0.2	0.2	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	2.3
(11)	M	.552	.567	.512	.636	.349	.736	.616	.755	.506	.545	.507	.515	.655	.571	.557
Inch	T	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	1.8
(12)	M	.528	.571	.500	.398	.589	.500	.445	.590	.471	.508	.525	.587	.486	.450	.514
Total	T	97.6	98.8	69.3	61.5	44.5	35.4	32.4	24.7	31.1	19.2	21.6	14.9	14.5	24.2	591.1
	M	.508	.526	.529	.467	.423	.410	.405	.452	.449	.493	.448	.487	.455	.430	.478

T = Total
M = Male

Source: BCR, 1977 census, final figures (rounded to nearest hundredth)

Exhibit 2-9

Professional Breakdown Sedentary Population - 1977 Census

Region/ Dept.	Farmers	Herders	Shepherds	Fishermen	Artisans Leather	Artisans Textiles	Artisans Metal	Traders	Teachers	Medical Personnel	Other Pub. Serv.	Clergy and Similar
00 NKTT	426	175	157	421	128	1297	714	5227	983	493	3000	294
001	67	39	20	52	17	112	120	1033	32	43	333	61
002	57	22	26	5	9	109	103	543	73	33	98	21
003	57	12	29	12	26	255	92	693	332	132	549	54
004	35	11	17	115	19	369	177	333	287	175	161	44
005	207	91	65	237	57	452	232	2965	159	103	413	114
01 H.CHR	13552	1337	1119	1	719	187	324	1992	189	201	753	365
011	2985	179	246		148	30	50	302	24	113	63	115
012	1327	44	37		41	16	25	129	8	12.	71	11
013	3507	427	320		232	27	33	353	19	7	39	54
014	2328	151	219	1	119	76	126	717	38	43	453	111
015	142	46	36		21	2	16	47	12	2	86	3
016	1995	488	269		158	36	69	433	38	14	88	71
02 R.GHA	5549	1024	1249		455	68	191	1307	152	37	403	175
021	1324	251	295		224	41	80	526	97	32	275	91
022	4051	466	389		93	4	44	190	9	3	36	54
023	1313	191	16		21	2	23	112	19	1	30	1
024	2337	316	549		117	21	44	496	27	1	71	22
03 ASSB	17653	1777	1449	7	344	33	267	2293	126	57	423	102
031	7135	297	425	1	66	13	67	403	7	5	33	11
032	1419	491	266		40	13	8	254	6	2	10	5
033	1583	207	44		53	9	24	304	16	3	27	5
034	5006	407	503	6	34	7	62	255	19	5	57	37
035	2320	465	215		151	36	106	952	76	42	203	44
04 COBG	24157	1651	1459	452	169	514	391	1444	269	123	611	142
041	5564	555	400	256	91	239	183	910	190	91	425	101
042	4405	431	414	194	8	190	92	165	15	16	67	11
043	11073	354	401	2	47	30	93	297	32	12	69	22
044	3005	309	178		23	5	23	72	32	19	47	8

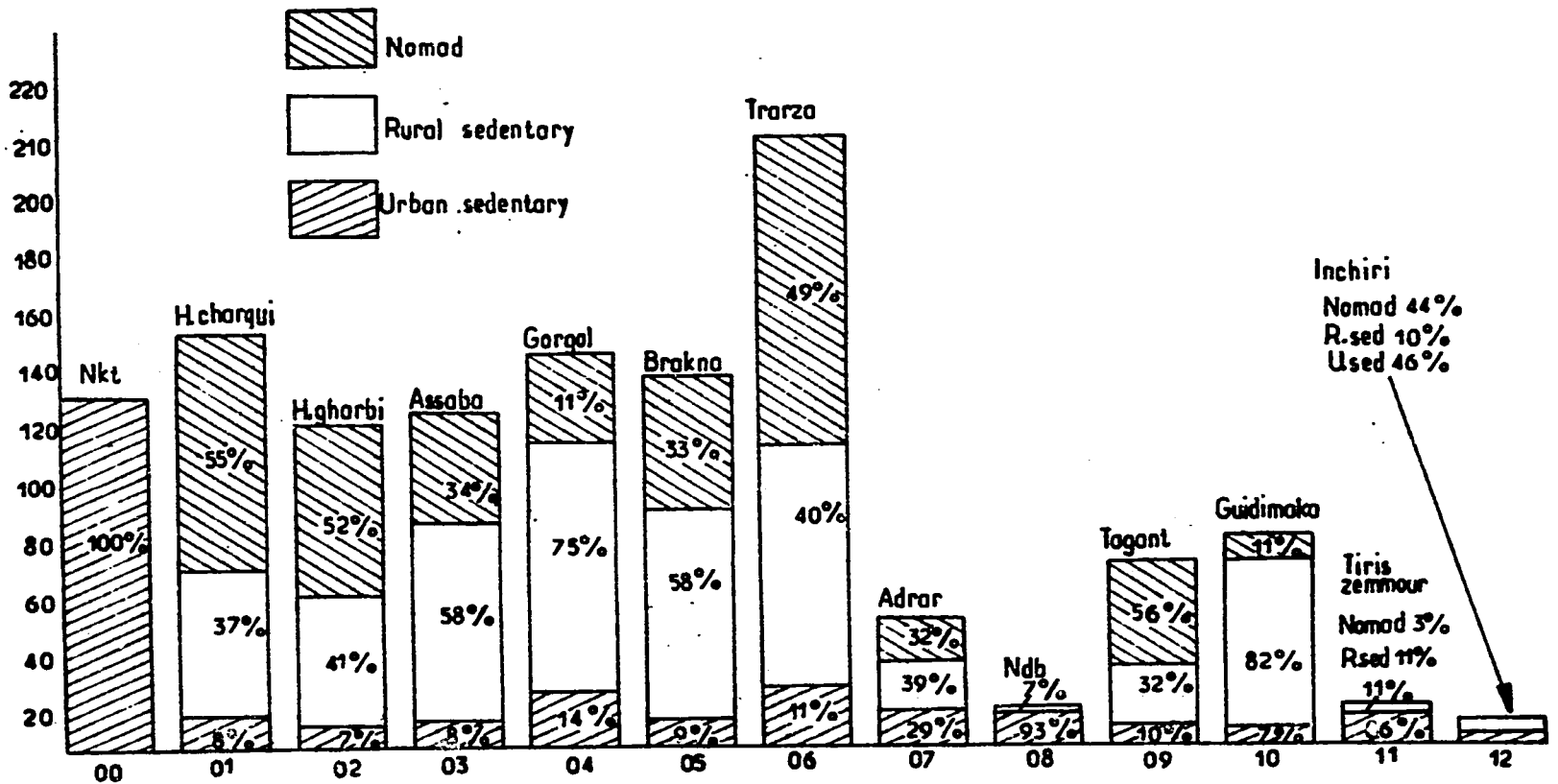
Professional Breakdown Sedentary Population - 1977 Census (Continued)

Region/ Dept.	Farmers	Herders	Shep-herds	Fisher-men	Artisans Leather	Artisans Textile	Artisans Metal	Traders	Teachers	Medical Personnel	Other Pu-bl. Serv	Clergy and Similar
05 BRAK	15687	1083	1812	150	414	265	377	1581	284	126	540	76
051	2004	459	579		125	50	115	445	84	41	246	3
052	2773	213	299	30	84	26	31	50	21	10	41	12
053	4337	218	430	94	53	76	65	398	101	50	152	21
054	2815	50	139		105	50	105	509	43	14	63	36
055	3758	143	365	26	47	63	61	179	35	11	38	4
06 TRAR	6258	1348	1793	913	369	491	823	4305	413	127	1190	342
061	196	478	397		93	21	70	632	120	23	150	73
062	416	22	90	431	1	184	6	336	18	9	34	9
063	417	332	476	1	83	30	85	895	56	12	67	47
064	91	36	111	104		13	8	140	16	2	165	24
065	3959	229	443	261	129	44	63	875	76	11	60	93
066	1180	251	276	121	63	199	100	1427	127	70	714	96
07 ADRA	2352	276	305		26	187	119	1306	147	51	2137	64
071	1542	141	187			66	31	150	8	3	61	7
072	1051	114	88		13	76	62	1036	122	46	1315	48
073	259	21	30		2	45	26	120	17	2	761	9
08 NDB	17	55	19	264	11	84	294	868	124	68	761	29
09 TAGI	5119	597	606	3	148	492	114	532	115	24	483	16
091	1735	76	152	2	35	13	38	136	26	7	134	1
092	128	11	5		14	1	4	16	2	2	105	
093	3256	420	449	1	99	478	72	370	87	15	244	15
10 GUID	22165	835	1247	113	196	155	242	500	75	55	196	38
101	6279	349	506		22	39	84	156	19	6	29	22
102	15886	486	741	113	164	116	158	344	56	49	167	66
11 T.ZK	45	11	19	2	21	66	180	654	90	52	1430	13
111	1	1	1			1		20	4	4	646	1
112	4	4	11		3	3	5	48	14	13	304	3
113	40	6	7	2	18	62	175	586	72	35	400	9
12 INCH	283	98	145	1	18	19	66	268	42	33	377	16
Total	117859	11057	11369	2332	3008	3908	4102	22347	3009	1452	12325	1725

Source: BCR, 1977 census, provisional figures.

Exhibit 2-10

Total Population by Region and by Type of Residence



Source: BCR, 1977 Census; final figures.

Exhibit 2-11

Migration

Population by Region of Birth

As of 1/1/1977

Region	Born in Region (% of total population)	Population of Region to Total %
Nouakchott	2.7	10.1
Hodh Charqui	12.0	11.8
Hodh Gharbi	9.8	9.3
Assaba	10.5	9.6
Gorgol	11.5	11.1
Brakna	13.5	11.3
Trarza	18.7	16.2
Adrar	5.9	4.1
Tagant	6.5	5.6
Guidimaka	5.9	6.2
Dakhlet-Nouadhibou Tiris Zemmour Inchiri	3.0	4.7
Total	100.0%	100.0%

Source: BCR, 1977 Census, provisional figures.

Exhibit 2-12
Average Size of Household

1977 Census

Region		Sedentary	Nomad	Total
00	Nouakchott	5.5	-	5.5
01	Hodh Charqui	5.4	4.9	5.1
02	Hodh Gharbi	5.6	4.9	5.2
03	Assaba	5.6	4.7	5.3
04	Gorgol	6.4	5.2	6.2
05	Brakna	6.0	5.0	5.6
06	Trarza	5.8	4.4	5.1
07	Adrar	5.5	5.4	5.5
08	D. Nouadhibou	4.8	-	4.8
09	Tagant	6.0	5.0	5.4
10	Guidimaka	7.7	4.6	7.2
11	Tiris Zemmour	6.1[a)]	5.7	6.1
12	Inchiri	5.8	5.8	5.8

a) Military garrison included.

See Definition of Terms above for explanation of household.

Source: BCR, 1977 Census, provisional figures.

2.5 Urban Population

Note on the Population of Nouakchott

At the time of the 1976/77 census, the capital of Mauritania was divided into 5 wards (arrondissements) commonly referred to by number.

In mid-1980, by government decree ward limits were modified to reflect population shifts and to reduce pressure on the more heavily populated wards. The numbers were replaced and a 6th ward was added to encompass Toujounine, a newly settled area some 7 km east of the main center.

The following map identifies the limits of the new wards. The 1980 population estimates are:

Tayaret	40,000	formerly 1st arrondissement
Ksar	10,000	formerly 2nd " "
Tevrakh Zeina	24,000	formerly part of 3rd "
Sebkha	40,000	formerly part of 4th "
El Mina	53,000	formerly part of 5th "
Toujounine	6,000	new arrondissement
	Total 173,000	

Figures rounded.

Souuce: Ward Prefects and RAMS adjustments

For a precise delimitation see Decree 70.199 of August 1980. It is important to note that the highly mobile and seasonal urban population can vary 30%, increasing during dry season (periode de soudure) and rainy (l'hivernage) season.

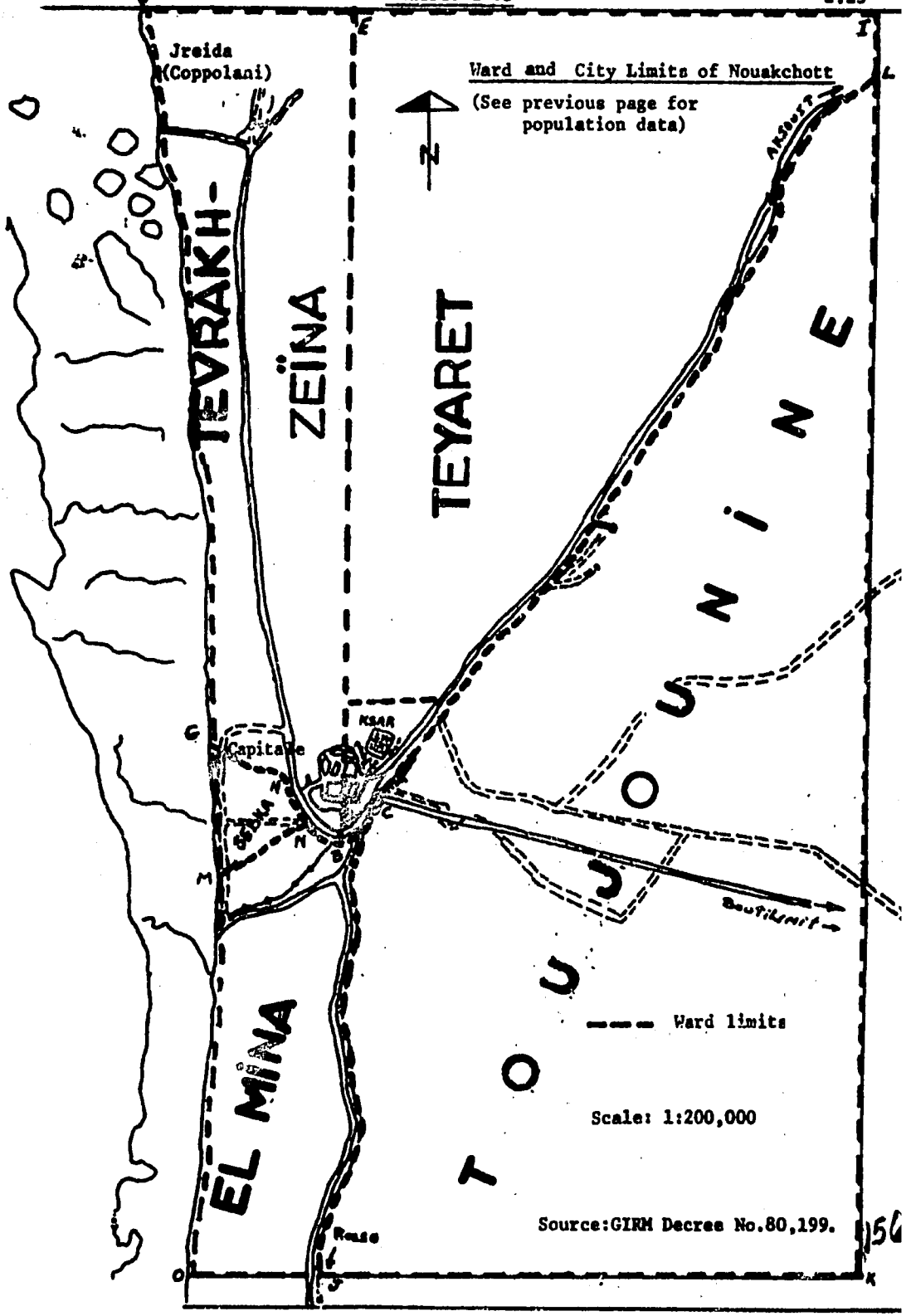

Jreida
(Coppolani)
Ward and City Limits of Nouakchott
(See previous page for
population data)
TEVRAKH-
ZEINA
TEYARET
TOUJOUNINE
EL MINA
Capitale
KSAR
Ward limits
Scale: 1:200,000
Source:GIRM Decree No.80,199.

Exhibit 2-14

Evolution of Urban Population (1961-1977)

(By size in descending order as of 1977)

City	Population (000)		% Average Annual Growth Rate		
	1977	1975	1961/62	61/62-75	1975-77
Nouakchott	134.7	104.1	5,8[a]	23,8	13.8
Nouadhibou	21.9	23.0	5,3[b]	11,5	-2.3
Kaedi	20.7	20.0	9.2	6.3	2.4
Zouerate	19.5	23.1	4.7	12.8	-8.1
Rosso	16.5	19.5	4.8[b]	10.9	-8.1
Atar	16.2	18.9	9.5	5.6	-7.5
Kiffa	10.3	16.7	4.4	11.4	-21.7
Aioun	8.5	13.6	4.9	8.6	-20.9
Akjoujt	8.0	13.0	2.5	14.0	-21.4
Nema	7.9	9.2	3.9	7.1	-7.3
Tidjikja	7.9	9.2	3.7	6.6	-1.9
Boghe	7.8	11.6	5.9[b]	5.2	-17.9
Boutilimit	7.3	7.6	2.8	8.4	-2.4
Selibaby	6.0	5.8	2.7	6.2	1.8
Aleg	5.3	5.2	1.4	11.4	0.9
Timbedra	5.3	- [e]	1.8	-	-
Total	303.8	299.3	76.1[d]	11.8%[c]	-0.1%

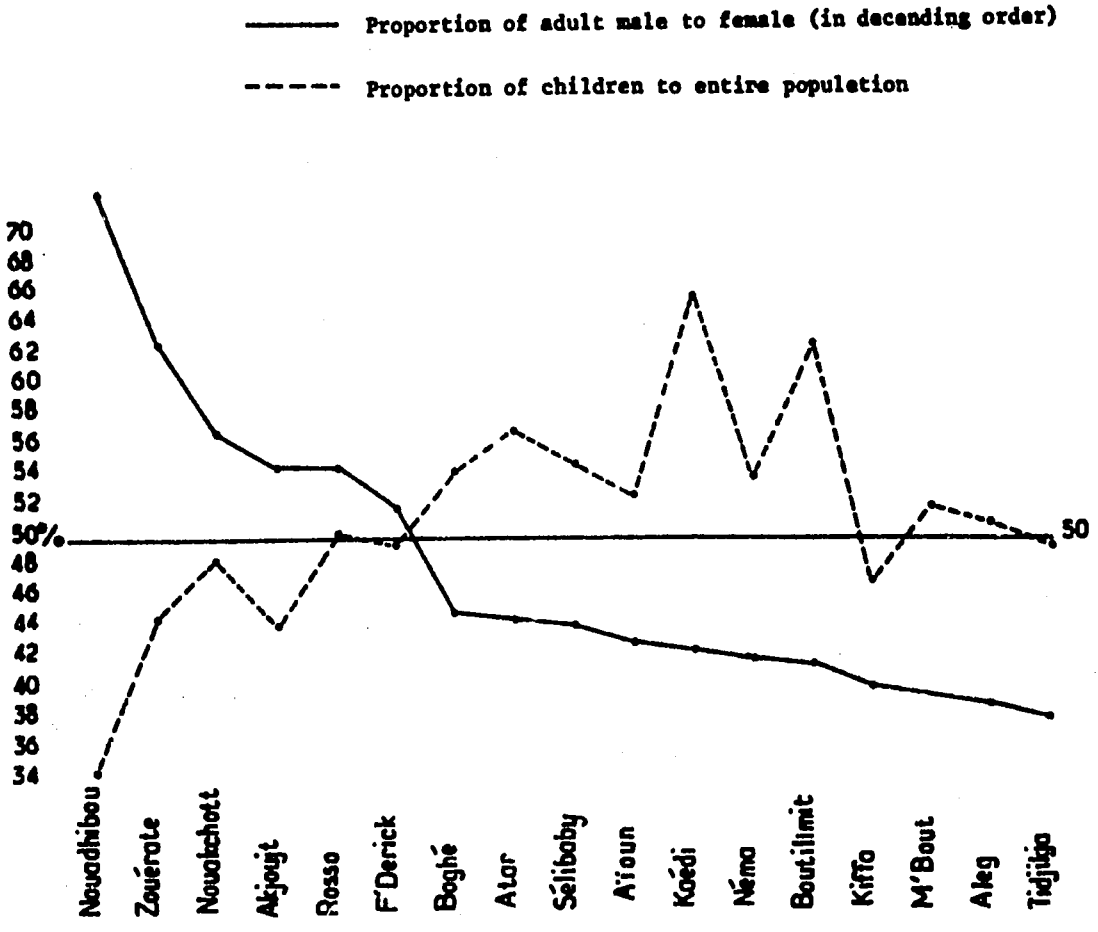
a) Zouerat, including F'Derick
b) Designates cities where census was conducted in 1961. Other populations were enumerated in 1962.
c) Calculation excludes Timbédra.
d) Not an arithmetic total. Total populations of Boghe, Rosso, Nouadhibou, and Nouakchott were adjusted for comparability with 1962 figures. (See BCR, Seconds Resultats Provisoires, p. 24)
e) Less than 5000 in 1975.

Source: BCR, 1977 census, provisional figures; Resultats Definitifs du Recensement en Milieu Urbain, January 1975; and unpublished census data (computer printout).

Exhibit 2-15

Demographic Profile of Urban Population 1975

Proportion of Adult Males and all Children for Urban Centers



Source: "Profil démographique des villes de Mauritanie d'après l'enquête urbaine de 1975", Bulletin de l'IFAN, T 38, serie B, No.3, 1976, juillet, p. 630.

Exhibit 2-16

Urban Population by Type and Size of Dwelling - All Towns

	Fixed/Semi-fixed						Mobile				Total
	Houses + Apartments (rooms)				Shacks + Huts		Shacks		Tents		
	1	2	3	4+	1	2+	1	2+	1	2+	%
% Households	23	17	13	8	5	1.5	10	4	19	0.5	100
% Population	16	18	16	13	4	1.5	9	5	17	0.5	100
Mean Household Size	4.2	6.4	7.2	9.3	5.3	6.0	5.1	7.3	5.1	6.5	6.2

Source: 1975 urban census; figures rounded.

Exhibit 2-17

2.6 Nomad Populations

Nomads: Intention to Sedentarize

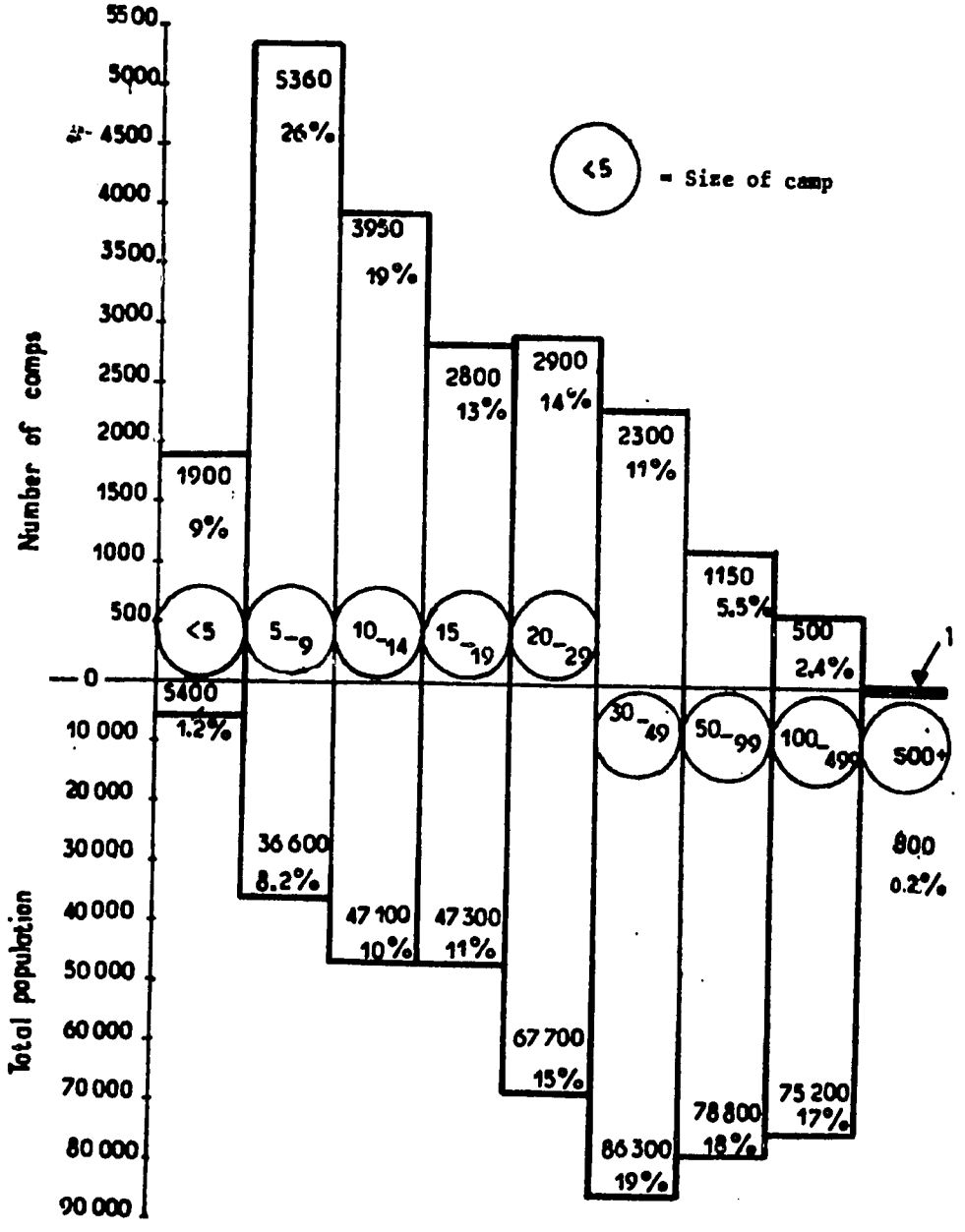
	% of Nomads
Already settled	4
Plan to settle within coming year:	
Nouakchott	0.3
Other town	1
Village	4
Plan to settle later:	
Nouakchott	0.4
Other town	2
Village	13
No intention to settle	76
Total	100.0

Figures should be taken as indicative only. There have as yet been no follow-up studies on actual rates of sedentarization, nor of the permanence of settlement. Presumably, medium-term rainfall conditions play a significant role in determining actual behavior. Overall, 1975 and 1976 were better than the preceding three years but about 14% below 1967-1970 period.

Source: BCR, 1977 Census, provisional figures (numbers rounded).

Exhibit 2-18

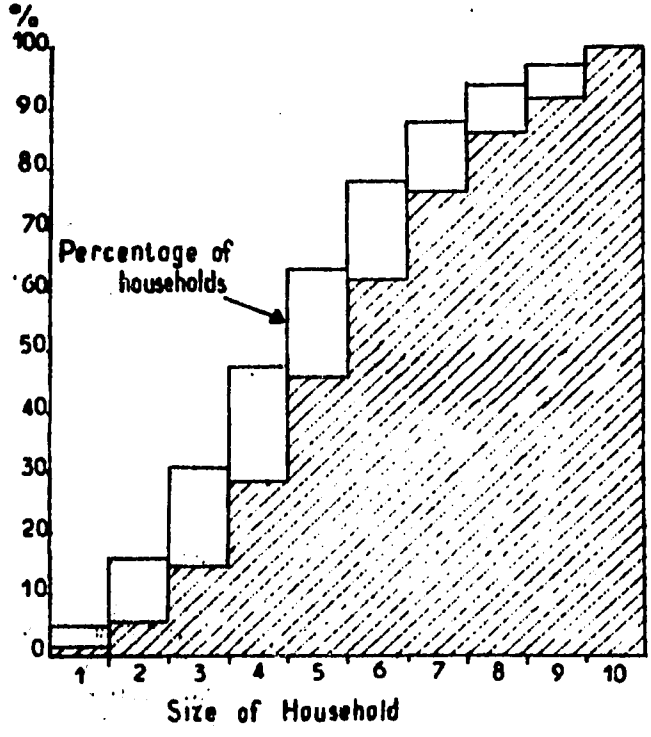
Nomad Camps by Size and Percent of Population



Source: BCR, 1977 Census, provisional figures; number of camps rounded to nearest fifty, population rounded to nearest hundred.

Exhibit 2-19

Cumulative Percent of Nomad Household by Size



Source: BCR, 1977 Census.

Exhibit 2-20

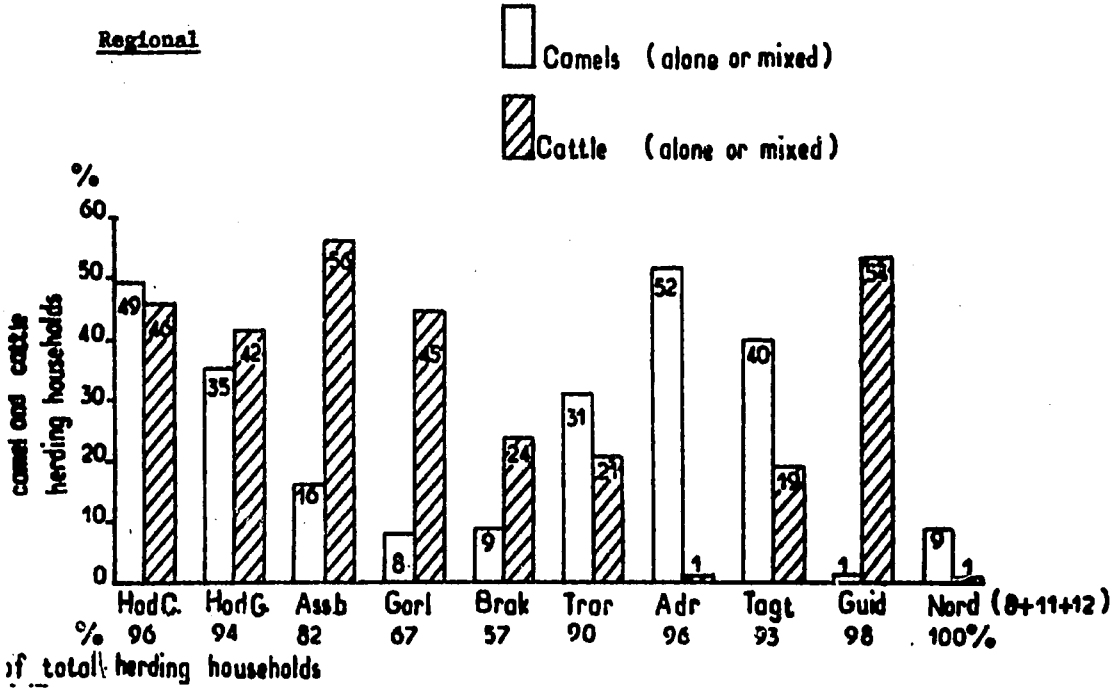
Nomad Households by Herd Composition

National

Type of Herd	Herding Households (%)
Camels only	4
Camels and cattle	7
Camels, sheep and goats	22
Cattle, sheep and goats	21
Cattle only	5
Sheep and goats	24
Goats only	16
Sheep only	1
Total	100

Number of herding households: 79,900 which represents 87% of total nomad households.

Regional



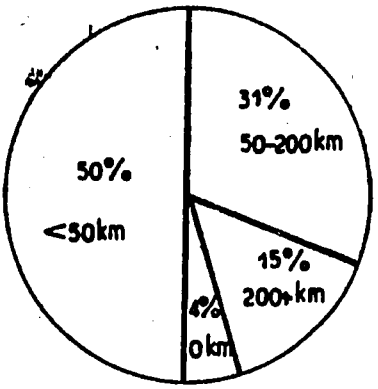
Note: The difference between the percentage of herding households and the sum of Camel and Cattle herders depicted by the bar chart equals households who own only goat and sheep. (E.g., Hodh C. 49% camels + 46% cattle = 95%, therefore, 1% goats and sheep = 96% of total herding household.)

Source: BCR, 1977 Census, provisional figures.

Exhibit 2-21

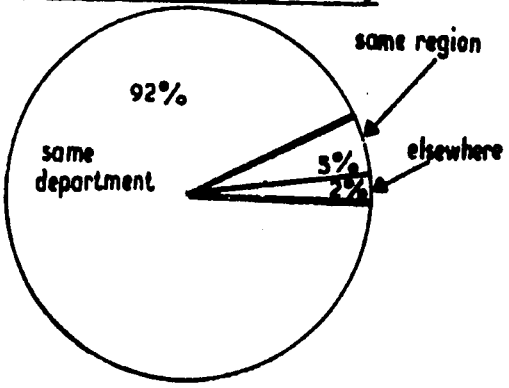
Nomad Movements

Distance Moved



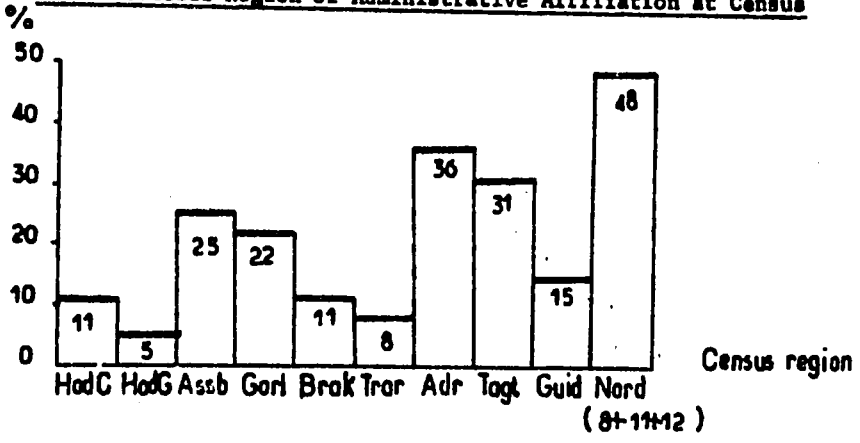
Figures essentially unchanged if households rather than total population used.

Most Frequent Stay in Relation to Census Locality



Figures roughly similar for all regions except Gorgol (76% same department) and Northern Regions (72% same area).

Nomads Outside Region of Administrative Affiliation at Census

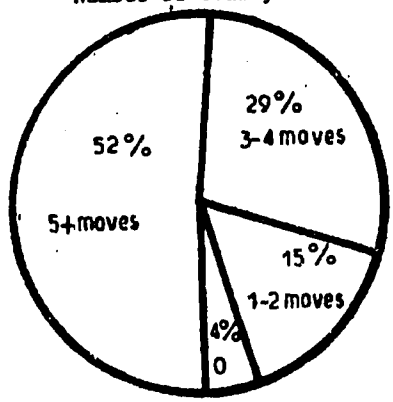


Source: BCR, 1977 Census, provisional print-outs.

Exhibit 2-22

Nomad Movements

Number of Yearly Moves

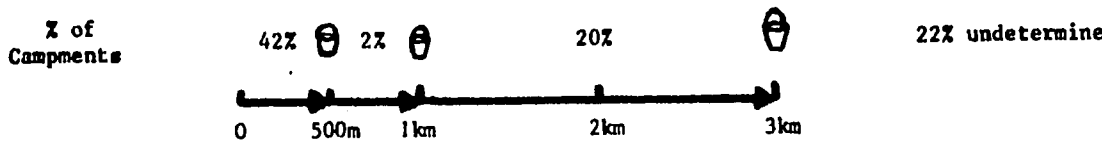


Category no moves (0) includes households with all members stationary (3%) and some members moving (1%).

Source: BCR, 1977 Census, provisional figures.

Distribution of Nomad Campment According

to Distance from Water Source



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Source: SEDES, Enquêtes Démographiques, 1965.

2.7 Population by Agro-Ecological Zones[a)]

The distribution of the sedentary population according to agro-ecological zones is established by assigning individual villages to zones in accordance with their geographical location (see Agro-Ecological Map in Production Section). Where there is inter-penetration of several zones, the village is located according to the predominant occupation of the inhabitants of the village as defined in the 1977 census lists (i.e., oasis agriculture, recessional agriculture, pastoralism).

The nomads are distributed among zones according to the area in which they were enumerated in 1977.

---

a) As defined in RAMS report Agro-Ecological Zones, 1980. See also chapter 6 of this report for greater details.

Exhibit 2-23

Sedentary and Nomad Resident Population by Region and Agro-Ecological Zone

1977

Region		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Transition	Total
Total	Sed.	149.8	257.8	90.3	88.3	123.9	184.7	894.8
	Nom.	30.6 > 180.4	88.3 > 346.1	105.4 > 195.7	59.7 > 148.0	160.0 > 183.9	0.0 > 184.7	444.0 > 1,338.8
Nktt	Sed.						134.7	134.7 - 134.7
	Nom.						0.0 > 134.7	
H. Chr	Sed.		30.7	24.3		16.0		71.0
	Nom.		31.4 > 62.1	24.2 > 48.5		30.1 > 46.1		85.7 > 156.7
H. Ghb	Sed.		26.6	12.5	11.0	10.1		60.2
	Nom.		18.6 > 45.2	25.6 > 38.1	7.0 > 18.0	12.8 > 22.9		64.0 > 124.2
Assab	Sed.		43.4	10.7	29.9	1.8		85.8
	Nom.		17.3 > 60.7	6.7 > 17.4	18.4 > 48.3	1.0 > 2.9		43.4 > 129.2
Gorl	Sed.	61.0	68.2	3.8				133.0
	Nom.	4.3 > 65.3	11.0 > 79.2	1.1 > 4.9				16.4 > 149.4
Brak	Sed.	44.8	14.8	17.4	2.3	21.4		100.7
	Nom.	6.1 > 50.9	.9 > 15.7	22.0 > 39.4	3.1 > 5.4	18.5 > 39.9		50.6 > 151.5
Trarza	Sed.	44.0				65.9		109.9
	Nom.	20.2 > 64.2				85.9 > 151.8		106.1 > 216.0
Adrar	Sed.			6.1	29.4	2.2		37.7
	Nom.			3.9 > 10.0	12.7 > 42.1	1.1 > 3.3		17.7 > 55.4
Ndhbou	Sed.					1.6	21.9	23.5
	Nom.					.0 > 1.6	.0 21.9	.0 > 23.5
Tagant	Sed.			15.1	15.7	1.7		32.5
	Nom.			20.4 > 35.5	18.5 > 34.2	3.6 > 5.3		42.5 > 75.0
Guid	Sed.		74.1					74.1
	Nom.		9.1 > 83.2					9.1 > 83.2
T. Zem	Sed.					2.0	19.9	21.9
	Nom.					.7 > 2.7	.0 19.9	.7 > 22.6
Inch	Sed.			.4		1.2	8.2	9.8
	Nom.			1.5 > 1.9		6.3 > 8.5	.0 8.2	7.8 > 16.6

Source: BCR 1977 census figures. as per RAMS definition Agro Ecological Zones.

Exhibit 2-24

Total Population by Agro-Ecological Zones and by Type of Residence (Nomad and Sedentary)

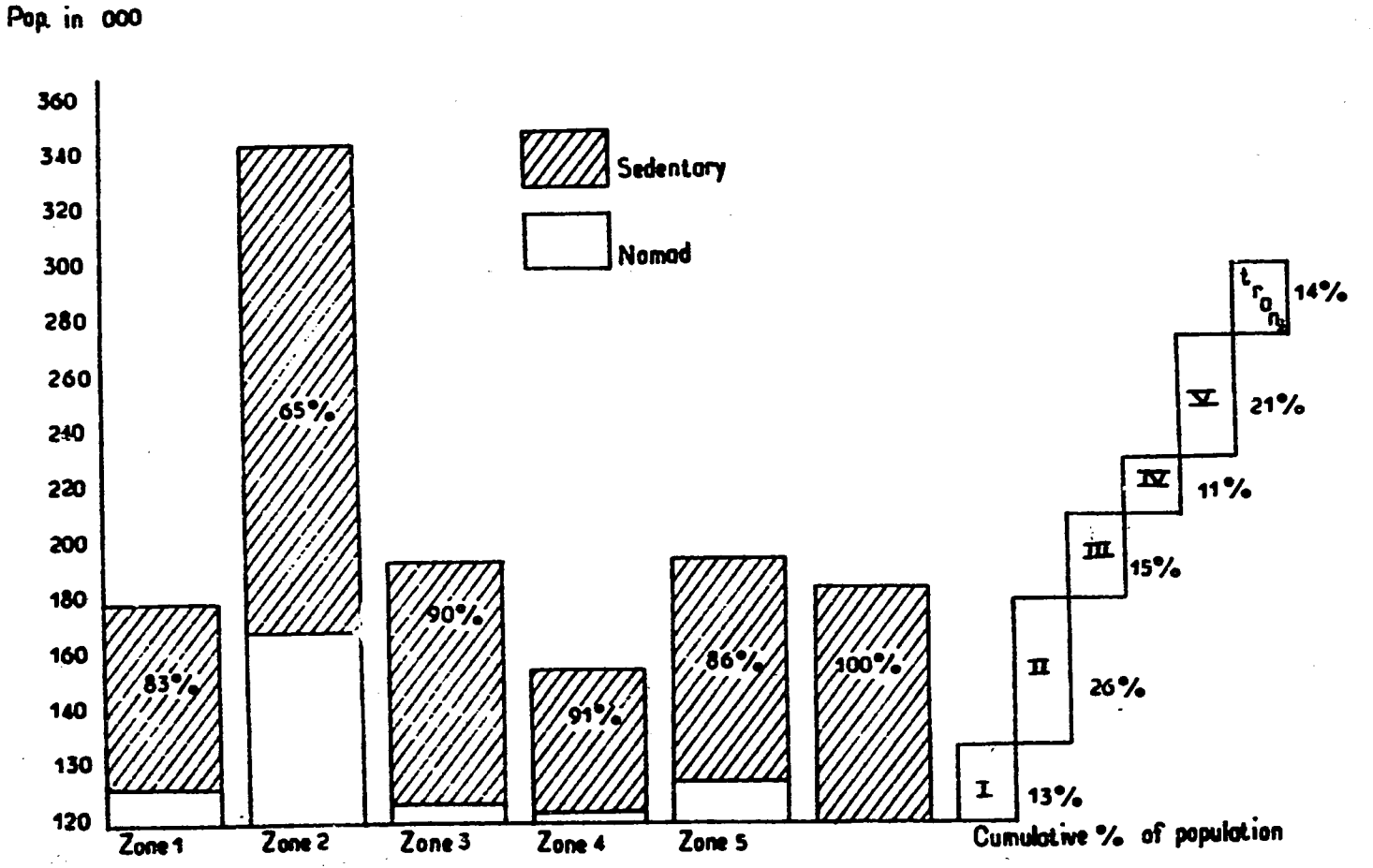

Exhibit 2-25

Number of Villages, Cultivators and Herdsmen by Agro-Ecological Zones as of 1/1/77

Agro-Ecological Zone	Number of Villages	Farmers	Herders/Shepherds
I	303	18,500	2,500
II	1,177	67,300	8,800
III	309	16,500	3,600
IV	141	6,600	1,500
V	407	7,300	5,500
VI	5	700	400
Total	2,342	117,000	22,300

Source: BCR, 1977 Census, provisional figures (rounded) and RAMS definition of Agro-Ecological Zones.

2.8 Village Data

Exhibit 2-26

Village Summary 1977 Census

	Region/ Department	No. of Villages	No. of Households[a]	Resident Population[b]	Accessible all year round[c] No. of Villages	Accessible all year round[c] No. of Population
00	Nouakchott	1	24,300	134.7	-	100
001	1 st arrond.	-	4,870	26.1	-	100
002	2 nd arrond.	-	1,990	11.9	-	100
003	3 rd arrond.	-	2,840	20.2	-	100
004	4 th arrond.	-	3,830	21.3	-	100
005	5 th arrond.	-	10,760	55.2	-	100
01	Hodh Charqui	292	12,980	71.0	100	100
011	Amourj	79	2,330	13.1	100	100
012	Bassikounou	25	1,140	6.2	100	100
013	Djigueni	74	2,530	14.4	100	100
014	Néma	49	3,760	20.2	100	100
015	Oualata	9	470	2.9	100	100
016	Timbédra	56	2,750	14.2	100	100
02	Hodh Gharbi	282	10,340	60.2	100	100
021	Aioun	60	3,720	20.4	100	100
023	Kobonni	95	2,710	17.0	97	99
023	Tamchakett	29	1,180	7.1	100	100
024	Tintane	98	2,730	15.7	100	100
03	Assaba	356	14,980	85.7	93	92
031	Barkewol	58	3,800	22.6	71	72
032	Boumdeid	27	1,420	7.9	100	100
033	Guerou	25	1,840	10.8	96	99
034	Kankossa	163	3,570	20.3	95	98
035	Kiffa	83	4,350	24.2	99	99
04	Gorgol	399	19,990	133.1	69	76
041	Kaédi	74	7,250	50.6	52	81
042	Maghama	68	3,000	25.1	57	57
043	M'Bout	197	7,290	41.6	73	74
044	Monguel	60	2,450	15.8	88	85
05	Brakna	264	16,030	100.8	72	82
051	Aleg	58	3,320	21.0	93	97
052	Bababé	49	2,290	15.2	86	93
053	Boghé	85	4,500	29.8	56	71
054	Maghta-Lahjar	22	2,390	13.9	91	94
055	M'Bagne	50	3,530	20.8	55	66

Village Summary 1977 Census (Cont'd)

	Region/ Department	No. of Villages	No. of Households[a]	Resident Population[b]	Accessible all year round[c] No. of Villages	Accessible all year round[c] No. of Population
06	Trarza	319	17,080	109.9	80	86
061	Boutilimit	41	3,550	22.3	100	100
062	Keur Massene	24	1,110	8.8	75	77
063	Mederdra	665	2,980	18.2	100	100
064	Oued Naga	26	720	3.9	100	100
065	R'Kiz	115	4,170	26.2	51	59
066	Rosso	48	4,550	30.4	79	89
07	Adrar	85	6,240	37.7	98	97
071	Aoujeft	45	1,500	8.4	98	99
072	Atar	35	4,150	25.4	97	95
073	Chinguetti	5	590	3.9	100	100
08	Nouadhibou	13	4,830	23.5	92	99.9
09	Tagant	72	5,170	32.4	100	100
091	Moudjeria	27	1,380	8.5	100	100
092	Tichitt	2	230	1.4	100	100
093	Tidjkja	43	3,560	27.6	100	100
10	Guidimaka	245	9,150	74.2	49	33
101	Ould Yengé	91	2,610	20.3	82	55
102	Sélibaby	154	6,540	53.9	29	24
11	Tiris Zemmour	7	3,690	21.8	100	100
111	Bir Moghrein	1	240	1.7	100	100
112	F'Derick	5	410	2.7	100	100
113	Zouerate	1	3,040	17.4	100	100
12	Inchiri (Akjoujt)	7	1,560	9.8	100	100
	Total	2,342	146,300	895	-	-

a) Rounded to nearest 10 - sedentary only.
b) Sedentary only BCR 1977 census final figures.
c) Accessible by 4-wheel drive vehicle. Figures to nearest hundred.

Source: BCR 1977 census preliminary results. The village file is not being revised with final figures. There have been several changes since 1977, notably in the Hodhs (villages disappeared) and the river zone (new villages created).

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Exhibit 2-27

Village Facilities 1977

Region/ Department		No. of Villages	Post Office	Private Transport Service	Gas Station	Mechanics	Dispensary	Market	Slaughter Facility
00	Nouakchott	(1)	4[a]	-	12	140[b]	-	10	1
01	Hodh Charqui	292	9	8	2	4	12	9	8
011	Amourj	79	2	3	0	2	2	2	2
012	Bassikounou	25	2	0	0	1	2	2	2
013	Djigueni	74	1	0	0	0	2	2	2
014	Néma	49	1	2	1	1	2	1	1
015	Oualata	9	1	2	0	0	2	0	0
016	Timbédra	56	2	1	0	0	2	2	1
02	Hodh Gharbi	282	5	3	1	3	3	3	3
021	Aïoun	60	1	1	1	3	1	1	1
022	Kobonni	95	1	0	0	0	0	0	0
023	Tamchakett	29	1	1	0	0	1	1	1
024	Tintane	98	2	1	0	0	1	1	1
03	Assaba	357	3	11	1	2	6	16	5
031	Barkewol	58	0	3	0	0	2	5	1
032	Boumdeid	27	0	1	0	0	1	2	0
033	Guerou	26	1	1	0	0	1	4	2
034	Kankossa	163	1	5	0	1	1	3	1
035	Kiffa	83	1	1	1	1	1	2	1
04	Gorgol	399	7	6	2	2	10	8	4
041	Kaédi	74	3	3	1	1	4	2	1
042	Maghama	68	2	1	0	0	3	2	1
043	M'Bout	197	1	1	1	1	2	3	1
044	Monguel	60	1	1	0	0	1	1	1
05	Brakna	264	6	4	2	5	14	10	3
051	Aleg	58	1	2	1	2	2	2	1
052	Bababé	49	2	0	0	1	3	0	0
053	Boghé	85	1	1	1	1	5	3	1
054	Maghta-Lahjar	22	1	0	0	0	2	3	1
055	M'Bagne	50	1	1	0	1	2	2	0
06	Trarza	319	10	44	6	8	18	18	23
061	Boutilimit	41	1	6	1	1	5	5	4
062	Keur Massene	24	2	3	0	0	2	2	1
063	Mederdra	665	1	8	2	1	3	3	4
064	Oued Naga	26	0	4	0	2	1	1	2
065	R'Kiz	115	3	11	1	2	4	6	6
066	Rosso	48	2	12	2	2	3	1	6

Village Facilities 1977 (Cont'd)

	Region/ Department	No. of Villages	Post Office	Private Transport Service	Gas Station	Mechanics	Dispensary	Market	Slaughter Facility
07	Adrar	85	2	20	2	6	6	5	8
071	Aoujeft	45	0	8	0	1	1	3	2
072	Atar	35	1	10	1	3	4	1	4
073	Chinguetti	5	1	2	1	2	1	1	2
08	Nouadhibou	13	1	2	1	3	3	1	1
09	Tagant	72	3	5	2	3	5	5	3
091	Moudjeria	27	1	1	1	2	2	4	1
092	Tichitt	2	1	0	0	0	1	0	1
093	Tidjikja	47	1	4	1	1	2	1	1
10	Guidimaka	245	5	4	1	4	13	6	4
101	Ould Yengé	91	1	0	0	2	5	2	1
102	Sélibaby	154	4	4	1	2	8	4	3
11	Tiris Zemmour	7	3	2	1	4	4	3	2
111	Bir Moghrein	1	1	0	0	1	1	1	0
112	F'Derick	55	1	1	0	2	2	1	1
113	Zouerate	1	1	1	1	1	1	1	1
12	Inchiri	7	1	1	1	1	2	1	1
112	Akjoujt	7	1	1	1	1	2	1	1

a) Updated to 1980 based on the Post et de Telecommunication (OPT)
b) RAMS survey 1980.

Source: BCR, 1977 census village file.

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Exhibit 2-28

Village Agricultural Production System/1977 Census

Region/Dept		No. of Villages	Irrigated %	Walo %	Dams %	Small Dams (cuvette) %	Dieri %	Date Palms %	No Agriculture %	Fishing %
01	H. Charqui	292	4	16	16	5	92	12	4	0.3
011	Amourj	79		29	8		96	8		
012	Bassikounou	25	4		4		92	8	4	
013	Djigueni	74	4	15	15	8	88	14	8	
014	Néma	49	4	22	41	12	94	16		2
015	Oualata	5	-	-	33		100	11		
016	Timbédra	56	2	2	9	5	89	16	9	
02	H. Gharbi	282	8	11	31	8	86	24	12	
021	Aïoun	60	17	20	47	3	80	32	13	
022		95	3	11	14	5	90	12	8	
023	Tamchekett	29	10	21	72		72	42		
024	Tintane	98	8	4	27	17	95	29	19	
03	Assaba	356	10	29	23	12	85	43	2	1
031	Barkewol	58	3	53	9	3	97	28	2	2
032	Boumdeid	27	22		78	33	78	15		
033	Guerou	25	19	19	30	11	67	78	4	
034	Kankossa	163	9	31	6	15	78	33	4	1
035	Kiffa	83	8	22	47	4	94	70		
04	Gorgol	399	2	49	5	13	93	3	4	10
041	Kaédi	74	9	75	3	3	96		7	21
042	Maghama	68	2	71	2	12	91		4	29
043	M'Bout	197		37	5	19	93	6	3	1
044	Monguel	60		30	9	9	98	2	5	
05	Brakna	264	6	65	14	17	86	6	5	33
051	Aleg	58		50	19	17	93	5	21	
052	Bababé	49		55	2	10	92	8	2	18
053	Boghé	85	11	88	4	20	78			22
054	Magta-Lahjar	22	18	14	82	27	77	36		
055	M'Bagne	50	6	77	6	15	94			10

Village Agricultural Production System/1977 Census (Cont'd)

Region/Dept		No. of Villages	Irrigated %	Walo %	Dams %	Small Dams (cuvettes) %	Dieri %	Date Palms %	No. Agriculture %	Fishing %
06	Trarza	319	17	31	3	11	64	14	21	15
061	Boutilimit	41	1	1		1	18	5	12	
062	Keur Massene	24	54	33		4	54	29	13	67
063	Mederdra	65	3	2		3	74	5	31	2
064	Oued Naga	26	12				50	11	46	15
065	R'Kiz	115	14	62	4	15	64	3	9	17
066	Rosso	48	39	39	9	28	63	35	9	15
07	Adrar	85	60	1	11	28	69	88	6	
071	Aoujeft	45	47	2	13	38	96	89	2	
072	Atar	35	71		9	20	40	86	9	
073	Chinguitti	5	100				40	100	20	
08	D. Ndhbou	13	31				15	23	85	69
09	Tagant	72	43	13	44	29	68	78	1	3
091	Moudjéria	27	19	30	33	33	78	63		4
092	Tichitt	2	50					100		
093	Tidjikja	43	58	2	54	28	65	86	2	2
10	Guidimaka	245	3	26	2	10	95	8	3	3
101	Ould Yengé	91	3	28	4	4	95	22	6	
102	Sélibaby	154	3	26	1	14	96		1	5
11	T. Zemmour	7			29		14	14	57	14
111	Bir Moghrein	1								
112	F'Dérick	5			40		20	20	80	
113	Zouérate	1								100
12	Inchiri Akjt	7	14		14		86	43	14	14

Nouakchott excluded

Source: BCR, 1977 Census, village file.

Exhibit 2-29

Type of Village Water Supply, 1977

% of Villages in Department by Water Supply Source

	No. of Villages	Well-Earthen	Well-Masonry	Well-Cement	Well-Trough	Public Stand Point
01 HODH CHARQUI	292	70	46	26	21	7
011 Amourj	79	77	64	15	20	0
012 Bassikounou	25	76	8	40	48	4
013 Djigueni	74	82	32	15	15	20
014 Néma	49	65	73	49	22	0
015 Oualata	9	55	100	67	44	22
016 Timbédra	56	50	25	23	14	5
02 HODH CHARBI	282	74	39	21	18	03
021 Aïoun El Atrouss	60	78	73	37	27	0
022 Kobonni	95	58	29	18	17	1
023 Tamchakett	29	93	59	21	14	0
024 Tintane	98	81	21	15	15	C
03 ASSABA	357	82	26	14	16	4
031 Barkewol	58	95	12	22	5	0
032 Boumdeid	27	70	37	41	33	0
033 Guerou	26	81	65	12	15	0
034 Kankossa	163	78	13	10	16	7
035 Kiffa	83	87	46	19	20	18
04 GORGOL	399	61	3	16	8	5
041 Kaédi	74	34	7	43	5	3
042 Maghama	68	37	0	22	1	0
043 M'Bout	197	73	4	5	11	8
044 Monguel	60	85	2	10	8	2
05 BRAKNA	264	38	3	37	22	4
051 Aleg	58	55	2	45	36	7
052 Bababé	49	24	4	31	16	0
053 Boghé	85	26	2	32	22	0
054 Magta-Lahjar	22	100	14	27	23	14
055 M'Bagne	50	24	2	48	12	8
06 TRARAZA	319	33	6	59	44	5
061 Boutilimit	41	22	12	85	80	5
062 Keur Massene	24	75	17	46	17	4
063 Mederdra	65	15	0	86	74	2
064 Oued Naga	26	15	0	62	27	8
065 R'Kiz	115	34	3	31	22	1
066 Rosso	48	50	15	73	48	21

Village Water Supply, 1977 (Cont'd)

	No. of Villages	Well-Earthern	Well-Masonary	Well-Cement	Well Trough	Public Stand Point
07 ADRAR	85	85	93	40	34	5
071 Acujeft	45	93	89	11	31	4
072 Atar	35	77	97	77	40	0
073 Chinguetti	5	60	100	40	20	40
08 DAKHLET-NOUADHIBOU	13	23	8	15	23	31
09 TAGANT	72	85	72	13	17	3
091 Moudjeria	27	78	63	19	11	4
092 Tichitt	2	100	100	0	50	0
093 Tidjikja	43	88	77	9	19	2
10 GUIDIMAKA	245	84	14	16	23	5
101 Ould Yengé	91	95	24	13	29	9
102 Sélibaby	154	78	8	18	20	3
11 TIRIS ZEMMOUR	7	29	43	29	43	57
111 Bir Mogrein	1	0	0	100	0	0
112 F'Derick	5	20	40	20	60	60
113 Zouerate	1	100	100	0	0	100
12 INCHIRI (Akjoujt)	7	29	14	29	14	71

Source:BCR, 1977 Census, village file.

PN-AAM-219

ISLAMIC REPUBLIC OF MAURITANIA

Honor — Fraternity — Justice

Ministry of Economy and Finance

Directorate of Studies and Programming

RAMS PROJECT

Rural Assessment and Manpower Surveys

Annotated Statistical Compendium
Volume 2

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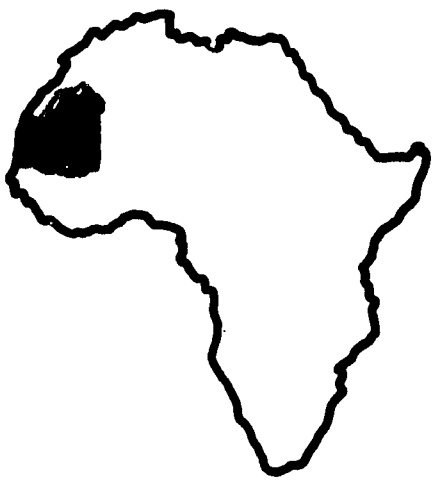

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Chapter 3: Human Resources

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Chapter 3 Human Resources

3.1 Overview

This section presents a selection of basic data on the human resources of Mauritania as reflected by data on education and manpower/employment.

There are essentially two major sources of nation-wide data[1], the 1977 census and the Ministry of National Education. These have been supplemented by several RAMS surveys covering the modern and urban informal sectors and rural skills.

Formal education statistics are obtained through questionnaires sent out annually to each Regional School director who, in turn, distributes them to all the schools in his region. The questionnaires are collected and verified, at least in theory, by him before being returned to the ministry. The data reflect the situation at the time of the survey rather than the yearly average. Depending on the weather, the year-end student population can fluctuate up or down 5-6% from the survey figure (ususlly around mid-year).

Non-formal education by its very nature has not and is not being covered systematically. At present the RAMS report Non-formal Education FS 3-3 (1981) is the only general synthesis available.

In terms of manpower/employment, only the modern, salaried sector witnesses a more or less regular collection of data through the Direction du Travail.

There is limited literature on the modern sector. One study, however, is particularly useful:

G. Khan, D. Dviry et R. Jourdain, Le Secteur non-'structuré' "Moderne" de Nouakchott, BIT/ILO, WEP 2-33/Doc 4, Geneva, 1978 (150 pp.).

This most recent report is based on surveys of Nouakchott's non-formal sector. Includes analyses of data on apprenticeships, employment and investments. Contains information on salaries, value added by sector, training and modes of management. A useful composite of the Nouakchott entrepreneur is presented in Annexes along with questionnaire and instruction manual.

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1) For the Senegal valley the various socio-economic studies contain a wealth of human resource data. (See references in the section on Population.

3.2 General Education and Literacy

Exhibit 3-1

Literacy Level by Urban/Rural and Sedentary/Nomad

(in % of the Population Aged 6 and Over)

	1977 Census					1964/65 Survey	
	Urban	Rural Seden.	Rural Nomad	Rural Total	National Total	Rural Total	National Total
Reading/Writing Arabic Only	16%	8%	10%	9%	10%	3%	9%
Reading/Writing French	8%	1%	0.1%	0.5%	2%	1%	2%
Reading/Writing French and Arabic	13%	4%	0.4%	2%	5%	2%	3%
Total Literate Pop.	37%	12%	10%	12%	17%	6%	13%

Source: BCR 1977 census and SEDES 1965 demographic survey

Exhibit 3-2

Literacy by Occupational Group of the Sedentary Labor Force

1977

(000)

Occupational Group	Literate	Illiterate	Total	% Literate
No Occupation	9.5	26.9	36.4	26
Agriculture	10.0	133.0	143.0	7
Industrial	1.6	2.0	3.6	44
Artisans	2.2	10.7	12.9	17
Office and Communication	6.5	0.9	7.4	88
Construction and Public Works	4.8	12.0	16.8	29
Commerce and Transportation	16.6	20.5	37.1	45
Professional and Technical Workers	1.7	0.3	2.0	85
Armed Forces and Security Service	9.2	6.6	15.8	58
Service and Social	7.4	18.9	26.3	28
Total Sedentary Workers	69.5	23.8	301.3	23

Source: BCR, 1977 Census Provisional Figures.

Exhibit 3-3

Sedentary Population Age 6 and Over by Type of Education

By Region and Department, 1977

Region	Dept.	No Education %	Traditional Education %	Formal Education			%	Total Number (000)
				Primary %	Secondary %	Tech/Prof. %		
01	Hodh Charqui	87.8	7.6	4.2	.3	.1	100.0	123.1
011	Amourj	90.7	6.1	2.8	.3	.1	100.0	21.1
012	Bassikounou	86.8	7.7	5.2	.2	.1	100.0	14.3
013	Djigueni	89.7	7.4	2.8	.1	.1	100.0	17.4
014	Néma	83.3	10.5	5.5	.4	.3	100.0	34.0
015	Oualata	93.1	3.3	3.1	.4	.1	100.0	13.4
016	Timbédra	87.6	7.1	4.9	.2	.2	100.0	23.0
02	Hodh Gharbi	86.3	8.7	4.3	.6	.1	100.0	102.1
021	Aioun	80.3	8.0	10.0	1.3	.3	100.0	27.8
022	Kobonni	91.1	7.1	1.3	.4	-	100.0	23.3
023	Tamchakett	89.0	9.4	1.3	.2	-	100.0	30.0
024	Tintane	85.0	10.2	4.4	.4	-	100.0	21.1
03	Assaba	86.9	9.3	3.3	.4	.02	100.0	101.9
031	Barkewol	93.4	5.4	1.2	-	-	100.0	25.0
032	Boumdeid	70.8	26.6	2.1	.5	-	100.0	9.7
033	Guerou	83.2	14.0	2.2	.5	.1	100.0	12.4
034	Kankossa	93.0	3.8	2.7	.5	.05	100.0	21.4
035	Kiffa	84.4	8.9	6.1	.7	-	100.0	33.3
04	Gorgol	89.5	3.2	6.6	.6	.2	100.0	114.9
041	Kaédi	83.8	4.3	10.3	1.2	.4	100.0	41.6
042	Maghama	92.6	2.0	4.9	.4	.2	100.0	19.1
043	M'Bout	93.9	2.0	4.0	.2	.03	100.0	38.4
044	Monguel	89.9	4.5	5.1	.4	.1	100.0	15.7
05	Brakna	87.2	6.7	5.3	.7	.1	100.0	122.4
051	Aleg	85.6	9.0	4.5	.6	.3	100.0	35.6
052	Bababé	88.1	3.5	7.3	1.1	.1	100.0	13.3
053	Boghé	86.7	2.8	8.8	1.5	.2	100.0	27.5
054	Magta-Lahjar	86.2	10.8	2.8	.2	.03	100.0	28.9
055	M'Bagne	92.4	3.6	3.9	.1	-	100.0	17.1
06	Trarza	76.7	15.4	6.5	1.2	.1	100.0	175.2
061	Boutilimit	70.6	22.2	5.7	1.3	.2	100.0	47.6
062	Keur Massene	80.8	12.3	6.2	.6	.2	100.0	16.8
063	Mederdra	77.5	16.9	4.9	.7	.03	100.0	36.4
064	Oued Naga	76.5	20.3	2.6	.6	-	100.0	10.3
065	R'Kiz	83.3	11.4	4.4	.9	.1	100.0	37.7
066	Rosso	74.9	6.8	15.3	2.7	.4	100.0	26.5

Sedentary Population Age 6 and Over by Type of Education (Cont'd)

Region	Dept.	No Education %	Traditional Education %	Formal Education Primary %	Formal Education Secondary %	Formal Education Tech/Prof. %	%	Total Number (000)
07	Adrar	75.9	10.7	11.4	1.3	.6	100.0	43.8
071	Aoujeft	89.4	7.9	2.3	.3	.1	100.0	11.7
072	Atar	66.9	13.6	16.5	2.0	1.0	100.0	24.7
073	Chinguetti	84.4	5.7	9.2	.5	.1	100.0	7.4
08	D. Noudhibou	64.4	6.8	23.8	4.5	.4	100.0	17.0
081	Nouadhibou	64.4	6.8	23.8	4.5	.4	100.0	17.0
09	Tagant	86.2	6.9	6.4	.4	.1	100.0	59.2
091	Moudjeria	89.3	5.2	5.3	.2	-	100.0	24.5
092	Tichit	90.6	7.0	2.2	-	.2	100.0	4.9
093	Tidjikja	82.9	8.2	8.0	.6	.2	100.0	29.8
10	Guidimaka	93.3	2.9	3.4	.3	.1	100.0	63.6
101	Ould Yengé	92.4	2.8	4.5	.2	.1	100.0	18.6
102	Sélibaby	93.7	2.9	2.9	.4	.1	100.0	45.0
11	Tiris Zemmour	65.3	8.1	23.4	3.0	.2	100.0	17.4
111	Bir Moghrein	72.8	4.4	17.6	5.1	-	100.0	1.4
112	F'Derik	65.0	11.3	21.2	2.1	.4	100.0	2.8
113	Zouerate	64.7	7.9	24.4	2.9	.2	100.0	13.2
12	Inchiri	66.9	19.8	11.2	1.5	.7	100.0	13.8
121	Akjoujt	66.9	19.8	11.2	1.5	.7	100.0	13.8
Total		82.0	8.7	7.6	1.3	.3	100.0	1.954.4

Source: BCR: 1977 Census Provisional figures.

Exhibit 3-4

General Educational Level Attained of Selected Active Populations

(Aged 12 and over)

1977 Sedentary Population -Rural: 591,000; Urban: 303,800

Residence and Activity / Type of Education	Rural Sedentary Agricultural occupation '000	(%)	Urban Sedentary Modern Manufact. '000	(%)	Urban Sedentary Craft Manufact. '000	(%)	Urban Sedentary Household and Business Services '000	(%)
No Education	126.4	(89.6)	.8	(63.6)	4.9	(76.1)	10.4	(81.1)
Traditional (Religious) Family Education	10.3	(7.3)	.1	(8.5)	.7	(11.4)	.9	(7.6)
Traditional Islamic Education	2.4	(1.7)	.05	(3.9)	. 1	(1.6)	.2	(1.5)
Primary Education	1.8	(1.3)	.2	(13.2)	.5	(9.0)	1.1	(8.2)
Secondary and Higher Education	.08	(0.06)	.1	(10.0)	.1	(2.0)	.2	(1.5)
Technical Education	-		.01	(.8)	0	(0)	.02	(.2)
Total	141.0	(100%)	1.29	(100%)	6.4	(100%)	12.88	(100%)

Source: BCR, 1977 Census final figures.

Exhibit 3-5

Nomad Population Age 6 and Over by Type of Education Received and by Region, 1977

Region \ Type of Education	No education or partial traditional education	Traditional education %	Organized traditional education %	Formal education %	Total
Hodh Charqui	97.5	1.1	1.2	.3	68,90
Hodh Charbi	4.9	3.8	.9	.4	52,000
Assaba	91.5	4.7	3.1	.7	34,600
Gorgol	95.8	1.2	.6	2.3	13,20C
Brakna	93.5	3.1	3.0	.3	40,500
Trarza	83.2	12.1	4.2	.4	86,700
Adrar	93.1	5.8	-	1.0	14,200
Tagant	93.8	4.0	1.4	.8	34,500
Guidimaka	99.2	.4	.4	-	6,900
North a)	84.2	9.0	5.6	1.2	7,900
Total (1977)	91.8	5.4	2.3	.5	359,400
('000)	329.9	19.3	8.3	1.9	

a) Inchiri, Tiris Zemmour and Adrar.

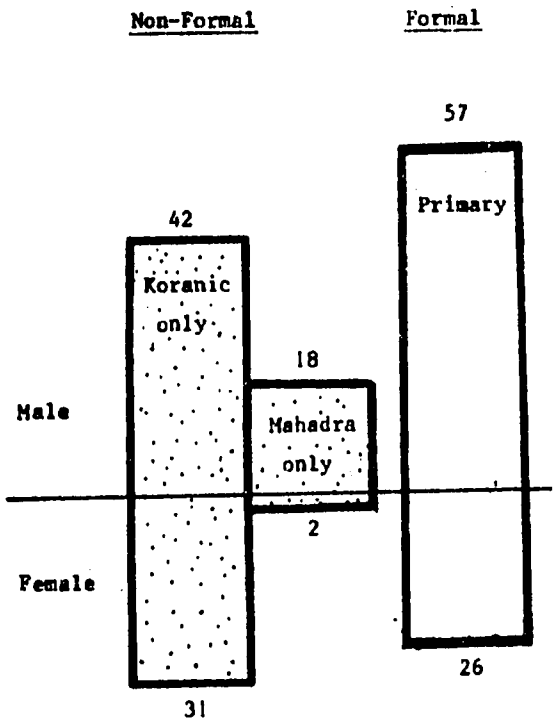
Source: BCR, 1977 Census, provisional figures.

185 X

Exhibit 3-6

Education - Formal vs Non-Formal, 1977

National Totals
(000)

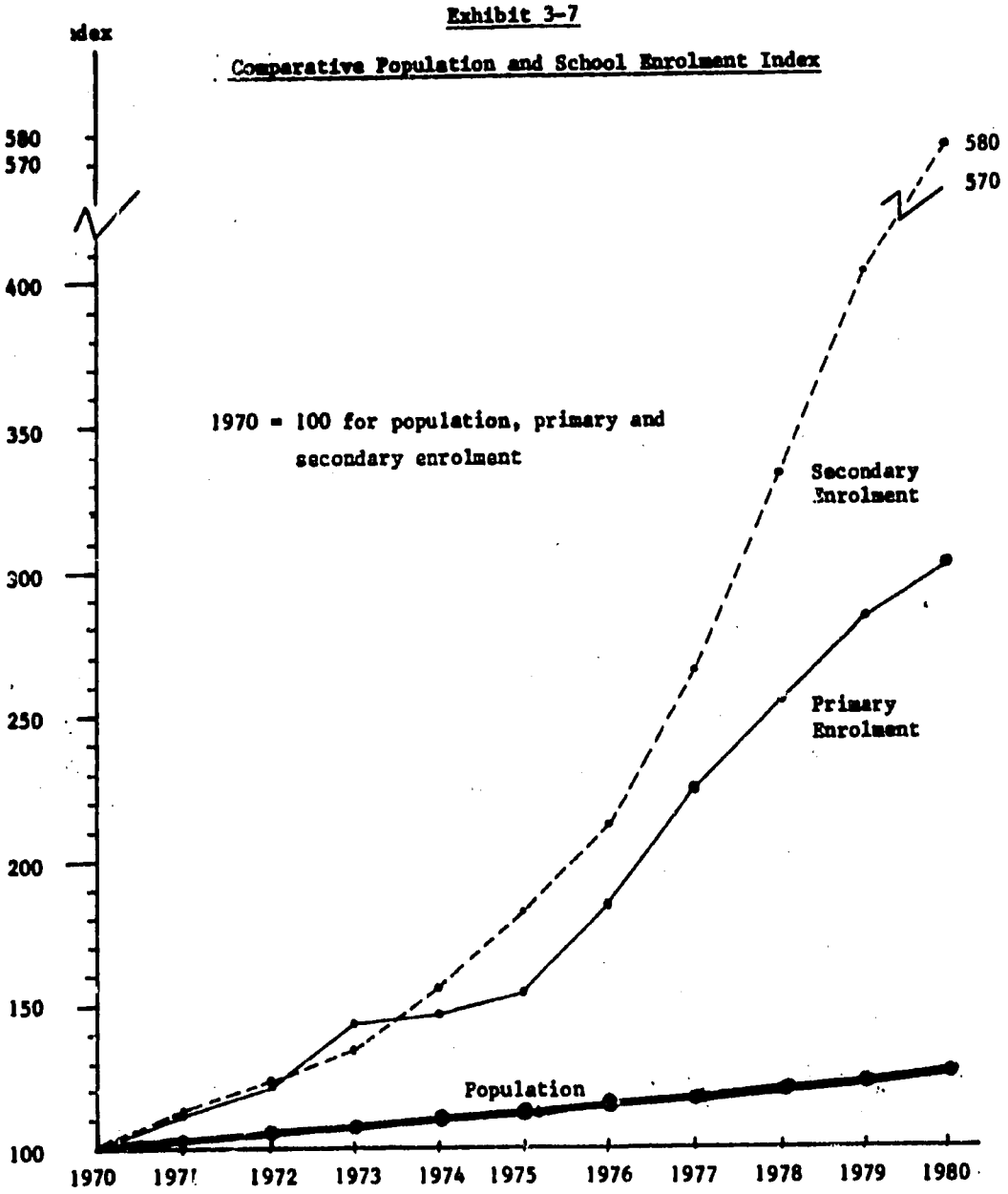


Source: BCR, 1977 Census.

3.3 Formal Education

Exhibit 3-7

Comparative Population and School Enrolment Index



1973-74: First cycle is reduced from 4 years to 3 years.

Source: Ministry of National Education, BCR and RAMS.

187 X

Exhibit 3-8

Education Statistics - Primary Level by Region

1976-77 - 1978-79

Region / School year ending		Nouakchott 76-77	Nouakchott 78-79	Hodh Charqui 76-77	Hodh Charqui 78-79	Hodh Gharbi 76-77	Hodh Gharbi 78-79	Assaba 76-77	Assaba 78-79	Gorgol 76-77	Gorgol 78-79	Brakna 76-77	Brakna 78-79	Trarza 76-77	Trarza 78-79
Enrolment (000)	T	13.1	16.8	5.2	5.8	4.5	5.2	3.7	4.8	6.8	7.9	6.7	8.8	10.1	12.1
	M	7.9	9.4	3.7	4.0	3.2	3.4	2.7	3.4	4.7	5.4	4.8	6.0	6.8	7.8
	F	5.2	7.4	1.5	1.8	1.3	1.8	1.0	1.4	2.1	2.5	1.9	2.8	3.3	4.3
Enrolment rate 6-14 pop. (%)	T	52	67	14	16	14	17	12	16	18	21	17	22	18	22
	M	57	68	18	20	20	28	17	21	23	27	23	28	23	27
	F	47	67	9	11	8	12	7	10	11	14	10	15	13	17
Ratio M/F Enrolment rate		1.2	1.0	2.1	1.9	2.4	2.3	2.5	2.2	2.0	2.0	2.3	1.9	1.8	1.6
No. of Schools			23		64		54		45		59		66		111
No. of Teachers			298		161		134		315		188		190		303
Student/Teacher Ratio			56		36		38		35		42		46		40

Total Enrollment:		1976-77	1978-79
	T	65.1	81.5
	M	43.7	51.9
	F	21.4	29.6
No. of Schools:			534
No. of Teachers:			1,826

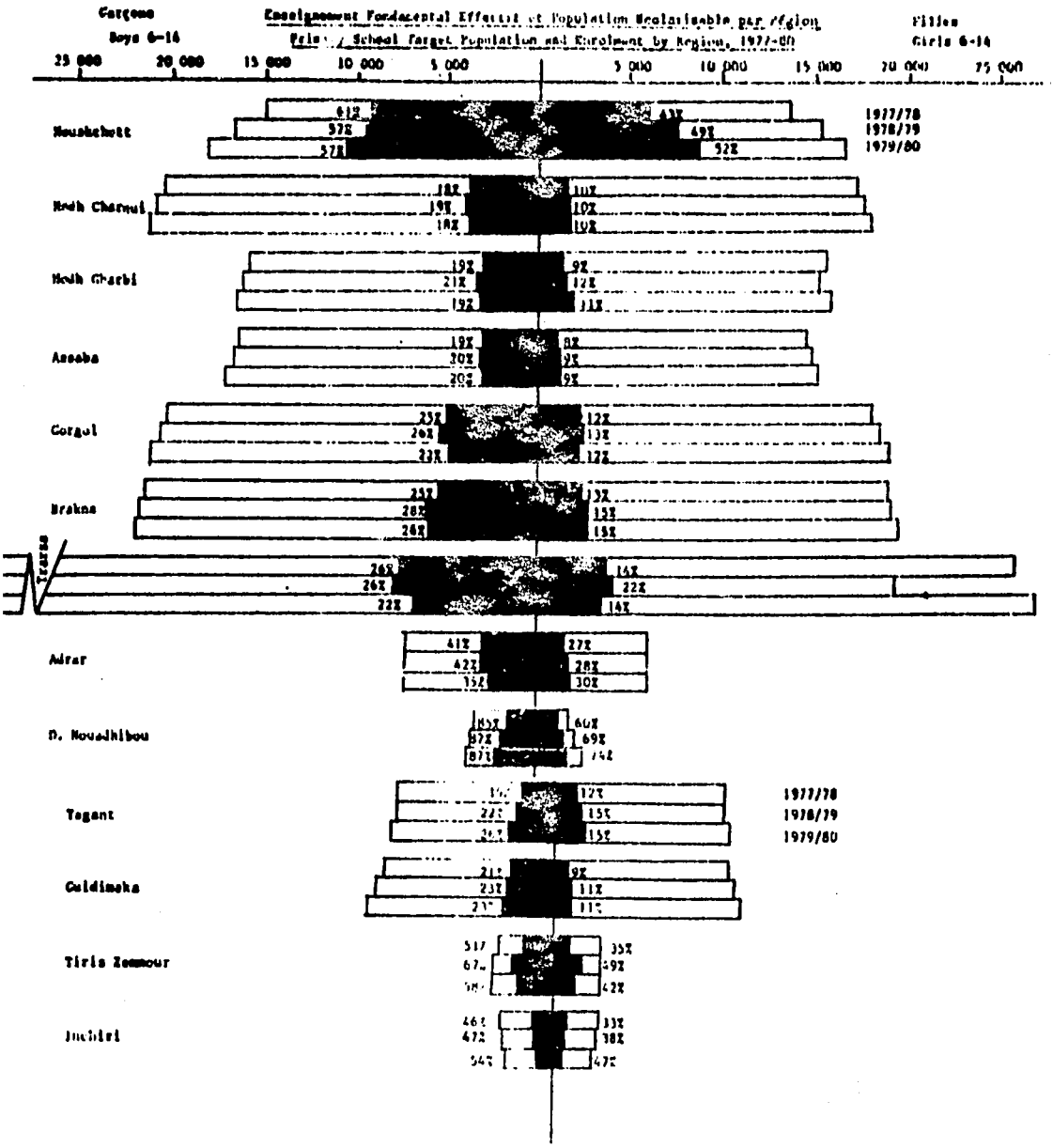
Source: Ministry of National Education and BAMS.

3.10

Education Statistics (Cont'd)

Region / School year ending		Adrar		D. Nouadhibou		Tagant		Selibaby		T. Zemmour		Inchiri		Total	
		76-77	78-79	76-77	78-79	76-77	78-79	76-77	78-79	76-77	78-79	76-77	78-79	76-77	78-79
Enrollment (000)	T	4.0	4.8	2.3	3.4	2.8	3.5	2.5	3.7	2.1	3.2	1.3	1.5	65.1	81.5
	M	2.7	3.1	1.4	1.9	1.8	2.1	1.8	2.6	1.4	1.9	.8	.9	43.7	51.9
	F	1.3	1.7	.9	1.5	1.0	1.4	.7	1.1	.7	1.3	.5	.6	21.4	29.6
Enrollment rate 6-14 pop.	T	29	36	54	79	15	18	12	18	42	62	31	35		
	M	35	42	65	88	18	22	17	24	52	72	37	38		
	F	21	28	44	69	11	15	7	11	30	52	24	31		
Ratio M/F		1.6	1.5	1.5	1.3	1.5	1.5	2.4	2.2	1.8	1.4	1.5	1.2		
Enrolment No. of Schools			24		8		38		30		5		7		
No. of Teachers			99		55		103		91		34		32		1,826
Student/Teacher Ratio			49		61		34		40		94		45		

Exhibit 3-9



Source: Ministry of National Education for enrolled population, RAMS for rate and school age population based on regional growth rates as provided by BCR.

3.12

Exhibit 3-10

Educational Statistics - Secondary Level - By Region

1977 - 79 (where available)

Region / School Year Ending		Nouakchott 1979	H.Charqui 1979	H. Gharbi 1979	Assaba 1977	Assaba 1979	Gorgol 1977	Gorgol 1979	Brakna 1977	Brakna 1979	Trarza 1977	Trarza 1979
Ebrolment	T	4986	533	1036	297	454	891	1135	741	749	1503	1739
	M	3732	473	944		393		976		664		1478
	F	1254	60	92		61		159		85		261
No. of Instructors		193	14	48		16		62		31		83
National		31	11	15		10		4		15		18
Foreigners		162	3	33		6		58		16		65
Student/Teacher Ratio		26	38	22		28		18		24		21
1st Cycle	T	3066	533	603		454		626		749		1279
	M	2144	473	525		393		492		664		1045
	F	922	60	78		61		134		85		234
2nd Cycle	T	1920	-	433		-		509		-		460
	M	1588	-	419		-		484		-		433
	F	332	-	14		-		25		-		27
Teacher training (Secondary)		yes	no	no		no		no		no		yes
Technical Education		yes	no	no		no		no		no		no
Higher Education		yes	no	no		no		no		no		no

Source: Ministry of National Education and RAMS.

Education Statistics - Secondary Level By Region (Cont'd)

Region / School Year Ending		Adrar		D. Nouadhibou		Tagant		Guidimaka		Inchiri	Total
		1977	1979	1977	1979	1977	1979	1977	1979	1979	1979
Enrolment	T	598	784	105	218	268	289	145	159	52	12,134
	M		619		166		228		127	39	9,839
	F		165		52		61		32	13	2,295
No. of Instructors	T		32		9		11		6	3	508
National			8		4		9		6	3	134
Foreigners			24		5		2		0	0	374
Students/Teachers Ratio			25		24		26		27	17	52
1st Cycle	T		610		218		-		159	52	8,349
	M		477		166		-		127	39	6,545
	F		133		52		-		32	13	1,804
2nd Cycle	T		174								3,496
	M		142		-		-		-	-	3,066
	F		32		-		-		-	-	430
Teacher (Secondary)			no		no		no		no	no	
Technical Education			no		no		no		no	no	
Higher Education			no		no		no		no	no	

Source: Ministry of National Education and RAMS.

Exhibit 3-11

Specialized Public Education Training Institutions, 1979-1980

	Technical Education	Mamadou Touré	CFAT	ENFVA	ENISF	ENECOFAS	ENA	ENI	ENS
School Population	679	96[a]	200	120	168[b]	127	257	455[a]	209[a]
Enrolment Capacity 1st yr.	150-180	125-150	100	300 50B	120	57	100	-	-
Degree of Enrolment or Capacity of Utilization	low	low	high	low	high	ave.	high	-	-
Length of Studies	1x3 yrs 2x4 yrs.	9 mos.	2 yrs.	2x3 yrs.	2-3 yrs.	2or3 yrs.	2-4 yrs.	1-5 yrs.	2x2 yrs.
Ratio of Students/ Teachers	1°level 11 2°level 6	-	-	-	-	-	-	-	-
		-	-	10	-	9	12	14[a]	7.7[a]
Female Participation %	0.0	-	100.0	0.0	-	-	10.1	8.8[a]	7.2[a]
Cost per Student (000 UM)	110.9	126.0	-	391.7	48.0	129.9	188.3	138.2	301.0
No. of Teachers	78	12	-	12	-	14	21	33[a]	27[a]
% Nationals	7.7	21.4	-	50.0	-	7.0	4.8	15.1	3.7
% Foreigners	92.3	78.6	-	50.0	-	93.0	95.2	84.9	96.3
Graduates	62[a] CAP 17 BAC	96[a]	-	15C[a] 28B	-	-	129[a]	162[a]	28[a]

a) 1978-79 b) 1977-78

CFAT - Centre de Formation de l'Artisanat de Tapis
ENFVA - Ecole Nationale de Formation et de Vulgarisation Agricole de Kaédi
ENISF - Ecole des Infirmiers et de Sages-Femmes
ENECOFAS - Ecole Nationale d'Enseignement Commercial, Familial et Social
ENA - Ecole Nationale d'Administration
ENI - Ecole Normale des Instituteurs
ENS - Ecole Normale Supérieure

Source: Ministry of National Education and RAMS.

193X

3.4 Non-Formal Education

For a good overview, see RAMS report Non-Formal Education, S3-3 in particular Table 1 "Types of Non-Formal Education Directly Linked to Productive Work", which groups activities by the following categories: agriculture, herding, fishing, rural development training, water resources, management, cooperatives, housing, crafts, vocational training, tertiary and government, maternal and child care, nutrition, public health, as well as adult literacy and envi- environmental protection. Religious and cultural activities are also covered. For each activity there are data on clients, trainers and location.

RAMS 1979 Skills Survey

The survey consisted of a series of questionnaires (for methodology, see Annex A) designed to assess the qualifications or skills of people in traditional occupations. It covered over 1,000 cultivators, herders, shopkeepers, craftsmen, fishermen and women in 38 villages spread over the country. The questions focused on:

- what the general nature of existing skills is, including type of technology used, management procedure and financing.
- the means by which skills are gained and transmitted, including the influence of family background, schools, training centers and extension services.
- the felt needs of the members of each socio-professional group.

The main results are presented in the form of summary "profiles" of each group. For further details see Non-Formal Education report.

Exhibit 3-12

Profile of Herders, 1979

Importance of Various Factors

	Response[a]
Meat Production	
Unfattened slaughter-aged animals	++
Fattened	++
Unfattened uncastrated animals	+
Fattened castrated	++
Methods of Fattening	
Complementary feeding	++
Use of natural forage	+++
Sale of Animals	
To the butcher	+
Private persons	+
Setting of Price	
Estimated weight	+++
Measured weight	+
Other means of appraisal	++
Exploitation and Organization Degree	
Herding only	+++
Supplementary feed	+
Production of human food	++
Professional Organization Credit	
Membership in a professional organization	+
Knowledge of the Mauritanian Development Bank (BMD)	+
Access to representative of the BMD	+
Knowledge of how to obtain a loan	+
Use of a ledger to record income and expenses	+
Acquisition of Knowledge	
Observation of parents(in childhood)	+++
Alone	+
With parents	++
Training center or school	-
Livestock service agent	-
Actions of Livestock Agents	
Visits by livestock agents: once a month	+
once a year	+++
never	++
New techniques brought by agents: Yes	++
No	+++
Demonstrations	+
Conferences	+
Talks	+
Useful advice: Yes	++
No	+
Herders applying this technique	+

195X

Profile of Herders, 1979 (Cont'd)

	Response[a]
Vaccination	
Modern Medicine received	+
Herders who own vaccinated cattle	+++
Herders believing in efficiency of vaccination	+++
Herders believing in efficiency of medicine	+
Felt Needs	
Improved yearlings	+
Means of improving the herds(technical advice)	+++
Producers organizations(cooperatives)	+
More services	++
Training	+
No. of respondents	107

a) - represents no (0) respondents
+ represents 1-25% respondents
++ 26-50%
+++ 51-75%
++++ 76-100%

Source: RAMS 1979 Skills Survey

Exhibit 3-13

Profile of Cultivators, 1979

Importance of Various Factors

	Hchr	Hghb	Assb	Gorg	Brak	Trar	Adr	Tagt	Guid	Inch	Nat'l
Tools											
Hoe	++++	++++	+++	++++	++++	++++	++++	++++	++++	++++	++++
Spade	-	+	++	+	+	+++	++++	+++	+	++++	++
Garden tools	-	-	+	+	+	+	+++	+	+	++++	+
Others	+	+	+++	+	++	+	+++	++	+++	+	++
Plow	+++	-	-	+	-	+	+	-	+	-	+
Seeder	-	-	-	+	-	-	+	-	+	-	+
Cultivator	+	-	-	-	-	-	+	-	+	-	+
Cart	-	-	-	+	-	+	+	-	+	-	+
Work											
Use of manure	++++	+	+++	+	+	+	++++	+++	+	++++	+
" Fertilizer	-	+	-	++	-	-	-	-	-	++	-
" Pesticides	-	-	+	++	+	+	+	+	++	-	+
Best period to prepare ground indicated by:											
Yourself-											
to sow	++++	++++	++++	++++	++++	++++	++++	++++	++++	++++	++++
to hoe	++++	+++	+++	++++	++++	++	++++	+++	+++	++++	++++
Village chief											
to sow	+	+	-	+	-	-	-	-	+	-	+
to hoe	+	+	-	+	-	-	-	-	+	-	+
Storage-											
granary	++++	+++	+	+++	+++	++	-	+	+++	+	++
Bags	++	++	+	++	++	+	++	+	+	-	+
Silo	+	+	-	+	+	-	-	-	-	-	+
Other	-	-	+++	+	+	+	+	++++	+	++	+
Finance/Prof. Organisation											
Receipt/expense book	-	-	-	-	+	-	+	+	-	+	+
Cooperative	+	-	+	+	+	+	++	++++	++++	++++	++
Profess.Groups	-	-	-	+	+	+	+	+	+	+	+
Production Assoc.	-	-	-	+	+	-	+	+	+	+	+
Know of BMDC	-	+	++	+	+	+	++	+	+	+	+
Know how to get loan	-	-	-	-	-	-	+	+	+	+	+
Acquisition of Knowledge											
Own radio	+++	+	++	+++	++	++	++	+++	++	++++	++
Listen to agr. programs	++	++	++	++	+++	++	++	+++	++	++++	++
Apprenticeship											
With parents	++++	+++	+++	++++	++++	++++	++++	++++	++++	+	++++
Working alone	+	+	++	+	+	+	++++	+	+	++++	+
Agr. extension in village											
Demonstration	+	+	-	+	+	+	-	+	+	+	+
Talks	-	-	-	+	+	+	+	+	+	+	+
Meetings	+	+	-	+	+	+	-	+	+	++	+
Films/slides	-	-	-	-	+	-	-	-	-	-	-

197X

Profile of Cultivators, 1979 (Cont'd)

	Hchr	Hghb	Assb	Gorg	Brak	Trar	Adr	Tagt	Guid	Inch	Nat'l
Felt Needs and Wants											
Technical advice	+++	++++	+++	+++	+++	+++	+++	++++	+++	++++	+++
Seed/Fertilizer	++	++++	++	+++	++++	+++	++++	++++	+++	++++	+++
Commercial Organisation	++	+++	++	++	+	+	+	++++	+	++	++
Training/ Education	++	+++	++	++	++	+	+	+++	+	++	-+
Modern tools/ materials	+++	++	++++	++++	++++	++++	++++	++++	+++	++++	++++
Easier credit	++	++	+++	+++	+++	++	++++	++++	+++	++++	+++
Cooperatives	++	++	++	+++	++	++	-	++++	++	++++	++
No. of Respondents	11	26	18	74	78	29	25	21	94	18	389

a)- represents no (0) respondents
+ represents 1-25% respondents
++ 26-50%
+++ 51-75%
++++ 76-100%

Source: RAMS 1979 Skills Survey.

Exhibit 3-14

Profile of Shopkeepers, 1979

Importance of Various Factors

		Response[a]
Material used in the trade		
	Scales	++++
	Meter stick	++++
	Calculator	+
	Cash register	+
Accounting	Yes	++
	No	++
	Day-book	+
	Daily transactions record	+
	Ledger	+
	Stock control book	+
Accounting expenses	Yes	++
	No	+++
	Done by themselves	+
	Done by another person	+
Calculation of Selling Prices		
	Cost price and Profits	+++
	In relation to prices charged by other shopkeepers	+
	According to demand	+
	Others	+
Calculation of the cost price		
	Buying price and expenses	++
	others	+
How do you buy		
	Without a bill - cash	++
	- check	-
	- drafts	+
	- other	+
	With a bill - cash	++
	- check	+
	- drafts	+
	- other	-
Acquisition of knowledge		
	working with parents	++
	observation of parents	++
	working alone	+++
	in a school	-
	as an apprentice	
	other means	
Aid received during Training		
	by the State	
	by employer	
	by parents	
	scholarship	
	salary	
	payment in kind	

199X

Profile of Shopkeepers, 1979 (Cont'd)

	Response[a)]
Complementary activities	
Yes	++
No	+++
Herder	+
Farmer	++
Artisans	-
Others	+
Felt Needs	
Technical advice	++
More modern material	++
Rational methods of management	++
Credit	++++
Improved delivery of supplies	++++
Professional organization	++
Training	+
Number of respondents	62

a) - represents no (0) respondents
+ represents 1-25% respondents
++ 26-50%
+++ 51-75%
++++ 76-100%

Source: RAMS 1979 Skills Survey

Exhibit 3-15

Profile of Craftsmen, 1979

Importance of Various Factors

	Hodha.	Assb.	Gorg.	Brak.	Trar.	Adr.	Tagt.	Guid.	Inch.	National
Tools										
Tradit'l Handtools	+++	++	+	++	++	++	++	++	+++	++
Modern Handtools	+	++	+	+	+	+	+	+	++	+
Machines	- +	-	+	+	+	+	-	-	-	+
Manpower Used										
Artisans working alone	++++	++++	+++	+++	+++	++++	+++	+++	++++	+++
Permanent employees	-	-	+	-	-	-	-	+	-	+
Jobbers	-	-	+	-	-	-	-	-	-	+
Occasional help	+	-	-	+	-	-	-	-	-	+
Apprentices	++	+	+	++	-	-	+	-	-	+
Family members	-	-	+	+++	+	-	-	-	-	+
Professional Organizations										
Don't know of any	+	++	++++	+++	++	++	++++	+++	+++	+++
Mutual aid	- ++	++	+	+	+	+	-	-	-	+
Supply of materials	+++	+++	+	+	++	++	-	-	-	+
Training	- +	++	-	-	-	+	-	-	-	+
Loan of materials	++++	+	-	+	++	+	-	-	-	+
Marketing of products	+++	+++	-	++	-	++	-	-	-	+
Monetary loans	-	-	-	-	++	-	-	+	-	+
Skill Acquisition										
In childhood (obs. of parents)	++	++++	++	+++	+++	++	++++	+++	++++	+++
With parents	++	++	+	+++	+++	++++	++	++++	-	++
Alone	++	+	+	+	+	+++	+	+	+	+
Training Center	-	-	+	-	-	-	-	-	-	+
In school	-	-	-	-	-	-	-	-	-	-
Apprenticeship(with a master)	+	+	++	++	-	+	-	+	-	+
Additional Skills										
Commerce	+	+	+	-	-	+	-	-	-	+
Fishing	-	-	+	-	-	-	-	-	-	+
Farming	+	-	+++	++	-	+	+	+++	-	++
Herding	++	-	-	+	-	-	-	+	-	+
Other Crafts	-	-	+	++	-	+	-	-	-	+
Laborer	-	-	+	++	-	-	-	+	-	+

201X

Profile of Craftsmen, 1979 (Cont'd)

	Hodhs.	Assb.	Gorg.	Brak.	Trar.	Adr.	Tagt.	Guid.	Inch.	Nati
Felt Needs										
Technical advice	+++	++++	++	++	+	++++	++++	++	+++	
Modern materials	++++	++++	+++	++++	+++	++++	++++	+++	++++	
Easier credit	++	++++	++	+++	++	++++	++++	++	++++	
Profess. Organisation	++++	++++	++	++	++	++	++++	++	+	
Commerc. Organisation	++++	++++	+++	+	+	++++	++++	++	+++	
Practical education, training	+++	++++	+	++	+	+	++++	++	+++	
Number of Respondents	28	17	52	14	8	17	19	11	15	

- represents no (0) respondents
+ represents 1-25% respondents
++ 26-50%
+++ 51-75%
++++ 76-100%

Source: RAMS 1979 Skills Survey

Exhibit 3-16

Profile of Fishermen, 1979

Importance of Various Factors

Fishing Methods	TRARZA Coastal Fishing	BRAKNA-GORGOL Inland Fishing	NATIONAL
Fishing materials			
Net or weir	-	+++	++
Fishing line	++	++++	+++
Seine	+++	+	++
Casting net	+++	+++	+++
Square net	-	+	+
Canoe	++++	+++	++
Canoe with outboard motor	+++	-	++
Other means	++	-	+
Acquisition and Maintenance of Fishing Materials			
Personal production	+++	+++	+++
Bought from a craftsman	-	-	-
Bought from a trader	++++	+++	++++
Recycling	+	+	+
Personal work	++++	++++	++++
Recourse to a specialist	+++	-	++
Methods of Drying Fish			
On the sand under the sun	+	++++	++
On wire screen	++	+	+
In charcoal dryers	-	+	+
Training of Apprentices			
Yes	++++	+++	+++
Means of Determining the End of Apprenticeship			
After a test	+	-	+
After a predetermined time	+	-	+
Others	++	++	++
Existence of Professional Organisations			
Yes	++	-	+
No	++	++++	+++
Don't know	+	+	+
Membership	++	-	+
Supplies	+	-	+
Training	++	-	+
Loans of money/materials	++	-	+
Marketing	+	-	+
Other uses	+	-	+
Acquisition of Knowledge			
Watching a relative work	+++	+++	+++
Working with parents	+++	+++	+++
Working alone	-	-	-
In a training center	-	-	-
In school	-	-	-
With a master	+	-	+
Other means	-	-	-

Profile of Fishermen, 1979 (Cont'd)

	TRARZA Coastal Fishing	BRAKNA-GORGOL Inland Fishing	NATIONAL
Complementary or Supplementary Activities			
Traders or trader's assistant	+	-	+
Artisan	-	+	+
Farmer	++	++	++
Herder	+	-	+
Worker in a city	+	-	+
Others	+	+	+
Fishermen Felt Needs			
Technical Advice	++	+	+
Modern materials	++	++++	+++
Credit	+++	+++	+++
Commercial Organisations	++	+++	++
Practical training/ Education	++	+	+
Number of respondents	11	11	22

- represents no (0) respondents
+ represents 1-25% respondents
++ 26-50%
+++ 51-75%
++++ 76-100%

Source: RAMS 1979 Skills Survey

Exhibit 3-17

Profile of Women, 1979

Importance of Various Factors

	Hodhs.	Assb.	Gorg.	Brak.	Trar.	Tagt.	Guid.	Inch.	Nation
Child Care									
Illness									
Take children to:									
Traditional healer	+++	+++	+	+	+	++++	++	++++	++
PMI	++	++	+	+	++	++	+	+++	++
Doctor	+	++	++	+++	++	++	++	+++	++
Hospital	+	+	++	-	+	+	++	++	+
For diarrhea give:									
Extra water	++	+	++	+	++	+++	+	+++	++
Ganidan	-	+	++	-	+	+	-	-	+
Charcoal	-	+	+	-	+	+	-	+	+
Other remedy	++++	++++	++	+	++++	++++	++++	++++	+++
Daily Care									
Have water to bathe children									
Bathe children daily	+++	+	+++	++	++	++	++++	++	+++
Education of Children									
Responsible for raising girls	+++	+++	+++	++++	++++	+++	++++	+++	+++
Boys	++++	+++	+++	+++	++++	+++	++	+++	+++
Educate girls at home	+	-	+	+	-	-	+	-	+
Educate boys at home	+	-	+	+	-	-	+	-	+
Do not send girls to school	+	++	+	+	+	+	+	+	+
Do not send boys to school	+	+	+	+	+	+	+	+	+
Send girls to Koranic school	+	++	+	+	++	++	+	+	+
Send boys to Koranic school	+	+	+	+	++	++	+	+	+
Send girls to primary school	+	++	+	+	+	+	+	++	+
Send boys to primary school	+	+	+	+	+	++	+	++	+
Non-Household Tasks									
Teach the Koran	+	-	+	-	+	-	-	-	
Work in the fields	+	-	+	++++	+++	+	++	+	+
Craft production	+	+	+	-	+	+	+	+	
Commercial Activity									
Commerce									
Sale of Home-made goods	-	-	-	-	+	+	-	+	
Home grown items	++	+	+	+	+	+	+	+	
Purchased items	+	+	+	-	+	+	+	+	

205 X

Profile of Women, 1979 (Cont'd)

	Hodh.	Assab.	Gorg.	Brak.	Trar.	Tagt.	Guid.	Inch.	National
Skills Acquisition									
Family	+	++	++	++++	+++	+++	++++	++	++
Alone	+	+++	+	+	+	++	+	+	+
School	-	-	+	-	-	-	-	-	+
Training center	-	-	+	-	-	-	+	++	+
Number of Respondents	32	9	139	29	40	10	22	37	318

- represents no (0) respondents
+ represents 1-25% respondents
++ 26-50%
+++ 51-75%
++++ 76-100%

Source: EAMS 1979 Skills Survey

Exhibit 3-18

Institutional Summary of Programs in Non-Formal Education

According to Administrative Affiliation of Sponsors

A. Government of Mauritania

. Rural Development Services
- Agricultural Extension Service
- Livestock Service
- Environmental Protection Service
- Cooperatives Service
- SONADER
- Water Resources Service (Service de l'Hydraulique)

. Public Health Department
- Hospitals (certain cases)
- Dispensaries (certain cases)
- Maternity Clinics (certain cases)
- PMIs (Mother and Child Protection Centers) (certain cases)
- CRNs (Nutritional Recovery Centers) (certain cases)

. Ministry Education (adult literacy)

. Ministry of Culture, Youth and Sports (National Library, Museum, Sports program)

B. Autonomous Public Agencies

. SNIM (National Mining and Industrial Company)
- Industrial Training Centers

. SONELEC (National Electricity Company)
- Worker Training Centers

C. Private Companies, Modern Sector

. Apprenticeships

. On-the-job-training

. Counterpart training (for Mauritanization)

D. Traditional and Non-Structured Sector

. Apprenticeships

E. Indigenous Systems and Organizations with Little or No Government Assistance

. Mahadras: (Traditional Islamic learning primarily for adolescents and young adults. Some teaching of "modern" subjects in the larger ones. Certain Mahadras receive a small subsidy from the Ministry of Justice and Islamic Affairs).

- Ecoles Ban Ameur: (Traditional Islamic learning oriented to native Arabic speakers taught in classical Arabic. Some 143 schools in the country, 3 of which in Nouakchott, rest in the rural sector. Appear to have highest female enrolment figures of any coeducational institution. Some teaching of "modern" subjects).

- Ecoles Fellahia: (Transitional schools offering Islamic learning as well as "modern" subjects to youth and adults).

. Délégués Sanitaires (Community Health Workers)

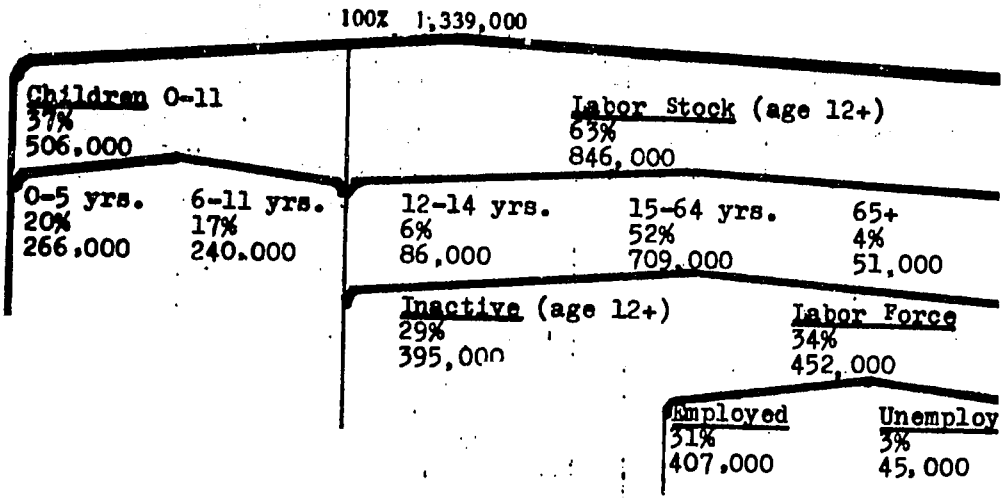
. Non-formal Private Schools (mainly urban, giving literacy in French or Arabic as well as tutoring to those who tend to take exams for the formal educational system; no government subsidy).

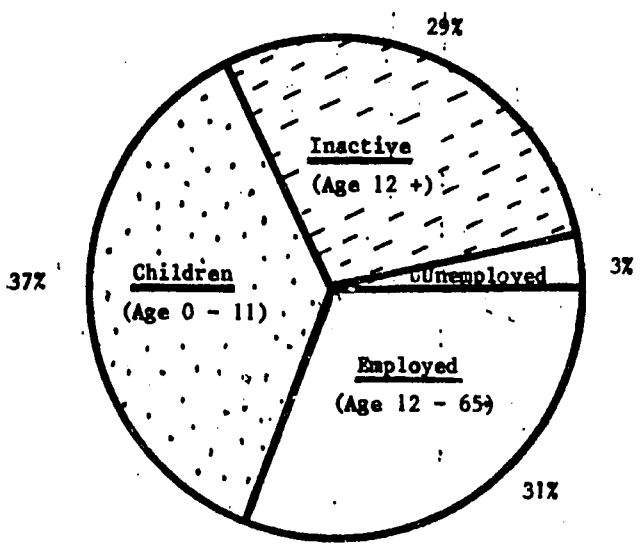
3.5 Manpower and Employment

Exhibit 3-19

Population Breakdown — 1977

Showing Employment Breakdown





Source: BCR, 1977 Census provisional figures and RAMS calculations.

Exhibit 3-20

Sedentary Labor Force by Economic Sector and Rural/Urban 1977

Sector	Rural Sedentary %	Urban %	Total Sedentary %
Agriculture	59.3	7.3	47.5
Industry	0.3	3.0	1.3
Crafts	3.5	5.3	4.0
Administration Communication	0.5	6.4	2.5
Public Works and Construction	1.4	13.1	5.5
Commerce and Transport	7.1	22.0	12.4
Skilled Workers and Technicians	0.2	1.6	0.7
Security Forces	4	7.3	5.3
Services, Social and Miscellaneous	5.6	14.0	8.5
Apprentices, Retirees, Unskilled Workers	8.2	20.0	12.3
	100%	100%	100%
Total Employed	195,000	106,000	301,000
Unemployed	9%	24%	14%

Labor Force: Employed and unemployed, figures rounded.

Source: BCR 1977 census provisional figures.

Exhibit 3-21

Sedentary Labor Force by Employment Type 1977 (%)

	Rural %	Urban %	Total %
Wage earners	10	45	22
Dependent workers[a]	5	3	4
Independent workers[b]	46	26	39
Owner-proprietors	0.1	0.3	0.2
Family workers[c]	30	2	20
Total employed	91.1	76.3	85.2
Unemployed	8.9	23.7	14.8
Total	100	100	100
Number	195,000	106,000	301,000

a) Unsalaried, non-family servants and apprentices.

b) Self-employed without salaried employees

c) Unsalaried, regularly working in professional capacity (i.e. excluding chores) for another family household member.

Figures rounded.

Source: BCR 1977 census, provisional figures.

Exhibit 3-22

Sedentary Labor Force in 1977 by Educational Background and Economic Sector

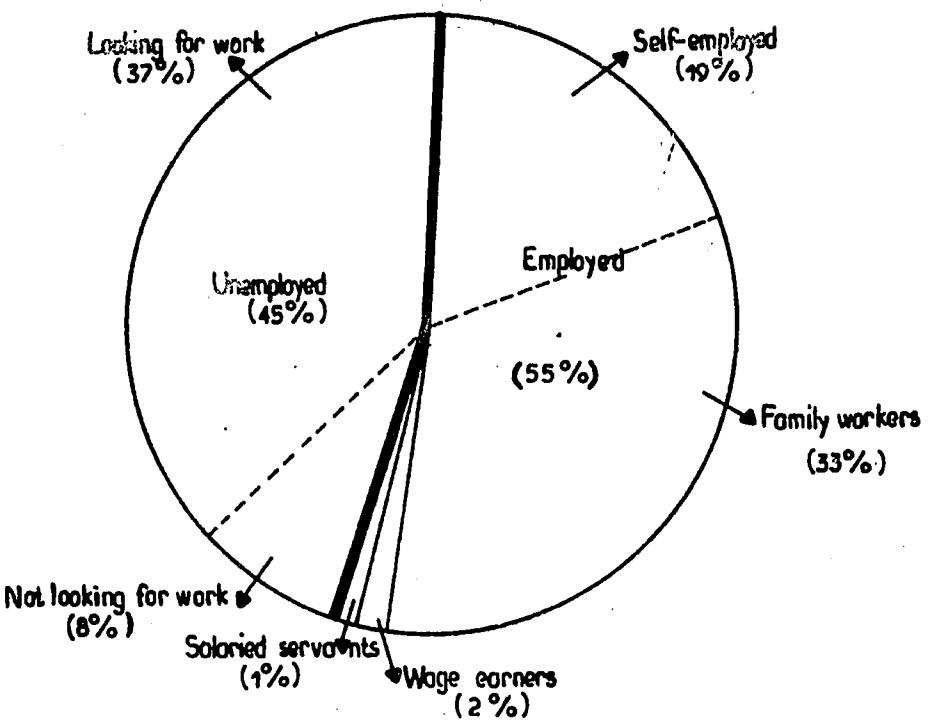
(000)

Economic Sector \ Educational Level	No Education	Traditional	Formal Education Primary	Secondary	Tech. Prof.	Total
Agriculture	128.2	13.0	1.8	.1	0	143.0
% by education level	(91)	(9)	(1)	(.1)	(0)	(100.0)
Extractive Water/Electric.	3.7	.6	1.8	1.4	.2	7.8
% by education level	(48)	(8)	(23)	(18)	(3)	(100.0)
Modern Mfg.	1.0	.2	.2	.1	.0	1.5
% by education level	(66)	(11)	(12)	(10)		(100.0)
Craft Mfg.	10.7	2.0	.7	.1	0	13.5
% by education level	(79)	(15)	(5)	(1)	(0)	(100.0)
Const. & Public Works	8.3	.9	1.1	.2	.2	10.7
% by education level	(77)	(8)	(11)	(2)	(2)	(100.0)
Commerce Rest. Hotels	16.9	10.2	1.5	.6	.1	29.2
% by education level	(58)	(35)	(5)	(2)	(.2)	(100.0)
Transp. & Commu.	3.3	.4	1.0	.4	.1	5.2
% by education level	(63)	(8)	(20)	(8)	(.1)	(100.0)
Gov't Finan. Inst.	12.4	2.9	7.4	5.0	2.3	29.9
% by education level	(41)	(10)	(25)	(17)	(8)	(100.0)
Household & Business Serv.	19.3	2.3	1.2	.2	.0	23.0
% by education level	(84)	(10)	(5)	(1)	(.1)	(100.0)
Not elsewhere classified	27.0	5.8	3.5	.8	.0	37.2
% by education level	(73)	(16)	(9)	(2)	(.1)	(100.0)
Total	230.8	38.3	20.2	8.9	2.9	301.2
% by education level	(67)	(13)	(7)	(3)	(.1)	(100.0)

Source: BCR, 1977 Census provisional figures, rounded.

Exhibit 3-23

Distribution of the Sedentary Labor Force Between Employed and Unemployed

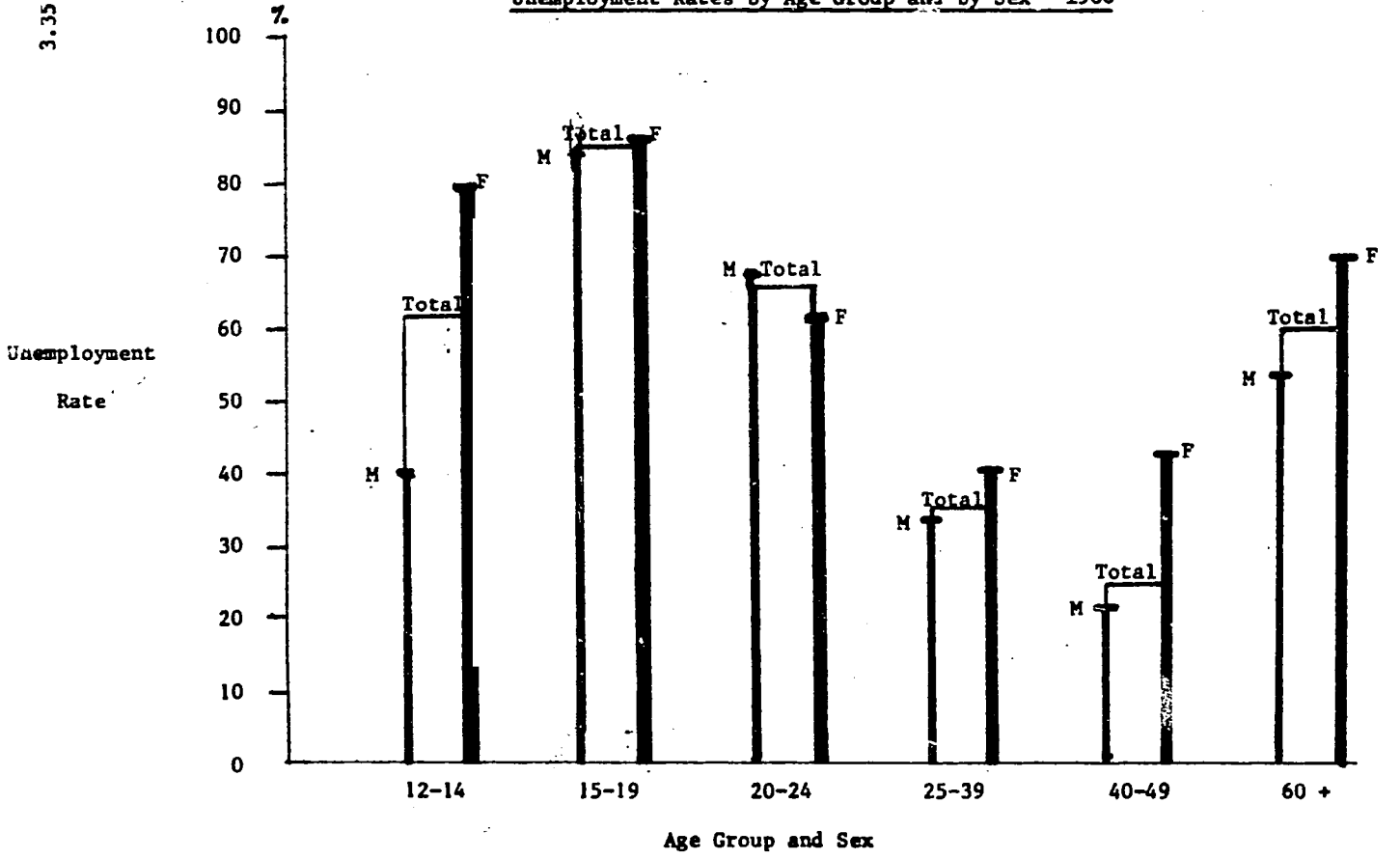


Employment survey covered some 800 predominantly urban households. See Annex A for description.

Source: RAMS 1979 Employment Survey

Exhibit 3-24

Unemployment Rates by Age Group and by Sex - 1980



Source: RAMS Employment Survey

Exhibit 3-25

Sedentary Population Employed in 1977 by Educational Background and Occupational Group

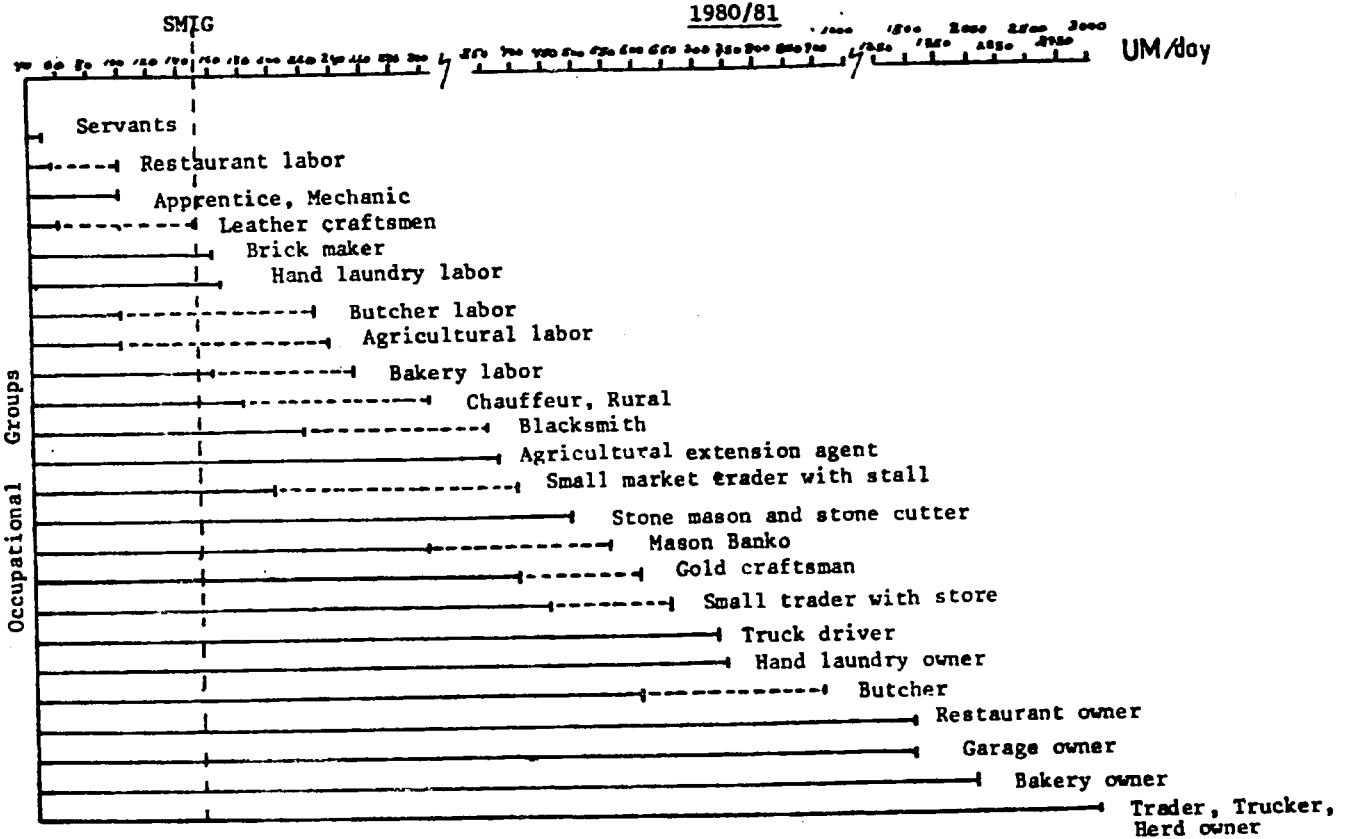
Occupational Group	Illiterate and no occup.	Trad'l	Formal Education: Primary	Secondary	Tech./Prof.	Total
Agriculture (000)	132.4	8.3	1.3	.0	.0	142.1
% by educ. level	(65)	(27)	(9)	(.6)	(.3)	(54)
Industry (000)	1.9	.5	.6	.3	.1	3.4
% by educ. level	(1)	(2)	(4)	(4)	(2)	(1)
Artisan (000)	10.1	1.6	.4	.0	.0	12.2
% by educ. level	(5)	(5)	(3)	(.5)	(.1)	(5)
Admin. & Commu. (000)	.9	.8	2.4	2.0	.8	6.9
% by educ. level	(.5)	(3)	(16)	(25)	(27)	(3)
Constr. & Publ. Works (000)	11.1	1.8	1.6	.4	.1	15.0
% by educ. level	(6)	(6)	(11)	(6)	(4)	(6)
Commerc. Transp. (000)	19.9	11.6	3.1	.8	.2	35.6
% by educ. level	(10)	(38)	(21)	(10)	(5)	(14)
Prof. & Tech. (000)	.3	.2	.1	1.2	2.0	2.0
% by educ. level	(.2)	(.5)	(.5)	(15)	(8)	(1)
Armed/Sec. Forc. (000)	5.8	2.9	4.1	1.4	.5	15.7
% by educ. level	(3)	(9)	(27)	(17)	(19)	(6)
Service/Soc. Workers (000)	18.6	3.2	1.3	1.7	1.0	25.8
% by educ. level	(9)	(10)	(8)	(22)	(35)	(10)
Apprent. Retir. and N.E.C.[a] (000)	.3	.0	.1	.0	.0	.4
% by educ. level	(.2)	(.1)	(.5)	(.1)	(0)	(.2)
Total Seden. (000)	202.5	30.8	15.1	7.9	2.8	259.2
% by educ. level	100 %	100%	100%	100%	100%	100%

a) Not elsewhere classified includes those who reported no occupation (mainly inexperienced workers) and those whose responses were illegibly recorded on the survey questionnaires.

Source: BCR 1977 Census provisional figures.

Exhibit 3-26

Salary and Wage Levels for Selected Occupational Groups in the Rural Sector



SMIG: Minimum wages.

----- Range

Source: RAMS field observations, 1980/1981.

Exhibit 3-27

Sedentary Population by Profession - 1977

Profession	% of Workers by Profession		
	Total	Urban	Rural
1. Farmers	24.4	1.3	23.1
2. Others in Agri.	19.7	.4	19.3
3. Retail merchant	8.2	4.3	3.9
4. Houseboys	6.6	3.6	3.0
5. Herders	4.5	.4	4.2
6. Shepherds	4.3	.1	.2
7. Soldiers, policemen	3.8	1.8	.1
8. Drivers, mechanics	2.7	2.4	.3
9. Manual labor in construction	2.6	2.1	.5
10. Guards, militia	1.6	.6	.9
11. Salesmen	1.4	.7	.7
12. Masons	1.3	1.0	.3
13. Leatherworkers	1.2	.3	.9
14. Jewelers	1.1	.4	.7
15. Fishermen	.9	.3	.6
16. Primary school teachers	.9	.5	.3
17. Workers in Personal service	.8	.6	.1
18. Secretaries	.7	.7	.1
19. Clergy	.7	.3	.4
20. Tailors	.7	.6	.1
21. Slaughterers, bakers	.6	.4	.2
22. non-specified industrial labor	.6		
23. Administrative agents and office workers	.6	.5	.1
24. Weavers	.5	.1	.4
25. Wholesaler, merchants, transporter	.5	.3	.2
26. Carpenter	.4	.4	.04
27. Other artisans	.4	.1	.3
28. Orderlies	.4	.4	.05
29. Bookkeepers	.4	.4	.02
30. Dockers, seamen	.4	.3	.04
31. Other construction and public-work workers	.3	.3	.1
32. Agricultural workers in large projects	.3	.1	.2
33. Nurses, Aides and other Health workers	.3	.2	.1
34. Electricians	.3	.3	.01
35. Charcoal producers and Lumber jacks	.3	.1	.2
36. Gardeners	.3	.1	.2

Sedentary Population by Profession (Cont'd)

Profession	% of Workers by Profession		
	Total	Urban	Rural
37. Metal workers	.3	.2	.03
38. Prison workers, detectives	.2	.2	.04
39. Other in services, beggars	.2	.1	.1
40. Construction Apprent. Bulldozer operators	.2	.2	.1
41. Heavy machinery oper.	.2	.2	.03
42. Other industrial workers	.2	.2	.1
43. Peddlers	.2	.1	.1
44. Secondary school teachers	.2	.2	.03
45. Artists, Writers	.2	.1	.1
46. Others in governm. admn.	.2	.2	.02
47. Other in admin. and comm.	.2	.2	.03
48. Office managers	.18	.15	.03
49. Nurses, midwives, Mid level Health workers	.18	.14	.04
50. Painters, glassworkers, plasterers	.17	.17	.01
51. Other apprentices	.16	.13	.03
52. Custom officials	.15	.13	.03
53. Contractors, foremen	.15	.14	.01
54. Radio and telephone Oper.	.15	.13	.02
55. Owners and directors in Commerce and transport.	.14	.08	.06
56. Other in commerce and transportation	.13	.10	.03
57. Architects, techn. engin.	.11	.11	-
58. Other school personnel	.11	.08	.03
59. Agents, sales chiefs	.11	.10	-
60. Economists, accountants	.10	.10	-
61. Nurserymen	.10	.01	.09
62. Pottery workers	.09	.03	.07
63. Industrial foremen	.09	.08	.01
64. Plumbers	.08	.07	.01
65. Armed forces officers	.08	.06	.01
66. High level technicians	.07	.07	-
67. Printers	.07	.06	.01
68. Armed forces staff	.06	.06	-
69. Miners	.05	.05	-
70. Firemen, environmental protection workers	.05	.04	.01
71. Warehousemen	.05	.04	-
72. Armed forces technicians	.04	.04	-
73. Basketmakers	.04	.01	.03
74. Judges, lawyers	.04	.04	.01
75. Tool operators	.04	.04	-
76. Doctors	.03	.03	-
77. Clerks	.03	.02	.01
78. Receptionists	.03	.03	-
79. Artisans of household articles	.03	.02	.01
80. Biologists, agronomists	.02	.02	-

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Sedentary Population by Profession (Cont'd)

Profession	% of Workers by Profession		
	Total	Urban	Rural
81. Tanners	0.02	-	.01
82. Sociologists, anthropolog.	.02	.02	-
83. Chemists, geologists	.02	.02	-
84. Communicators	0.1	.01	-
85. Other professional and technical workers	.01	.01	-
86. Mineral processing	.01	.01	-
87. Insurance, real estate agents	.01	.01	-
88. Hunters	.01	-	-
89. Food processing	-	-	-
90. Retired	-	-	-
91. Others in armed forces	-	-	-
92. Textile workers	-	-	-

Total workers 1977 -- 259,200
Total urban workers-- 80,300
Total rural workers-- 78,900

Source: BCR 1977 census provisional figures.

Exhibit 3-28

Nouakchott Non-Structured Sector Survey - 1980

Business Establishment by Economic Activity[a)]

Commercial Sector		10,131
Food		
Stores	3,002	
Shops	1,460	
Stands	360	
Tables	808	
Vendors	94	
Clothing	1,927	
Hardware	195	
Books and papers	35	
Miscellaneous products cigarette stands, charcoal, mats	2,250	
Artisanal Manufacturing Sector		1,752
Artisan : Wood	162	
Metal	156	
Cloth/textile (tailor, dyeing)	928	
Straw	25	
Leather	76	
Food processing: miller, baker, butcher	263	
Other: jeweler, upholsterer, bricks	131	
Construction[b)]	11	
Service Sector		1,788
Repair and maintenance	352	
Sign painters	3	
Taxi owners[c)]	926	
Miscellaneous personal services	507	
Total		13,671

a) Establishments employing less than 5 workers (estimated).
b) Only establishments with exterior sign of identification. Independent workers with their own tools exist, but could not be located.
c) Number of taxi licences issued as of April 1981, Nouakchott district.

Source: RAMS Survey, 1980.

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Exhibit 3-29

Modern Sector Employment by Economic Sector - 1980

Sector	Employees %	Firms %
Agriculture	1	1
Industry/mining	37	2
Manufacturing	9	16
Crafts	0	0
Construction	16	11
Commerce/hotels/restaurants	10	32
Transport	11	13
Government + financial	13	12
Private	3	13
Total	100	100
Number	156,000	191

Figures rounded.

Source: RAMS 1980 Modern Sector Survey.

Exhibit 3-30

Nomad Labor Force by Economic Sector - 1977

Sector	%
Agriculture	93
(Livestock)	(78)
(Farming)	(15)
Crafts	1
Commerce + Transport	2
Services, Misc.	2
Unemployed	2
Total	100
Number	150,000

Source: BCR, 1977 Census.

Chapter 4: Socio-Economic Data

Table of Contents

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4.1 Overview

Health and nutrition are inter-related factors in the context of a country's socio-economic development. This chapter presents basic data selected to assist in the identification and in the planning of integrated health/nutrition program at the national and regional/ local levels. It begins with a sociological profile of Mauritania's dominant ethnic groups, presented schematically for purposes of simplification.

It concludes with a section on income and consumption which provide data on the purchasing capabilities of rural populations and current consumption patterns which are intended to be used in association with the Nutrition and Health tables.

4.2 Sociology

The diagrams which follow (accompanied by descriptive notes) represent the social structure, the socio-political organization and the socio-economic relationships of the three major ethnic groups of Mauritania: the Moors, the Halpoularen (Toucouleur and Peulhs) and the Soninké. They express generally accepted information for each of these societies. Missing are the nuances, the complexities of the rural-urban relationships, the upheavals of change in all its forms, as well as the changing relationships within and between the different ethnic groups, which cannot be shown schematically. Diagrams should be thought of, therefore, not only as outlines but as memory charts, best understood after reading the literature on the societies considered.

For bibliographic references and analyses on the traditional and changing social groups, see Sociological studies of the RAMS:

I. Sociological Profiles:

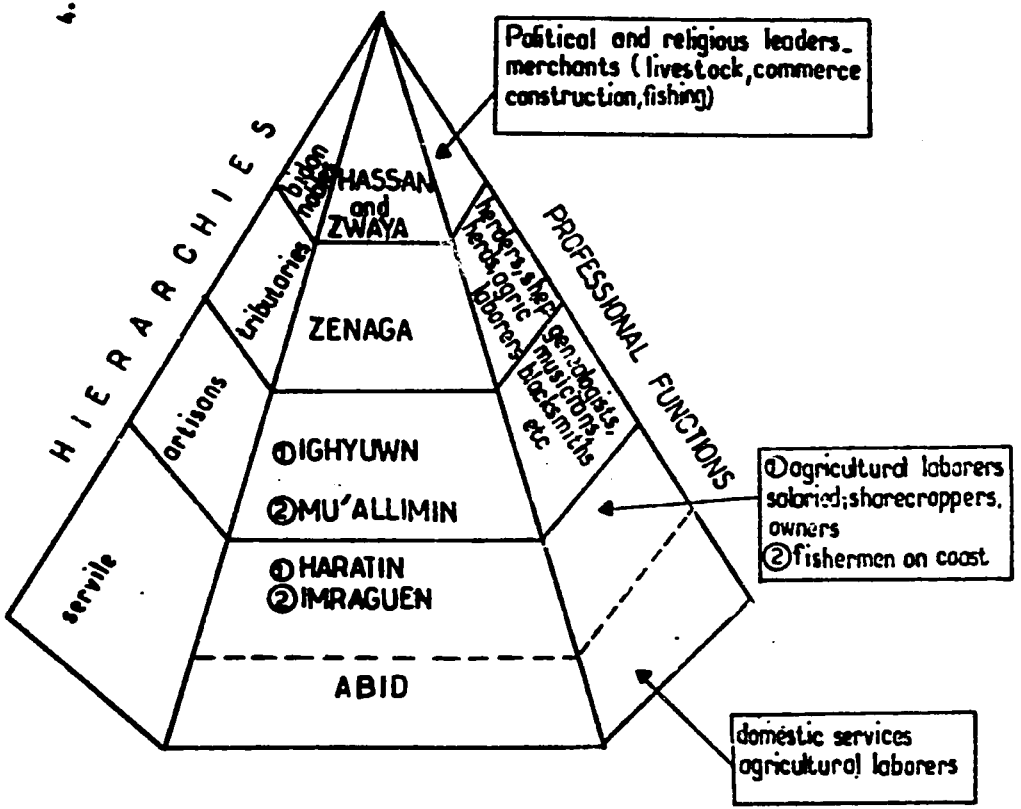
1) The Moors
2) Black-African Mauritania

II. Studies in Social Change:

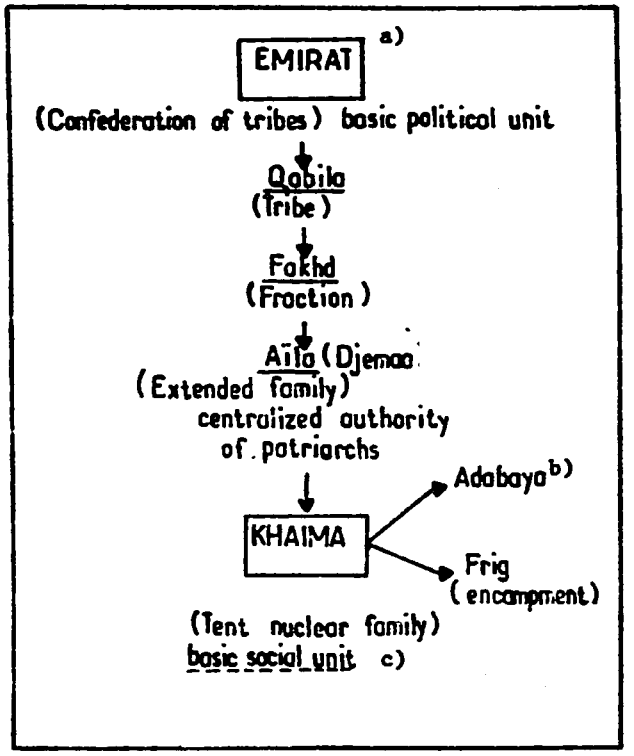
1) Social Organization of Agricultural Production
2) Population Movements and Migrations in Mauritania
3) Evolution of Modes of Accumulation and Social Change
4) The Future of Pastoralism in Mauritania

THE MOORS

Exhibit 4-1



SOCIAL STRUCTURE



SOCIO-POLITICAL ORGANIZATION

a) Personified today in figure of politically strong Emir.

b) A Haratine agricultural village; plural is known as Adouaba.

c) The nuclear family is the most constant characteristic of the Moor family structure, enabling an easier adjustment in moving from rural to urban center. The Haratin who have settled near black African communities tend to create a communal-based social or decision-making organization similar to those of the river peoples.

DIAGRAM OF SOCIO--ECONOMIC RELATIONS OF MOORS

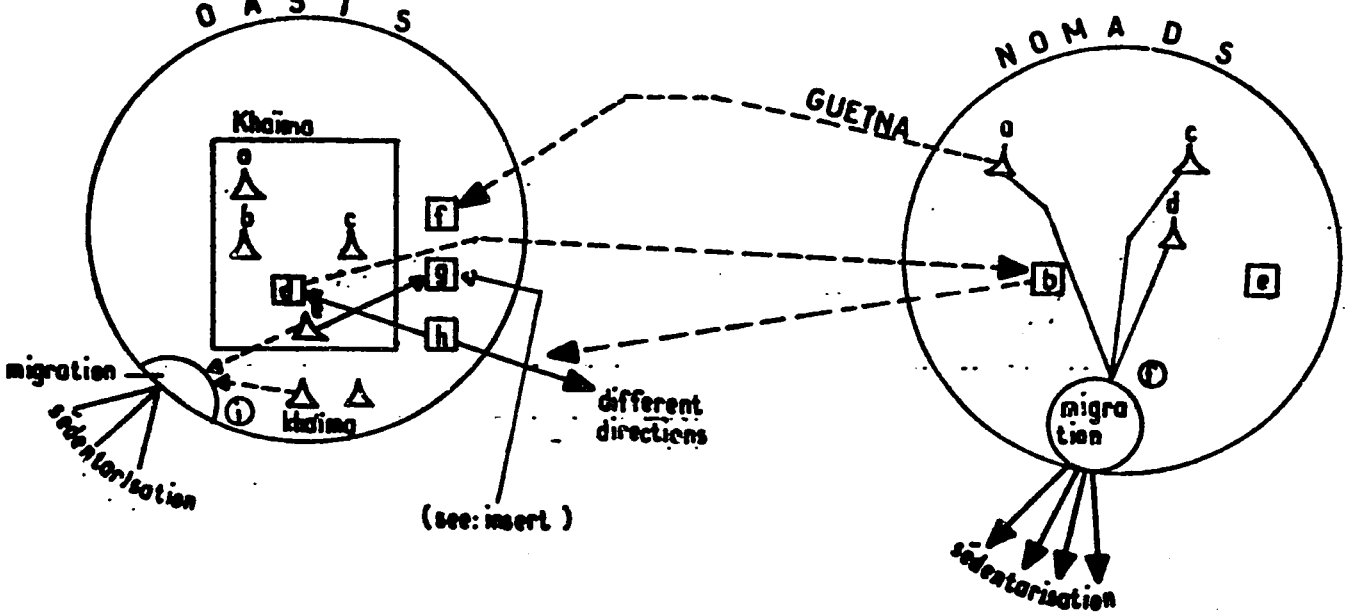


Exhibit 4-3

Notes for Diagram on

The Socio-Economic Relationships of the Moors

Oasis

a) Djemaa: Patriarchs = make all decisions in an encampment.

b) Abid: Servants who are linked to the tent.

c) The woman is owner of the tent and all items in it. She is frequently a merchant. The Bidane woman especially is economically autonomous.

d) Trade: Bidane merchants are also frequently big herd owners.

e) Haratines work the fields. They are those who migrate the most.

f) Palm groves: Majority of owners are Bidanes. Individual ownership exists within clan ownership. The dates are either for home consumption and eaten during the annual guetna cure or are commercialized.

g) Field: Wheat, henna, sorghum. Owned by Bidanes; cultivated by Haratines. Rural exodus of Haratines forces many Bidanes to cultivate.

h) Herds of camels = Bidane owners. Shepherds = poor Bidane or Zenagas. Haratines may own small ruminants.

i) Migration is particularly heavy among Haratine, forcing Bidanes to cultivate.

Nomads

a) Guetna: Annual date cure serving also social and economic functions between groups.

b) Nomads sell camels to merchants of oasis and buy staples (or exchange).

c) Women are in charge of Khaima while men are away on long stretches.

d) Abid: Servants of Khaima.

e) Herds: Owned by Bidane nomads. Milk is never sold but leather is worked and sold by women, both Bidane and Haratine.

f) Migration and sedentarization are intensive and directed towards major roads and urban centers.

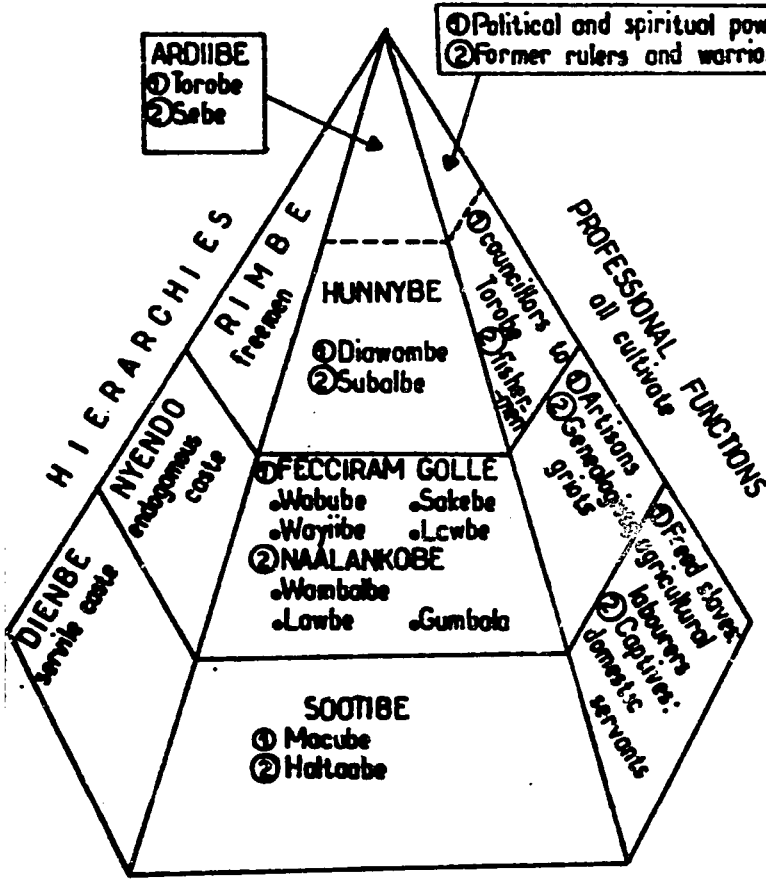
Insert: Land Tenure

- Land is held by majority of Bidanes who cultivate only if destitute.
- Cultivators: Haratines and Zenagas working as sharecroppers or salaried laborers.
- Land, inalienable (habous), is property of clan with individual ownership allowed within clan.
- Tithes vary according to region and clan.
- Traditional ownership rights of palm trees are offered to Haratines.

THE HALPOULAREN

Exhibit 4-4

THE TOUCOULEURS



SOCIAL STRUCTURE OF TOUCOULEURS

THE PEULHS

Walo	Peulhs	Sedentarized (Agriculture_Livestock)
Dieri	Peulhs	Semi-Sedentarized (Agriculture_Livestock)
Foulabes		Transhumant (Herders)

TOUCOULEURS & WALO PEULHS

* Almamy
(elected political chief)
= past political authority
↓
Ardo
(chief of clan)
↓
Pooye
(extended family)
↓
Maodo Ouoro
(chief of village)
= basic political authority to:
Galle
(concession = basic social unit)
↓
Foyre
(nuclear family)

DIERI PEULHS & FOULABES

Galle
(chief)
= central authority in the community
↓
Foyre
(nuclear family)

SOCIO-POLITICAL ORGANIZATION

* These two traditional functions exist no more, having been replaced by government appointed District

Exhibit 4-5

DIAGRAM OF SOCIO-ECONOMIC RELATIONSHIPS OF TOUCOULEUR AND PEULH VILLAGES

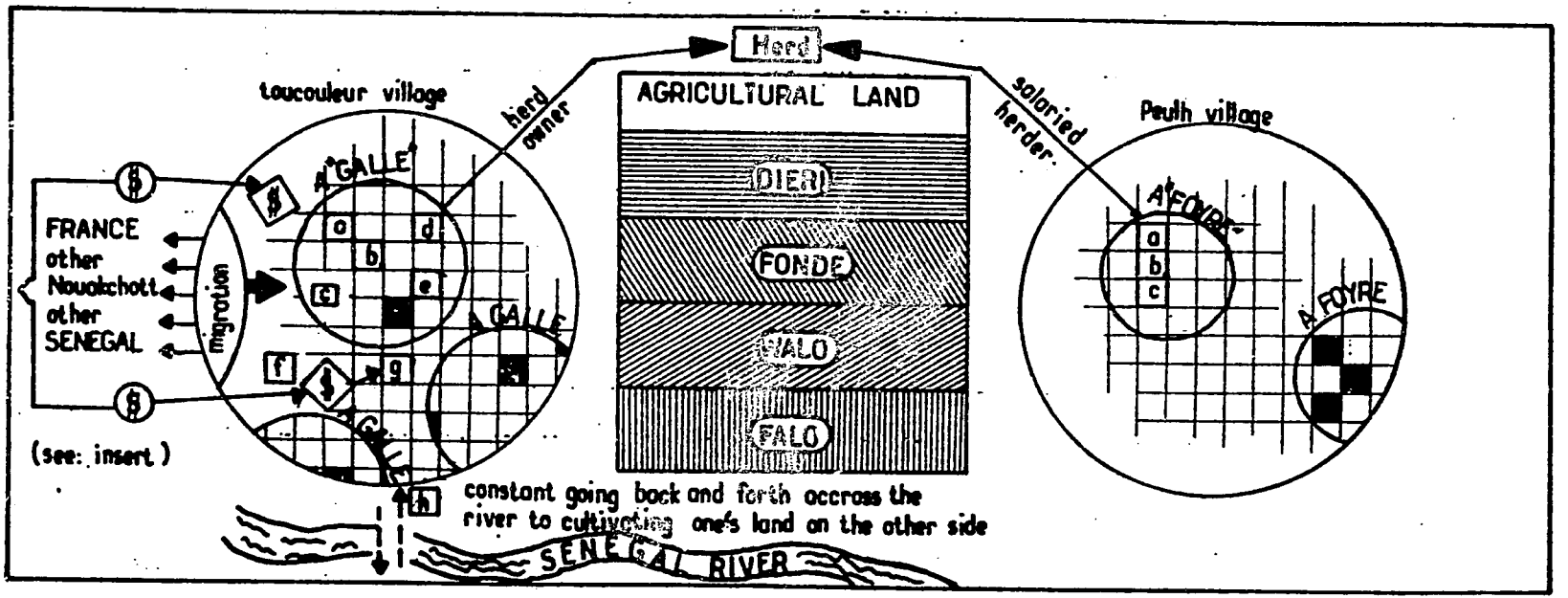


Exhibit 4-6

Notes for Diagram on

the Socio-Economic Relationships of the Toucouleurs and Peulh Villages

Toucouleur

a) Head of foyré = decision-maker in the distribution of food and harvest. Cash coming from migrants goes to the foyré.

b) Chief of concession (gallé) = decision maker in the distribution of land to individual foyrés and in labor on communal land.

c) Artisans and griots = attached to each gallé, they live on commissions. Today, artisans and griots of all ethnic groups have individualized their professions and can live outside the gallé.

d) Herd owner = individual owner of herds who employs Peulh herder as a salaried shepherd for herd.

e) Trader = often a bidan Moor owning a small grocery shop in the village.

f) Cash from migration is channelled to foyré and mosque to the detriment of investment in agriculture.

g) Mosque = most important center of investment, most obvious in village.

h) Traditional frontiers of Fouta Toro have not been destroyed by national frontiers.

Agricultural Land

Dieri = rainfed agriculture land: communal ownership, individual distribution.

Fondé = highland between Dieri and Walo. Land of Fondé and Walo remain uncontested until development actions with irrigation and individualization of land catalyze problems of change. Laborers become owners, such as the Maçube who lost traditional rights of ownership reclaimed by Torobe and Maraboats.

Walo = recession agriculture land. It is communal property of Torobe owners.

Falo = river bank. Property belongs to Subalbe owners who have also traditional rights to fishing.

Peulh

a) Father = herd owner and decision maker in all herd transactions. Since drought and loss of cattle, he works as shepherd for Toucouleur herd owner.

b) Male children = shepherds for family herd; start owning herd at 15.

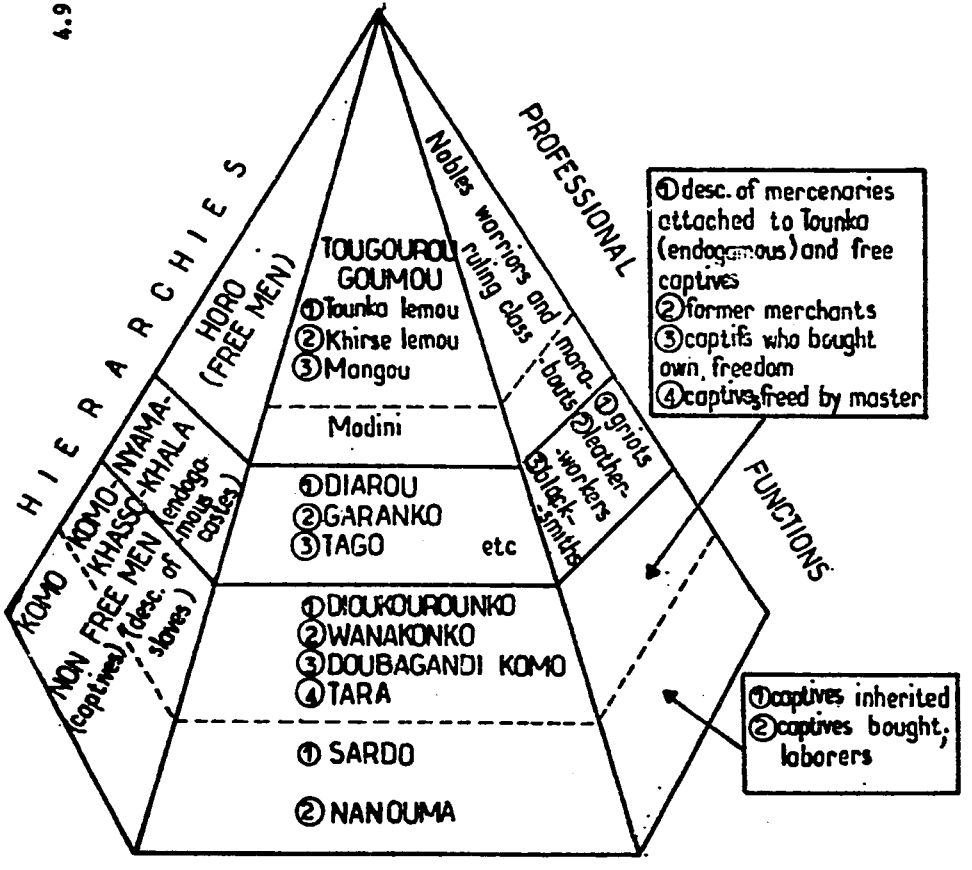
c) Mother and daughters = they have no traditional rights of inheritance in cattle; they trade milk produce and leather.

Insert: Toucouleur Land Tenure

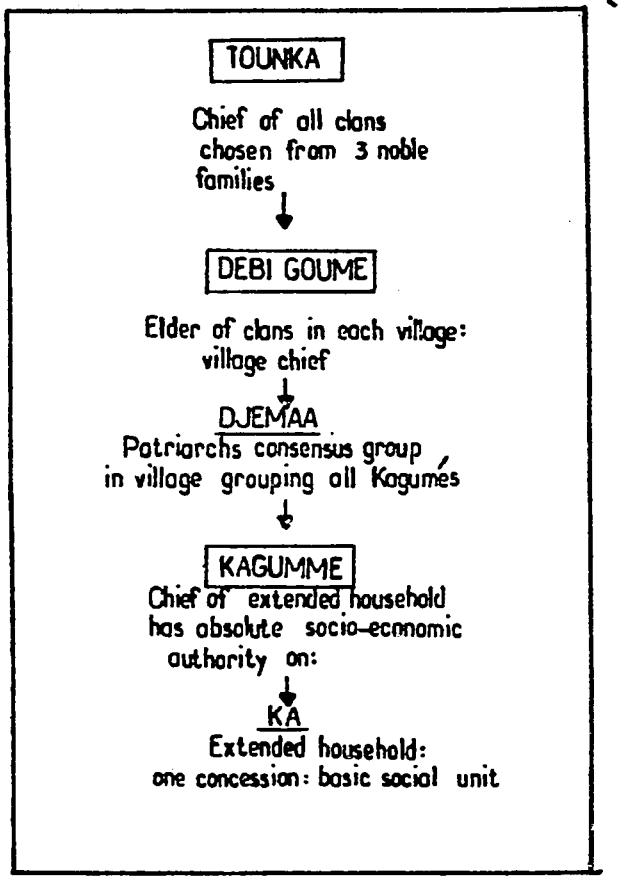
- Sixty percent of the land is held by the Torobés. All classes cultivate but share-croppers and laborers are essentially slaves and ex-slaves.
- Numerous forms of usufruit rights and titles exist according to area.
- Land is inalienable, although a small beginning of selling for construction is found, especially in Dieri and Fondé lands.

THE SONINKE

Exhibit 4-7



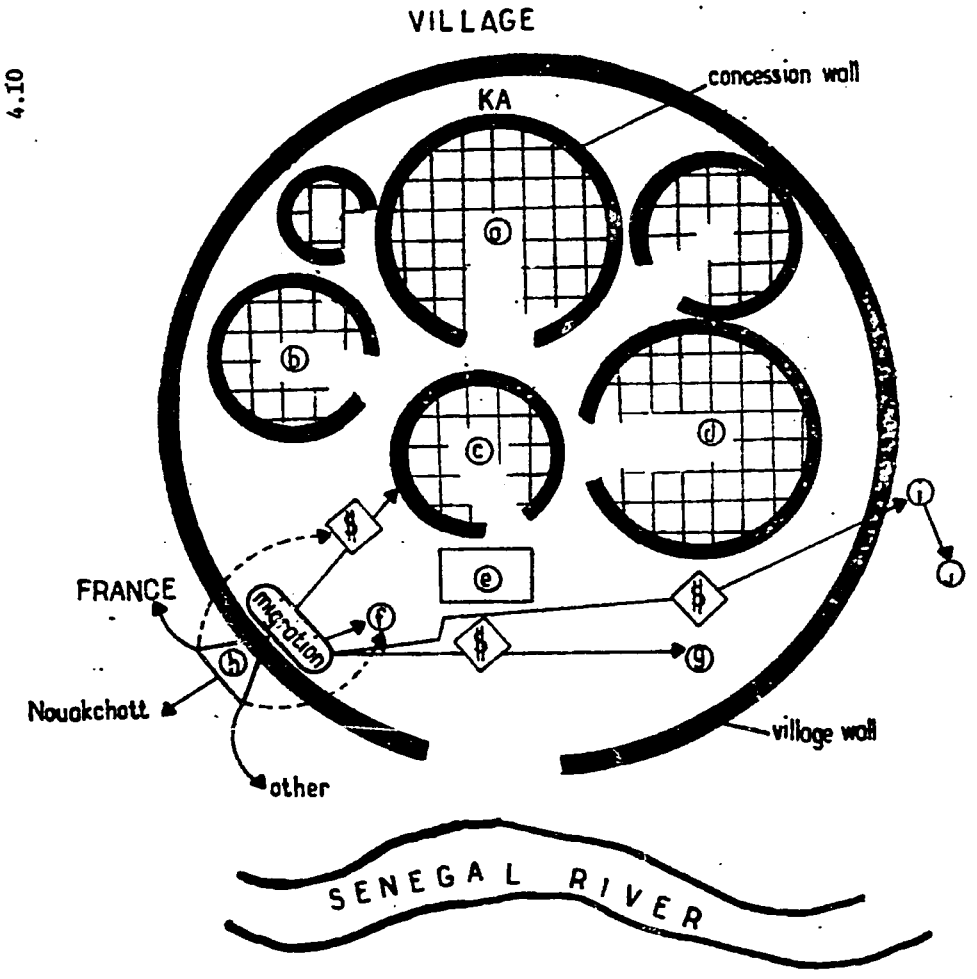
SOCIAL STRUCTURE



SOCIO-POLITICAL ORGANIZATION

Exhibit 4-8

THE SONINKE: SOCIO-ECONOMIC RELATIONSHIPS



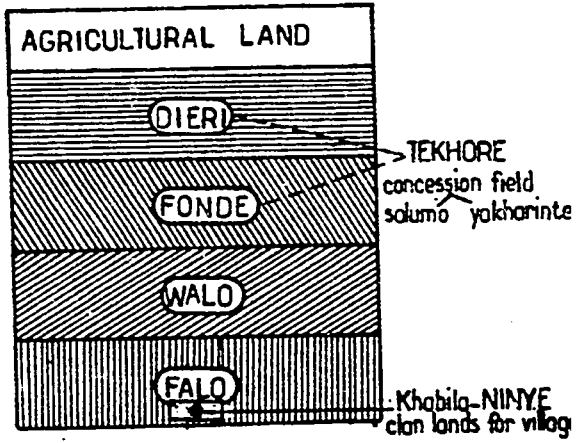


Exhibit 4-9

Notes for Diagram on the Socio-Economic Relationships of the Soninké

The Village

a) A multiplicity of concessions close to each other and surrounded usually by a wall is characteristic of the Soninké village. High population density and concentration of concessions render village a veritable maze and the concession heavily concentrated.

b) Concessions farthest away from center of village belong to slaves; concessions closest to center belong to nobles.

c) Chief's house - the Debigoume - is closest to village center.

d) Head of extended household - Kagummé - has absolute responsibility for distribution of land, labor force, daily food rations, etc.

e) Village courtyard: Djemaa's meeting place.

f) Commerce: Owners are the "Free Men".

g) Mosque: Most important investment target.

h) Migration is very heavy among the Soninké for men of all categories, between 15-45 years old. Return from migration is mandatory. Cash is invested in mosque, family and for individual purposes in commerce and herds.

i) Herd of cattle: New but important form of individual investments.

j) Salaried Peulh herder takes care of Soninké herd.

Agricultural Land

Diéri: Land farthest from village. Usufruit rights for servile classes and castes; ownership: community of nobles. Family fields may exist there or on Fondé.

Household field: Tekhore = cultivated by all members with specific functions according to role and plac held in concession.

Husband's plot: Salumo = for family consumption.

Wife's plot: Yakharinte = (esp. rice and peanuts) also could be in Falo (total economic autonomy).

Fondé: Usufruit rights for most cultivators. Newly reclaimed for irrigated perimeters.

Walo: Does not consistently exist in all of Guidimaka, giving Fondé and Falo greater importance. Ownership: majority of nobles and Marabouts.

Falo: Majority of owners are nobles with servile classes as laborers ("Non-Free").

Land Tenure

- All land is owned by nobles and Marabouts.
- Head of concession has absolute authority on all communal land.
- Land is inalienable and indivisible.
- Tithes vary from area to area.

4.3 Nutrition and Food Requirements

On the basis of its research and sample field surveys, RAMS has made a series of calculations for the nomadic, sedentary rural and urban populations which are shown in the following tables. Coverage includes:

1. Food Ration

The national food balance sheet, which takes into account domestic production, imports, exports and deductions due to losses, seed and set-asides for animals, indicates that the current average food intake in Mauritania is 2,200 K calories per person per day. The level has increased in recent years (expressed in K calories):

1974	1,921
1975	1,938
1976	1,971
1978	2,167
1979	2,223

Apparent food consumption, measured by weight during RAMS Household Consumption Surveys over a one-year period (3 technical observations, yielded the data shown in Exhibit 4-10). The term "apparent" is used because left-overs were not weighed after meals.

There are of course, variations from the average among different ethnic groups, even among the sedentary population. The food ration of the Moors is inferior to that of the other ethnic groups, reflecting the relatively lower consumption of cereals. Wolofs, Toucouleurs, and Sarakolles also consume a significant amount of edible oils, relatively more than the Moors.

2. Recommended Rations

Different food rations were calculated for each populatic grouping (Exhibit 4-11 and 4-15). "Recommended rations" were established for planning purposes in order to evaluate future food requirements. The average net requirement per person per day computed has a safety margin of 10%, to account for losses due to distribution.

3. Food Requirements

Calculations were made to indicate what is considered to represent the food needs of the population taking into account food habits identified during RAMS' Consumption Survey (Exhibit 4-16).

A full exposition and interpretation of the foregoing data are provided in the RAMS Option Paper entitled "Food Requirements and Nutrition Strategy - Estimates for Year 2000".

Exhibit 4-10

Apparent Average Consumption Per Person Per Day

In Country Location and Population Grouping	Food Ration		Proteins	
	K Calories	% of Need Satisfied	Total Grams	Of Which % Animal
Rural				
River Valley				
Dry Season	2,400	100	68	35
Early Wet Season[a)]	2,278	95	62	31
Other Regions				
Dry Season	2,270	95	58	20
Early Wet Season[a)]	1,807	75		
Yoruda				
End of Rainy Season	1,845	89		
Urbans				
Kaiai				
Dry Season	2,520	105	71	41.3
Early Wet Season[a)]	2,576	106	74	39
Akjouit				
Dry Season	1,705	77	68	39.7
Early Wet Season[a)]	1,897	86	67	35.8

a) Prior to harvest time.

Exhibit 4-11

Recommended Rations

Rural Sedentary for the Hodhs and the Assaba Regions

Food Items	Per Person kg/year	g/day	Calories	Protein g	Lipids g
our or Semolina		400	1,480	31.5	9.5
llet 30%	47				
ce 50%	73				
eat 20%	32				
	(152)				
ead, Noodles, Wheat Flour	7.3	20	72.8	2.0	
ot Crop	4.75	13	11.8		
ound Nuts	7.3	20	73.6	3.1	6.0
termelon Seeds	7.3	20	103.6	3.7	7.7
lses	5.5	15	51	3.5	0.2
gar	14	38	152		
ef	3.6	10	15.8	1.2	1.2
mel	7.3	20	17	2.9	0.5
tton	3.6	10	19.9	1.3	1.6
ultry	2	6	9.9	0.9	0.6
lk	45	125	98.7	4.7	6.0
esh Fish	14.6	40	26.7	4.9	0.6
l	5.5	15	135		15
tter	5.5	15	127		15
getables	18.2	50	20	0.6	
uits	9.1	25	12		
		Total Calories	2,426	60.3	63.9
		of which animal is		15.9	
		thus		26.4%	

haracteristics of the Ration

otal Calories	2,426
f Protein origin	10%
f Lipid origin	23.7%

ource:RAMS

Exhibit 4-12

Recommended Rations

Rural Sedentary for the Gorgol, Brakna, Trarza and Guidimaka Regions

Food Item	Per Person Kg/Year	g/day	Calories	Protein g	Lipids g
Flour or Semolina		410	1,517	32.3	9.8
1. Gorgol Regions					
Millet 46%	74				
Rice 48%	71.8				
Wheat 6%	9.9				
	(155.7)				
2. Brakna & Guidimaka					
Millet 65%	105				
Rice 30%	44.9				
Wheat 5%	7.5				
	(157.4)				
3. Trarza Region					
Millet 20%	33				
Rice 75%	112.2				
Wheat 5%	7.5				
	(152.7)				
Bread, Noodles, Wheat flour	7.3	20	72.8	2.0	
Root Crop	4.75	12	11.8		
Ground Nuts	11	30	109	4.6	9.0
Niébé	5.5	15	51	3.5	0.2
Sugar	14	38	152		
Beef	7.3	20	31.7	2.4	2.3
Mutton	7.3	20	39.7	2.5	3.2
Poultry	2	6	9.9	1.3	0
Milk	25.5	70	55.3	2.6	3.3
Fresh Fish	29.2	80	53.5	9.7	1.3
Oil	10.9	30	265		30
Vegetables	18.2	50	20	0.6	
Fruits	9.1	25	12		
		Total Calories	2,400	61.5	59
		Of which animal		18.5	
		thus		30%	

Characteristics of the Ration	
Total Calories	2,400
Of Protein origin	10.5%
Of Lipid origin	22%

Source: RAMS

Exhibit 4-13

Recommended Rations

Rural Sedentary for Adrar, Dakhlet-Nouadhibou, Tagant, Tiris-Zemmour and Inchiri Regions

Food Items	per person kg/year	per person g/day	Calories	Protein g	Lipids g	Remarks
Flour or Semolina		410	1,517	32.3	9.8	
Millet 25%	41					
Rice 45%	67.3					
Wheat 30%	49.3					
	(157.6)					
Bread, Noodles, Wheat flour	7.3	20	72.8	2.0		
Watermelon Seeds	7.3	20	73.6	3.1	6	
Pulses	5.5	15	51	3.5	0.2	1 Dakhlet Nou: 10 g. 19,9 ; 1,3 ; 1,6
Sugar	14	38	152			34,2 ; 5,7 ;
(1) Camel	21.9	60	51.2	8.6	1,6	(1) 40 g. came
(2) Mutton	7.3	20	39.7	2.5	3,2	Dakhlet
Poultry	3.6	10	14.2	1.6	0,5	
Milk	45	125	98.7	4.7	6	
(1) Fish Dakhlet-Nouadhibou)	14,6	40	26.7	4.9	0,6	Fish: Dakh
Oil	5.4	15	135		15	
Butter	5.4	15	127.5		15	
Vegetables	18.2	50	20	0,6		
Dates	3.6	10	19,2			
			Total Calories	2,372	58.9	57.9
			of which animal is		17.4	
			thus		29.5%	

Of Protein origin 10%
Of Lipid origin 22%

Dakhlet-- K. calories 2,363
Proteins 60,7
Animal 18,2 thus 30%

Of Protein origin 10.3%
Of Lipid origin 21 %

Source: RAMS

Exhibit 4-14

Recommended Rations - Nomads

Food Items	per person Kg/year	g/day	Calories	Proteins g	Lipids g
Flour or Semolina		400	1,480	31.5	9.5
Millet 25%	40				
Rice 45%	65.7				
Wheat 30%	48				
	153.7				
Noodles, Wheat flour	7.3	20	72.8	2	
Pulses	1.8	5	17	1.2	
Sugar	14	38	152		
Dates	5.5	15	29		
Camel or Beef	3.6	10	8.6	1.5	0.2
Goat or Mutton	10.9	30	59.6	3.8	4.8
Milk	84	230	181.7	8.7	11
Butter	5.4	15	135		
Oil	1.8	5	45		
		Total Calories	2,180	48.7	5.5
		Of which animal	14		
		Thus	28.7%		

Calories: Of Protein origin 9%

Calories: Of Lipid origin 18.9%

Source: RAMS

Exhibit 4-15

Recommended Rations - Urbans

Food Item	per person kg/year	per person g/day	Calories	Protein g	Lipid g
Flour or Semolina		325	1.202	25.6	7.7
Rice 70%	83				
Millet 15%	19				
Wheat 15%	21				
	123				
Bread, Noodles, Wheat flour	18.2	50	122.5	3.5	0.5
Pulses	3.6	10	34	2.3	
Ground Nuts	7 3	20	103.6	3.7	7.7
Root Crops	5.5	15	10	0.2	
Vegetables	18.2	50	20	0.6	
Fruits	9.1	25	12		
Sugar	14	38	152		
Fish	21.9	60	40.1	7.3	1
Beef	9.1	25	44.4	3.4	3.3
Mutton	7.3	20	39.7	2.5	3.2
Poultry	1.8	5	7	1	0
Oil	9.1	25	225		25
Sugar	1.8	5	45		5
Milk	18.2	50	39.5	1.8	2.3
			Total Calories	2,096.88	51.9	56.7
			of which animal		14.2	
			Thus		27.3%	

Calories: Of Protein origin 10%

Of Lipid origin 24.3%

Source: RAMS

Exhibit 4-16

Food Requirements - 1980

Item	Rural Sedentary (Tons)	Nomads (Tons)	Urban (Tons)	Total National (Tons)
Millet	43,799	16,360	6,726	66,885
Barley	47,787	27,280.3	29,382	104,449.3
Wheat	13,645.4	19,632	7,434	40,711.5
Bread Flour	4,964	2,985.7	6,442.8	14,392.5
Pulse Crops	2,892.75	0	1,947	4,839.75
Groundnuts	5,899.8	0	2,584.2	8,484
Watermelon Seeds	2,095.1	0	0	2,095.1
Meat	3,349.5	624.6	385.2	4,359.3
Hides	390.5	111.6	889.2	1,391.3
Sugar	9,520	5,726	4,956	20,202
Milk	3,646.5	1,249.2	3,221.4	8,117.1
Camel	3,102.5	223.2	0	3,325.7
Potatoes	4,150	4,458.1	2,584.2	11,192.3
Poultry	1,360	0	637.2	1,997.2
Oil	22,936.5	34,356	6,442.8	63,735.3
Fresh Fish	14,687	0	7,752.6	22,439.6
Vegetables	12,376	0	6,442.8	18,818.8
Fruits	5,541.9	0	3,221.4	8,763.3
Egg	5,855.1	736.2	3,221.4	9,812.7
Butter	1,571.4	2,208.6	637.2	4,417.2
Dates	255.6	2,249.5	0	2,505.1

Source: RAMS

4.4 Health

Recognizing the fact that there are no precise data in Mauritania to reflect the health situation of the country, RAMS has assembled the available morbidity and mortality information to make a preliminary assessment of the health sector. The tables and charts which follow highlight some of the salient data, showing the causes of death among women and children (Exhibit 4.17), the prevalence of five diseases by age group (Exhibit 4.18) and statistics on health personnel and facilities (Exhibit 4.19 and 4.21)

RAMS Option Paper on Health and Nutrition — Part I: "Health System in Mauritania: Analysis of Problems and Alternative Solutions" — provides a detailed analysis

Exhibit 4-17

Causes of Mortality Among Children and Pregnant Mothers by Order of Frequency, 1980

Children				Pregnant Women	
	0 - 1 year		1 - 5 years		
1.	Obstetrical causes	1.	Respiratory infection	1.	Obstetrical causes
2.	Prematurity	2.	Malaria	2.	Infections
3.	Respiratory infections	3.	Malnutrition	3.	Hemorrhages
4.	Gastroenteritis	4.	Gastroenteritis	4.	Toxemias
5.	Measles	5.	Transmissible diseases		

Source: Ministry of Health and Social Welfare, 1981.

Exhibit 4-18

Five Most Prevalent Diseases in Mauritania, 1980

Disease	No. of Cases Reported	Rate per 1,000
Diarrhea/Enteritis	80,000	171.0[a]
Malaria	57,600	40.0[b]
Measles	11,200	25.0[a]
Lung TB	7,400	5.0[b]
Schistosomiasis	6,500	0.5[b]

a) In children 0 - 9

b) In general population

Source: Ministry of Health and Social Welfare, 1981

Exhibit 4-19

Professional and Auxiliary Health Personnel in Service Units of Ministry of Health by Region, 1980

(March 1981)

	Doctors	Dentists	State Midwives	State Nurses	Technicians	Total Prof.	% of Professionals	Licensed Nurses	Auxiliary Nurses	Nurses Aides	Auxiliary Midwives	TOTAL
Nouakchott National Hospital	23	1	10	69	25	128	34.0	75	22	35	9	397
District	17	2	19	20	5	63	16.7	55	17	66	19	283
SUB TOTAL	40	3	29	89	30	191	50.7	130	39	101	28	680
H. Charqui	1	-	1	14	2	18	4.8	23	3	9	7	78
H. Gharbi	1	-	1	13	-	15	4.0	12	3	5	5	55
Assaba	1	-	1	12	2	16	4.2	17	2	17	3	71
Gorgol	2	1	4	11	3	21	5.6	19	19	17	6	103
Brakna	1	-	2	13	2	18	4.8	19	3	23	4	85
Trarza	2	-	4	19	1	26	6.9	19	8	36	12	127
Adrar	2	1	2	11	2	18	4.8	12	4	14	3	69
D. Nouadhibou	2	-	2	7	3	14	3.6	6	1	6	1	42
Tagant	-	-	1	5	-	6	1.6	8	1	6	3	30
Guidimaka	1	-	2	12	3	18	4.8	21	5	21	5	88
Tiris Zemmour	1	-	1	6	-	8	2.1	9	1	4	-	30
Inchiri	1	-	2	4	1	8	2.1	4	5	13	-	38
Regional Sub-Total	15	2	23	127	19	186	49.3	169	55	171	49	816
National Total	55	5	52	216	49	377	100.0	299	94	272	77	1496

Source: Personnel Office, Ministry of Health and Social Welfare, 1981

Exhibit 4-20

Distribution of Health Institutions, 1980

Region	Hospital	Polyclinic	Mother/Child Centers	Health Centers A	B	C	PMI a)	CREN b)	CHS c)	ASNAT d)	Mobile Units	Total	%
Nouakchott	1	2	1	2	4	0	3	3	1	2	0	19	9.4
Hodh Charqui	0	0	0	2	4	10	3	2	0	1	2	24	11.9
Hodh Gharbi	1	0	0	0	4	2	2	1	1	1	1	13	6.4
Assaba	1	0	0	2	3	3	2	1	1	1	1	15	7.4
Gorgol	1	0	0	1	1	11	3	3	1	1	1	23	11.4
Brakna	1	0	0	3	4	8	2	2	0	2	1	23	11.4
Trarza	1	0	0	3	3	10	3	3	1	1	1	26	12.9
Adrar	1	0	0	1	3	1	1	1	1	1	1	11	5.4
D. Nouadhibou	1	0	0	1	0	1	1	1	1	1	1	8	4.0
Tagant	1	0	0	2	1	3	2	1	0	1	1	12	5.9
Guidimaka	1	0	0	2	0	11	2	1	0	1	1	19	9.4
Tiris-Zemmour	0	0	0	1	2	1	0	0	0	0	0	4	2.0
Inchiri	1	0	0	1	0	1	1	1	0	0	0	5	2.5
Total	11	2	1	21	29	62	25	20	6	13	11	202	100.0

a) PMI = Protection Maternelle et Infantile

b) CREN = Centre de Récupération/Education Nutritionnelle

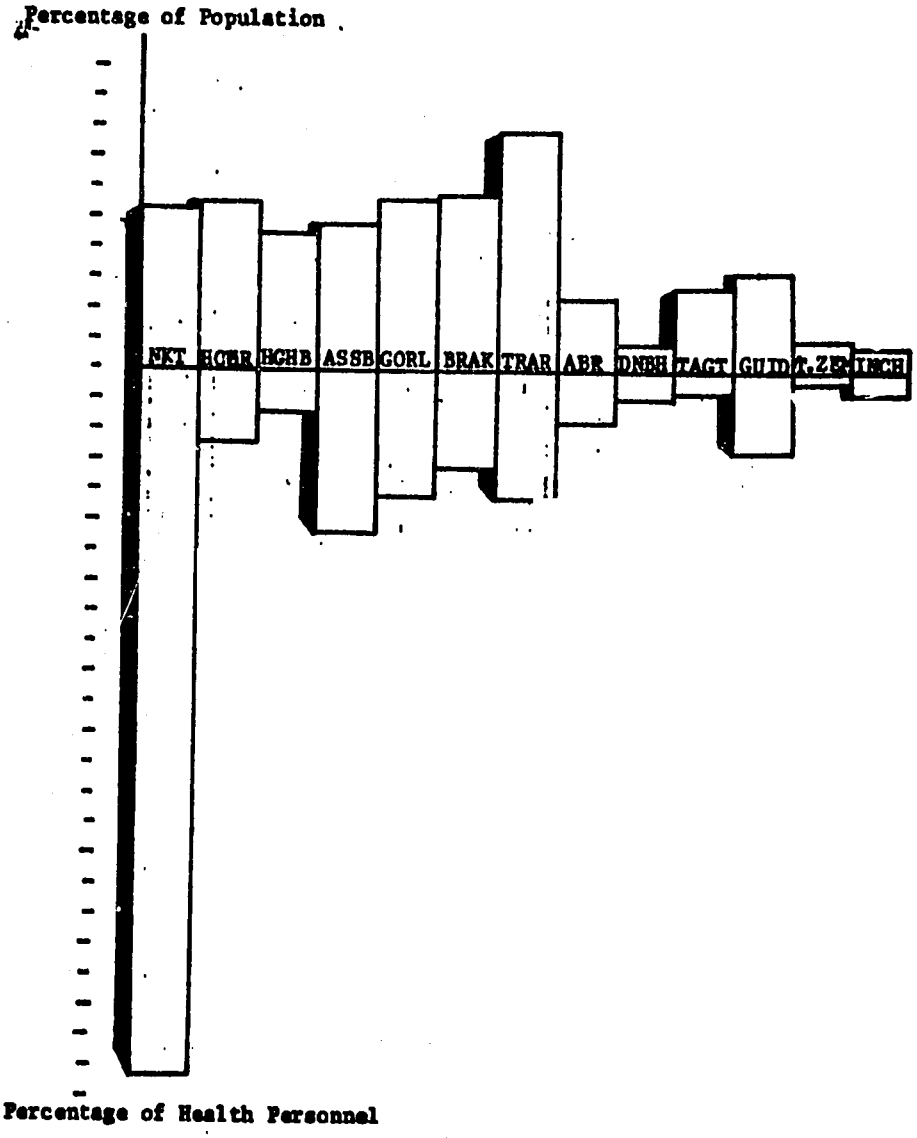
c) CHS = Centre d'Hygiène Scolaire

d) ASNAT = Antenne du Service National Anti-Tuberculeux

Source: Ministry of Health and Social Welfare

Exhibit 4-21

Regional Distribution of Health Personnel in Proportion to Population, 1980



Source: Ministry of Health and Social Welfare, 1981

4.5 Rural Consumption and Income

Consumption and Income data presented herein are based on findings gathered in RAMS' 1979/1980 Revenue/Consumption/Nutrition Survey. Sixty-four households were observed quarterly for a total of 24 days. Additional nomad households (12 for consumption and 34 for income) were surveyed at the end of 1980.

Households surveyed were actually units whose composition included food and non-food consumers and both present as well as absent contributors to the household budget. (See Annex A for a discussion of RAMS' surveys.) As a result of this definition, the size of household units (averaging 11 for sedentary population and 6.4 for nomads) is larger than the National Census figure of 5.4 individuals per household, members of which were defined as those actually present or had spent the previous night there. (See Definition of Terms Used in 1977 Census, Chapter 2.)

A Food Preference Table is presented as a possible guide to project identification in the agricultural crop sub-sector. The information provided is intended to show, on the basis of a sample of the sedentary population, the food items for which there is additional demand.

Exhibit 4-22

Average Size of Consumption Unit by Ethnic Group

Ethnic Group	No. of Individuals per Unit
Sedentary	
Moor	10
Toucouleur	9.7
Peulh	11
Wolof	14.5
Soninke	17
Weighted average	11
Nomad	
Maure	6.4

Source: RAMS 1979-1980 Survey.

Exhibit 4-23

Food and Non-Food Rural Consumption by Quantity 1979/80

Food Items	Per Capita Annual Consumption	
	Sedentary[a]	Nomads[b]
- Cereals (see below)	135 kg	84 kg
- Fruits and vegetables	24 kg	5 kg
- Meat (see below)	33 kg	5 kg
- Fish	10 kg	0 kg
- Milk & dairy products	29 liters	166 liters
- Tea (product)	1.8 kg	1.3 kg
- Sugar	13.6 kg	7.0 kg
Non- Food Items		
- Health and hygiene	4.6 kg	- [c]
- Energy products		
- kerosene (for lamp)	.8 liters	- [c]
- wood[d]	538 kg	445 kg
- Tobacco	140 gr	- [c]

For Sedentary Only

Breakdown of Cereal Consumption	
Millet/sorghum	50%
Rice	43%
Wheat	6%
Others	1%
Total	100%

Breakdown of Meat Consumption	
Beef	47%
Lamb	18%
Goat	3%
Camel	29%
Poultry/Others	2%
Total	100%

a) Based on average of 4 six-day observations during a 12-month period.

b) Based on a single observation (October/November) a period when milk production is higher than average but general food consumption is lower than average. Figures only indicate tendencies.

c) Figures not available.

d) Wood equivalent (1 kg charcoal = 5 kg wood)

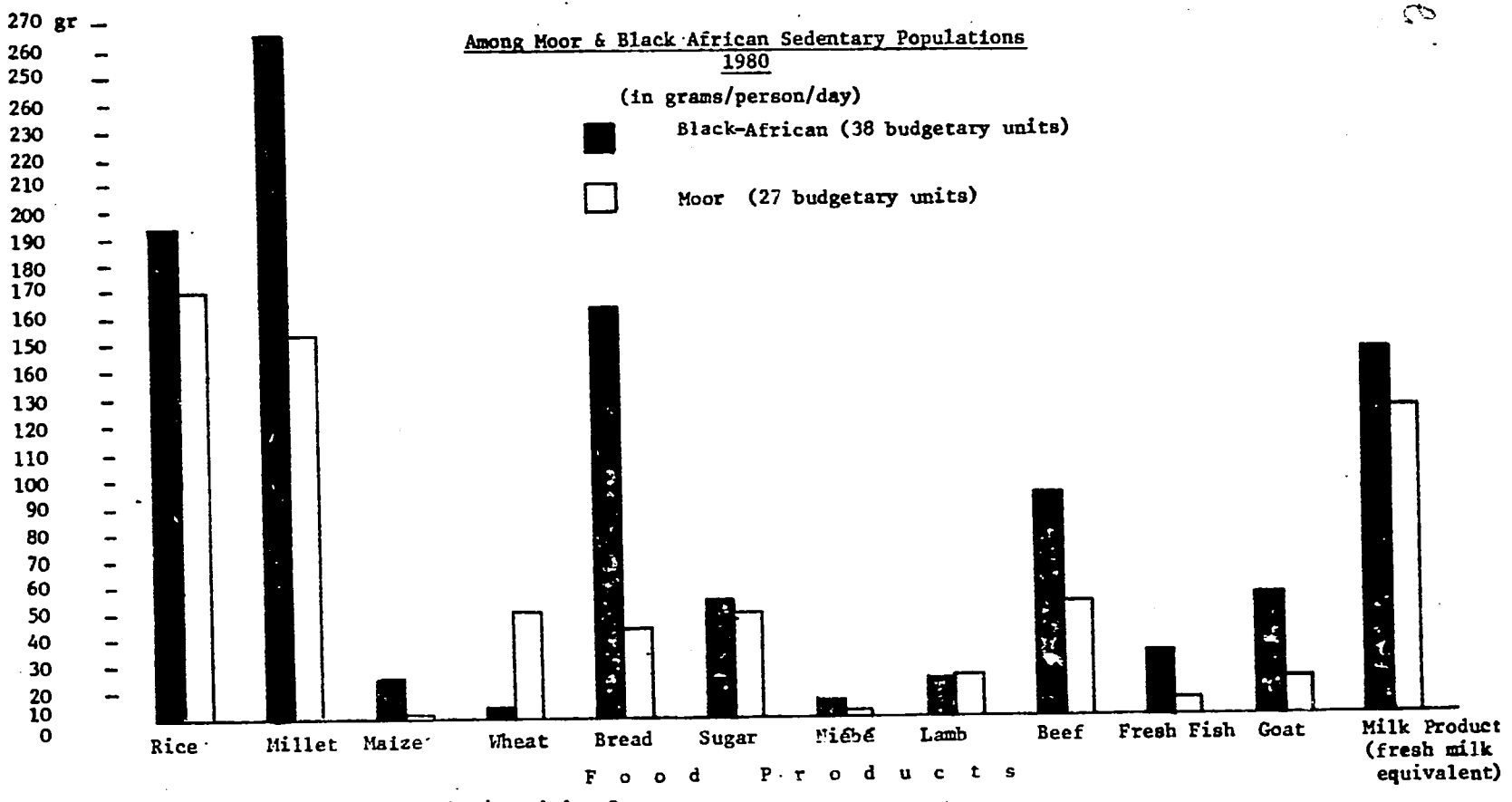
Source: RAMS 1979/80 Revenue/Consumption/Nutrition Survey.

Exhibit 4-24

Comparative Food Consumption of Selected Products

Among Moor & Black African Sedentary Populations
1980

(in grams/person/day)



Source: RAMS 1980 Revenue /Consumption/Nutrition Survey
(average of 3rd and 4th observations; July and October, 1980).

Food Preference Table

In the food preference survey conducted as part of the third observation of RAMS' Revenue/Consumption/Nutrition Survey, respondents 15 years and older[1] were read a list of 21 food products most commonly found in Mauritania. They were then asked to name the product they wanted to consume more if they could. The item was noted as their first choice. Successively, they were asked the next product which they wanted to increase consumption, and so on up to five choices. These became respectively their second, third, fourth and fifth choices of preference.

In the accompanying summary table, it is evident milk was the most commonly cited item, yet one-fourth of the respondents selected millet as their first choice.

The food item appearing in the list included:

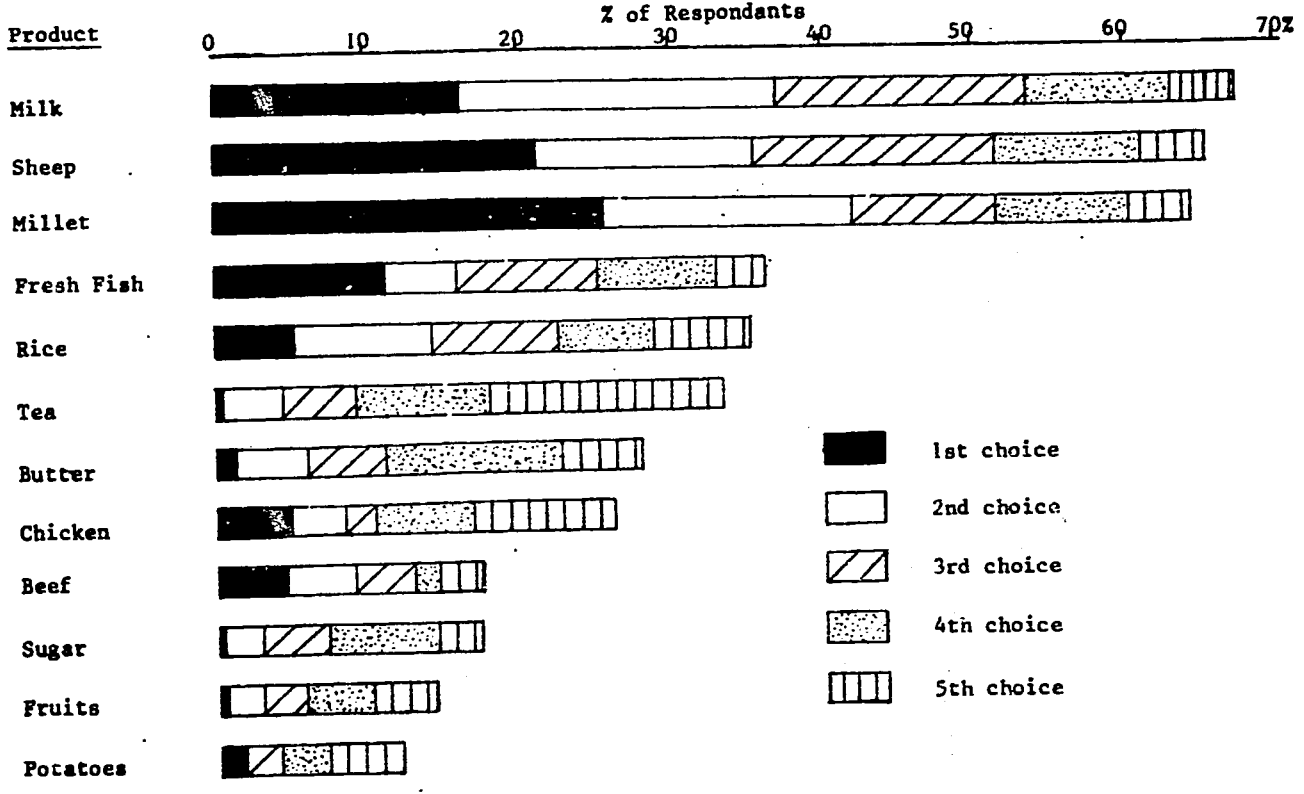
1. beef	8. lamb	15. niébé (cow peas)
2. millet/sorghum	9. maize	16. potatoes
3. sweet potatoes	10. fresh fish	17. dry fish
4. bread	11. camel	18. chicken
5. sugar	12. butter	19. fruit
6. rice	13. tea	20. oil
7. milk	14. vegetable	21. ground nut

1) Total of 275 usable questionnaires were processed.

Exhibit 4-25

Food Preference Table

of Rural Sedentary Population 1980[a)]



a) Indicates by order of preference what food product respondents indicated they would consume more of if they could and if the product was available.

Source: RAMS Survey, 1980

Exhibit 4-26

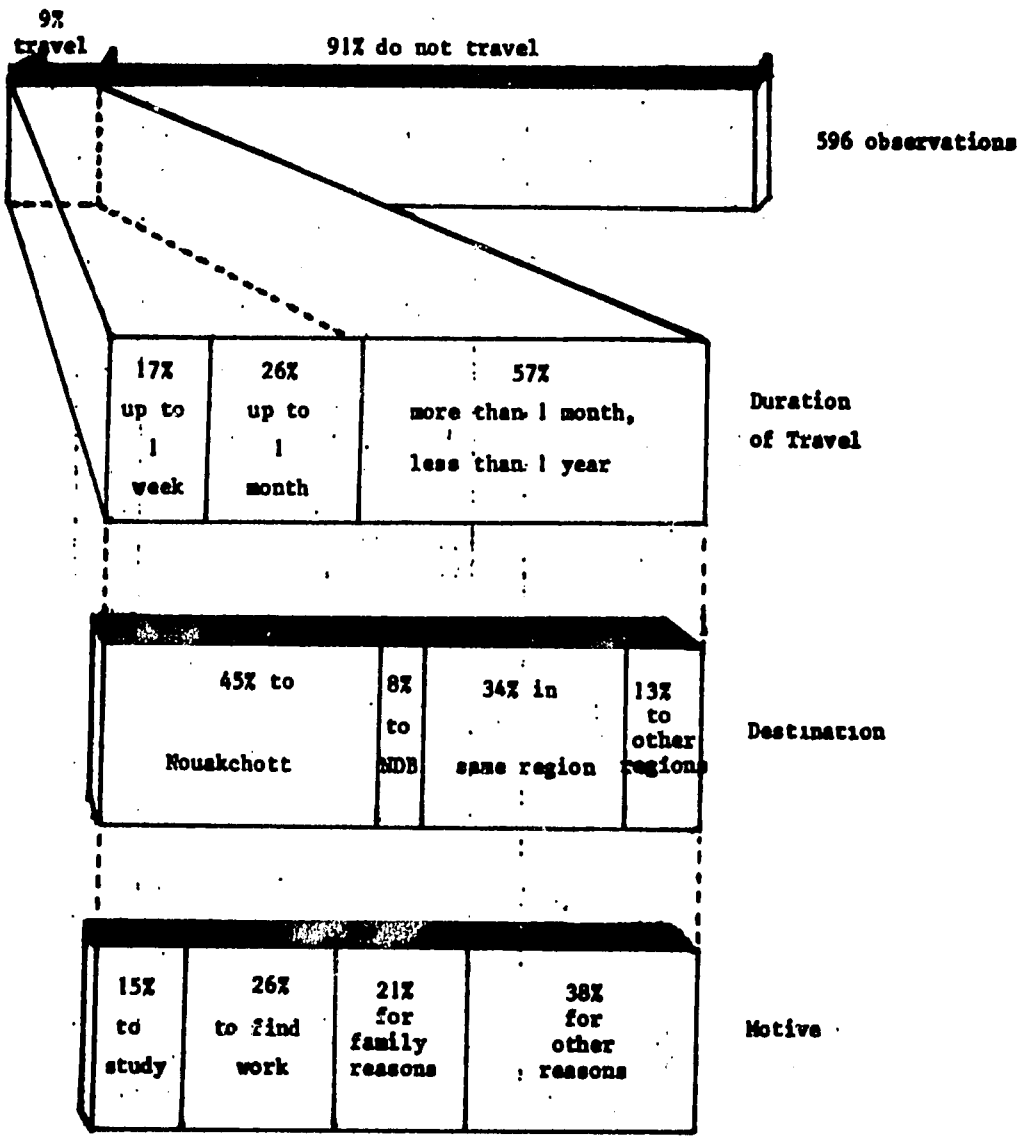
Rural Sector: Source (%) of Personal Income

Production Revenue	Sedentary	Nomad	Total
Sale of agricultural produce %	6 %	2 %	5 %
Sale of livestock produce	14 %	60 %	22 %
Sale of fishing produce	2 %		2 %
Sale of craft produce	1 %	7 %	2 %
Service Revenue			
Business profits	17 %	7 %	16 %
Salaries	26 %	4 %	22 %
Transfer Revenue			
Debts	4 %	4 %	4 %
Pensions, family allowance	5 %		4 %
Transfers	13 %	7 %	12 %
Gifts	4 %	9 %	4 %
Others	8 %		7 %
Total	100	100 %	100 %
Revenue UM/Person/Year	13,500	9,300	12,200

Source: RAMS 1979/80 Revenue/Consumption Survey.

Exhibit 4-27

Mobility of Rural Sedentary Population, 1980



Source: RAMS 1979/80 Revenue/Consumption/Nutrition Survey. Reflects average of March and July observation periods.

Chapter 5: Services and Infrastructures

Table of Contents

5.1 Overview

The following section regroups administrative and economic activities affecting the rural economy which are not covered elsewhere in this report.

It begins with summary tables on government services, the public share of GDP and civil servants in various ministries and agencies, particularly the Ministry of Rural Development. Included as well are tables of the government's regional budgets which are allocated for development projects and the regional distribution of agricultural and livestock extension agents.

Semi-public institutions, or parastatal organizations, are briefly presented in terms of their function and nature of operation. Several tables on utilities provide information on water and energy production (which equals consumption) for both the country's rural and urban areas.

Finally, cooperatives, the economic activities of the rural private sector and road transport are treated separately as a means of providing the reader with a rapid overview of these topics.

5.2 Public Sector

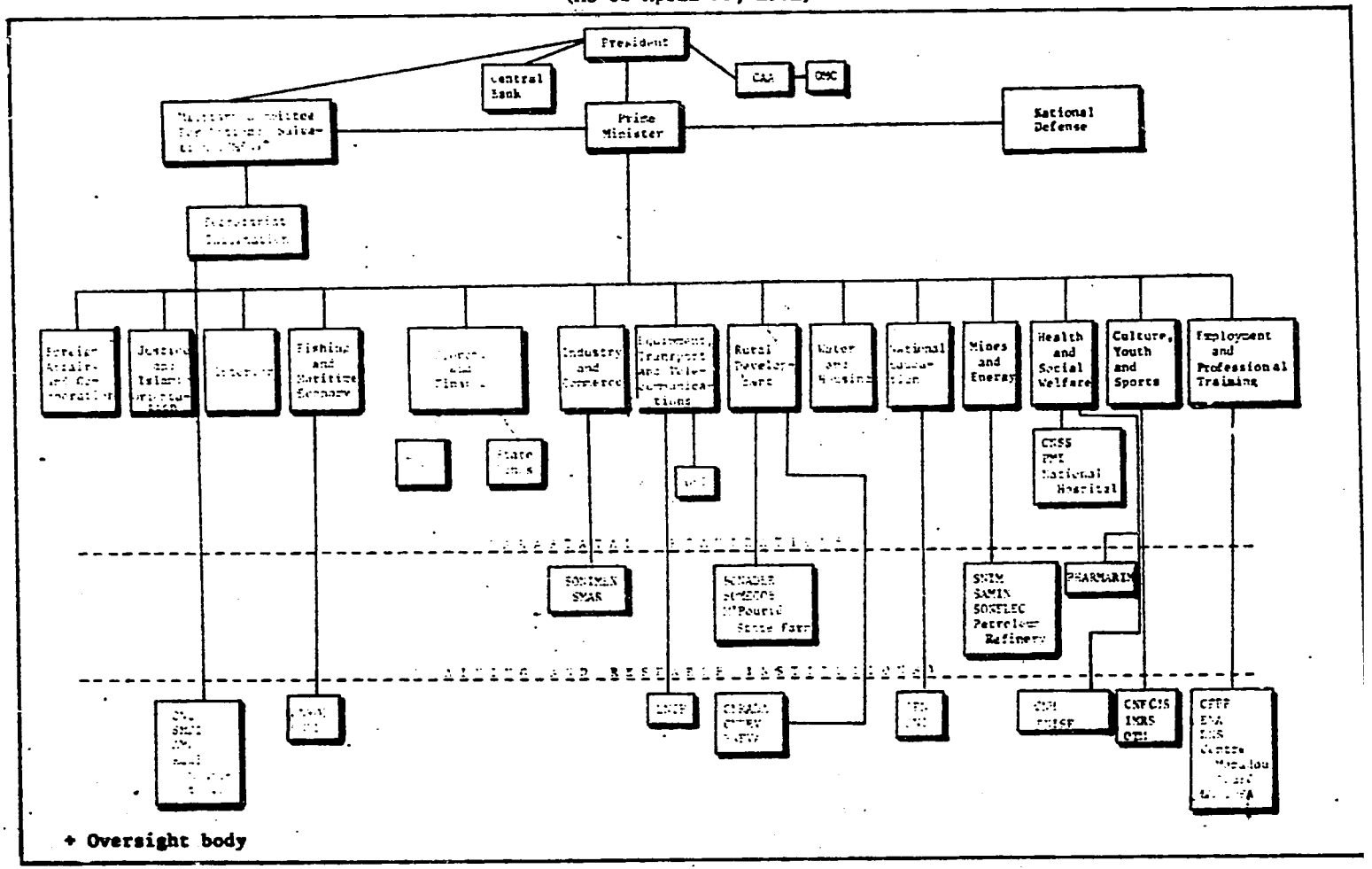
The Mauritanian civil service has grown substantially over the past decade. The number of government employees has increased on a yearly average of 7% since 1973. During the same period, government services accounted for 12.2% of GDP in 1973, increasing to 18.2% in 1979.

Public institutions and their management have been characterized by a highly centralized structure, frequent reorganizations, and a multiplication of agencies. The avowed aim of the government is to decentralize authority and to delegate responsibility to the territorial levels of government. As a result, regional governments are gradually becoming more involved in identifying and implementing development programs.

The following tables provide a summary of government departments and public institutions as they relate to rural development. For a more comprehensive discussion of public institutions, consult RAMS' report Public Sector: Organization and Operation of Rural Development Activities.

Exhibit 5-1

National Government of Mauritania
(As of April 25, 1981)



See introduction section 0.5 for explanation of acronyms.

Exhibit 5-2

Public Sector

Contribution to GDP and Number of Civil Servants

1973 - 1980

	Contribution of Gov't Services to GDP ('000 UM)	Gov't Services as % of GDP	Number of Civil Servants
1973	1,327	12.2	7,939
1974	1,568	11.0	8,345
1975	2,087	12.8	9,235
1976	2,977	14.9	10,192
1977	3,947	18.7	11,155
1978	4,515	20.2	10,753
1979	4,740	18.2	11,482
1980	-	-	12,731

Source: National Budgets and IMF Report 1980

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Civil Servants by Ministries and Categories, 1980

The Government is the principal employer in Mauritania. In 1980, almost 10,000 people were on the government payroll. The best source for a breakdown of employment by ministries is the payroll computer printout which lists recipients according to five salary categories. Since it may take several months to process a new employee and may take considerably longer to delete the name of an individual who has left a service, figures may be slightly inflated.

Category	Minimum Level
A	University or higher Post-secondary degree
B	Lower secondary certificate supplemented with technical training or further studies.
C	Primary certificate plus either supplementary advanced secondary studies or technical training at lower level than for Category B.
D	Some primary studies and/or supplemental technical training or work experience.
Other	According to post. No minimum school level required.

Exhibit 5-7

Number of Civil Servants by Ministry and Category, 1980

Ministry	Categories A	B	C	D	Others	Total	% of Distrib.
Primary and Secondary Education	231	918	1,631	492	288	3,560	37%
Industry and Mines	11	17	28	35	18	109	1%
Rural Development	14	121	194	2,155	137	681	8%
Youth, Sports, Crafts and Tourism	9	34	58	162	48	311	3%
Civil Service and Staff Training	17	21	33	38	49	158	2%
Interior	89	89	170	115	65	528	6%
Equipment and Transport	5	39	47	79	47	217	2%
Culture, Information and Telecommunication	8	7	9	45	13	82	1%
Plan and Fisheries	7	12	7	23	11	60	1%
Finance and Commerce	135	174	157	556	132	1,154	12%
Justice and Islamic Affairs	11	47	117	147	121	443	5%
Foreign Affairs	17	9	11	22	11	70	1%
Health-Labor and Welfare	30	254	418	949	171	1,822	19%
CMSN Permanent Secretariat	3	3	4	18	6	34	0.4%
President's Office	31	25	40	98	128	322	3%
Common Services	2	2	3	4	8	19	0.2%
Total	619	1,772	2,927	2,998	1,254	9,570	
Percentage	6%	19%	31%	31%	13%		100%

Note: Excludes security forces.

Source: Ministère de la Fonction Publique et de la Formation des Cadres, 1980.

Exhibit 5-4

Public Sector

Ministry of Rural Development

Civil Servants by Service and Position, 1980

Service	Veterinarian or Rural Engineer	Assistants	Mid- or Low-Level Employees
Agriculture	12	19	87
Administration	4	9	45
Teach'ng/Research	1	3	17
Affiliated Organizations	7	7	25
Animal Health	8	31	95
Administration	5	-	95
Teaching/Research	2	-	-
SONICOB	1	-	-
Forestry	4	3	50
Administration	4	3	50
Other Specialities	3	1	4
Rural Engineering	3	-	4
Statistics	-	1	-
Total	27	54	236

Source: Ministère du Développement Rural, Rapport de la Commission Sectorielle du Développement Rural, Oct. 1980.

Exhibit 5-5

Public Sector

Regional Comparison of Agricultural Extension and Livestock Services, 1980

Region	Total Personnel per Service		Ratio of Population to Agent a)		
	Agriculture	Livestock	Agriculture Sedentary	Livestock Sedentary	Livestock Nomad
Nouakchott	20	6	1:25	1:57	-
H. Charqui	10	22	1:673	1:114	1:745
H. Gharbi	8	14	1:720	1:230	1:868
Assaba	10	19	1:931	1:170	1:391
Gorgol	21	18	1:701	1:183	1:117
Brakna	15	24	1:602	1:117	1:243
Trarza	11	14	1:338	1:231	1:534
Adrar	5	3	1:411	1:154	1:1059
D. Nouadhibou	-	3	-	1:19	-
Tagant	7	12	1:368	1:90	1:668
Guidimaka	8	9	1:1226	1:253	1:194
Tiris Zemmour	-	2	-	1:15	-
Inchiri	1	3	1:331	1:87	-
Total	116	149			

a) Population figures derived from BCR 1977 Census provisional figures.

Sourc Ministry of Rural Development.
1980 graduates of the ENFVA are not included.

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Exhibit 5-6

Public Sector

Regional Budgets

(000 UM in 1980 prices)

	1978	1979	1980
Nouakchott (Dist.)	162,370	211,250	213,808
Hodh Charqui	25,737	-	33,273
Hodh Charbi	15,919	19,166	16,947
Assaba	10,599	12,609	15,361
Gorgol	17,716	15,324	18,262
Brakna	13,156	14,603	15,914
Trarza	28,370	33,000	29,588
Adrar	14,775	17,548	16,138
D. Nouadhibou	24,600	-	84,350
Tagant	9,250	11,035	13,627
Guidimaka	7,882	9,856	9,704
Tiris Zemmour	16,836	-	25,362
Inchiri	5,333	-	7,671

Source: Ministère de l'Interieur

5.3 Parastatal Organizations and Utilities

Exhibit 5-7
Parastatal Organizations
1980/1981

Name[a] (Date Created)	Function	Nature of Operation
SONIMEX (1966)	- Controls prices, regulates supply and demand of basic consumer products, reduces speculation.	- Monopoly on imports and wholesale distribution of rice, tea, sugar, Guinea cloth. - Monopoly on export of gum arabic.
SONICOB (1975)	- Controls purchasing, processing, marketing of livestock sector with a view to supply export market and urban/mining regions of country.	- Operates large centralized slaughter, processing and refrigeration facilities in Kaedi.
OMC (1975)	- Controls distribution and commercialization of cereal production with intent on stimulating production.	- Determines surplus and deficient cereal areas of country, sets prices, purchases, receives and stores grain for distribution.
SONADER (1975)	- Stimulates rural farm output.	- Channels national and international rural development assistance. Predominantly involved with irrigated rice production.
ONPP (1981)	- Encourages and orients fishing sector particularly artisinal.	- Not operational as of May 1981.

a) For full title, consult list of acronyms in the Introduction. For additional information, consult RAMS report Economic Activities of the Rural Private Sector.

Exhibit 5-8

Grain and Cereal Storage

Total public storage facilities are estimated at 12,500 tons. These are distributed among five regional centers (Boutilimit, Aleg, Atar, Selibaby and Nouadhibou), each with 500-ton holding capacity, and 20 portable rubber butyl silos for Nouakchott.

With the aim of increasing these facilities, OMC (Office Mauritanien de Cereales) is constructing storage centers of 1,000 tons each for an additional storing capacity of 52,000 tons.

Construction is being carried out in two phases: the first will be completed in 1981 providing 20,000 tons of storage in Nouakchott, Rosso and Nouadhibou; and the second will affect Néma, Aioun, Kiffa, Kaédi, Selibaby, Boghé, Aleg, Tidjikja, Maghta-Lahjar, Moudjeria, Atar, F'Derick and Akjoujt.

OMC's 1980 storage charges for a ton of cereal are calculated as follows:

	UM
Overhead costs (5% depreciation)	650
Upkeep	260
Equipment maintenance	64
Agency management and other salaries	129
Treatment and disinfection	400
Loss of stock (3% of cereal value)	300
	1,803

Utilities

SONELEC (Société Nationale d'Eau et d'Electricité) is responsible for the provision of potable water and electricity in the country. However, SNIM, the National Mining Company, supplies water and electricity to the mining town of Zouerate.

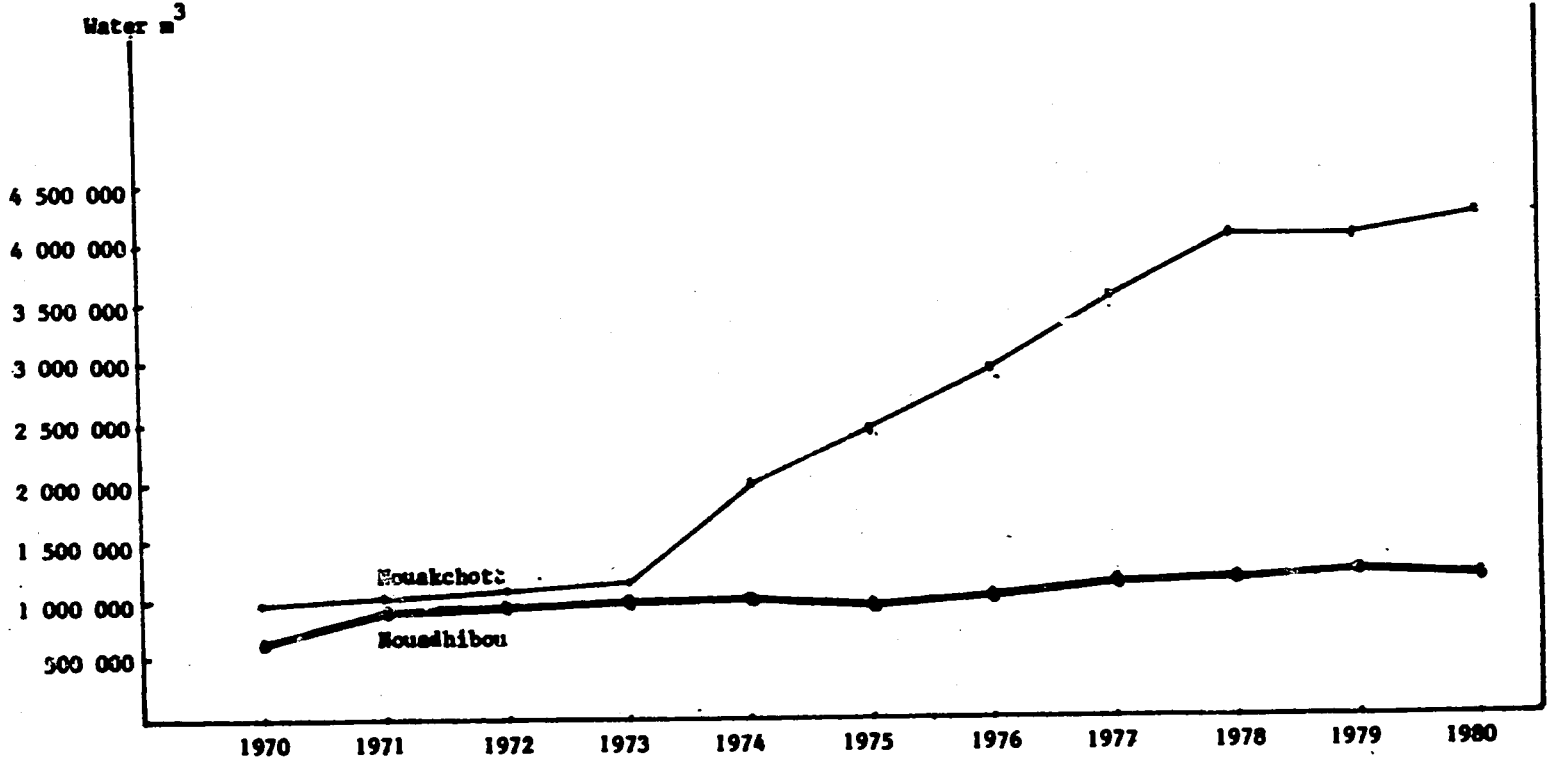
Nouakchott's water supply comes from Idini, a region 70 km east of the capital. Present utilization according to SONELEC is less than one half of the aquifer's daily output capacity. Nouadhibou is supplied by an 80 km pipeline from Bou Lanouar where present utilization is approximately one-third of capacity.

All electricity is diesel generated for Nouakchott as well as for 7 rural urban centers. Installed generating capacity for Nouakchott is roughly 13,500 Kw, with plans to nearly double this by 1982. Nouadhibou's facilities include a 14,800 Kw SNIM plant which guarantees 2,500 Kw to SONELEC. Akjoujt's plant has the capacity to generate 6,800 Kw. The other rural centers combined capacity (Kaédi, Rosso, Atar) totals approximately 2,500 Kw.

The following tables trace water and electricity production for the areas served by SONELEC.

Exhibit 5-9

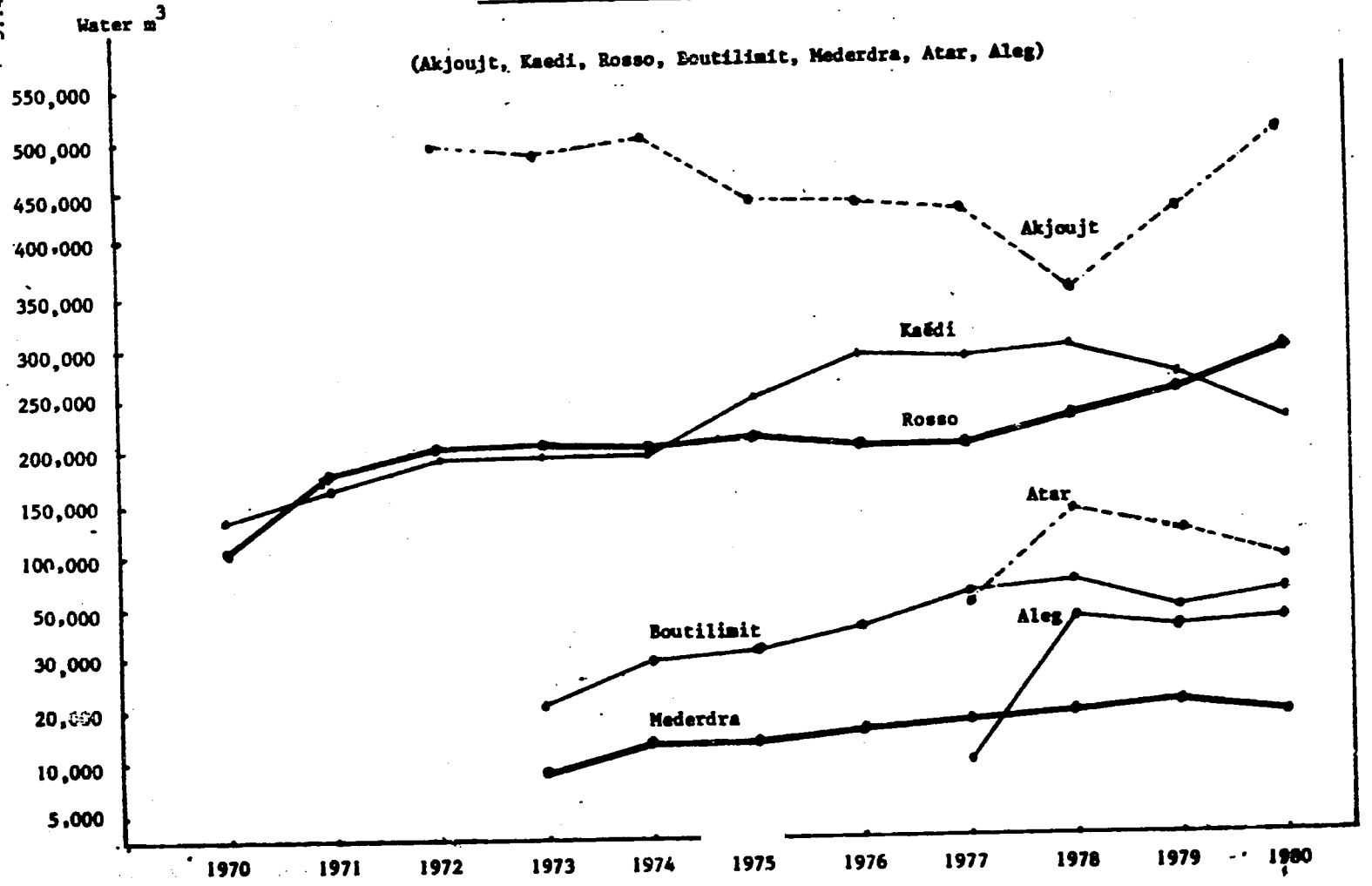
Water Supplied by SOMELEC to Nouakchott and Nouadhibou



Source: SOMELEC.

Exhibit 5-10

Water Supplied to Rural Towns by SONELEC

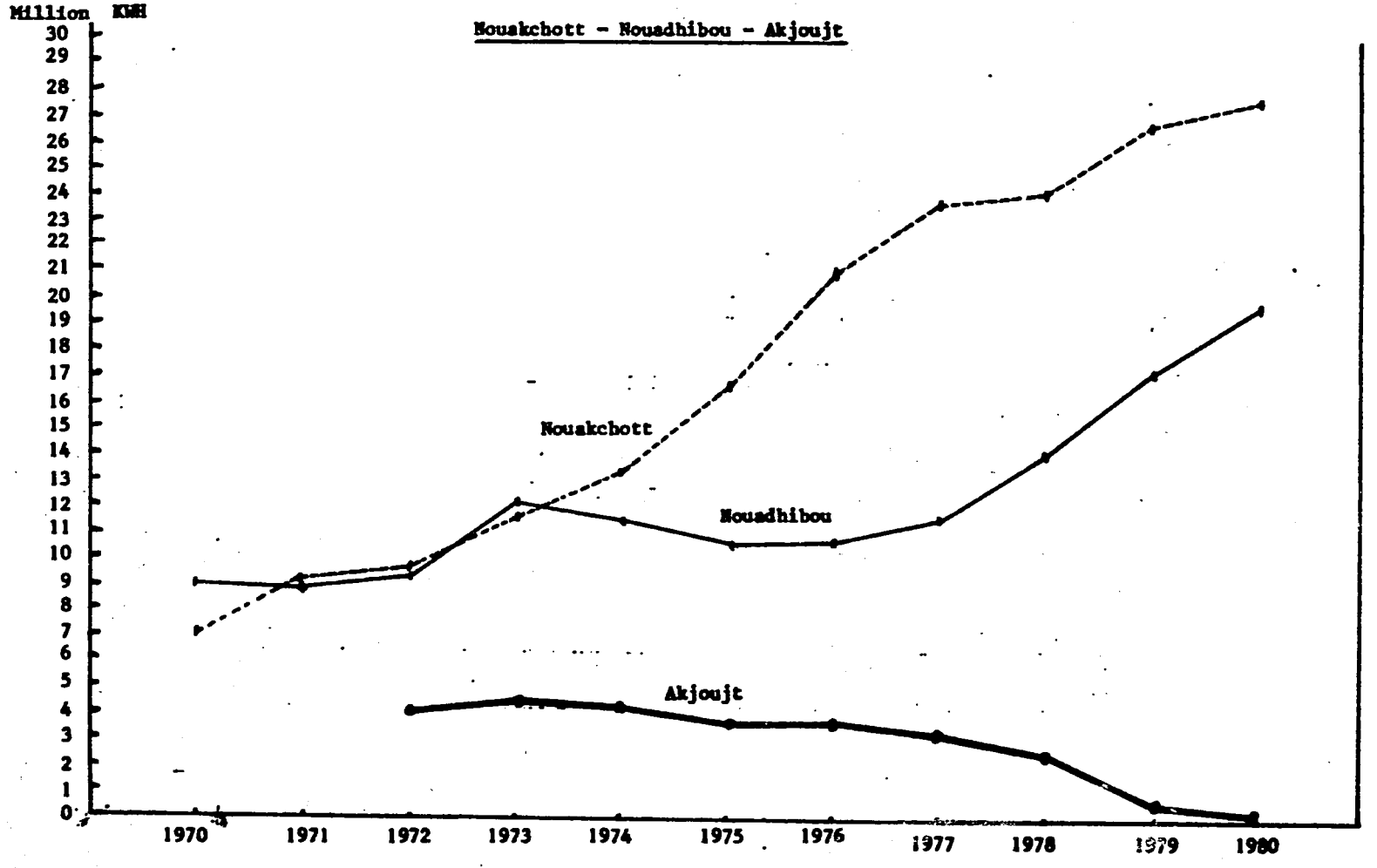


Source: SONELEC.

Exhibit 5-11

Electricity Supplied by SONELEC to Three Largest Urban Consumers

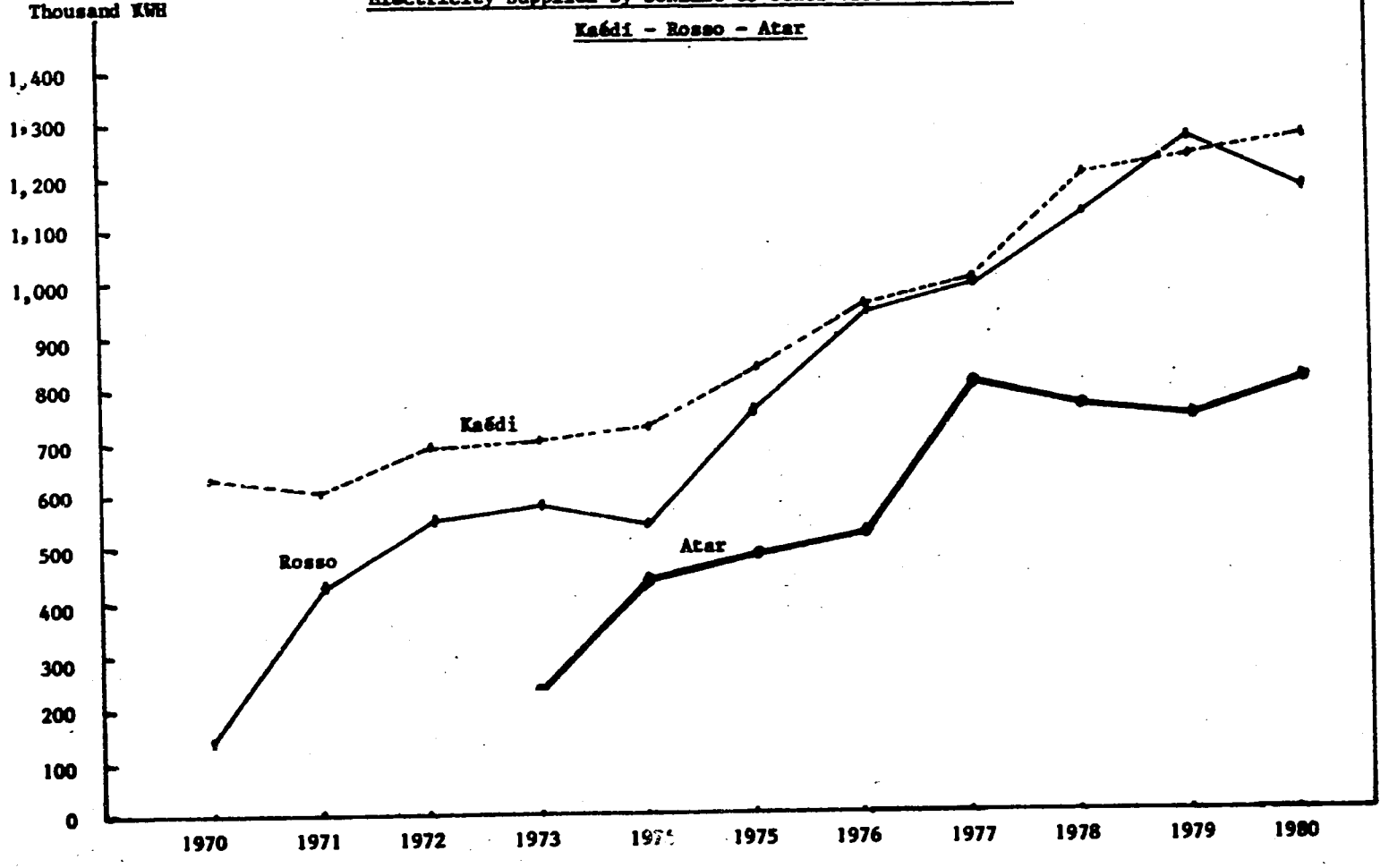
Nouakchott - Nouadhibou - Akjoujt



Source: SONELEC.

Exhibit 5-12

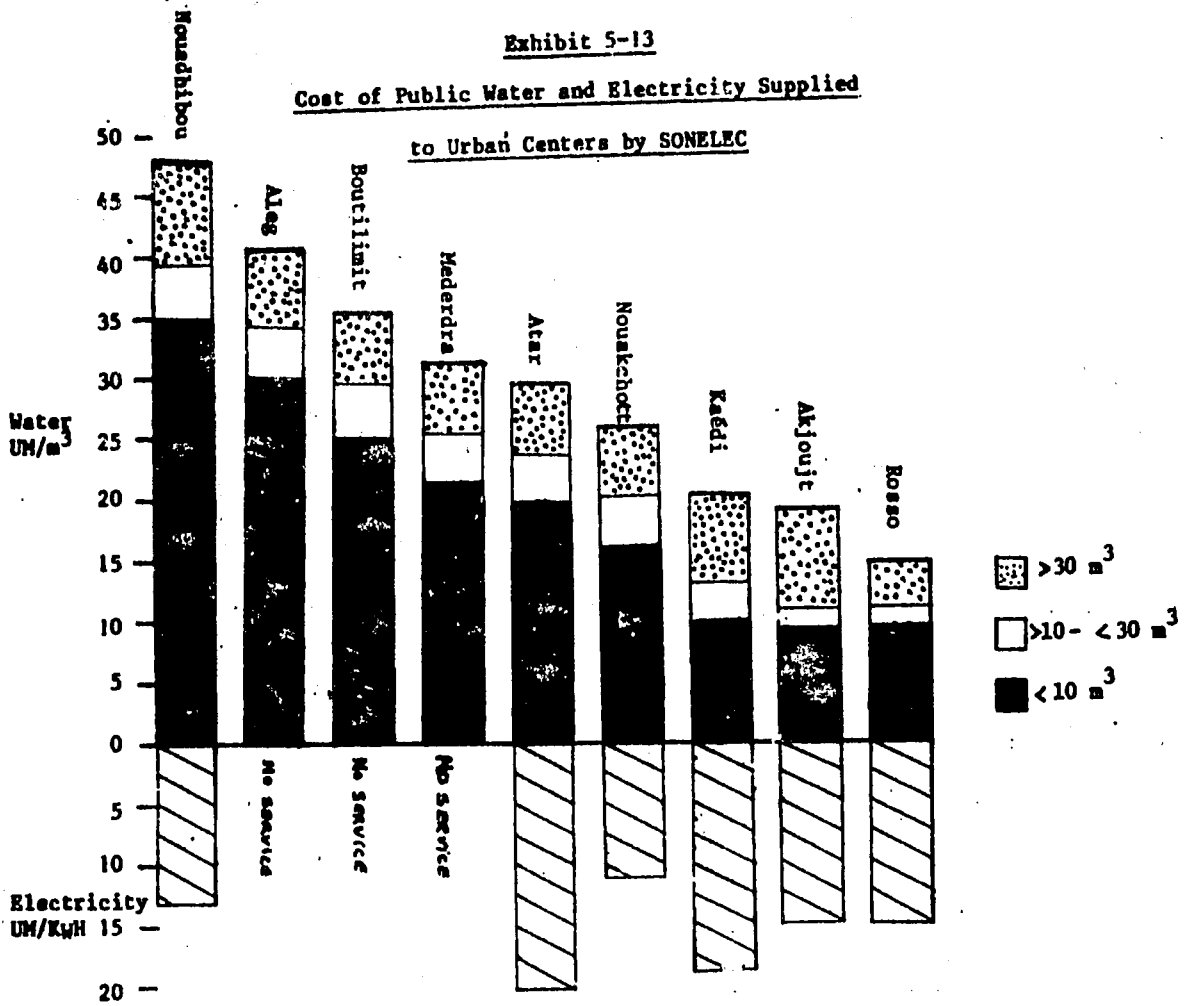
Electricity Supplied by SONELEC to Other Urban Consumers
Kaédi - Rosso - Atar



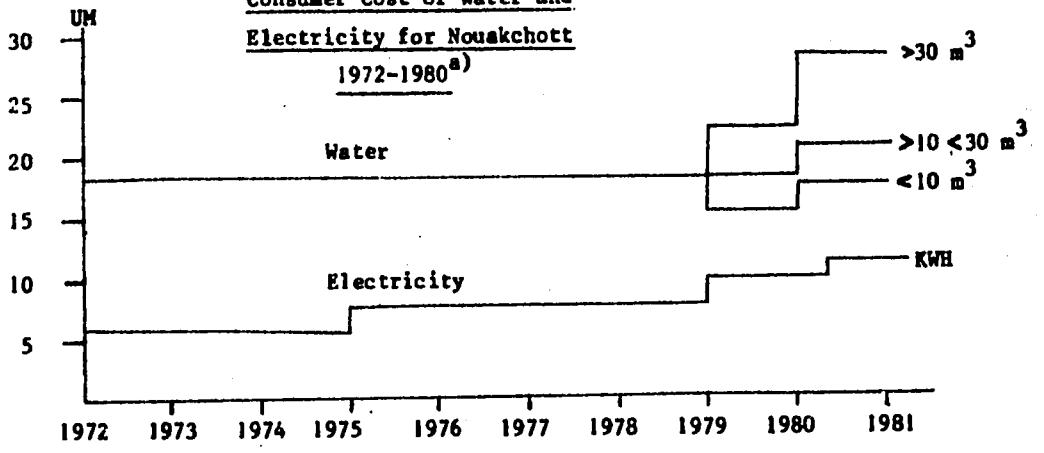
Source: SONELEC.

Exhibit 5-13

Cost of Public Water and Electricity Supplied to Urban Centers by SONELEC



Consumer Cost of Water and Electricity for Nouakchott 1972-1980[a)]



a) Tariff changes assigned to 1st of year.

Source: SONELEC

5.4 Cooperatives and Pre-Cooperatives

Cooperatives traditionally encourage group work ("Touiza" in Hassaniya). They have enjoyed a legal status since 1967, when a statute regulating the creation and operation of cooperatives was promulgated. Cooperatives come under the auspices of the Cooperative Division in the Ministry of Rural Development, which registers new groups and determines their status. Groups are first recognized as pre-cooperatives (minimum 2 year period) or as full-fledged cooperatives, qualifying for certain procurement privileges.

In 1980, the roster of the Cooperative Division and SONADER (which sponsors its own cooperatives) included 485 pre-cooperatives or cooperative groups, of which:

451 were agricultural
19 were artisanal
11 were consumer
4 were fishing

The regional breakdown is as follows:

Region	Total No. Cooperative Groups	Membership	% Employed Population as Member of Cooperative
Hodh Charqui	5	98	0.4
Hodh Gharbi	12	245	1.4
Assaba	20	291	1.1
Gorgol	41	3,383	10.2
Brakna	54	4,440	17.7
Trarza	178	9,804	37.6
Adrar	80	1,609	15.9
Dakhlet Nouadhibou	2	1,171	13.6
Tagant	57	1,979	21.4
Guidimaka	16	2,045	7.5
Tiris Zemmour	1	19	0.3
Inchiri	19	381	15.0
Total	485	25,465	Average 11.8%

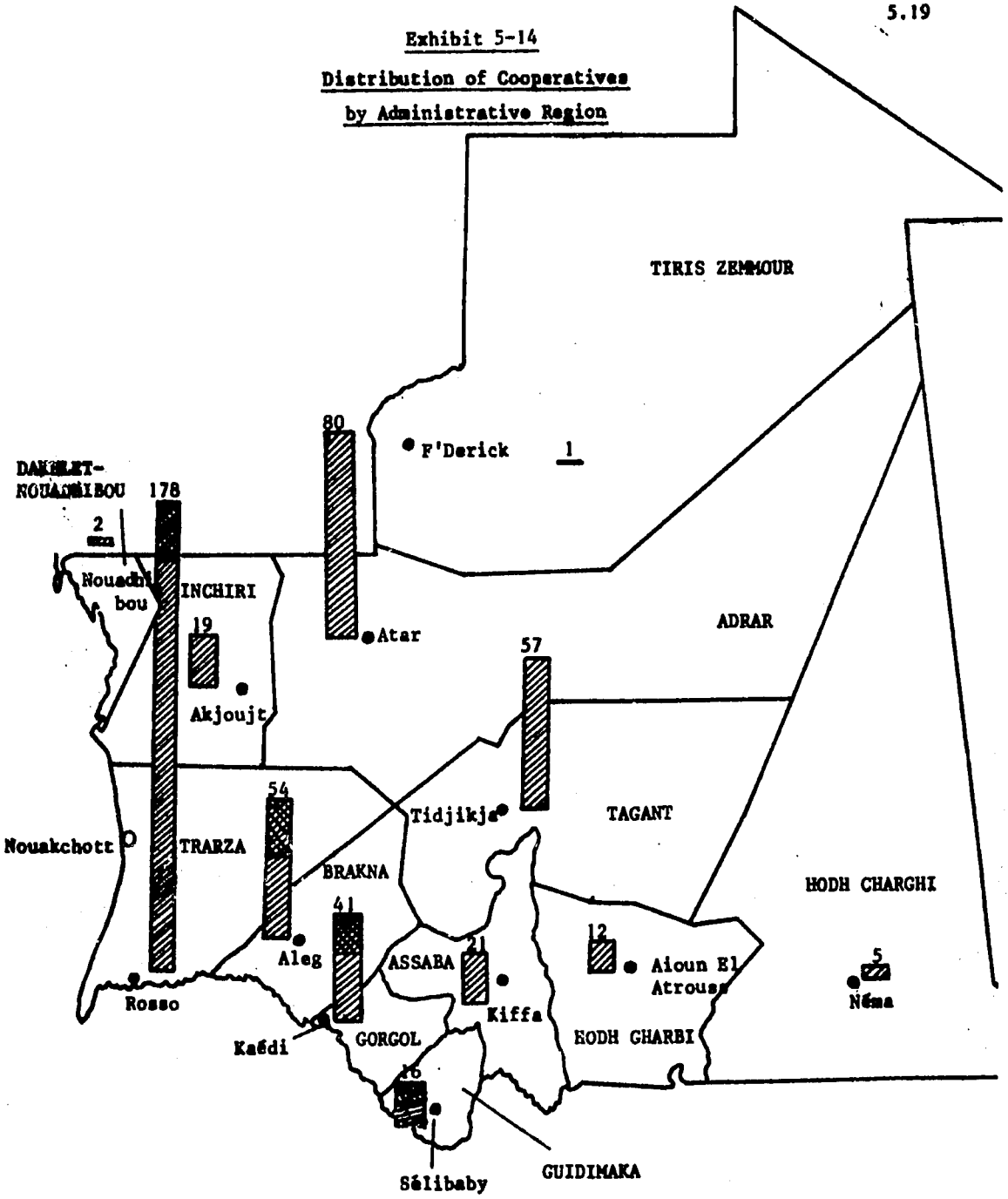
It should be noted that the Division register is not necessarily up to date. Some registered cooperatives may in fact be defunct, others not yet registered. This is particularly notable in the Guidimaka, where various types of cooperative-like organizations exist.

Source: Division de la Coopération (MDR) and SONADER.

Exhibit 5-14

Distribution of Cooperatives

by Administrative Region



SONADER Cooperatives

Cooperatives registered with the Ministry of Rural Development

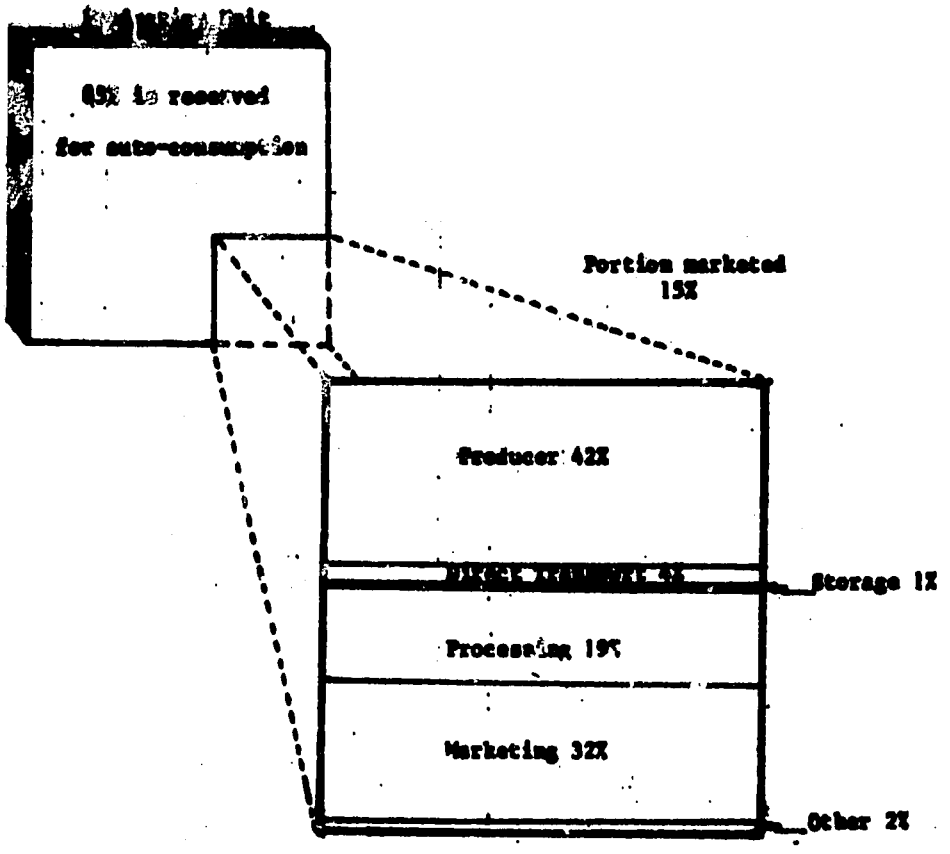
5.5 Rural Private Sector

The private sector of small-scale family businesses at the rural level gives evidence of significant vitality. These enterprises are characterized by a remarkable ability to adapt to the demands imposed by accelerated sedentarization. These businesses are working because they are capable of offering the products and services demanded by the affected population. In addition, the small-scale businesses follow and help to create circuits of monetarized exchanges.

The following exhibits provide some data on intermediary consumption and on production and labor budgets for a few select number of small rural businesses. They can be used in comparison with the manpower and employment exhibits in Chapter 3.

Exhibit 5-15

Breakdown of Intermediary Costs
in Relation to a Unit of Production



Source: RAMS

Exhibit 5-16

Production and Labor Budget of
a Grain Mill Processor
(UM)

	Per day[a]	Per month	Annual
Costs			
Grain mill	261	3,924	47,000[b]
5 l. gas/day	150	2,250	27,000
Labor	120	4,000	21,600
Tax 400/mo.	27	400	4,800
License	9	135	1,600
Rent 1,000/mo.	66	1,000	12,000
Parts and other exp.	33	500	6,000
Total Costs	666	12,209	120,000
Receipts			
Averages 450 kg/day at 6 UM/kg	= 2,700/day	x 180 day/yr	486,000
Less yearly costs (above)			120,000
		Net Profit	386,000

a) Based on average of 180 working days/year.

b) Purchase cost: 100,000 UM at 15% interest, machine lasting 3 years.

Note: Major constraints to operation are maintenance and spare parts. Mills are found predominatly in larger towns, are capital intensive and operate an average of 180 days/year. It has been observed that the presence of a mill in a village accomplishes the work of approximately 30 women who normally would receive 9 UM to handpound a kilo of millet or wheat as opposed to a cost of 6 UM/kg by a mill.

Source: RAMS field observations, 1980.

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Exhibit 5-17

Production and Labor Budget
Rural Garage in Kiffa

Expenditure	Per Month (UM)
Amortization on equipment	7,500
Rent[a]	2,500
Labor	35,000
Spare parts (average)	40,000
Tools, grease operating expenses	3,600
License/tax	29,000
	117,600
Revenue/month	
Fees[b] (between 150-200,000 UM)	175,000
Total expenses	117,600
Net Profit	54,400

a) Flexible cost since most garages are located on owner's land.

b) Price is often established on the "value of the problem" and not on hourly cost.

Resource: RAMS field observations, 1980.

Exhibit 5-18

Operating Budget of a Laundry and a Restaurant, 1980 (UM)

	Monthly	Per Day
Restaurant:		
Recurring Expenditures		
Meat		600
Rice, Oil, Tomatoes		160
Charcoal/wood		20
Labor for 2		200
License/tax (6,000 ÷ 1625 UM/yr)		20
Total per day		1,000
Monthly: (Month = 30 day	30,000	
Fixed Monthly Expenditures	1,200	
Receipts/day		
26 meals x 80 UM		2,080
Monthly	62,400	
Less Total Monthly expenses (per above)	(31,200)	
Net Monthly Profit:	31,200	
Hand Laundry:		
Recurring Expenditures		
Charcoal		50
Gum		100
Soap		150
Dye		40
Labor for 2[a)]		340
License and Tax		75
Rent		33
		788
Monthly: (Month = 30 days)	23,640	
Fixed Monthly Expenditures	140	
Receipts/day		1,050
Monthly	31,500	
Less Total Monthly expenses (per above)	(23,780)	
Net Monthly Profit:	7,720	

a) A hand laundry is generally situated by a well. Water is thus costed in the labor.

Source: RAMS field observations, 1980.

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Exhibit 5-19

Production and Labor Budget for Metal and Leather Craftsman in the Tagant Region

Metalworking Articles	Raw Material Costs (UM)	Unit Resale Price (UM)	Profit per Unit	Time In Production	Work Days Per Year	Annual Production (Units)	Net Income (UM)
Tea Pot	700	1,600	900	2.5 days	125	50	45,000
Household Items	10	30	20	.1	55	550	11,000
Reparation Services	10	30	20	.33	25	75	2,250
					205 days/year		58,250
			Less Operating Costs (Charcoal, etc)				4,100
				Net Annual Profit			54,150
Leather Crafts							
Leather cushion[a]	160	260	100	1.0	25		2,500
			Less Operating Costs				-
				Net Annual Profit			2,500
			Total Yearly Profits (54,150 + 2,100)				56,650
			Average Daily Income (230 days worked)		UM/day		246

a) Often produced in Touisa, a form of cooperative labor organization. The work is reserved predominantly for Moorish women to earn supplementary income. Income is calculated as an average of male and female cushions.

Note: Artisanal labor, the more distant it is from sedentarized centers, is exchanged for goods and therefore falls outside the monetarized circuit. This is especially the case among nomads where an itinerant craftsman travels from encampment to encampment exchanging goods for services.

Source: BAME field observations. 1980.

Exhibit 5-20

Production and Labor Budget of a Craftsman (Blacksmith) in the Hodh Gharbi Region

Article	Length of Production	Raw Material Costs (UM)	Annual Production Level	Work Days per Year	Unit Price (UM)	Income (UM)	Constraints
Camel saddle	6 days	600	2	12	2,500	3,800	Frequent trips in bush to procure supplies
Calabash bowl	0.5 day	-	30	15	120	3,600	
Wooden bed	1.5 days	900	25	37.5	1,500	15,000	Lack of wood
Portable table (Michakhab)	12 days	600	2	24	2,200	3,200	
Burner	0.5 day	-	5	2.5	200	1,000	Low demand
Wooden bucket (Tadit)	1 day	-	4	4	200	800	Lack of wood
Farm tools	0.5 day	(scrap metal)	20	10	100	2,000	Low demand
Repair of radio/ tape recorder	-	-	-	36	-	12,000	Parts and tools
				141 days/year		41,400	
Operating costs (charcoal, tools)				141 days/year		2,300	
						39,100	

Average income/day worked - 277 UM

a) Less time taken to procure raw material

Source: RAMS field observations. 1980.

5.6 Road Transport

The following exhibits provide data on the domestic road transport system. Other modes of domestic transport include the railroad between Nouadhibou and Zouerate serving the SNIM mining operation, but also providing passenger transport between these towns and Nouakchott (via Choum); Air Mauritanie with at least weekly or bi-weekly flights to regional capitals; and traditional caravans. As far as is known, no study exists on this latter mode, nor any systematic data.

The volume of freight in 1980 in rural sedentary areas has been estimated at between 200,000 and 225,000 tons/km. This traffic circulated at an average rate of 8.26 UM/ton/km, providing an income evaluated at 159.7 million UM of added value. Truck transport represents 12% of the transport GDP, generally estimated as 2,130 million UM for 1980. Volume of freight presented in the following exhibits include only inter-regional transport and this only for traffic exceeding 1,000 tons for the year.

Truckers' profit margins are generally set by government decree. The decree establishes a scale of road transport charges for freight, which is evaluated with a 15% profit. Freight distributed by parastatal organizations to private transporters (for whom the Food Aid Commission provides 40% of their work during certain periods) tends to substantiate the official rates.

For complementary information see RAMS Economic Activities of the Rural Private Sector. Report AE-4

Exhibit 5-21

Road Network
By Type of Road, 1980

Type of Road	Total (km)	As Seen Between
1. Asphalt	1,344	Nouakchott - Rosso
2. Improved dirt	710	Akjoujt - Atar
3. Non-improved track National	3,005	Rosso - Boghé
4. Non-improved track Regional	1,425	Kankossa - Kiffa
5. Secondary track	1,050	Ouadane - Chinguetti
Total	7,534	

Source: Ministère de l'Equipement et des transport, Programme de Remise en Etat, d'Entretien et de Construction du Reseau Routier Mauritanien, March 1980.

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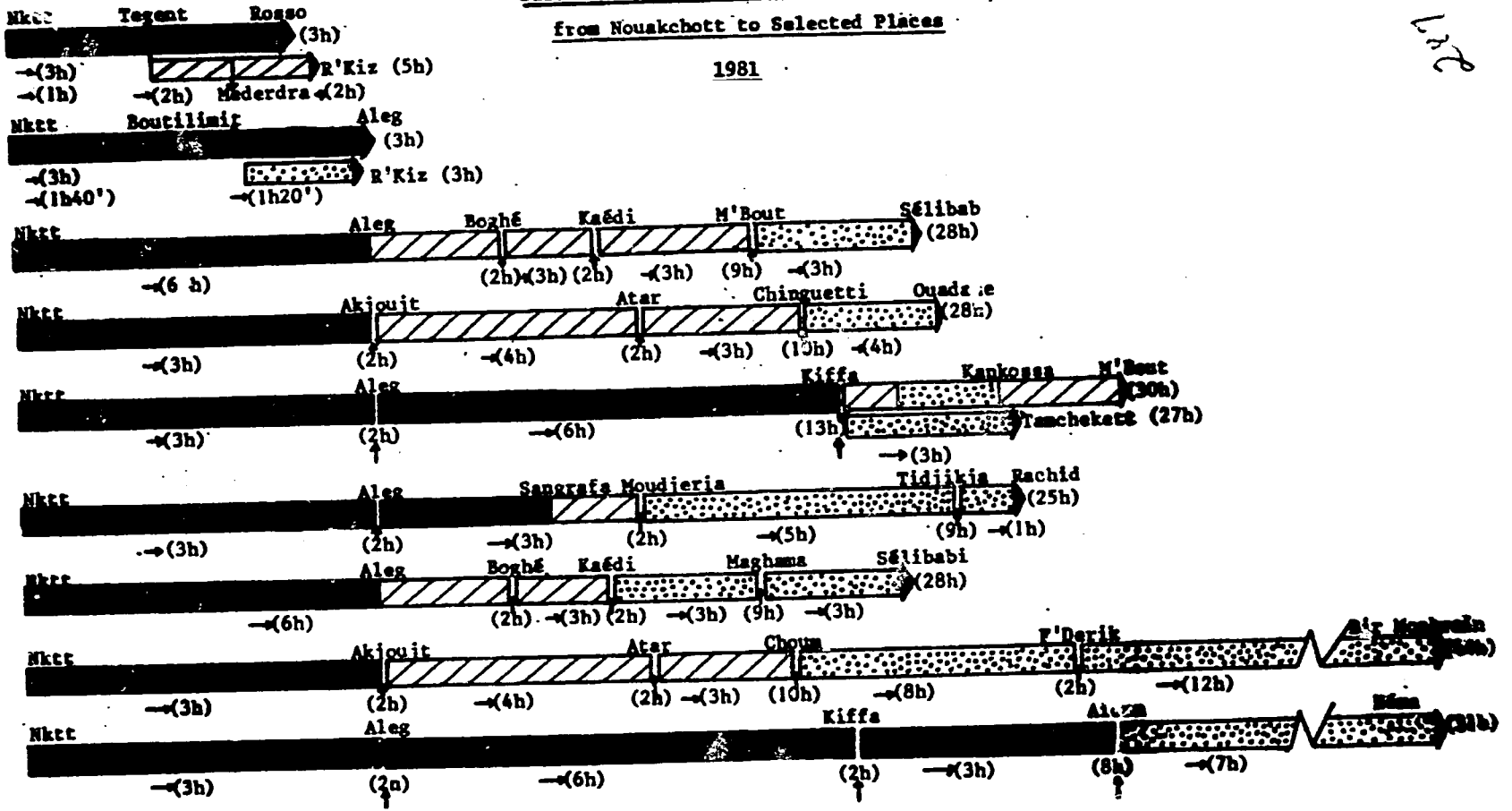
Exhibit 5-22

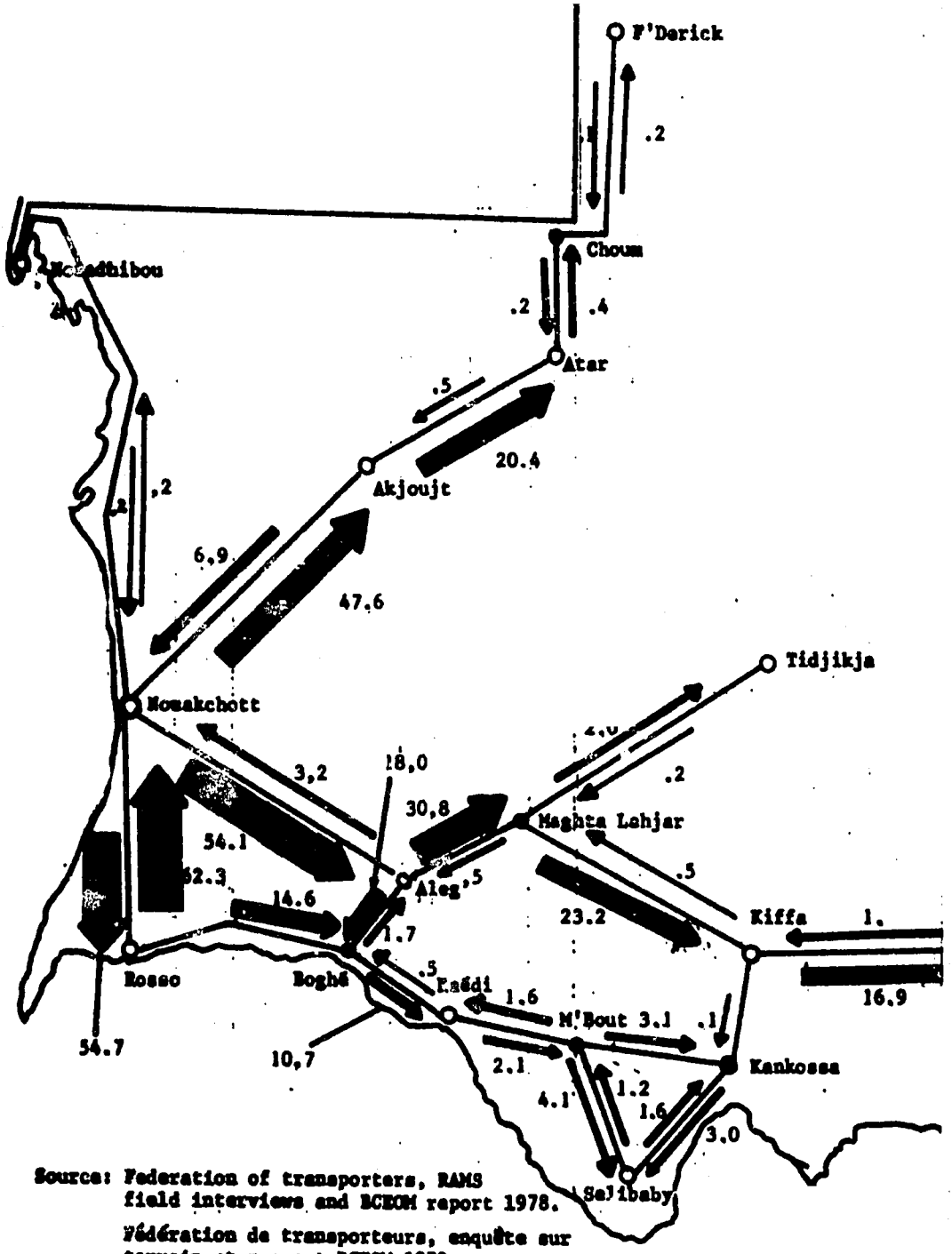
Distances by Road Between Selected Towns

	Aioun El Atrouss	Akjoujt	Aleg	Atar	Bir Moghrein	Boghé	Boutilimit	Chinguetti	F'Derik	Kaédi	Kankossa	Kiffa	Maghama	M'Bout	Nederdra	Moudjeria	Néma	Nouakchott	Ouadane	Rosso	Sélibaby	Tamchekett	Tidjikja	Tinbedra	Zouerate
Aioun El A.		1043	535	1241	1955	605	639	1367	1554	496	291	191	541	371	799	461	300	793	1487	839	431	160	470	183	1584
Akjoujt	1043		514	198	1161	621	410	318	505	699	959	858	817	815	434	720	1349	256	438	460	935	979	880	1332	535
Aleg	535	514		712	1419	70	104	832	1019	180	544	344	307	305	264	210	835	258	952	240	425	464	370	718	1048
Atar	1241	198	712		707	782	608	120	307	888	1157	1055	1015	1013	632	918	1547	454	240	658	1133	1177	1078	1430	337
Bir Moghrein	1955	1161	1419	707		1489	1315	827	400	1595	1864	1763	1722	1720	1339	1625	2254	1161	947	1365	1840	1884	1785	2137	430
Boghé	605	621	70	782	1489		174	902	1085	110	405	414	237	235	279	280	906	328	1022	215	347	534	440	796	1119
Boutilimit	639	410	104	608	1315	174		728	915	284	548	448	411	409	160	314	939	154	848	200	404	558	474	822	945
Chinguetti	1367	318	832	120	827	902	728		427	1012	1276	1176	1139	1137	1296	1042	1669	574	120	778	1257	1296	1202	1550	457
F'Derik	1554	505	1019	307	400	1085	915	427		1199	1454	1363	1322	1320	939	1225	1854	761	545	965	1440	1484	1385	1737	30
Kaédi	496	699	180	888	1595	110	284	1012	1199		295	305	127	125	444	390	796	438	1132	325	227	425	550	679	1229
Kankossa	291	959	444	1157	1864	405	548	1276	1454	295		100	250	170	708	370	591	702	1396	748	140	220	530	474	1493
Kiffa	191	858	344	1056	1763	414	448	1176	1363	305	100		350	180	604	270	491	603	1297	644	240	120	430	374	1393
Maghama	541	817	307	1015	1722	237	411	1139	1322	127	250	350		70	570	517	841	565	1259	452	110	470	677	724	1356
M'Bout	371	815	305	1013	1720	235	409	1137	1320	125	170	180	70		568	515	671	563	1257	450	120	300	675	671	1354
Nederdra	799	434	264	632	1339	279	160	1296	939	444	708	604	570	568		493	1099	160	872	64	625	724	653	1095	969
Moudjeria	461	720	210	918	1625	280	314	1042	1225	390	370	270	517	515	493		761	468	1162	450	510	390	160	644	1259
Néma	300	1349	835	1547	2254	906	939	1669	1854	796	591	491	841	671	1099	761		1093	1767	1135	731	460	921	117	1884
Nouakchott	793	256	258	454	1161	328	154	574	761	438	702	603	565	563	160	468	1093		694	204	683	723	678	976	791
Ouadane	1487	438	952	240	947	1022	848	120	545	1132	1396	1297	1259	1257	872	1162	1787	694		898	1373	1417	1318	1670	577
Rosso	839	460	240	658	1365	215	200	778	965	325	748	644	452	450	64	450	1135	204	898		570	764	610	1018	935
Sélibaby	431	935	425	1133	1840	347	404	1257	1440	227	140	240	110	120	625	510	731	683	1372	570		360	670	614	1464
Tamchekett	160	979	464	1177	1884	534	558	1296	1484	425	220	120	470	300	724	390	460	723	1417	764	360		550	343	1513
Tidjikja	470	880	370	1078	1785	440	474	1202	1385	550	530	430	677	675	653	160	921	678	1318	610	670	550		653	1419
Tinbedra	183	1332	718	1430	2137	788	822	1550	1737	679	474	374	724	671	1095	644	117	976	1670	1018	614	343	653		1766
Zouerate	1584	535	1049	337	430	1119	945	457	30	1229	1493	1393	1356	1354	969	1259	1884	791	577	935	1464	1513	1419	1766	

Source: IGN Map of Mauritania at 1:2,500,000. 2nd Edition, 1980.

Exhibit 5-23
Distance and Travel Time by Type of Road
from Nouakchott to Selected Places
1981





Source: Federation of transporters, RAMS field interviews and BCEOM report 1978.

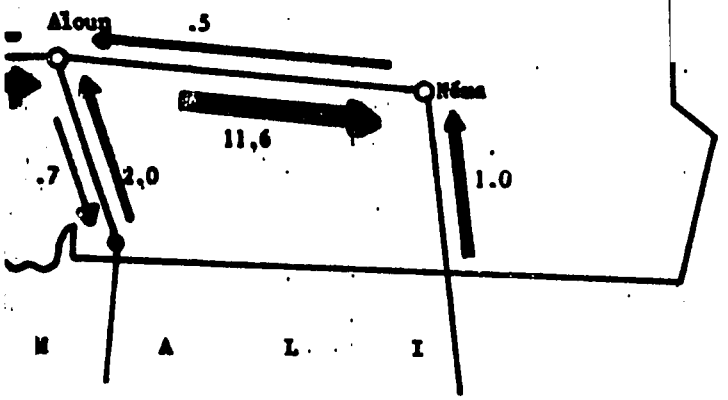
Fédération de transporteurs, enquête sur terrain et rapport BCEOM 1978.

Exhibit 5-24

Inter-Regional Truck Transport, 1980
1,000 tons)

eaux du Transport, 1980
liers de tonnes)

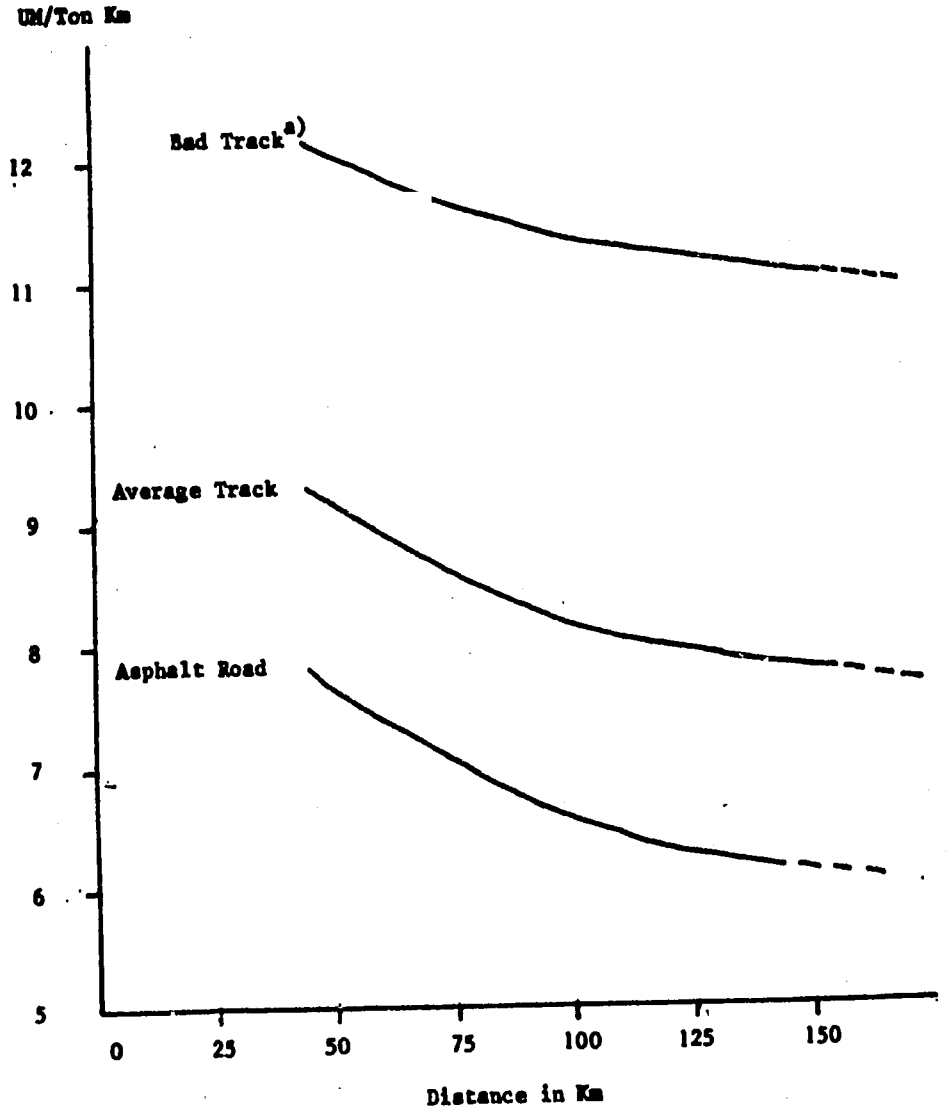
Regional Capital - Chef-lieu de région
Relay village - Village de relais



S/E = 1:4,000,000

Exhibit 5-25

Average Operating Cost of a 12 Ton Truck by Road Surface Type, 1980-1981



a) Defined as irregular and causing slowdowns.

Source: RAMS.

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Exhibit 5-26

Transport Cost - Trucking

1980

Relay towns	UM/kg[a] (1980)	Kms	Tons/km
Nouakchott - Boutilimit	3	154	19.50
" - Aleg	4	258	15.50
" - Kaédi	5	438	6.90
" - Kiffa	5	603	8.29
" - Aioun	7	793	8.82
" - Néma	9	1,093	8.23
Kiffa - Selibaby	2	240	8.33
" - Kankossa	1	100	10.00
" - Aleg	3	344	8.72

a) Rates apply to transported goods (excluding fresh fish) between Nouakchott and points south and west. Back-haul rates are lower.

Source: RAMS field observations, 1980.

Exhibit 5-27

Public Passenger Transport Rates Between Selected Towns[a)]

Travel Points	Distance (km)	1975 (UM)	1978 (UM)	1980 (UM)	Increase 1975-1980
Nouakchott - Rosso	204	250	320	355	42%
Nouakchott - Akjoujt	256	320	400	440	38%
Aleg - Kiffa	344	200	165	175	- 13%
Akjoujt - Atar	198	350	450	495	13%
Atar - Aoujeft	90	160	200	220	38%
Rosso - Boghé	215	450	570	630	40%
Moudjeria - Tidjikja	160	200	260	290	45%
Kaedi - Selibaby	227	350	450	495	41%
Kiffa - Aioun	191	450	550	605	34%
Kiffa - Nema	535	800	950	1,045	31%

a) Taxi rates. Small truck transport rates are 15% to 20% lower. Rates do not apply to baggage, for which there are no price controls.

Source: Ministere de l'Industrie et du Commerce.

Chapter 6 Rural Production

Table of Contents

6.1 Overview

This chapter is divided into two parts: the first includes selected descriptive data of each major production subsector, the second regroups detailed past and present production data.

The first part is introduced by a section on agro-ecological zones, to which the subsequent tables are keyed. These zones also serve as pivotal points to the various sections that follow. There is a discussion of farm and labor budgets, and a presentation of agricultural activities on a calendar basis. A composite table in the General Section compares cost, yield and returns of various crops by type of cropping system.

The second part consists of production tables from which GDP calculations were formulated. Additional details on these subjects can be obtained by consulting studies and texts referred to in the selected bibliography and RAMS reports (see list in Introduction).

Collected data originate from these principal sources:

- Mauritania and FAO publications
- RAMS surveys and reports
- Special studies

elected Annotated References

Rural Production

Cultures vivrières dans la zone fluviale du Sud-Est Mauritanien (possibilités de développement), B.D.P.A., Sécrétariat d'Etat aux Affaires Etrangères, 1967 (124 pp.)

Object of study was to formulate a development plan that would enhance and promote agricultural production in the southeast. Data on agricultural and livestock productions are presented together with economic evaluations of production. Recommendations cover the entire range of agricultural activity.

Déplacements Saisonniers des éleveurs en basse et moyenne Mauritanie, F. Bonnat-Dupeyron, Ministère de la France d'outre-mer, 2 maps 1:500,000. 1950

Superbly detailed work representing seasonal movements of herdsmen by tribe and group of tribe. Includes axes used in periods of various rainfalls, types of herds moved along the axes[a] and cultivated and protected fields. Pinpoints wells and watering points according to depth and salinity, permanent and temporary villages serving as cattle trading and transport centers and palm groves. Shows that seasonal movements are not always on a north-south basis.

Développement Rural de la Région du Tagant, SONADER, Agrar - und Hydrotechnik. GMBH. INSTRUPA, 1979

A professional study of the agricultural development potential using a water-resources approach.

Evaluation des effects sur l'environnement d'aménagement prévus dans le bassin du fleuve Sénégal, rapport partial sur le développement agricole, O.M.V.S., Gannett, Fleming, Corddry and Carpenter Inc., Harrisburg, Pa. en association avec ORGATEC, 1976 (also in English)

Thorough review of factors limiting or contributing to the development of the Valley and in particular to irrigation. The impact of the proposed dams at Diama and Manantali on the existing agro-ecosystem is discussed.

La Moyenne vallée du Sénégal - Etude Socio-Economique, J.L. Boutilier, et al, Ministère de la Cooperation/INSEE, Paris, 1962 (368 pp.)

Considered as the classic study on agro-socio-economical conditions of the Senegal river valley. Chapter 2 treats extensively traditional agricultural practices and patterns of the ethnic groups inhabiting the banks and cultivating the dieri and the walo.

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a) Accompanied by shepherds or by population.

Projet de développement du Sud-Est Mauritanien, BDPA, L.C. Beaudoin, Tomes I-IV: République Française - Ministère de la Coopération, 1975

An exhaustive study of the agro-pastoral system existing in the southeast. From the crop aspect, agronomic characteristics of local varieties of millet and sorghum are presented, as well as yields and the economics of production. The role played by livestock as an element of the agro-pastoral system is also considered, as well as its utilization for cultivation by animal traction.

Projet de développement intégré dans la vallée du fleuve Sénégal, CARITAS, Mauritanie, Région Administrative de Kaédi RIM, 197? (82 pp.)

Constitutes a project proposal for the development of perimeters in four villages in the Kaédi and Maghama Departments. An excellent guide to the nature and wide range of conditions to be taken into consideration in designing such projects.

6.3 Agro-Ecological Zones

At the inception of the Project, RAMS sought to identify coherent agro-ecological zones intended to "constitute the interior framework within which sample surveys and impact analyses of investments and development strategies"[a] could be implemented.

The Zones were to permit the identification of sub-zones where human and physical potentials of development existed, as well as to identify associated constraints which limited such developments.

A map and a description of each zone is included. The zones represent the four dominant agricultural production systems practiced in Mauritania: irrigation, dryland, oasis and livestock herding.

For planning purposes, however, administrative regional divisions were considered more appropriate for data collection and classification. Thus, a chart is included which presents an integration of the regions with the agro-ecological zones from a surface area perspective.

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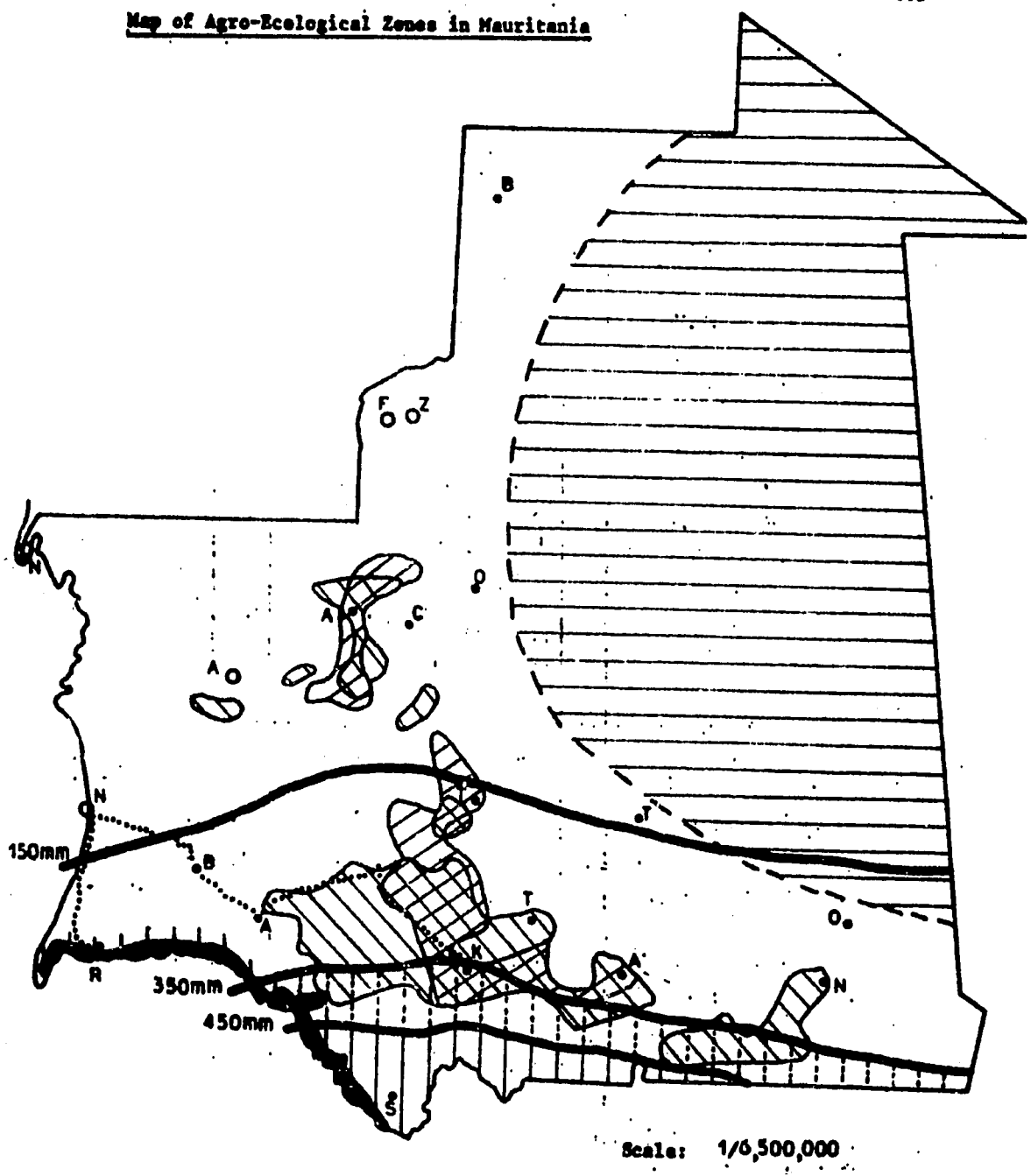
a) Proposition pour l'Evaluation du Secteur Rural et des Ressources Humaines, Islamic Republic of Mauritania, USAID, 1978.

Exhibit 6-1

Map of Agro-Ecological Zones in Mauritania

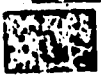


Rainfall lines (Isohyets) are shown.

SOURCE: RAMS 1980

Legend of Exhibit 6-1
Map of Agro-Ecological Zones

1. Agro-ecological Zones



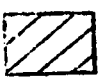
1. Senegal River Valley

350 mm +0 450 mm

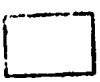
450 +0 650 mm

— 2. Rain-fed cultivation

3. Oued floodland cultivation

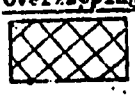


4. Palm - groves (oasis)



5. Pastoral zone

Overlapping zone

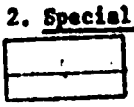


1. Oued floodland cultivation and palm groves

2. Oued floodland cultivation and rain-fed cultivation (between 350 mm & 450 mm)

3. Intermixing of 3 zones - Palm groves
- Oued floodland cultivation
- Rain-fed cultivation (between 350 mm & 450 mm)

2. Special ecological zone



Majabat Al Koubra

3. Autres non-ecological zones

○ Modern urban zones

Transitional zones: recently paved roads.

Description of Agro-Ecological Zones[a)]

Zone 1 : Senegal River Valley Zone

Zone has more agricultural potential than other zones. Annually enriched by silt deposits (floods from June through October).

a) Climate: Rainfall varies from 650 mm in the southern-most part of the zone (Guidimaka) to 300 mm in the north. Inter-annual rainfall variations are great.

b) Soils: Essentially hydromorphic gleyey (of varied chemical richness), developed on alluvia.

c) Natural Vegetation: Dominant tree in the periodically flooded lowlands is Acacia Nilotica. On the edges of the valley, Acacia sieberiana, Acacia seyal, Zisiphus mauritania. Grasses are presented by Vetiveria nigritana.

d) Agriculture and Population: Millet and sorghum are principle cereal crops. Types of agriculture practiced are: floodland cultivation (oualo), irrigated cultivation (rice) and rainfed cultivation (dieri) on non-flooded banks.

Compact and impermeable soils (clayey) are planted in rice and sorghum. The valley represents more than 80% of the crop production of Mauritania. Traditional agriculture is practiced by the Wolofs in the lower valley, downstream from Rosso, by Soninke or Sarakoles in the Guidimaka, and by Toucouleurs between Rosso and Maghama. These are all sedentary farmers.

Zone 2 : Rainfed Cultivation

Agriculture directly dependent on spatial distribution of rainfall rainfall volume and distribution over time. Usually practiced regularly each year to the south of the 450 mm isohyet. To the north, rainfed cultivation can extend up to the 350 mm isohyet during good years.

Zone is located approximately between the 15° latitude north (for the southern part of the zone) to above the 16° latitude north (for the northern-most part, around Kiffa).

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a) For more detailed information and relevant tables, see RAMS report Agro-Ecological Zone.

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Livestock raising is the dominant activity.

a) Climate : Rainy season lasts from 3 to 4 months, shorter towards the north. Dry season lasts from 8 to 9 months.

b) Soils : Zone covers great variety of soils. Classified as follows:

- hydromorphologic soils of the Gorgol Noir, Gorgol Blanc and Karakoro valleys
- little complementary soils (central Guidimaka)
- erosion and crust soils (raw material) - (Assaba, Affolé)

c) Natural Vegetation

- Combretum glutinosum in the south (Guidimaka and along the Malian border) and grass savannas, with baobabs and palm trees.
- Soudanian savanna to vegetation of the Sahelian steppe type towards the north.
- Acacia senegal (Trarza), Comiphora africana (Brakna), Ziziphus mauritania (Aftout de M'Bout), Acacia tortilis (Assaba, Guidimaka), etc., from east to west.

d) Agriculture and Population

Zone of extensive agriculture, devoted essentially to millet and sorghum ("little millet" in the northern-most part of zone). Also pastoral zone.

Peulhs and Moors lead their herd in search of pastures (the Peulhs practice transhumance, the Moors practice nomadism). The rainfed cultivation zone is the domain of cattle raising.

Herd movements are from the south to the north during rainy season, and towards the south in dry season. Also east-west migrations according to the distribution of rainfall.

Population is composed of sedentary farmers and semi-sedentary nomads which include Toucouleurs, Soninkes or Sarakoles, Moors (and Haratins).

During periods of severe drought, the nomads, both Moors and Peulhs, abandon nomadism and practice agriculture part-time.

Zone 3 : Oued Floodland Cultivation (recessional)

Zone is intermixed with Palm Grove Zone (see Zone 4).

Floodland cultivation is located along oueds, and is practiced after the floods. Small dams are built across favorable spots of oueds in order to store rain water up-stream. As water recedes (controled by the farmers), humid banks are cultivated. Type of agriculture depends directly on rainfall which fills dam reservoir through runoffs from up-stream catchment basins.

Also included in this zone are ponds in the lowlands fed by rains which dry up progressively, allowing cultivation of the edges, and the Adrar grairs. In low zones of the oueds, cultivation is possible one year out of five.

a) Climate and Hydrology

Zone located between the 350 isohyet and the 100 mm isohyet (where floodland cultivation is very "risky"). Aleg to Moudjeria axis marks western limit (sand-covered expanses to the west). Towards east, floodland cultivation is found up to the Dhar Nema, below the isolated reliefs.

Flocdland cultivation found essentially to the south of the 150 mm isohyet. But also exists in the Adrar above the 150 isohyet. High sandstone reliefs which can rise to 800 m in altitude, having a high runoff coefficient, capture and concentrate the runoff oueds. This permits extension of floodland cultivation towards the north.

b) Soils

Cultivation is practiced on oued alluvia, which are generally sandy (with varying proportions of clay, silt and gravel). Around ponds, hydromorphic pseudo-gley soils are found in areas which are submerged the longest. In the grair flow zones of the oueds, soils are sandy and stoney.

c) Natural Vegetation

Species found only in the south advance towards the north along oueds. Acacia nilotica is common along

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ouads becoming scarcer towards the north. Vegetation distribution is a function of micro-climate and geomorphology.

d) Agriculture and Population

Intensive cultivation is practiced along the ouads; sorghum is main crop. Other crops include millet, corn, wheat, niébé, sweet potatoes.

Most storage dams are traditional structures (about 95%), composed of an earth dike, sometimes consolidated by slabs of sandstone built across a narrow part of the oued (they are several meters high), not solid and poorly maintained. Slowly being replaced by modern dams, composed of a compacted earth dike, with a cement spillway and drainage atructure. Floodable surface areas vary considerably from year to year.

Populations which cultivate these areas are Moors and Harratins.

Herding is dominant activity. Cattle raising can attain the 150 mm isohyet in the north. Peulhs lead their herds (Zebu gobra) in search of pasture; they rarely go above the 350 mm isohyet coinciding with extreme northern limit of rainfed cultivation. Moors and Harratins, practice cattle raising above the 350 mm isohyet (Zebu Maure).

Since the drought which began in 1968 and the disappearance of cattle resources, many Harratins left their Moorish "protectors". Agricultural production also decreased as storage dams remained unfilled. This has reduced food self-sufficiency based on cultivation of sorghum and cattle raising.

Zone 4: The Palm Groves

Palm groves are distributed over a vast area which includes the highlands:Adrar, Tagant, Assaba, Affole, Dhar Nema and Dhar Tichitt.

The main cultivation is of the date palm (Poenix dactylifera).

a) Climate and Hydrology:

The date palms require average temperature higher than 28°C, an absence of rainfall during fructification but large amounts of water (8000 m^3 per hectare), which explains their extension into mountainous massifs at the foot of springs or on the edge of oueds.

b) Soils : Light, developed on sandy alluvia.

c) Vegetation : See Agriculture.

d) Agriculture and Population

Major date-producing regions are the Adrar, the Tagant, the Assaba, the Affole and the region of Nema-Oualata. Surface area covered by all these palm groves is not greater than 3,000 hectares, and the number of date palms is about 1 million.

Palm groves are generally small, the largest only a few dozen hectares. There are two types of palm groves: wild and farmed.

The farms are more numerous, surrounded by thorn fences (Zeriba)or low stone walls. Plots are small, generally 30 m^2. Wild palm groves are actually abandoned groves without fencing. Visited by nomads at harvest time (Guetna).

Some Harratins and even a few "noble" Moors (Bidan) practice permanent date cultivation in the farmed palm groves. Some groves are devoted solely to date production, others to inter-cropping (millet, wheat, barley, henna, lemon trees, beans, niébé, potatoes, carrots, turnips, onions, etc.)

Irrigation is important and is carried out by water drawn from the délou, with balanced beams or motor pumps or ditch networks.

Zone 5 : Pastoral Zone

This zone is a vast area in which livestock raising is predominant.

a) Climate:

Extends to the north of the 200 mm isohyet but also descends to the Senegal River Zone.

Rainfall is quite variable from several mm to 200 mm.

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Climate is basically arid, with high temperature in the summer (16 to 49°C), and cool temperature in the winter (0 to 33°).

b) Soils: Desert and steppe soils dominate.

c) Vegetation

Vegetation is of the steppe type, more sparse towards the north, main vegetation groups being Acacia tortilis ss. raddiana. Grasses are mainly Panicum turgidum ("Markba") and Stipagrostis pungens ("Sbatt").

d) Population and Livestock

Pastoral migrations are linked to the distribution of rainfall. The "Acheb", or "spontaneous pasture", appears after the first rains. Moors follow the rains with their herds.

Some who live on the edge of the Sahelo-Sahara and the Sahara stay south in the dry season, to benefit from winter rains, and move southwards in the Sahel during the summer rains.

In the Saharan zone, dromedaries are the main resource. In the Sahelian zone, livestock consists primarily of cattle.

The Ecological Zone of East Mauritania

Zone 6 : The Desert

This zone is nearly devoid of human activity. It is known as the "Majabat al-koubra")"land of the great crossing"), or as the "west Saharan Empty Quarter" (Theodore Monod).

Desert covers about a third of Mauritania's surface area, most of which is covered by an erg, is to cross due to extreme rarity of water holes.

a) Climate: No climate observation stations exist; rainfall is known to be extremely low and temperatures very high.

b) Soils: Desert soils, and complementary desert soils on eolian sand.

c) Vegetation: Sparse vegetation. The areal richness rate is 4, one of lowest in the world. Stipagrostis pungens (a grass) is dominant vegetation group; very sparse and only found in a few areas.

Exhibit 6-2

Integration of Agro-Ecological Zones and Administrative Regions

Region	Surface Area km^2	Zone 1 River Region	Zone 2 Rain-fed	Zone 3 Oued Re-cessional	Zone 4 Palm Groves	Zone 5 Pasto-ral	Zone 6 Majabat Al Koubra	Interpenetration of Zones
Hodh Charqui	182,700	-	10%	2%	-	33%	55%	6,000 km^2 of Region is composed of Z.2 superimposed by Z.3.
Hodh Gharbi	53,400	-	40%	15%	-	45%	-	2,000 km^2 of Region is composed of Z.2, locally superimposed by Z.3, 5,150 km^2 of Z.3 is over-lapped by Z.5.
Assaba	36,600	-	46%	45.8%	-	8.2%	-	Central portion of Z.3 contains palm groves.
Gorgol	13,600	22%	78%	-	-	-	-	Approx. 25% of Region in north, between 350 isohyet 350 + 450 mm contain oued recessional superimposed on Z.2.
Brakna	33,000	8.5%	3%	31.5%	-	57%	-	
Trarza	67,800	5%	-	-	-	95%	-	
Adrar	215,300	-	-	- 8%	-	38%	54%	Z. 3+4 are superimposed
Dakhlet-Nouadhibou	17,800	-	-	-	-	100%	-	
Tagant	95,200	-	-	-	17%	53%	30%	Approx. 40% of Z.3 superimposes Z.4.
Guidimaka	10,300	15%	85%	-	-	-	-	
Tiris Zemmour	252,900	-	-	-	-	40%	60%	
Inchiri	46,800	-	-	3%	-	97%	-	

Source: RAMS.

6.4 Selected Agricultural Tables

6.4.1 General Information

Exhibit 6-3

Estimates of Arable and Cultivated Lands by Region [a] (ha)

Region	Wolo Falo/Fondé	Dieri	Irrigated	Oasis Date Palms (000)	Oued DAMS	Pasture Potential (000)
H. Charqui						
arable	-	n.a.	-		2,910	6,362
cultivated	-	2,000	-	b)	n.a.	
H. Gharbi						
arable	-	n.a.	-		2,910	5,155
cultivated	-	16,500	-	48	873	
Assaba						
arable	-	n.a.	1,364		2,230	2,829
cultivated	-	n.a.	900	221	950[c]	
Gorgol						
arable[d]	33,000	60,000	240		1,120	f)
cultivated	20,500	23,500	n.a.	b)	n.a.	
Brakna						
arable	n.a.	n.a.	1,590		1,120[e]	f)
cultivated	20,000	16,500	507	b)	n.a.	
Trarza						
arable	n.a.		3,898		n.a.	f)
cultivated	7,500	8,000	2,666	b)	n.a.	
Adrar						
arable	-	-	n.a.		n.a.	f)
cultivated	-	-	300[g]	444	55	
Tagant						
arable[h]	-	1,000	300		4,000	f)
cultivated	-	700	162	292	1,300	
Guidimaka						
arable	-	n.a.	n.a.	-	n.a.	1,013
cultivated	-	28,000	533[i]	-	12,000[j]	
Inchiri						
arable	-	-	n.a.		300	f)
cultivated	-	-	n.a.	b)	n.a.	

- = type of agriculture not found

See following page for source and explanations.

Source for Exhibit 6-3

Politique du Stockage des Cereales Alimentaires en Mauritanie, Agroprogress, GMBH-OMC, 1977.
For Wolo, Falo/Fondé, Deri except where otherwise indicated.

RAMS
For Irrigated, Oued and Oasis except where otherwise indicated.

L'Elevage en Sud-Est Mauritanien, FED, 1976, Tome I.
For Pasture

a) Excludes Tiris Zemmour and Daklet-Nouadhibou.

b) RAMS estimates 20,000 trees for these 5 regions.

c) Monographie Statistique de la 3^{e} Region, Direction de la Statistique, 1976.

d) Monographie Statistique de la Region du Gorgol, Direction de la Statistique, 1976.

e) The total figure of 2,240 for both Brakna and Gorgol Regions has been equally divided for the purpose of this table.

f) No attempt has been made to estimate pasture potential in these areas. A USAID Renewable Resources project will, by the end of 1981, complete a soil and vegetation inventory of the southwest area, providing useful pasture information.

g) Monographie Statistique de la 7^{e} Region, Direction de la Statistique, 1975. Converted from production figures of 450 tons.

h) Analyse de la Situation du Tagant, 1979.

i) SONADER, 1980.

j) Monographie Statistique de la 10^{e} Region, Direction de la Statistique, 1975.

n.a.=not available

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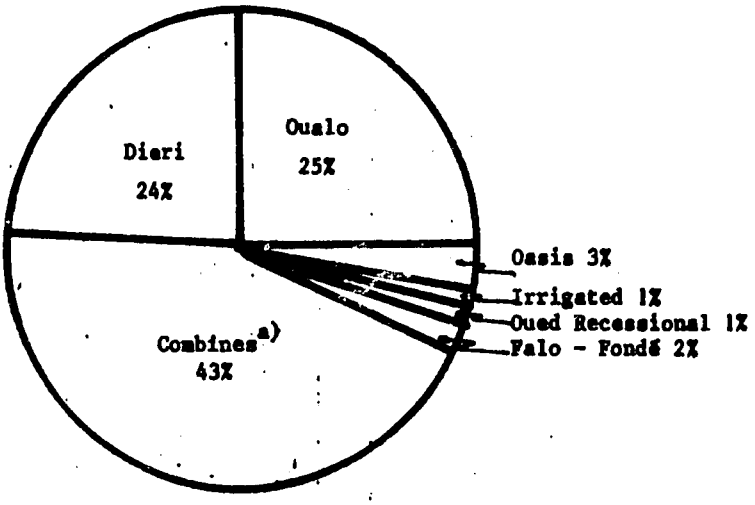
Exhibit 6-4

der Different Types of Cropping Syetem, 1979/1980

oduction in kg	Price UM/kg	Total Return in UM	Net Return in UM	Labor Days/yr	Return per Labor Day in UM
10 (Sorg.)	15	6,235	4,782	85.5	72
10 (Mil.)	14	4,050	3,274	70.4	55
15 (Nieb.)	30	1,350			
15 (Sorg.-Mil.)	14	4,550	5,623	72	78
10 (Nieb.)	30	1,800			
75 (Sorg.-Mil.)	14	5,250	5,348	55[a)]	96
50 (Nieb.)	80	1,800			
33 (Head)	7,280/head	2,450			
30 (Sorg.)	15	6,235	7,179	89	81
50 (Nieb.)	30	1,800			
2[illegible]0	10	40,000	16,570	150	110
5[illegible]0	15	50,750	31,880	120	266
500	20	50,000	11,430	74[d)]	145
200	35	112,000	200,435	174	1,169
000	25	150,000			
592	3	1,480			
200	35	112,000	105,305	117	900
800	25	20,000			
592	3	1,480			

Exhibit 6-5

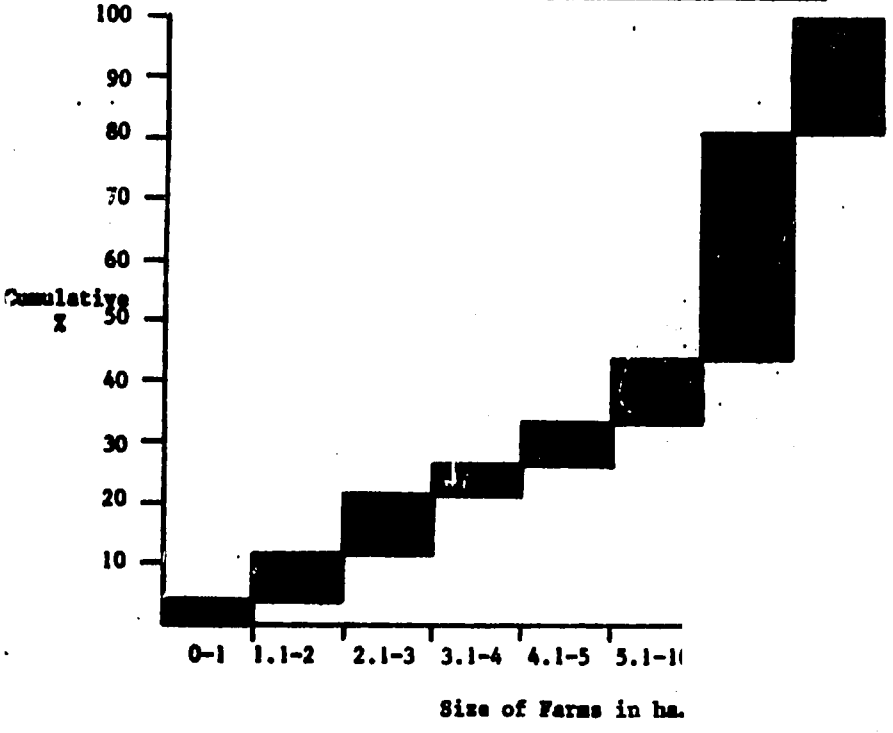
Estimated Percent of Total Cultivated Land by Type of Exploitation



a) Two or more types of farming practiced by one operator.

Exhibit 6-6

Cumulative Total of Cultivated Land by Size



Source: RAMS Production Survey 1979.

Exhibit 6-7

Percentage of Farms by Type of Exploitation

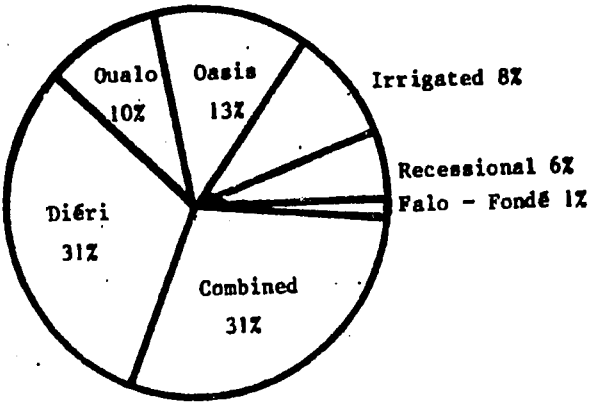
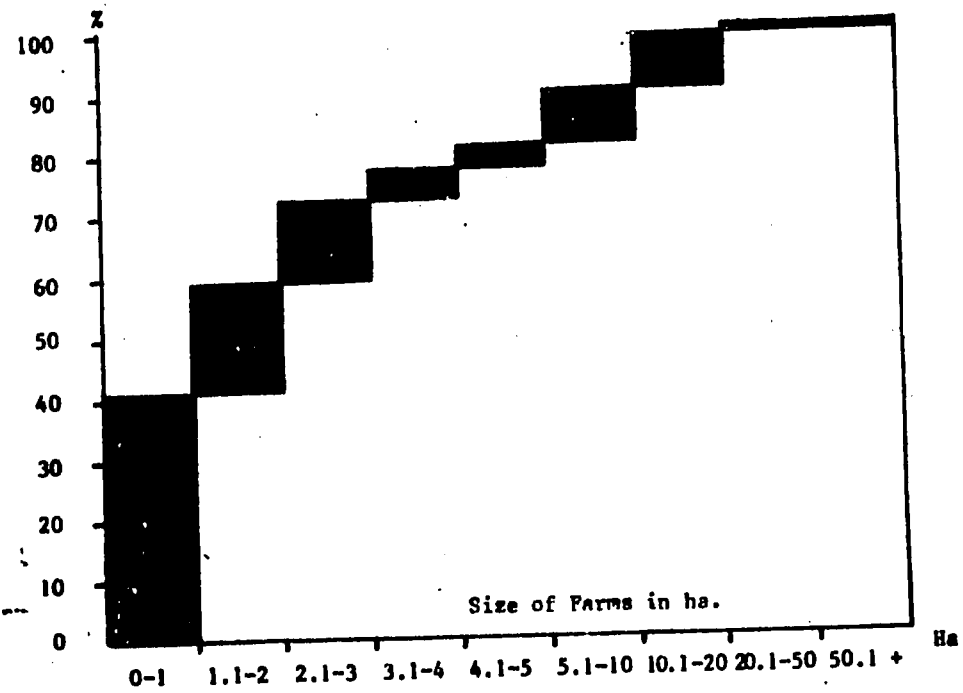


Exhibit 6-8

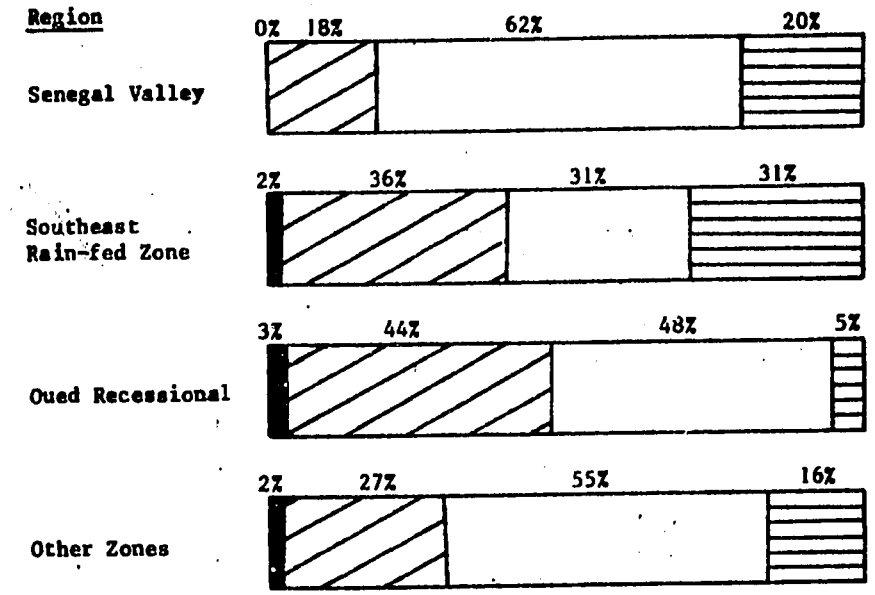
Cumulative Total of Farms by Size



Source: RAMS, 1979 Production Survey.

Exhibit 6-9

Distribution of Surveyed Farmer Population by Age and Production Type



Based on 250 production units.

Source: RAMS, 1979/80 Production Survey.

Exhibit 6-10

Cost of Processing Domestic Rice

1980

	UM/mt
Producer Price of Paddy	11,000
Transport and Handling	2,000
Sacks and Labor	500
Milling (paddy)	1,800
Storage	500
Sub Total	15,800
Conversion	0.60
Rice equivalent/ton	24,500
Less price of by-products	-1,800
Sub Total	22,700
Transport Nouakchott	3,000[a]
Cost delivered	(27,700)[b]

a) At subsidised cost.

b) Including unsubsidized transport cost (averaging 5 UM/kg) of 5,000 UM

Source: RAMS.

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Exhibit 6-11

Comparative Prices for Domestically Produced Cereals, Summer 1980

(UM/kg)

	Millet	Sorghum
Producer Price[a)]	13 - 15	14 - 16
Price at Local Market	19 - 22	18 - 20
Cost of Transport	5 - 6	5 - 6
Wholesale Price Nouakchott	28 - 30	24 - 26
Retail Price Nouakchott	32 - 34[a)]	25 - 28[a)]

Sources: RAMS Production Survey and interviews with buyers and sellers in local markets.

a) These are prices in the dry season. Information on prices during the wet season is not available.

Exhibit 6-12

Prices of Cereals in Nouakchott and Interior Markets

(UM/kg)

	Nouakchott August 1980	Interior
Millet and Sorghum	30 - 35	18 - 21
Rice (SONIMEX)	14	18 - 20
Donated Cereals	10	8
	December 1980 - February 1981	
Millet and Sorghum	32 - 36	NA
Rice	17 - 30[a)]	NA
Donated Cereals	10	8

a) 17 UM/kg for broken and 30 UM/kg for whole grain rice.

Source: RAMS Production Survey and interviews with buyers and sellers in local markets.

Gum Arabic

The Acacia Senegalensis (gum arabic), found mostly in the south-western third of the country, has greatly decreased in number since 1973. The tree product, collected from October to May, once represented the second most important item (after salt) in traditional Moorish trade. SONIMEX (see Chapter 5) is now the exclusive exporter of gum. Amounts commercialized since 1972 by the company are reproduced in the following table.

Exhibit 6-13

Gum Arabic Commercialized by SONIMEX

Year	Ton	Value (millions)
1972	4,709	1.7 CFA
1973	725	7.0 UM
1974	510	5.6 UM
1975	1,635	3.4 UM
1976	441	0.6 UM
1977	298	1.3 UM
1978	122	4.5 UM
1979	485	8.5 UM
1980	131	5.0 UM

Figures rounded.

Source: SONIMEX, RIM, 1981.

315X

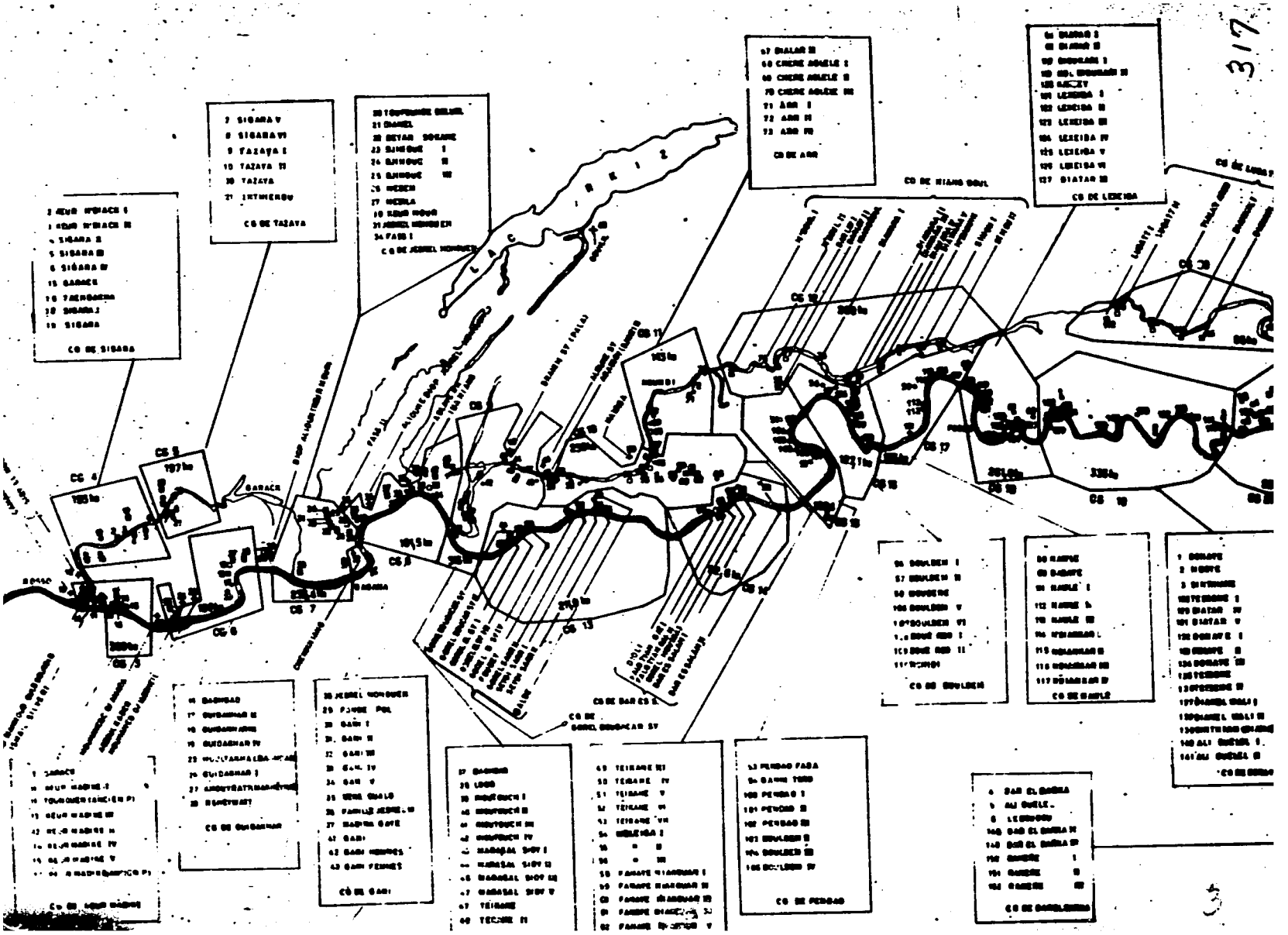
6.4.2 Irrigated Agriculture

Irrigated agriculture practiced along the Senegal river employs approximately 8,000 persons, or 10% of the total active population. Since the drought, crop irrigation is seen as a means to ensure high output and security during difficult years.

Rice is the predominant crop encouraged by SONADER, the parastatal organization charged with the planned development of irrigated agriculture.

The following maps detail the Mauritanian bank of the Senegal river region, identifying irrigated perimeters according to their types; i.e., large perimeters or those under preparation, small SONADER perimeters either cultivated or under preparation, and existing small private plots.

Each is regrouped in Administrative Centers ("Centre de Gestion", marked "CG" on maps), their function would be to provide, at the local level, technical, financial and material support to farmers for the purpose of improving production by integrating livestock and crop agriculture. (The idea of the proposed centers was not, in the final analysis, accepted by RAMS.)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CS 17
CS 18
CS 19
CS 20
CS DE SIGARA
CS DE TAZAYA
CS DE GARAGE
CS DE ARR
CS DE KIAMA GHAL
CS DE LEKEIBA
CS DE BOULEKH
CS DE GARDIL
CS DE PENDAO
CS DE GARDIENNAGE
CS DE GARI
CS DE BAR CS 8
CS DE BARDIL GHADAR SY
LAC R E I S
OUED
BARAGE
DIAMA
RIVIERE
ROUTE
PISTE

317

REPUBLIQUE ISLAMIQUE DE MAURITANIE

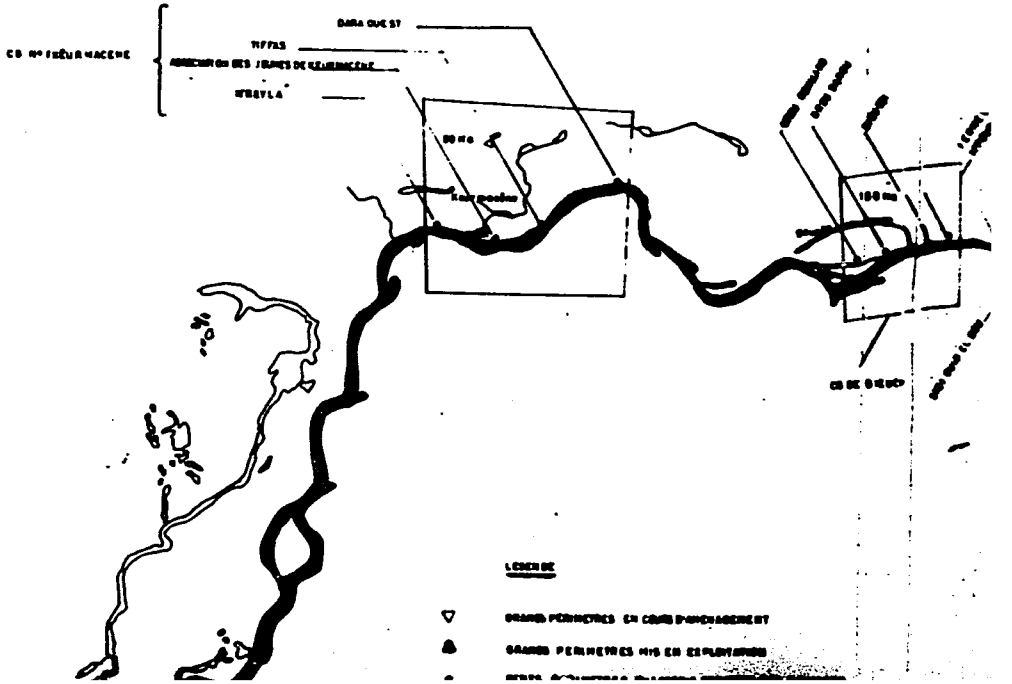
MINISTERE DE L'ECONOMIE ET DES FINANCES

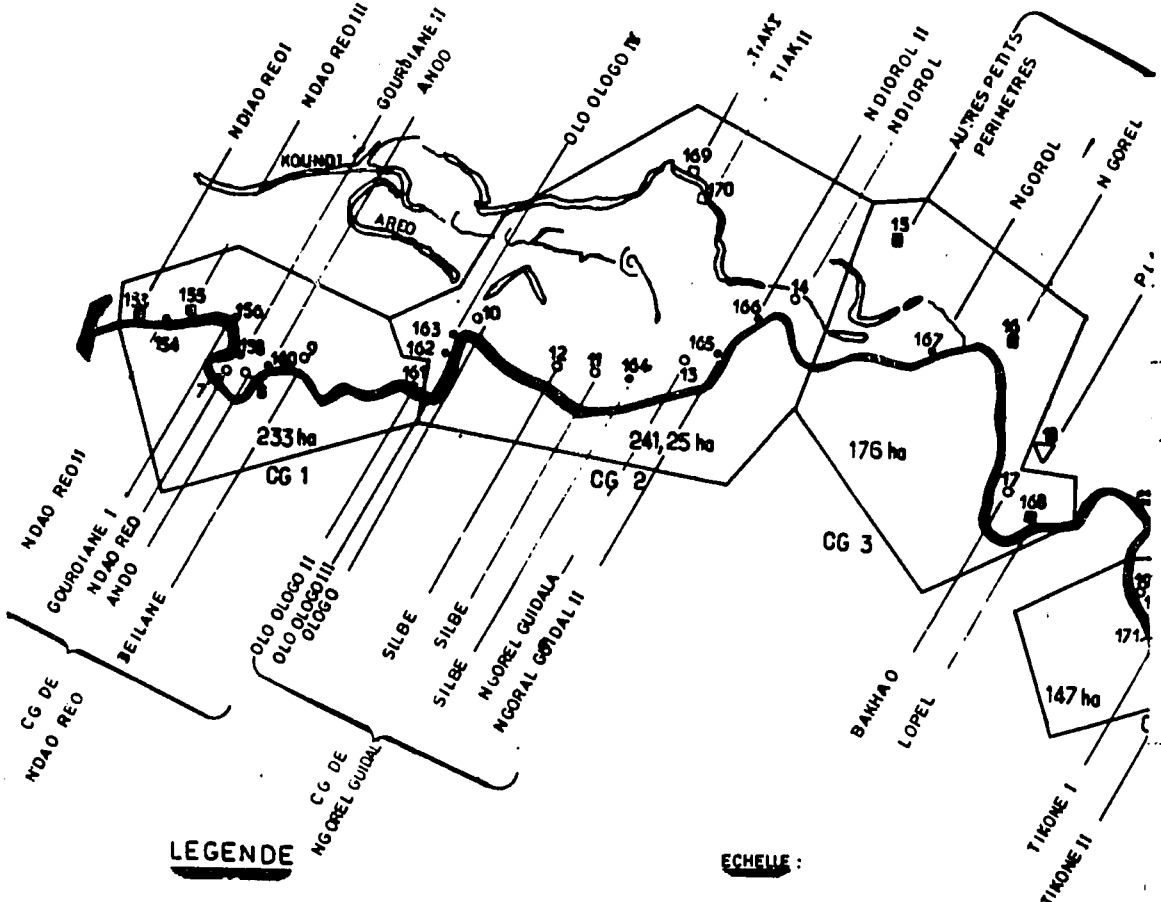
SECTEUR DE ROSSO

- AMENAGEMENT DE PETITS PERIMETRES VILLAGEOIS EN CONFORT DE VULGARISATION ET DE GESTION

Rapport

JANVIER 19..



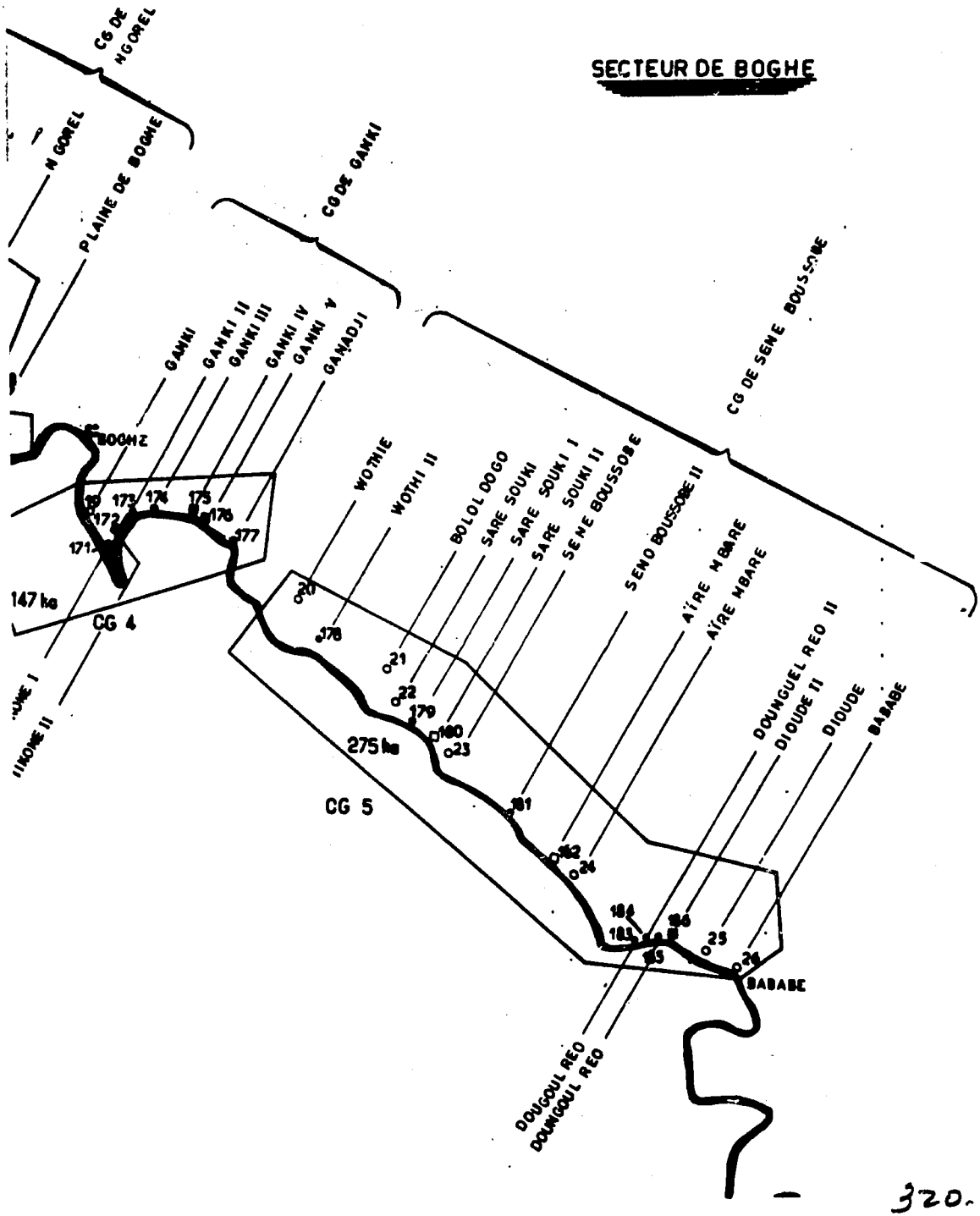


LEGENDE

ECHELLE :

- o PETITS PERIMETRES VILLAGEOIS ENCADRES PAR LA SONADER
- ■ PETITS PERIMETRES SANS ENCADREMENTS OU ENCADRES PAR DIFFERENTES MISSIONS
- ● ■ □ PETITS PERIMETRES PROGRAMMES
- ▽ GRAND PERIMETRE EN COURS D'AMEGEMENT

CG = CENTRE DE GESTION


SECTEUR DE BOGHE
CG DE NGOREL
NGOREL
PLAINE DE BOGHE
CG DE GANKI
CG DE SEME BOUSSOBE
GANKI
GANKI II
GANKI III
GANKI IV
GANKI V
GANADJI
BOGHE
WOTHIE
WOTHI II
BOLOL DOGO
SARE SOUKI
SARE SOUKI I
SARE SOUKI II
SEME BOUSSOBE
SENO BOUSSOBE II
AIRE MBARE
AIRE MBARE
DOUNGUEL REO II
DIOUDE II
DIOUDE
BABABE
DOUGOUL REO
DOUNGOUL REO
147 ks
CG 4
275 ks
CG 5
171
172
173
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O26

LEGENDE

ECHELLE : 1/

C68

C67

C66

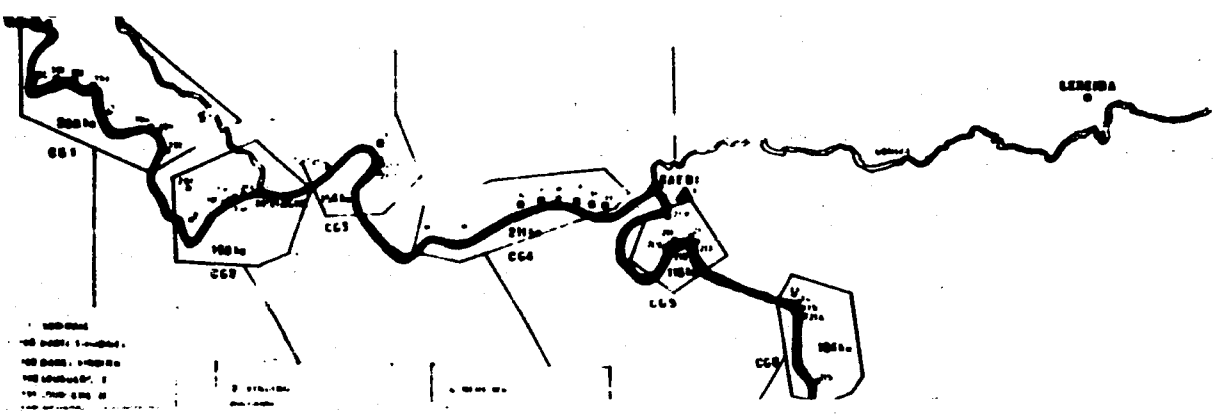
C65

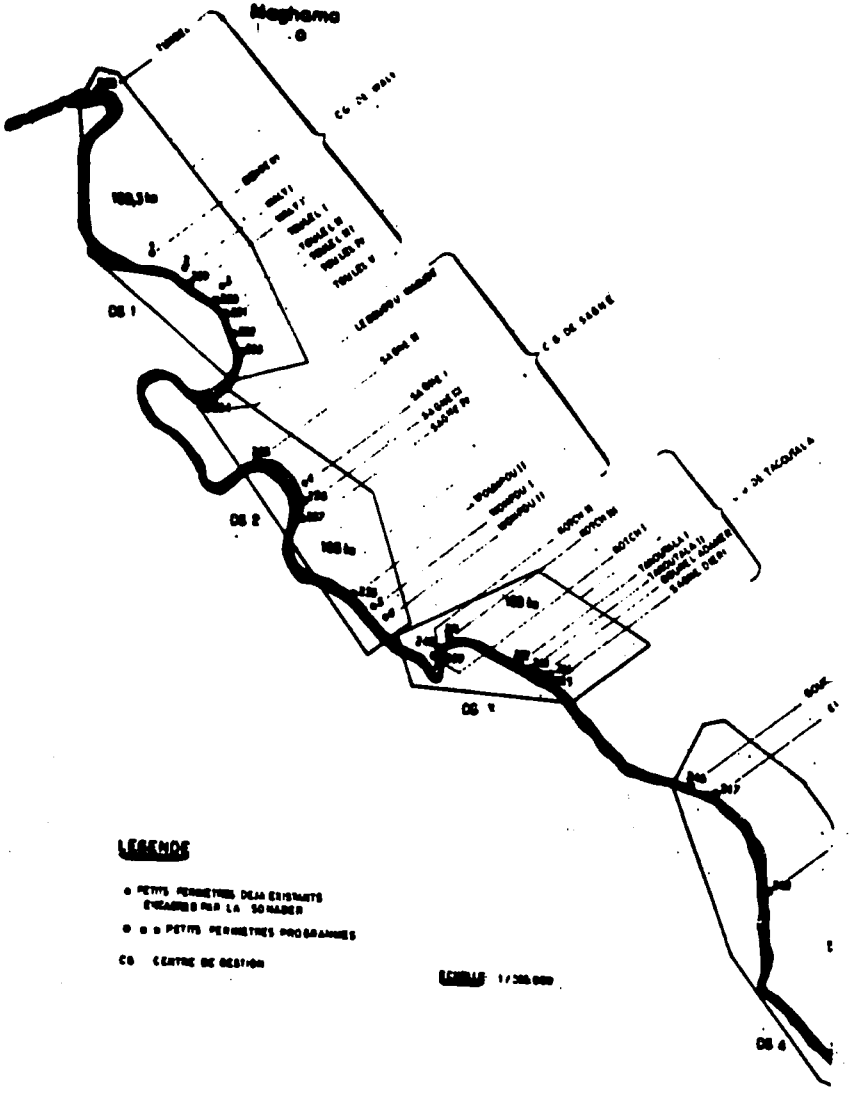
321

RÉPUBLIQUE ISLAMIQUE DE MAURITANIE

MINISTERE DE L'ECONOMIE ET DES FINANCES

SECTEUR DE KAEDI





323

REPUBLIQUE ISLAMIQUE DE MAURITANIE

MINISTERE DE L'ECONOMIE ET DES FINANCES

SECTEUR DE SELIBABI

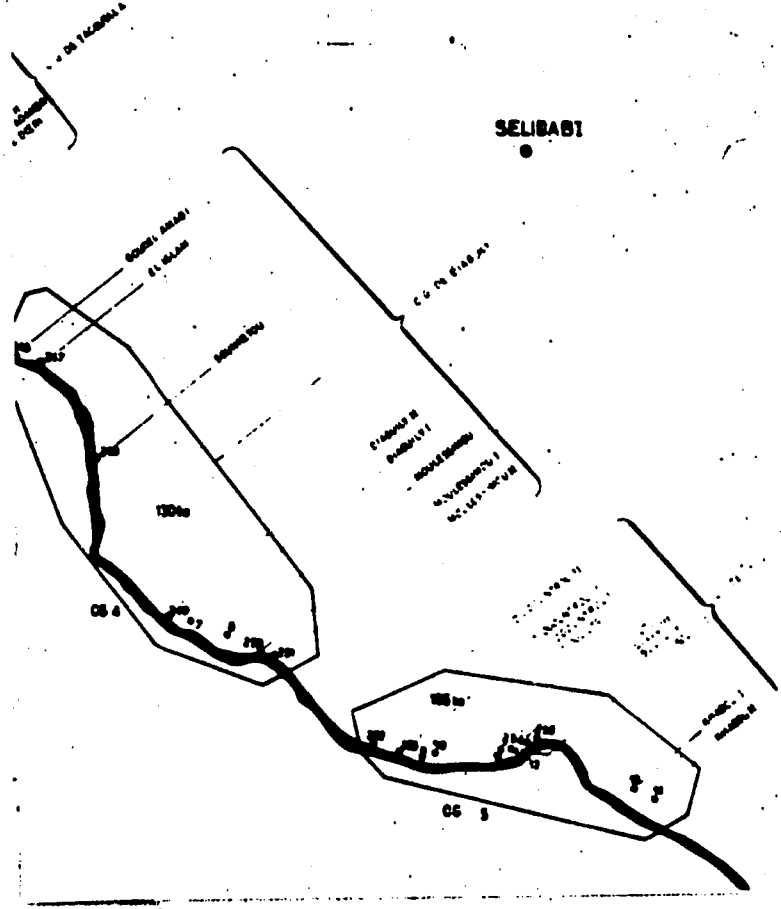


Exhibit 6-18
Irrigated Agriculture
Status of Surface Areas and Production Along Senegal River - 1979 Campaign

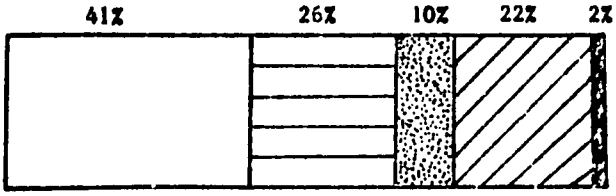
	Rice		Corn		Vegetables		Fruits (Bananas + Other)	
	Surface Area(ha)	Production (t)	Surface Area(ha)	Production (t)	Surface Area(ha)	Production (t)	Surface Area(ha)	Production (t)
1) Large Perimeters:								
M'Pourie	1,200	5,640						
- State	624	2,683						
- Farmers	576	2,937						
Gorgol:								
- State	35	157						
- Farmers	70	385						
2) Small Village Perimeters supervised by SONADER								
- Rosso	129	477			70	1,400		
- Boghé	249	711	100	300				
- Kaédi	109	451	50	150				
- Sélibaby	52	191	20	60				
3) Other Public Village Perimeters:								
- Rosso	89	445			50	1,000		
- Boghé	10	40			20	400		
- Kaédi	33	165	10	30				
4) Private Perimeters:								
- Rosso	113	340			416	6,247	4	40
5) Research Center:								
- Boghé							10	100
- Kaédi	25	150					65	650
Total	3,314	14,772	180	540	556	9,047	79	790

Exhibit 6-19

Irrigated Agriculture Senegal Basin

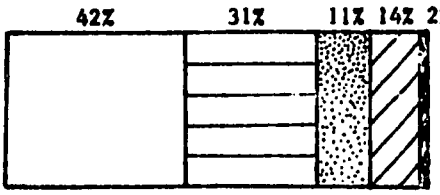
Prepared and Cultivated Surfaces, 1980/81

Prepared



Total 6,100 ha

Cultivated



Total 4,300 ha

Large exploitations ("Grands périmètres")

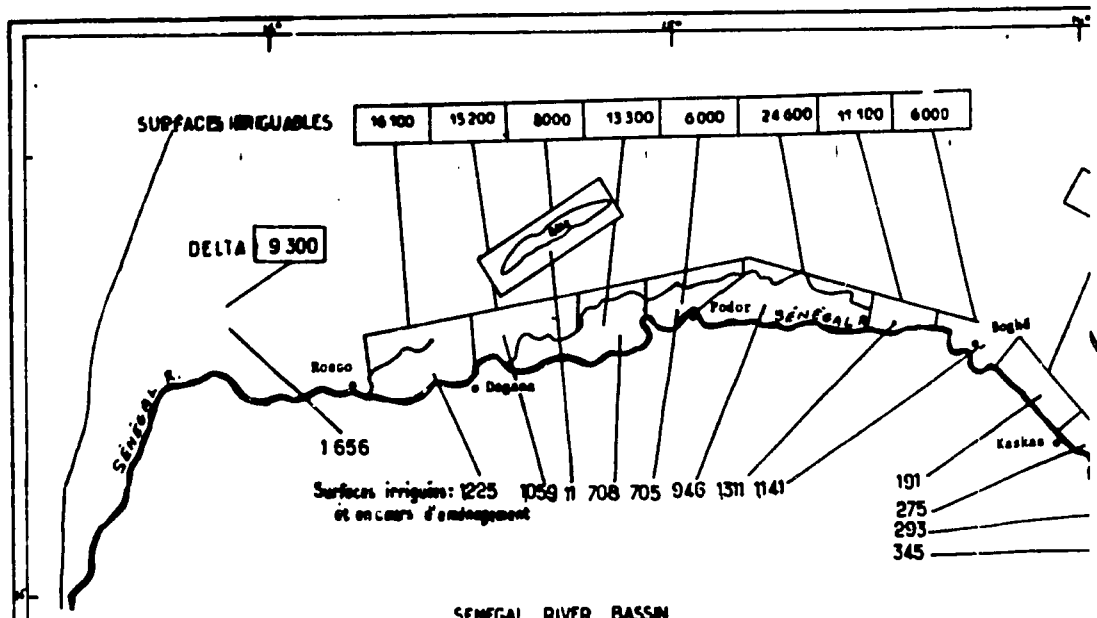
Small village exploitations SONADER ("PPV")

Small village exploitations Non-SONADER

Private plots

Research and experimental stations

Source: SONADER and RAMS compilations.



SENEGAL RIVER BASSIN

BASSIN DU FLEUVE SENEGAL

Summary of irrigable and irrigated lands (including projected areas) 1981

Bilan des surfaces nettes irrigables et surface irriguées (y compris eau en cours d'aménagem

SOURCE: OMVS & RAMS CALCULATIONS

1/1000000

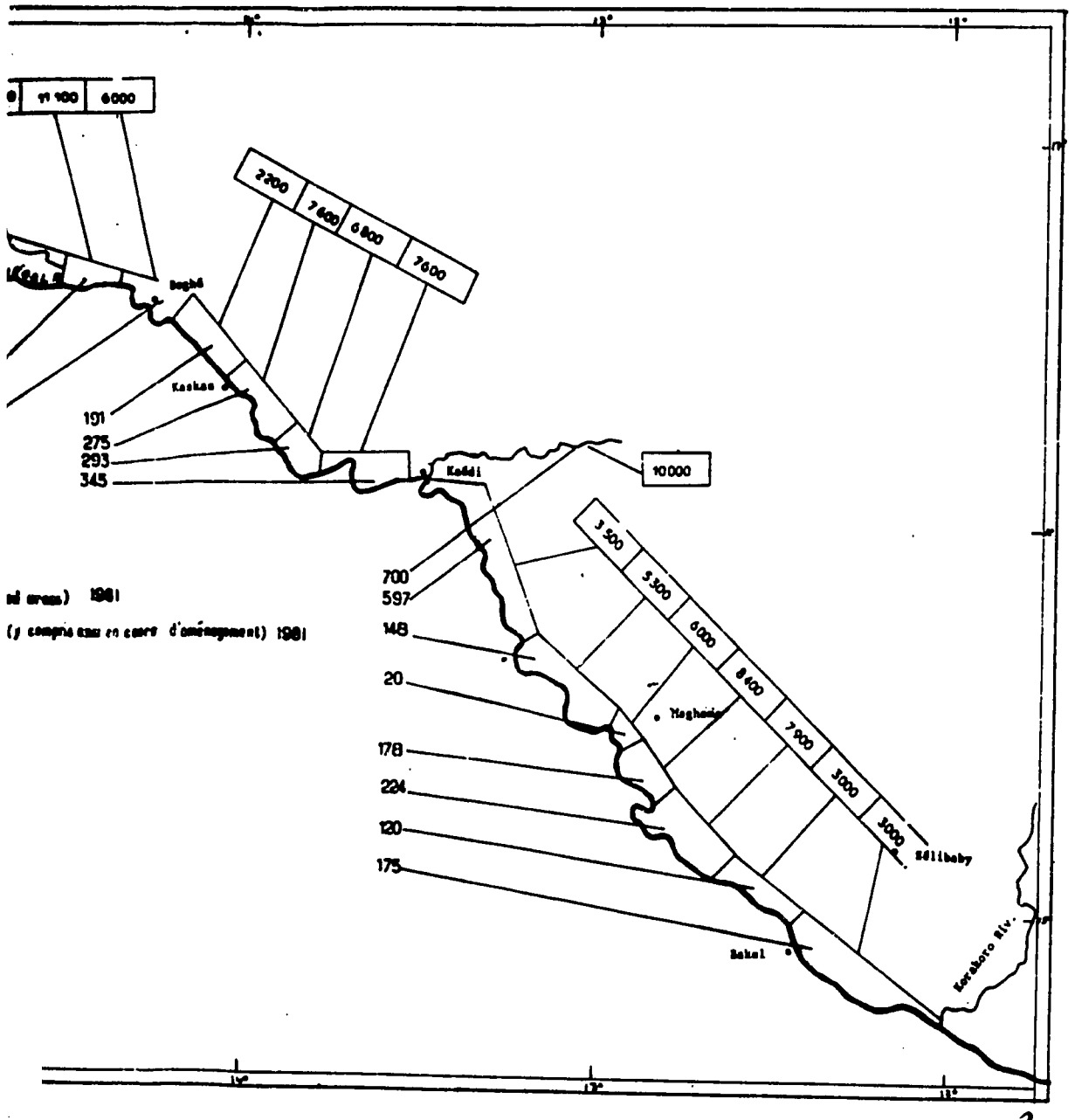

11 100
6000
2200
7600
6800
7600
Kaolack
191
275
293
345
Kaffrine
10000
700
597
148
20
178
224
120
175
3 500
5 300
6000
8 400
7 900
3000
3000
Sédhiou
Bakel
Kolda
328

Exhibit 6-21

Irrigated Agriculture

Cultivation of One Hectare of Rice (Single Crop) 1980

Operation	Traditional Farming Quantity	Costs	Mechanized Farming Quantity	Costs
Preparation of land	40 days	6,000 UM	8h x 400 UM	3,200 UM
Sowing (selected seeds)	150 kg x 30 UM	4,500 UM	150 kg x 30	4,500 UM
Weeding	20 days	2,400 UM	20 days	2,400 UM
Irrigation	20 days	2,400 UM	20 days	2,400 UM
Fertilizer	200 kg	3,600 UM	200 kg	3,600 UM
Harvest plus transport and threshing	34 days	4,080	6h x 1,200	7,200 UM
Amortization of motor-pump, spare parts and repairs		4,000 UM		4,000 UM
Diesel Fuel		1,280 UM		1,280 UM
Amortization improvements to land		10,000 UM		10,000 UM
Other		42,086 UM		42,438 UM
Total		42,086 UM		42,438 UM

Average Yield : 5 tons/hectare

Average production cost per kg. traditional farming = 8.4 UM
modern farming = 8.4 UM

based on data from Mlaiga farm (Tekane) for modern farming and Dar El Barka for traditional farming.

Exhibit 6-22

Irrigated Agriculture

Cultivation of One Hectare Rice (Double Crop)

1980

Operation	Traditional Farming		Modern Farming	
	Quantity	Cost	Quantity	Cost
Preparation of land	60 days	7,200 UM	12 h	4,800 UM
Sowing	300 kg x 30 UM	9,000 UM	300 kg x 30 UM	9,000 UM
Weeding	40 days	4,800 UM	40 days	4,800 UM
Irrigation	40 days	4,800 UM	40 days	4,800 UM
Fertilizer	400 kg.	7,200 UM	400 kg	7,200 UM
Harvest, transport and threshing	68 days	8,160 UM	12 h x 1 200	14,400 UM
Amortization of motor-pumps, spare parts and repairs		8,000 UM		8,000 UM
Diesel Fuel		2,560 UM		2,560 UM
Amortization improvements to land		10,000 x UM		10,000 UM
Other		6,172 x UM		6,556 UM
Total		67,892 UM		72,116 UM

Average yield : 9 tons - for double crop

Average production cost/kg :

- Traditional farming (Dar El Barka) = 7.5 UM
- Modern farming (Mlaiga) = 8 UM

Source: RAMS

Exhibit 6-23

Irrigated Agriculture

Cultivation of One Hectare of Tomatoes

1980

Operation	Quantity	Cost
Preparation of land		
- Plowing and replowing	6 h	6,000 UM
- Pulverization	3 h	
- Mounding	6 h	
Maintenance of mounds	10 days of labor	1,200 UM
Purchase of plants and planting	15 days	2,000 UM
Irrigation	23 days	2,760 UM
Weeding	40 days	4,800 UM
Fertilizer	300 kg	5,400 UM
Chemical treatment		1,500 UM
Harvest and transport (10% of production)		15,500 UM
Amortization of motor-pump, spare parts and repairs		4,000 UM
Diesel Fuel		1,280 UM
Amortization of land improvement		10,000 UM
Other (10%)		5,394 UM
Total		59,334 UM

Mlaipa Farm (Tokane)

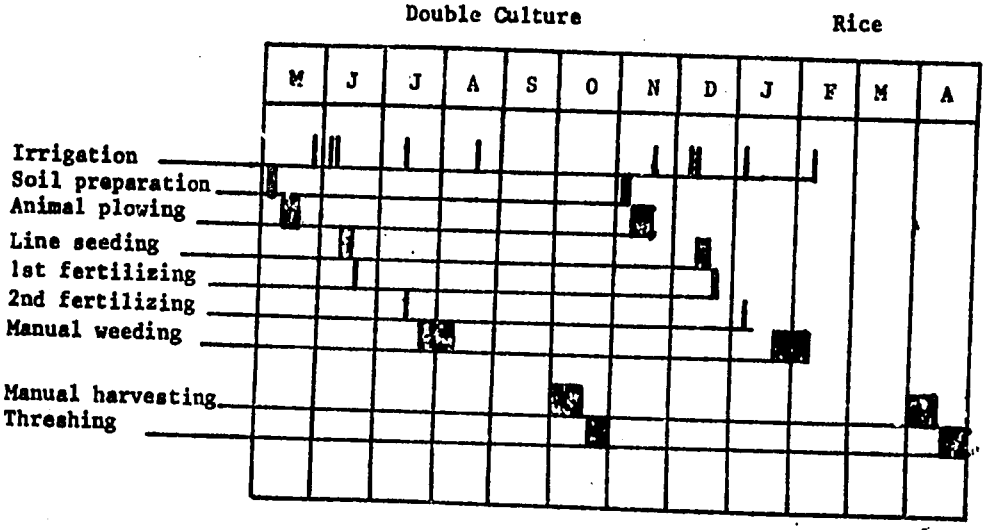
Average Yield : 25 tons/hectare

Average Production Price/kg = 2.3 UM

Source: RAMS

Exhibit 6-24

Cultivation Calender for River Irrigated Agriculture



Source: Annuaire Statistique de la Mauritanie, 1967

6.4.3 Oasis Agriculture

Three dominant types of oasis production systems exist in the country. The following map and labor budget tables are classified accordingly. They have the following characteristics:

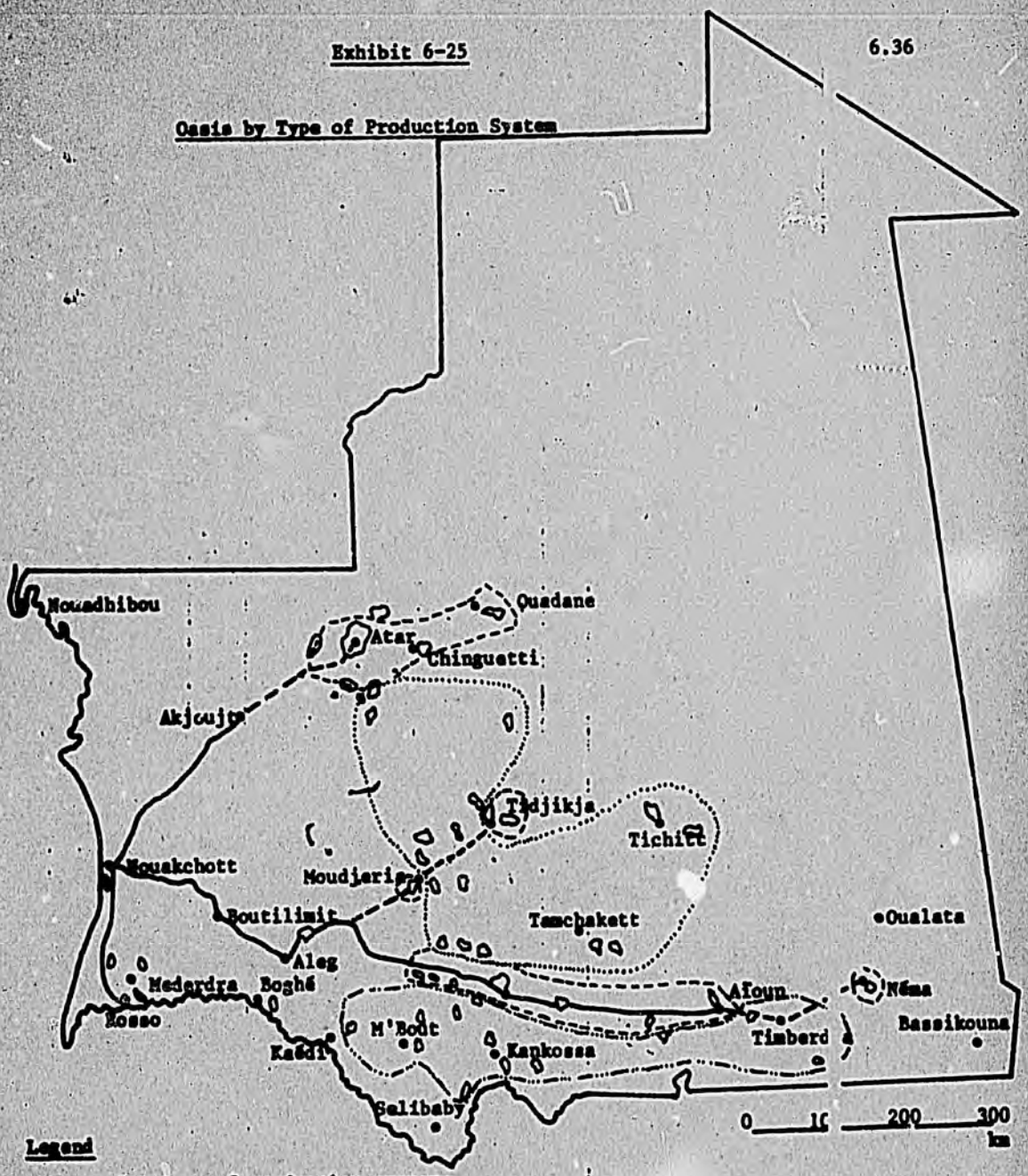
Type 1: Systems in state of relative disintegration, due to physical (drought, sand encroachment) or socio-economic (rural exodus, social mobility) factors. Typically, the old "urban" oases and those easily accessible via roads. Usually has associated cultures.

Type 2: System in equilibrium with environment. Part of semi-nomad/transhumant domain, typically tended by Haratin and visited during the Guetna. Generally difficult to access and lack associated cultures.

Type 3: Newly created oases in non-traditional date-palm areas. Varied social mix. Technical knowledge and practices rarely applied.

Exhibit 6-25

Oasis by Type of Production System



Legend

----- 1st type of production systems

..... 2nd type of production systems

_____ 3rd type of production systems

_____ --- Principal road axes

• Towns

Oasis

Source: RAMS, Oasis Agriculture Report, 1981.

Exhibit 6-26

Number of Date Palms in Mauritania Between 1929 and 1980

Region	1929[a]	1936[a]	1949[b]	1958[c]	1961[d]	1973[e]	Low[f]	Medium[f]	High[f]
Adrar	115	146	200	400	n.d.	n.d.	444	444	444
Tagant	217	152	190	238	n.d.	n.d.	252	292	331
Assaba	2	8	100	141	150	n.d.	193	221	221
Hodh Gharbi	n.d.	n.d.	50	35	30	n.d.	48	48	48
Other Regions	n.d.	n.d.	20	4	4	n.d.	20	20	20
Total			560	818		1,000	957	1,025	1,064

Note on date palm estimates: No systematic, national census of date palm exists. The only notable exception concerns the Adrar in 1958/59. Patching together the various estimates in the above table gives the following growth rates estimates.

6.3% for 1936-49
5.1% " 1949-58
1.5% " 1958-73

The 1958-73 rate gives a toal of 1.09 million palms for 1980. A completely comparable total, though lower, is obtained by summing up independent regional estimates obtained from various available data, supplemented by field observations. See Chapter 2.1.1 of the RAMS' Oasis Agriculture report for further details.

Source: a) District Commissioner Reports, in Munier, 1955.
b) IFAC estimates, Munier, 1955
c) From Boucher, 1958/59.
d) EDPA,1967.
e) Munier, Le Palmier Dattier en Mauritanie, 1973.
f) RAMS.

n.d. = Not determined.

Exhibit 6-27

Oasis Labor Budget

by Type of Production System

(by units of work days)

Production System	Type 1		Type 2	Type 3
Nature of Labor / Method of Irrigation	Mechanized Irrigation	Achil Irrigation(c)	Achil Irrigation(c)	Délou (c) Irrigation
Date Palm Growing	1 ha	200 palm trees	1 ha : 200 palm trees	1 ha : 250 palm trees
Soil Preparation and Planting (a)	2	2	2	2
Irrigation (b)	0.5	2	12	10
Pollination	25	25	20	20
Trimming, Harvesting	30	30	24	24
Caretaking	15	15	25	30
Protection	2.5	2.5	2	5
Other	5	5	2	0
Sub Total	80	81.5	87	92
Companion Crops	0.6 ha	0.1 ha	Negligible	0
Soil Preparation and Fertilization	12	2	-	-
Sowing, Thinning	8	1.5	-	-
Hoeing, Weeding	20	3	-	-
Irrigation	35	25	-	-
Harvesting	15	3	-	-
Other	4	1.5	-	-
Sub Total	94	36	5	-
Grand Total	174	117.5	92	92

(a) This standard was considered in order to account for plantation renewal and extension.

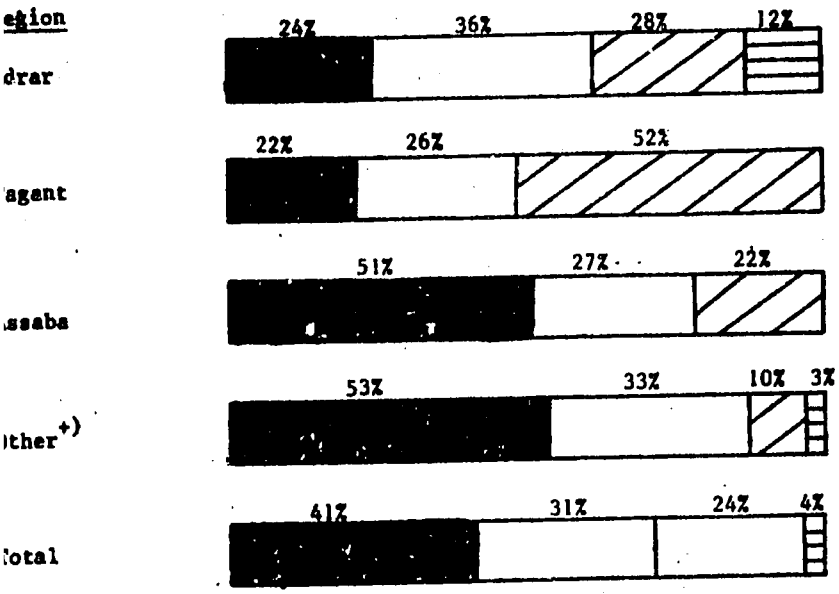
(b) For irrigation of young plants only.

(c) Traditional manual irrigation with use of a folcrum.

Source: RAMS.

Exhibit 6-28

Distribution of Date Palms by Age Group and Region



+) Hodhs, Brakna.

5 years old or less

15 - 80 years

6 - 14 years

80 +

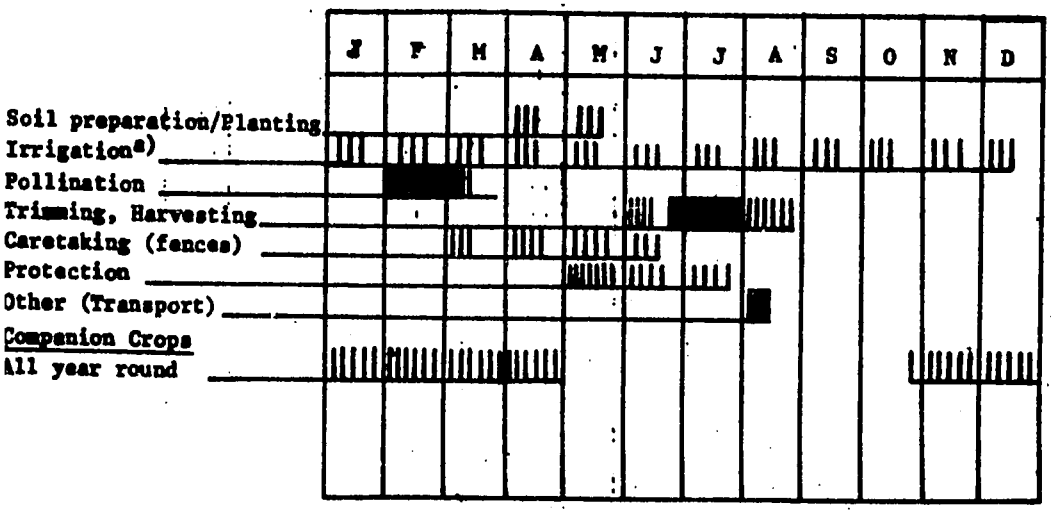
Based on 4,600 trees.

Source: RAMS, 1979/80 Production Survey.

Exhibit 6-29

Cultivation Calender for Oasis Cultivation

(Mechanized Irrigation)



a) For palms aged 1-3 years.

Source: RAMS

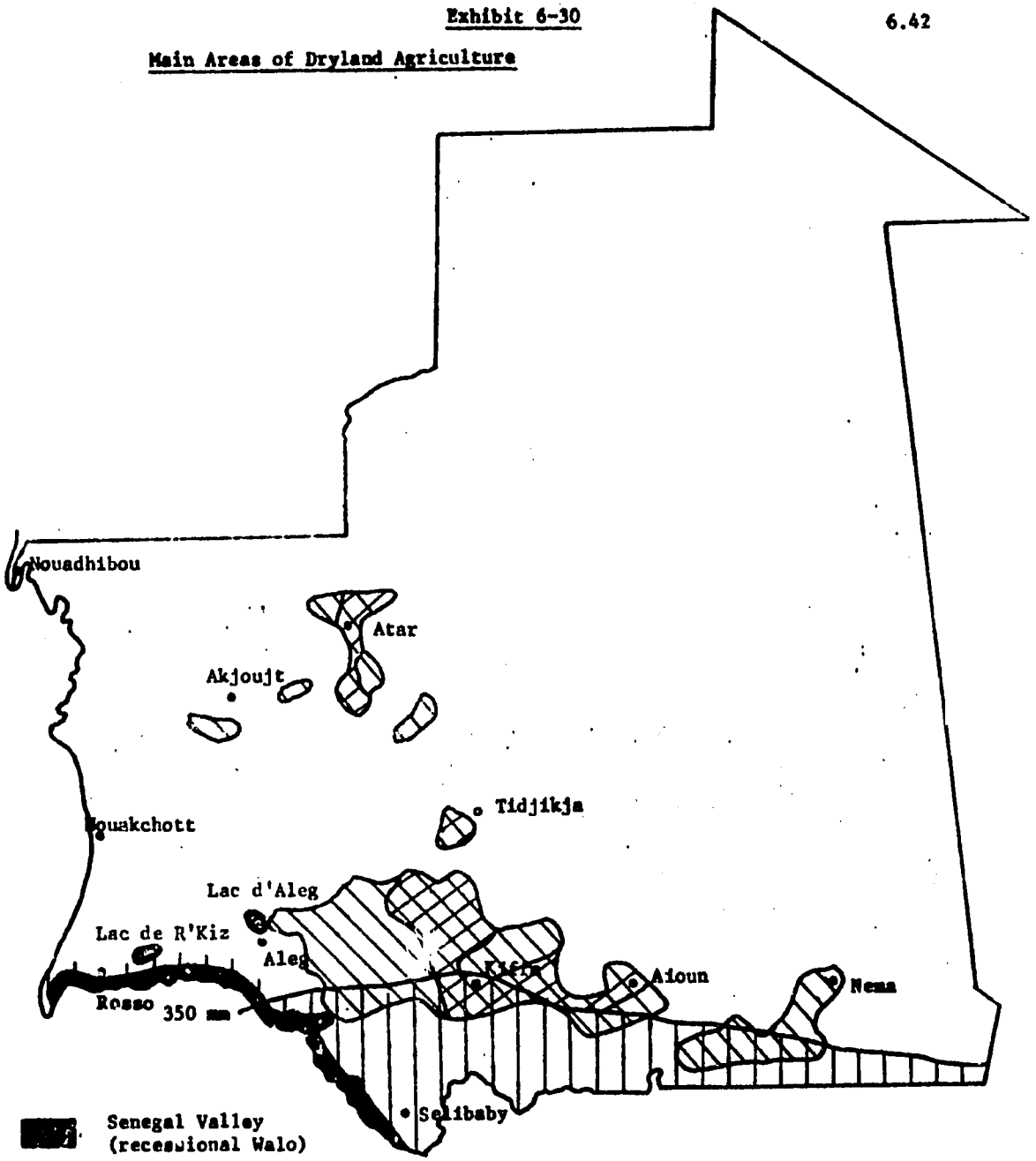
6.4.4 Dry-Land Agriculture

This type of agriculture employs the largest portion, approximately 70%, of the rural population. It is in large part a subsistance production system localised in three major zones: the Senegal River Valley, the southern rainfed zone, and the oued floodland (see following map.

Cereal is the predominant crop grown, although 20% of cultivated lands are associated with Niébé beans, béref (watermelon cultivated for its seeds), ground nuts, sweet potatoes, yams and certain condiments.

Exhibit 6-30

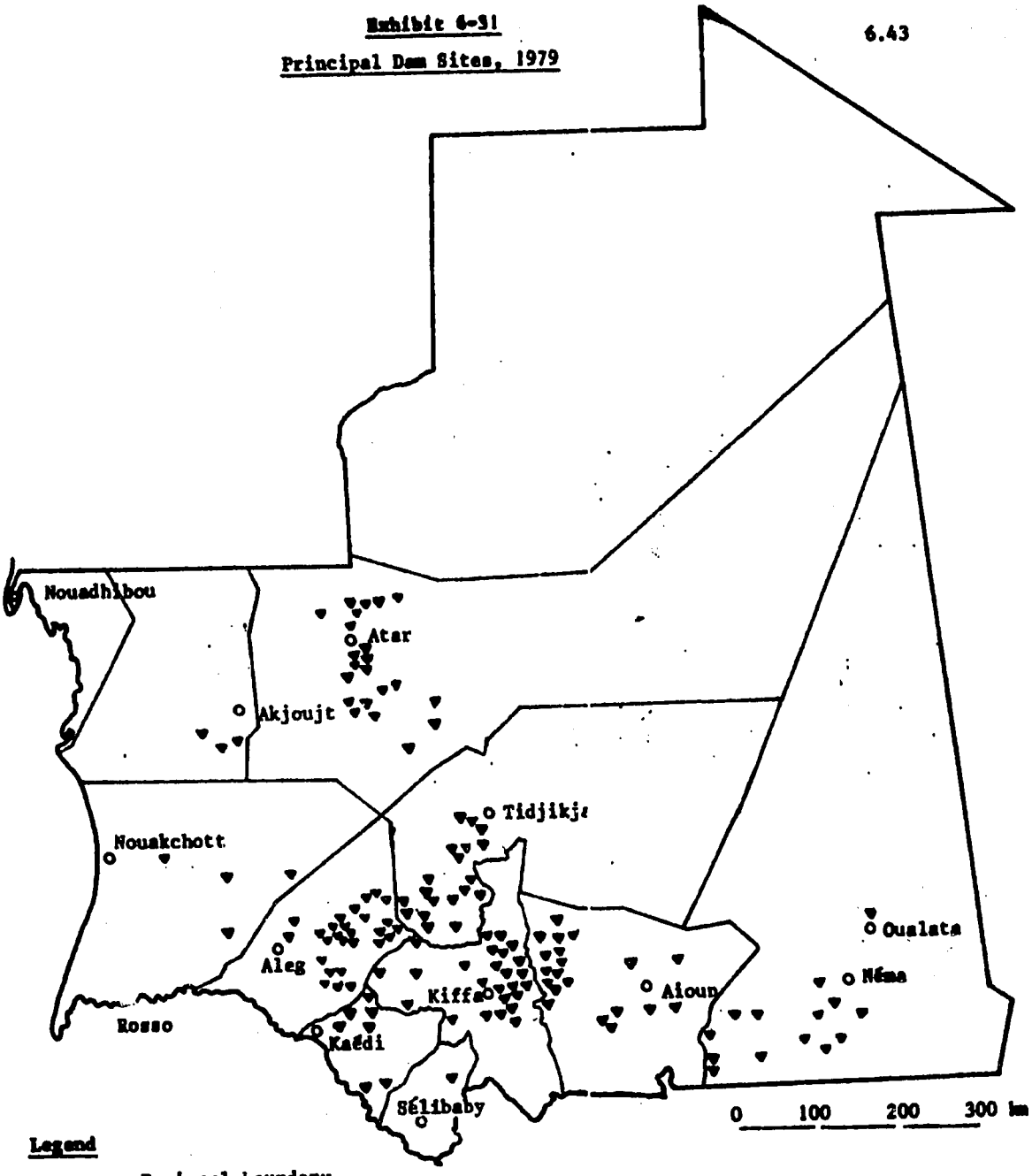
Main Areas of Dryland Agriculture



Source: RAMS

Exhibit 6-31

Principal Dam Sites, 1979



Legend

Regional boundary

Dam

Town

Scale - 1/6,500,000

Source: SOMADER map 1:1 000 000 "Barrages en Mauritanie - Principaux Sites", Feb. 1979.

Exhibit 6-32

Geographical Distribution of Traditional and Modern Small Dams 1979-1980.

(By type of Dam)

Regions	Traditional small dams of average to limited capacity: No.	Traditional small dams of average to limited capacity: Surface of Basin (ha.)	Small retaining diguettes with minimum retention capacity: No.	Small retaining diguettes with minimum retention capacity: Surface of Basin (ha.)	Small modern dams: No.	Small modern dams: Surface of Basin (ha.)	Total: Surface of Basin (ha.)
Hodhs	126	1,820 (26) a)	2,000	1,500-2,00	30	2,250	5,570 -5,820
Assaba	26	680 (17) a)	81	n.d.	12	1,650	2,230
Tagant	34	340	n.d.	n.d.	10	2,620	2,960
Brakna-Gorgol	24	140 (5) a)	n.d.	n.d.	8	2,100	2,240
Atar	n.d.	n.d.	n.d.	n.d.	2	55	55
Total	210	2,980 (48) a)	2,081		62	8,675	

a) Numbers in parenthesis indicate the number of small dams for which basin surface is known.
n.d. = not available
Source: BAME compilation from various sources (including field visits).

Exhibit [illegible]

Labor [illegible] for Senegal
types [illegible] Agriculture
(Days/ha.)

Type of Agriculture	Senegal Valley		Rain-fed		Recessional
Work	Oualo	Diari	Manual Cultivation	Animal Traction	Ouad Recessional
Preparation	-	-	-	-	2
Plowing				3	
Sowing	11.0	4.3	7.5	1.5	7
Enclosure		0.5			0.5
Weeding, clearing	20.5	31.9	23	13	18
Caretaking	48.0	20.2	28	28	48
Cereal harvest and transport	6.0	7.7	8	8	8
Associated crops harvest and transport		2.4	2	2	1.5
Diverse		3.4	3.5	2.5	4
Total	85.5	70.4	72	58	89

Source: a) Report on La Moyenne Vallee du Senegal, 1965.

b) [illegible]

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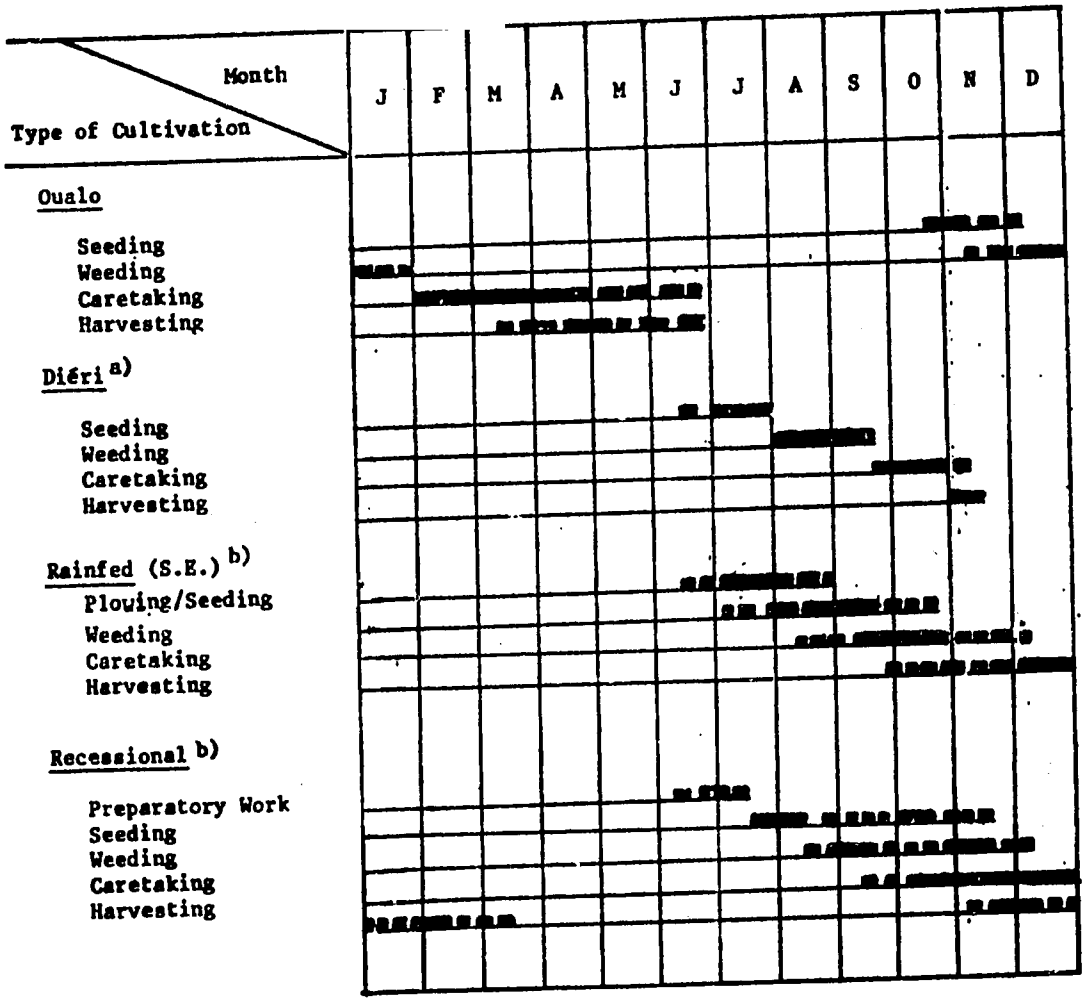
Exhibit 6-34

Cultivation Calender for Dryland Agriculture



Source: a) La Moyenne Vallée du Sénégal, 1965

b) RAMS

Exhibit 6-35

Dry land Agricultural Production Yields

By Crop and Type of Production

Crop	(Kg/ha) Oualo	Diéri	Rainfed	Oued Recessional
Sorghum	430	-	285-423	300-500
Millet	-	240-460	285-423	150-300
Maize	450-650	-	-	-
Wheat Barley	-	-	-	400-600
Niébé	200-300	50-250	50-250	200 - 250
Ground Nut	-	200	300-350	-
Water Melon (béréf)		300	360	-
Sweet Potatoes	200-600	-	-	-

Source: RAMS compilation.

6.4.5 Livestock

The following tables include basic budget and price data on four classes of livestock in Mauritania: cattle, sheep, goats and camels. Production data and herd composition are included apart in Section 5 of this chapter.

Knowledgeable estimates indicate that the total Mauritanian herd averages 6 million animals, of which 1 to 1.5 million are estimated to move across the border into Mali and Senegal during the rainy season. Similarly, about 1 million animals move north into Mauritania from the two neighboring countries, thereby bringing the herd size to between 4.5 million and 7.5 million at various times of the year.[a)]

Livestock budgets for the three major species of livestock are shown in Exhibit 6-36. In contrast to crop budgets which evaluate cost and returns per hectare regardless of farm size, these are operating unit budgets in which the number of animals that can be attended by one herder constitutes the operating unit. Furthermore, these budgets in each case apply to a specialized herd (i.e., cattle only), whereas under actual conditions cattle and camel herds usually contain some sheep and goats.

The results show that returns per labor day for herd owners are exceeded only by oasis culture which is severely constrained by land availability. In addition, the rate of return on investment by non-herders, although quite moderate, is probably higher than most other available investment in rural Mauritania. The high return on the sheep and goat enterprise (nearly double the other two) is not unexpected, since prices are favorable, costs are low and demand in urban markets is high, while supplies are often limited.

RAMS estimates from the various surveys show that about 30% of the nomads and 40% of the sedentary rural residents who own livestock hire herders. In addition, livestock is a popular investment for urban dwellers so that a reasonable estimate might be that about 40% of the national herd is owned by non-herders.

---

a) C. Kowtok, Nouakchott, 1981.

Exhibit 6-36

Livestock Budgets in Mauritania 1979/80

(Values in UM)

Income	Cattle Only	Camel Only	Sheep + Goat
Number of animals (value/head)[a]	100 (10,000)	50 (20,000)	100 (2,000)
Value of animals	1,000,000	1,000,000	200,000
Gross herd increase			
Percent	7.5%	6.2%	20.0%
Value	75,000	62,000	40,000
Milk production			
Quantity (liters)	8,750	10,000	3,150
Value	43,750	50,000	15,750
Hair	-	2,700	3,600
Total income	118,750	114,700	59,350
Expenditures			
Feed, veterinary, etc.	6,200	2,300	1,780
Other and miscellaneous (10%)	11,875	11,400	5,935
Sub total	18,075	13,700	7,715
Herder cost	21,000	21,000	21,000[b]
Total cost	39,075	34,700	28,715
Net return	100,675	101,000	51,635
Labor days	365	365	180[b]
Return per labor day	276	277	287
Investment income (non-herder)	79,679	80,000	30,625
Return on investment	8.0%	8.0%	15.3%

a) Typical herd size that can be tended by one herder. RAMS survey data show that about 30% of the nomads and 40% of the sedentary rural livestock owners hire herders. Including urban livestock owners, about 40% of the national herd is estimated to be owned by non-herders. Budgets apply to specialized herds only, whereas most cattle and camel herders also have some sheep and goats

b) Assuming herd is on trek for 6 months. The remainder of the year herding is done part-time by children and other family members.

Source: RAMS, 1980.

Exhibit 6-37

Prices Paid to Farmers for Livestock 1979

(UM/Head)

	Low	High	Estimated Average
Cattle			
Bulls	4,000	16,000	10,000
Cows	4,000	20,000	9,000
Young Bulls	3,500	12,000	7,000
Heifers	3,000	6,000	5,000
Calves	1,500	5,000	3,000
Sheep			
Rams	1,600	3,000	2,200
Wethers	700	2,200	1,500
Ewes	800	5,300	1,800
Heavy Lambs	700	1,800	1,200
Baby Lambs	400	1,000	600
Goats			
Adults	600	2,500	1,300
Yearlings	600	1,500	1,200
Kids	200	1,200	400
Camels			
Adults	7,000	27,000	20,000
Young	5,000	18,000	10,000

Source: RAMS Production Survey, 1980.

Exhibit 6-38

Price Per Head at the Nouakchott Abattoir

Dec. 1980 - Feb. 1981
(000 UM)

		Live Price (Entry)			Carcass Price (Exit)		
		Large[1]	Medium[1]	Small[1]	Large[1]	Small[1]	Medium[1]
Camels	(101)[2] (5 217)[3]						
	Low	17.0	12.0	8.0	20.0	15.0	9.0
	Mean	22.7	18.4	13.1	25.7	21.7	15.3
	High	30.0	25.0	16.0	35.0	30.0	20.0
Cattle	(558)[2] (13 270)[3]						
	Low	14.0	12.0	7.0	18.0	15.0	9.0
	Mean	19.6	15.2	12.6	23.5	18.8	14.6
	High	26.0	20.0	15.0	30.0	25.5	20.0
Sheep	(437)[2] (7 238[3]						
	Low	2.0	1.5	1.0	2.5	2.0	1.2
	Mean	3.2	2.7	1.8	4.2	3.3	2.4
	High	5.0	4.0	3.0	5.1	5.0	3.6
Goats	(230)[2] (4 820)[3]						
	Low	2.0	1.5	1.0	2.5	2.0	1.2
	Mean	3.2	2.4	1.8	3.9	3.1	2.3
	High	4.5	4.2	3.0	5.5	4.5	3.5

[1] Size of animals is a relative measure based on carcass weight on the specific slaughter day. In general, however, the following categories apply (kg/head).

	Large	Medium	Small
Camels	200 +	150 - 200	Less than 150
Cattle	180 +	140 - 180	Less than 140
Sheep	30 +	20 - 30	Less than 20
Goats	30 +	20 - 30	Less than 20

[2] Number of head slaughtered during 10 visits.

[3] Number of head slaughtered during the year as reported by the Inspection d'Elevage.

Source: Nouakchott abattoir.

Exhibit 6-39

Producer Prices for Live Animals 1970 - 1979

(expressed in UM)

Year	Cattle	Sheep	Goats	Camels
1970	2,836	340 - 650	650	5,500
1971	3,000	480 - 720	540	5,520
1972	5,400	400 - 700	600	10,000
1973[a)]	1,500 - 2,500	500 - 1,600	300 - 1,000	5,000 - 7,000
1974	3,400 - 9,000	1,000 - 2,500	560 - 1,800	5,500 - 15,000
1975	4,000 - 10,000	1,500 - 3,000	600 - 1,900	6,000 - 16,000
1976	6,000 - 14,000	1,500 - 3,500	650 - 1,950	12,000 - 20,000
1977	10,000 - 15,000	1,600 - 3,600	1,000 - 2,000	15,000 - 25,000
1978	11,000 - 16,000	1,700 - 4,000	1,000 - 2,100	15,000 - 26,000
1979	11,000 - 16,000	1,700 - 4,000	1,100 - 2,400	16,000 - 26,000

a) Large scale movements to markets occured in 1973 because of lack of pasture.

Source: Directorate of Statistics.

Exhibit 6-40

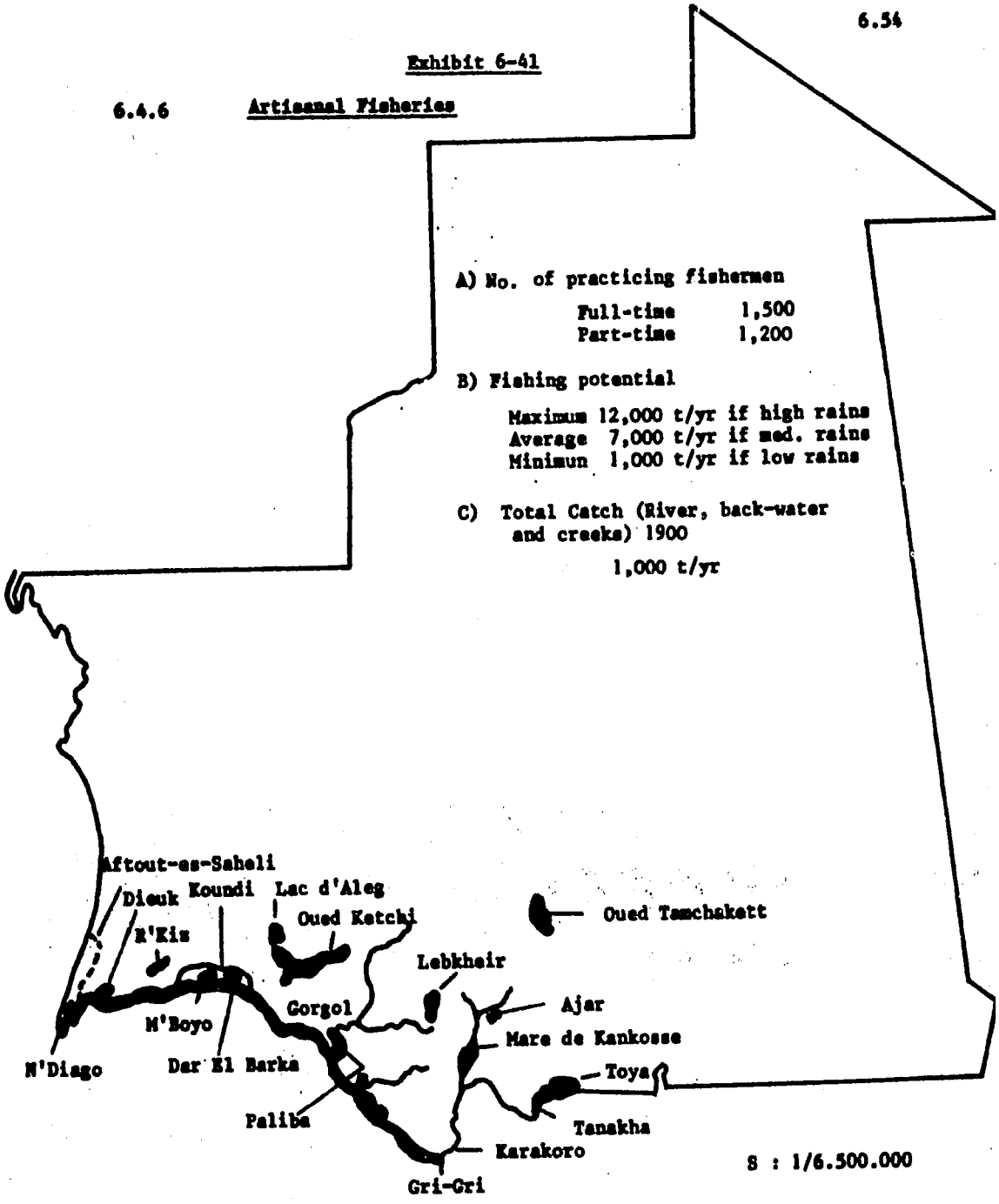
Number of Animals Slaughtered at the Nouakchott Abattoir - 1980

Month	Cattle	Sheep	Goat	Camel	Total	%
January	1,286	457	493	171	2,407	7.88
February	1,226	489	480	212	2,407	7.88
March	1,252	376	383	308	2,319	7.59
April	1,184	286	298	326	2,094	6.85
May	1,128	216	207	418	1,969	6.45
June	604	199	236	599	1,638	5.36
July	486	253	145	894	1,778	5.82
August	540	385	393	983	2,301	7.53
September	1,140	869	577	527	3,113	10.19
October	1,219	990	597	242	3,048	9.98
November	1,558	1,186	624	293	3,661	11.98
December	1,650	1,532	387	244	3,813	12.48
Total	13,273	7,238	4,820	5,217	30,548	100.00
Monthly Average	1,106	603	402	435	2,545	

Source: Inspection d'Elevage, Nouakchott, Mauritania.

Exhibit 6-41

6.4.6 Artisanal Fisheries

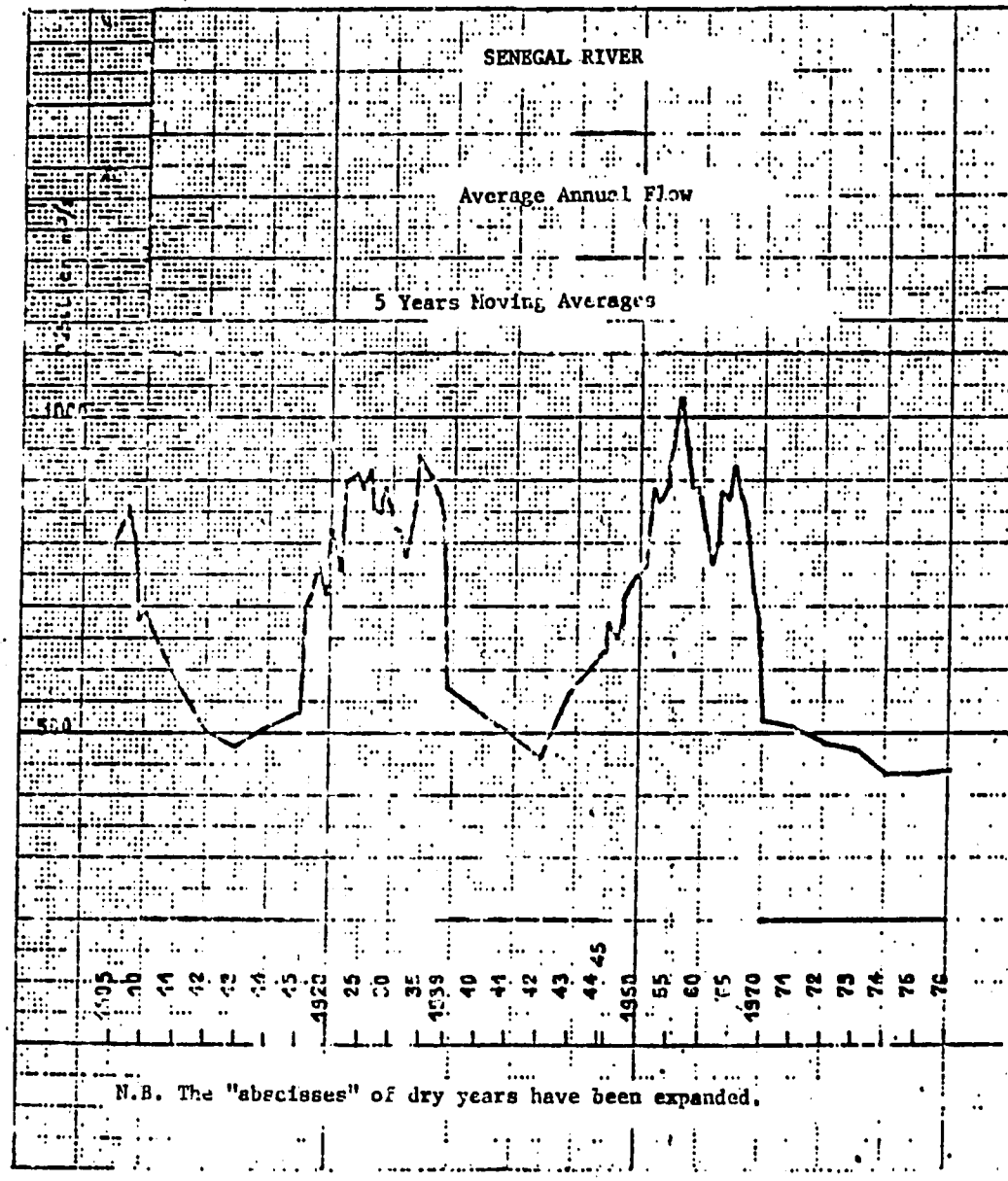


Zones where inland fishing is practiced, Senegal river, back-water creeks, lakes and ponds.

Source: A) BCR, 1977 provisional figures and RAMS estimates.
B+C) SCET International, 1978.

Exhibit 6-42

Senegal River - Average Annual Flow



N.B. The "abscisses" of dry years have been expanded.

Exhibit 6-43

Average Monthly Temperature Variations

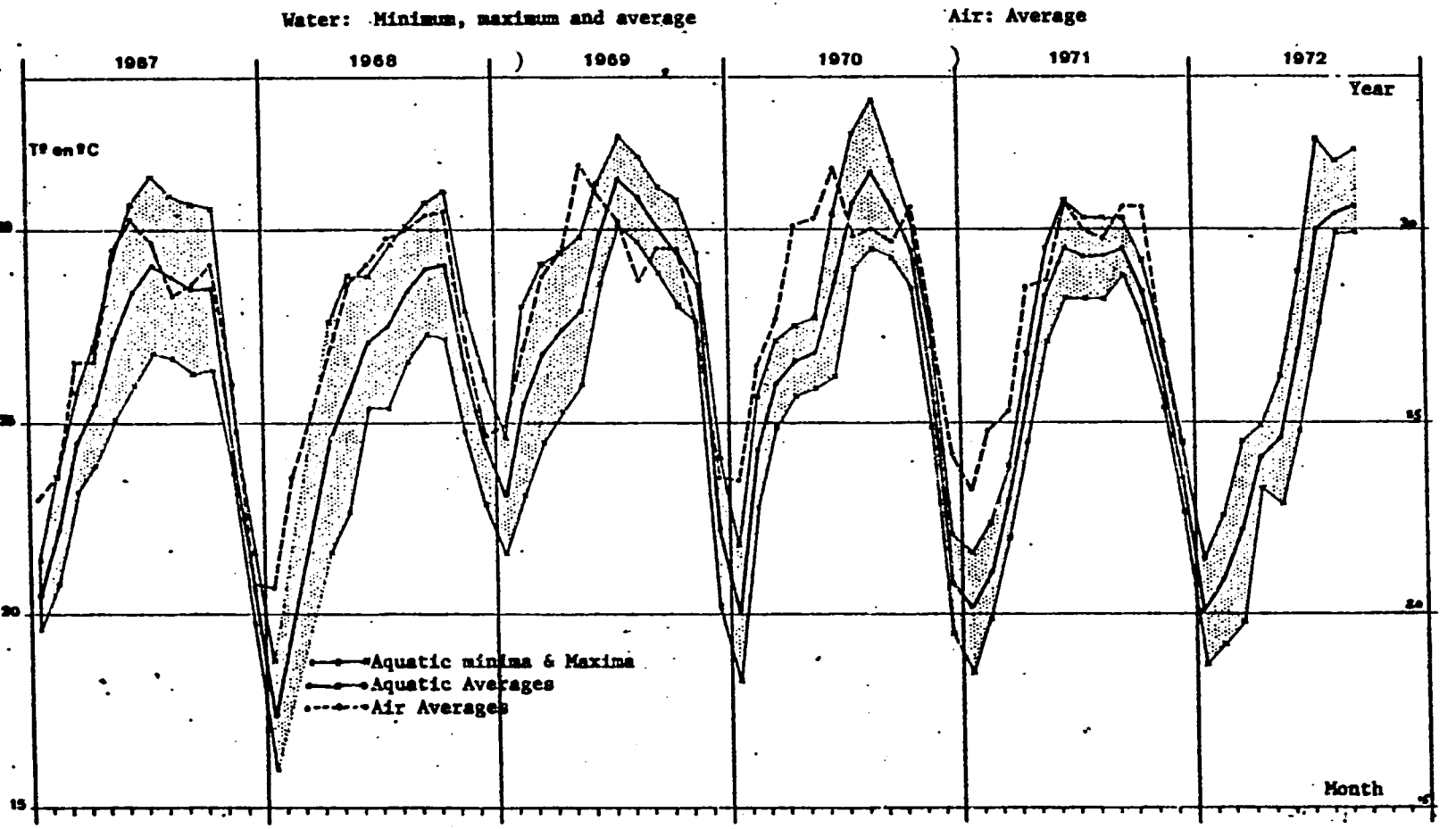
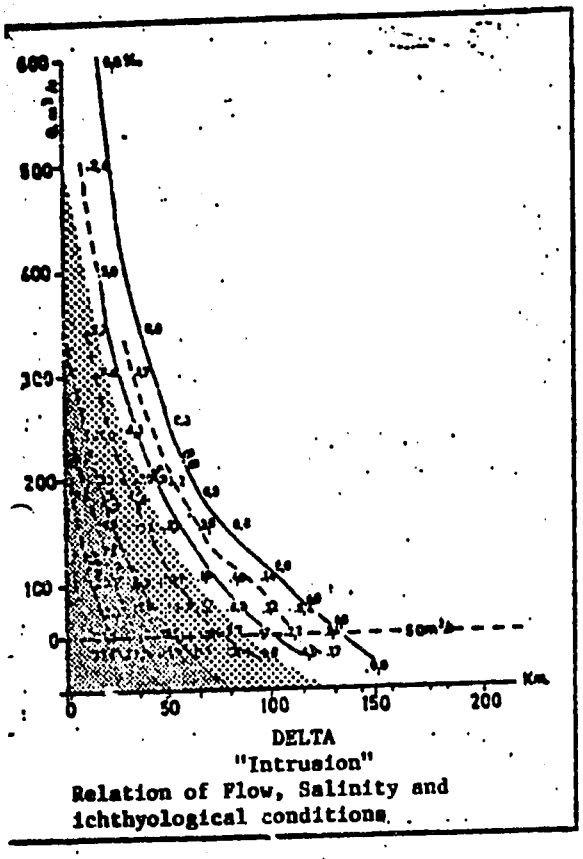
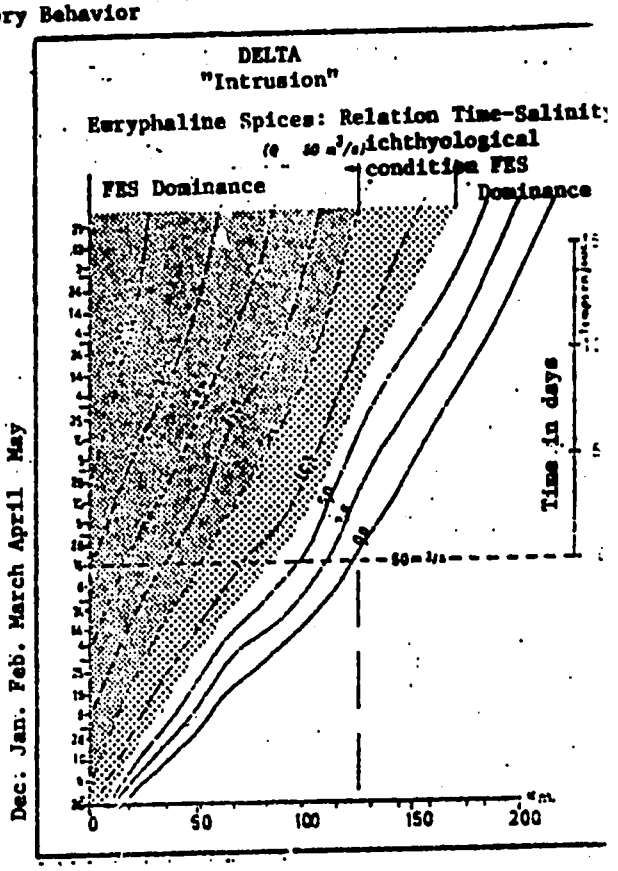


Exhibit 6-44

Fish.- Migratory Behavior



DELTA
"Intrusion"
Relation of Flow, Salinity and ichthyological conditions.



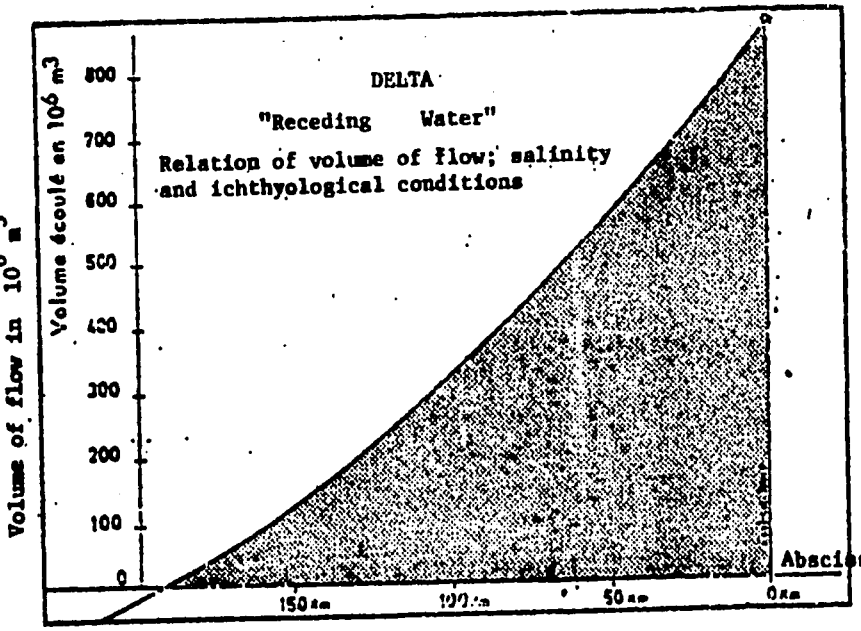


Exhibit 6-45

Fresh Water Species in an Average Year

Schematic Diagram showing Annual Cycles of Principal Abiotic and Biotic factors in the Middle Valley of the Senegal River: Fresh Water Species in an Average Year.

(See detailed diagram on the next page.)

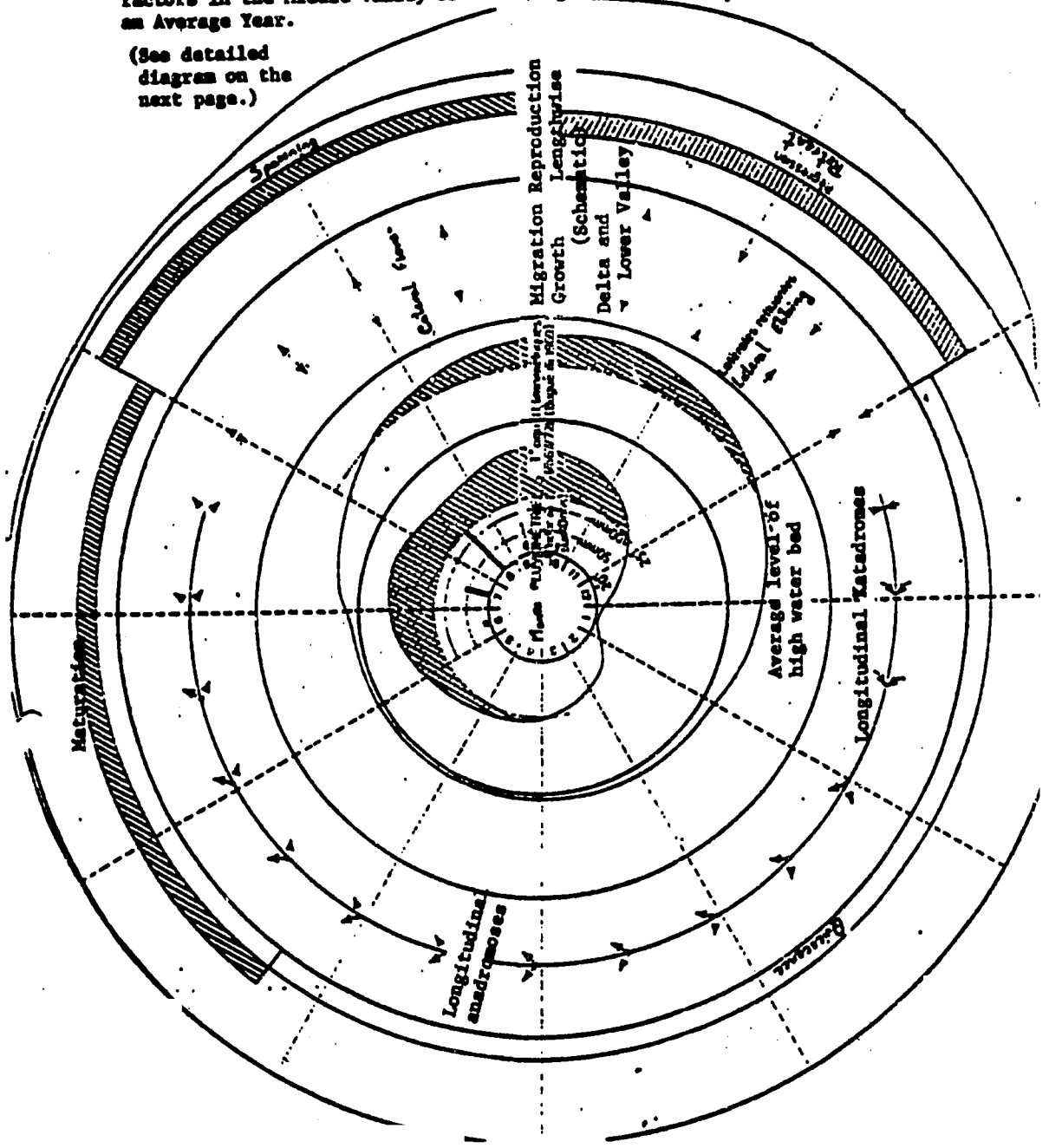
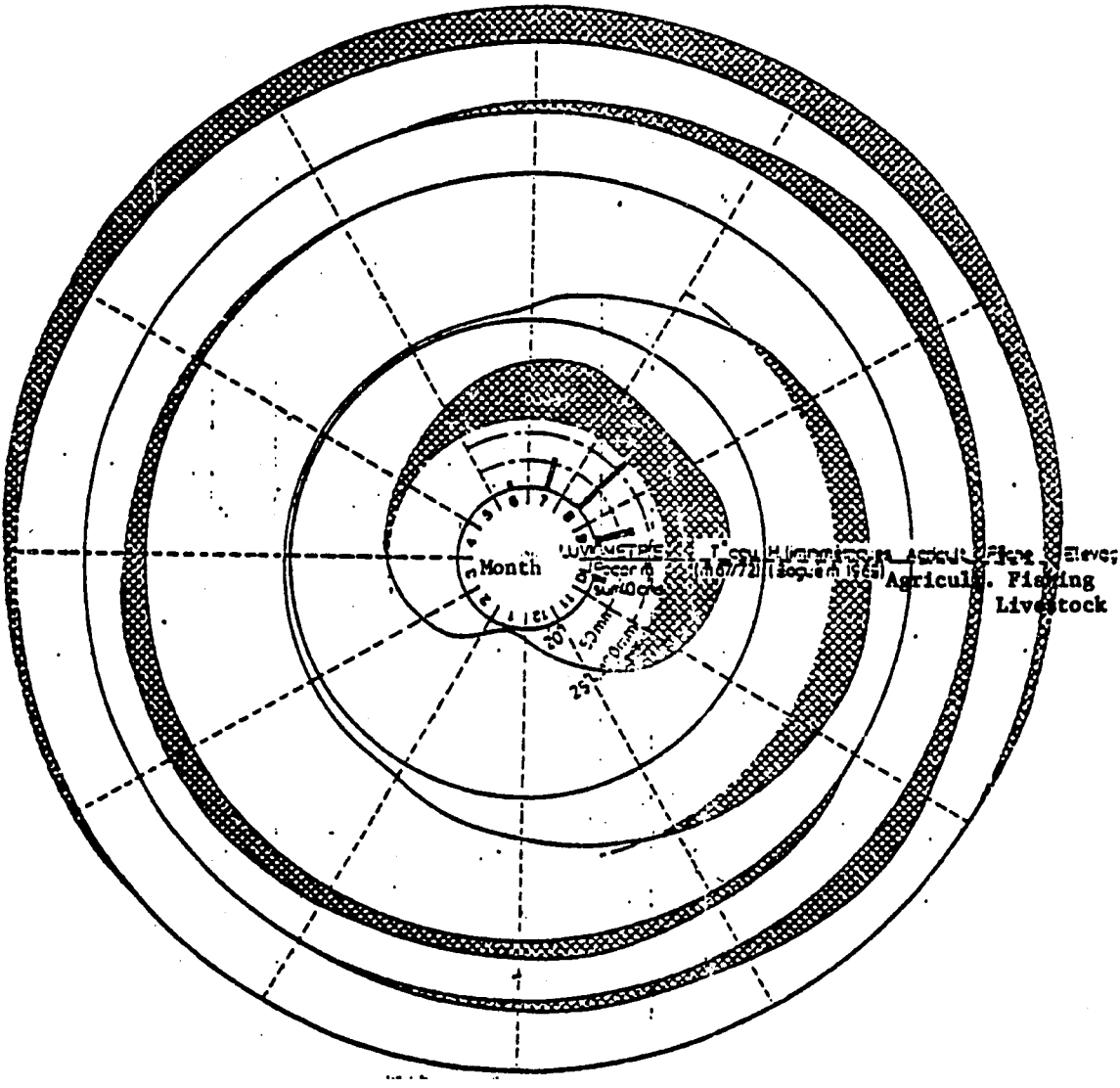


Exhibit 6-46

Utilization of Floodplain in Time & Space[a)]

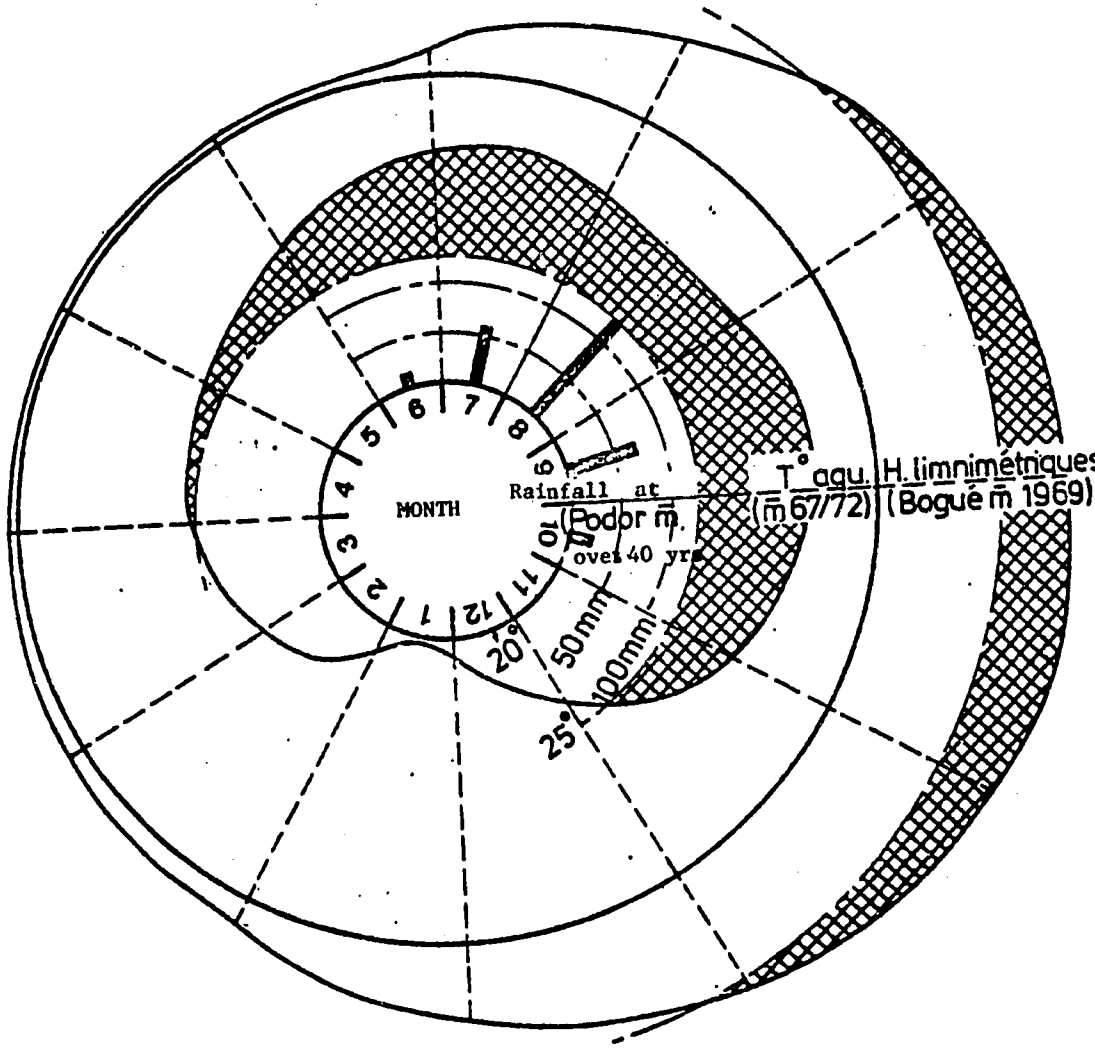
Utilization of Floodplain in Time and Space



a)· · See detailed diagram Exhibit 6-47

Exhibit 6-47

Synoptic Chart showing cyclical changes of the principal abiotic parameters



T = Temperature
H = Height
m = Average

GRAPHIQUE SYNOPTIQUE CYCLIQUE DES PRINCIPAUX PARAMETRES ABIOTIQUES

Exhibit 6-48
Exhibit 6-47

Average Cyclical Movement of the Inter-Tropical Weather Front over the Senegal River Basin

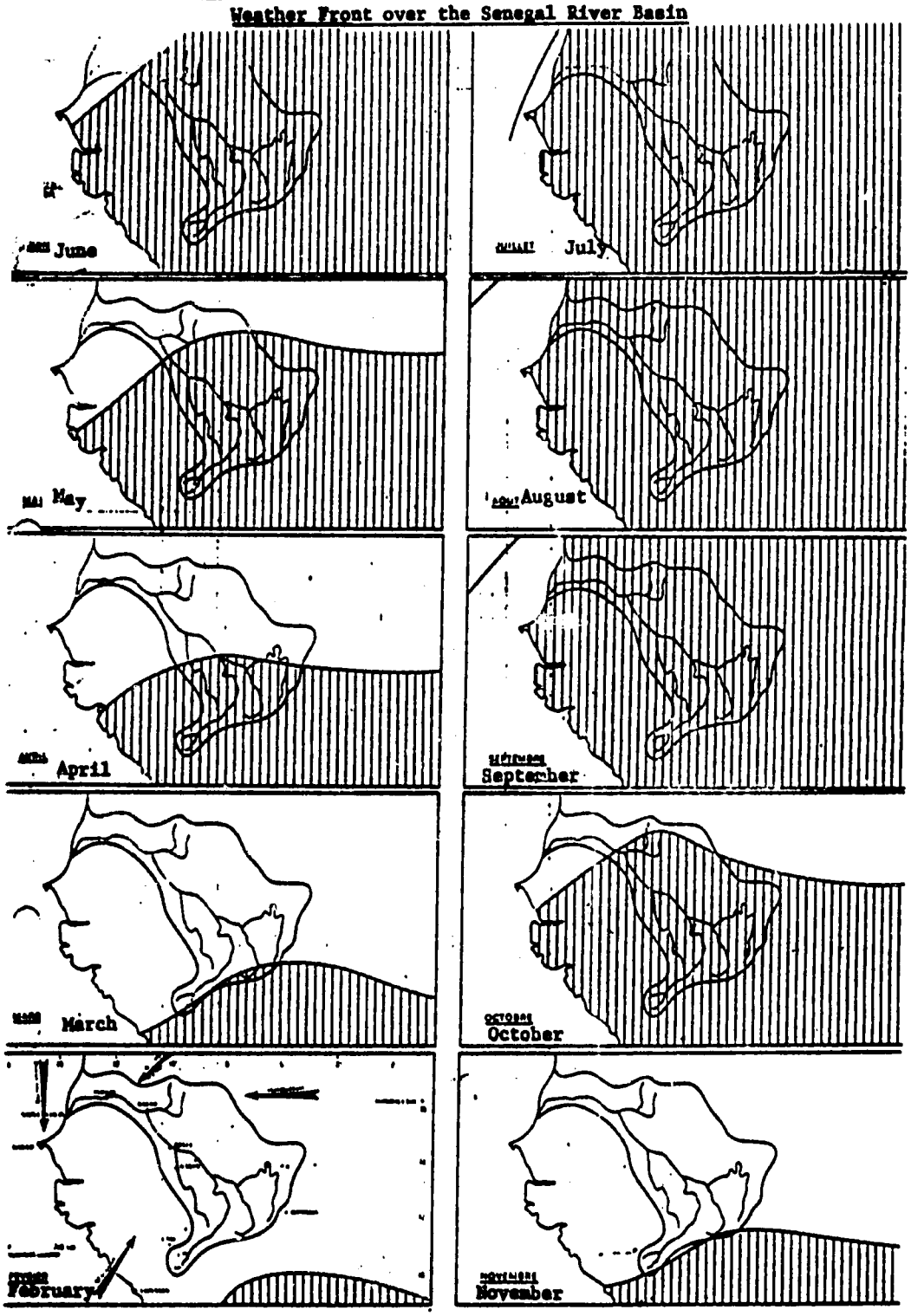


Exhibit 6-49

Senegal River Flow - Cubic meters per second

The 1980 potential is at its minimum since the flow has been below normal since 1968.

Year		River Flow	
1968	$Q \bar{m} =$	394	m^3/s
1969		765	[= $\bar{m}$ between 1903 & 1980]
1970		542	
1971		593	
1972		260	[= record μ between 1903 & 1980]
1973		361	
1974		760	[= $\bar{m}$ between 1903 & 1980]
1975		602	
1976		470	
1977		324	
1978		523	
1979		301	
1980		576	

Conclusion: 2 average floods, 11 below average floods between 1903 and 1980.

Exhibit 6-50

6.63

Inland Fisheries

Factors in the Cost of Production of Fishing Equipment in the River and its Tributaries

Material Used	Type	Average Price 1980	Life of Equip.	Maint. cost	Manpower	Yield	Period of Use
Canoe	Casamance	32,000 UM	15 yrs.	after 5 years	1	900 kg.	12 mos.
Goubol Net	Shore use	20,000 UM	3 yrs.	10 %	10 - 18	100 kg. x 4 days	5 mos.
Goubol Net	Shore use	40,000 UM	3 yrs.	10 %	20 - 25	200 kg. x 4 days	4 mos.
Goubol	Shore use	60,000 UM	3 yrs.	10 %	30 - 40	300 kg. x 4 days	3 mos.
Sleeping net	Draggged	15,000 UM	2 yrs.	10 %	1	100 kg. x 1 day	5 mos.
Sleeping net	Stationary	6,000 UM	2 yrs.	20 %	1	50 kg. x 1 day	7 mos.
Casting net		5,000 UM	4 yrs.	5 %	1	7 kg. x 2 days	12 mos.
Multiple Hook line	Diolinke	3,200 UM	2 yrs.	20 %	1	45 kg. x 2 days	12 months.

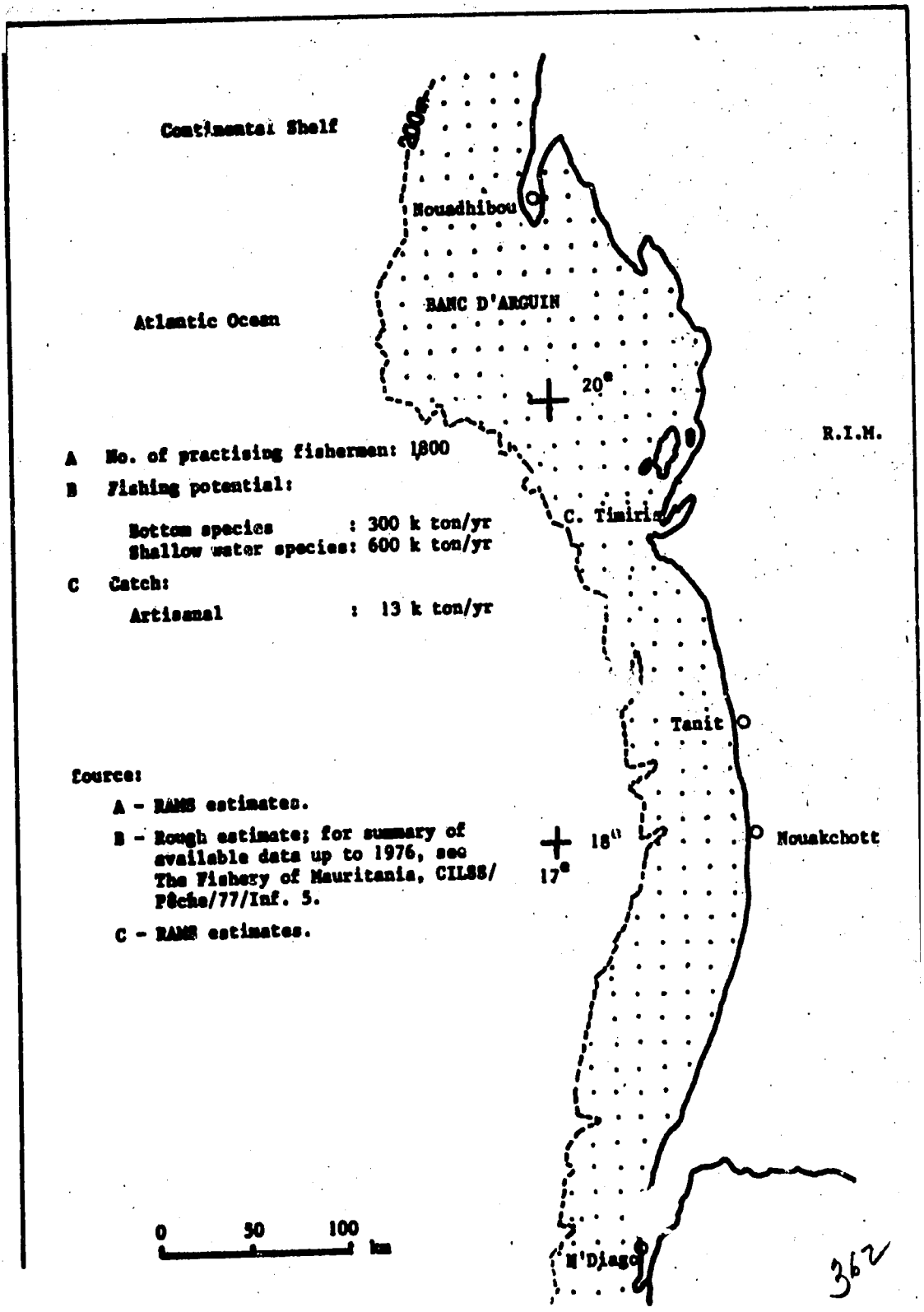
Based on information gathered from fishermen and authorities along Senegal river and its tributaries. Prices are an average of costs of equipment in Dakar and Nouakchott. Yields take into account the life of the material and maintennance costs.

A family may have one or two canoes for 5 to 7 fishermen. Canoes usually belong to head of family. They are used by family members without payment, either for fishing or to transport merchandise.

Source: RAMS.

Exhibit 6-51

Off-Shore Artisanal Fisheries



A No. of practising fishermen: 1800

B Fishing potential:

Bottom species : 300 k ton/yr
Shallow water species: 600 k ton/yr

C Catch:

Artisanal : 13 k ton/yr

Source:

A - BAMS estimates.

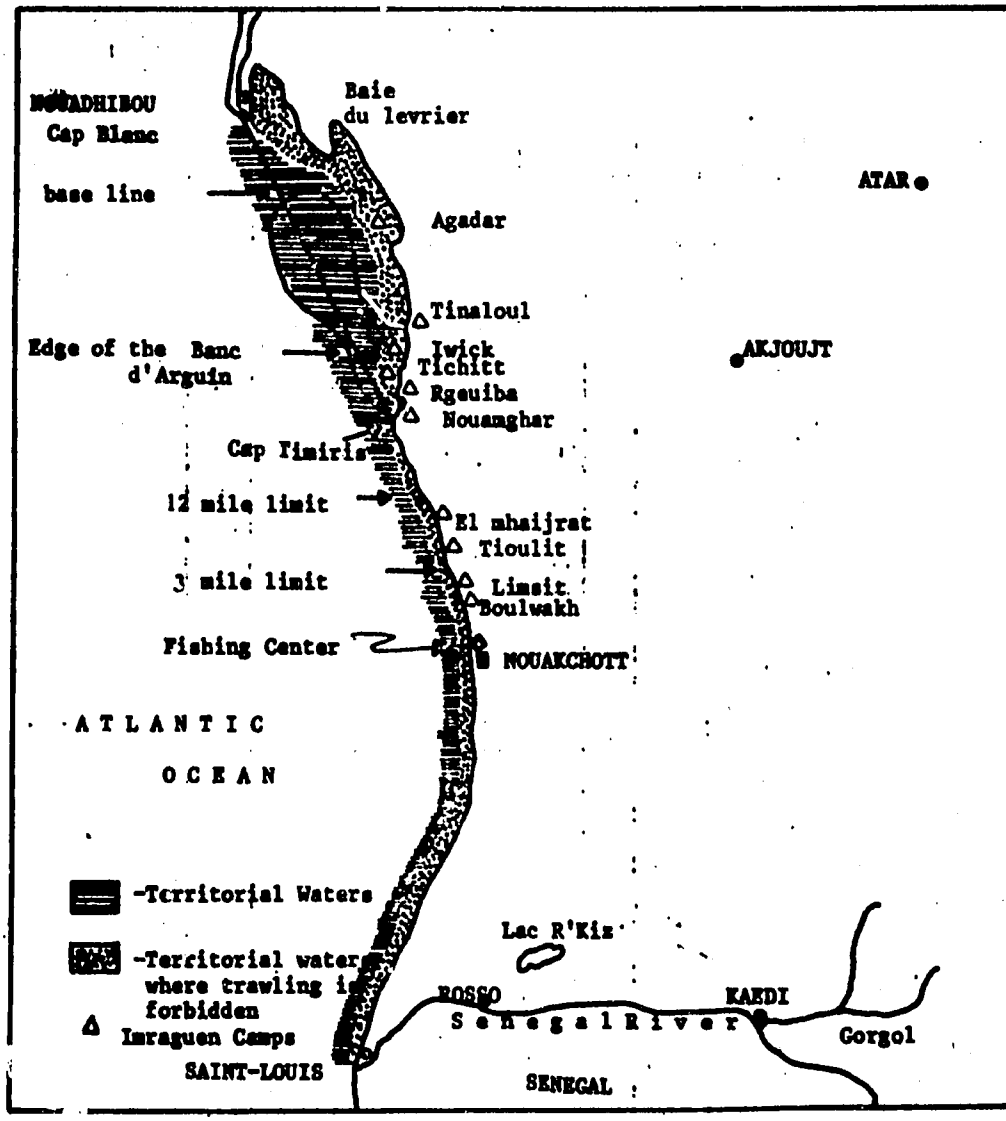
B - Rough estimate; for summary of available data up to 1976, see The Fishery of Mauritania, CILSS/Pêche/77/Inf. 5.

C - BAMS estimates.

362

Exhibit 6-52

Mauritanian Coastal Waters
and Fishing Villages



Source: RAMS

6.4.7 Forestry and Pasture

Lacking other studies on the subject, the following approach to forestry production was used in order to develop RAMS' Rural GDP projections.[a] The method consists essentially of calculating the supply side by examining land area, rainfall patterns and approximate vegetal growth (not including agriculture) at the various rainfall levels. The demand on this growth consists essentially of livestock biomass demand and human wood needs which are in large parts cooking needs.

Supply

Estimates on the supply side are based on pasture, brush and woodland in combination with the density of trees shading off into brush and then open pasture. This growth is referred to as dry-matter whether it is grass, brush or trees. A rainfall scale is then applied to growth rates available from various sources both in and out of Mauritania and is classified as follows:

1976-1978 Rainfall Zones, mm	Dry-matter Production Kg/ha.	Land Area by Zones Km^2, 000	Dry-matter Production mt 000
50	40*	488.0	976
50 - 100	70*	251.5	1,408
100 - 150	115	77.5	891
150 - 200	190	78.3	1,488
200 - 250	320	70.1	2,243
250 - 300	540	25.7	1,388
300 - 350	900	14.7	1,323
350 - 400	1,500	18.0	2,700
400 - 450	2,420	6.6	1,597
Total		1,030.4	14,014

* This production is spread so thinly over vast areas that an estimated 50% and 20%, respectively, is judged to be beyond utilization.

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a) For more detail on the calculation. consult RAMS' option paper on Rural Sector GDP.

From the foregoing, it is possible to deduct that 14 million metric tons of biomass growth available for livestock grazing and browsing, which RAMS has estimated with reference to UBT (Unite de Betail Tropicale) measure to approximately10.6 million tons of equivalent dry-matter. Fifty percent of this amount is consumed and the other half is left on the pasture and dies at the end of each season, a normal biological process.

The remaining 2.7 million metric tons is in shrub and trees from which removals are made as reeds, leaves, green and dead wood for: cooking fires, charcoal, timber poles, housing, fencing, mats and other uses. The aggregate estimate for these uses is approximately 730,000 mt for 1980. The residual portion includes losses due to sand dune damage, decomposition and return to soil. In summary, the disposition of the above supply is:

Livestock	10,592,000 mt
Wood Material	730,000 mt
Decomposition and losses	2,692,000 mt
Total Supply	14,014,000 mt

Demand

Total livestock biomass demand, with reference to UBT and calculated for each type of herd (camel, cattle, sheep, horses and donkeys) for Mauritanian as well as Malian and Transhumant animals totals 5,292,000 metric tons.

Total human cooking needs, measured in kilos of wood equivalent per person per year, and weighted according to rural, nomad and urban consumption totals 695,050 mt.

The following table sums the above:

	(000 mt)	
	Supply	Demand
Livestock	10,592	5,292[a]
Wood Material	730	696
Decomposition and losses	2,692	2,692
Total	14,014	8,680

a) Cooking wood equivalent only.

Gum Arabic, which was a significant forestry product before the drought, has been obliterated in the last few years. Exhibit 6-13 traces the quantities of Gum Arabic commercialized by SONIMEX, the national company which has the monopoly on the purchase of the product.

6.5 Production Tables

The following sets of tables summarize selected FAO data printouts. They regroup first by food-type and then by type of crop, basic data on total crop production, area under cultivation, and the amount used for seed, feed, waste, and consumption. Additional data on kilo-calories are included for each food-type.

The kilo-calorie analysis shows the data to be complete and a fair statement of Mauritania's agricultural production for the period 1973-1979.

Exhibit 6-53
Cereal Grain Production By Years (in metric tons)

Item	K-cal 100 g.	1973	1973	1975	1976	1977	1978	1978
Wheat		150	150	170	250	200	180	200
Hectares		300	300	310	420	400	340	400
Seed		18	19	25	24	20	24	24
Feed		25	25	28	44	35	30	34
Waste		4	6	7	10	8	7	8
Food	364	103	100	110	172	137	119	134
Paddy Rice		3,000	3,000	3,840	3,960	3,600	3,500	4,000
Hectares		1,000	1,000	1,036	1,187	1,600	1,700	2,000
Seed		80	83	95	128	136	160	160
Feed		326	326	406	416	375	363	417
Waste		809	808	10,50	1,075	973	937	1,078
Food	364	1,785	1,783	2,289	2,341	2,116	2,040	2,345
Barley		150	160	170	180	200	150	200
Hectares		200	210	220	230	240	300	300
Seed		14	14	15	16	20	20	20
Feed		38	40	44	45	49	37	50
Waste		8	9	9	10	11	8	11
Food	337	90	97	102	109	120	85	119
Maize		1,500	3,000	4,000	4,500	4,000	4,800	5,000
Hectares		6,000	6,000	8,000	8,500	8,000	8,800	9,000
Seed		198	264	281	264	290	297	297
Feed		156	168	176	201	182	213	223
Waste		36	233	376	425	356	453	472
Food	350	1,110	2,335	2,167	3,610	3,172	3,837	4,008
Sorghum/Millet		25,000	50,000	45,000	36,000	21,000	17,200	35,000
Hectares		130,000	160,000	109,000	70,000	60,000	109,000	110,000
Seed		3,200	2,180	1,400	1,200	2,180	2,200	2,200
Feed		3,100	6,808	6,209	4,956	2,678	2,135	4,669
Waste		1,133	2,435	2,206	1,759	963	769	1,673
Food	345	17,567	38,577	35,185	28,085	15,179	12,096	26,458
Cereals		29,800	56,310	53,180	44,890	29,000	25,830	44,400
Hectares		137,500	167,510	118,566	80,337	70,240	120,140	121,700
Seed		3,510	2,560	1,816	1,632	2,646	2,701	2,701
Feed		3,645	7,367	6,863	5,662	3,319	2,778	5,393
Waste		1,990	3,491	3,648	3,279	2,311	2,174	3,242
Food		20,655	42,892	40,853	34,317	20,724	18,177	33,064
K-cal, m		67,793	148,441	141,549	119,043	72,075	63,306	114,733

Source: Derived from FAO 06/8/80 computer printout

6.70

Vegetable and Fruit Production (in metric tons)

Item	K-cal 100 g.	1973	1974	1975	1976	1977	1978	1979
Fresh Veg.		1,500	1,600	1,700	1,700	1,800	2,00	2,300
Hectares		375	400	425	425	450	500	575
Seed		15	16	17	17	18	20	23
Waste		135	144	153	153	162	180	207
Food	20	1,350	1,440	1,530	1,530	1,620	1,800	2,070
Water-melon		1,000	1,500	1,500	3,000	3,000	4,000	4,300
Hectares		120	200	200	400	400	500	700
Waste		100	150	150	300	300	400	430
Food	14	900	1,350	1,350	2,700	2,700	3,600	3,870
Food seeds	518	1,200	1,400	1,600	1,600	1,800	1,800	2,000
Fresh Fruit		1,500	1,600	1,600	1,700	1,800	1,000	2,000
Hectares		-	-	-	-	-	-	-
Waste		150	160	160	170	180	180	200
Food	60	1,350	1,440	1,440	1,530	1,620	1,620	1,800
Dates		10,400	10,400	10,600	10,000	11,000	12,000	12,000
Hectares		-	-	-	-	-	-	-
Waste		1,040	1,040	1,060	1,000	1,100	1,200	1,200
Food	70	9,360	9,360	9,540	9,000	9,900	10,800	10,800
Sum		14,400	15,100	15,400	16,400	17,600	19,800	20,600
Hectares		495	600	625	825	850	1,000	1,275
Seed		15	16	17	17	18	20	23
Waste		1,425	1,494	1,523	1,623	1,742	1,960	2,037
Food		12,960	13,590	13,860	14,760	15,840	17,820	18,540
Food seeds		1,200	1,400	1,600	1,600	1,800	1,800	2,000
K-cal, m		13,974	15,145	16,325	16,190	17,928	18,720	19,956

Source: Derived from FAO 06/28/80 computer print-out.

6.71

Pulses Production (in metric tons)

Item	K - cal 100 g.	1973	1974	1975	1976	1977	1978	1979
Cow peas, dry		3,060	4,000	8,300	10,000	12,000	13,000	14,000
Hectares		10,000	16,000	25,000	29,400	35,000	36,000	37,000
Seed		640	1,000	1,176	1,400	1,440	1,480	1,480
Waste		206	400	830	1,000	1,200	1,300	1,400
Food	1oo	1,214	2,600	6,294	7,600	9,360	10,220	11,120
Other Pulses		5,000	6,500	9,000	10,000	10,500	11,500	12,000
Hectares		21,000	21,000	24,000	25,000	25,000	26,000	26,000
Seed		1,050	1,200	1,250	1,250	1,300	1,300	1,300
Waste		441	597	900	1,000	1,050	1,150	1,200
Food	1o8	3,509	4,703	6,850	7,750	8,150	9,050	9,500
Pulses		7,060	10,500	17,300	20,000	22,500	24,500	26,000
Hectares		31,000	37,000	49,000	54,400	60,000	62,000	63,000
Seed		1,690	2,200	2,426	2,650	2,740	2,780	2,780
Waste		647	997	1,730	2,000	2,250	2,450	2,600
Food		4,723	7,303	13,144	15,350	17,510	19,270	20,620
K - cal, m.		7,935	12,269	22,082	25,788	29,417	32,374	34,642

Source: Derived from FAO 06/28/80 computer printout.

Exhibit 6-56

Root Crop Production (in metric tons)

Item	K-cal 100 g.	1973	1974	1975	1976	1977	1978	1979
Potatoes		1,500	1,600	1,800	2,500	2,500	4,160	4,000
Hectares		100	120	150	200	200	250	300
Seed		96	120	160	160	200	240	280
Waste		144	152	174	244	243	410	390
Food	71	1,260	1,328	1,466	2,096	2,057	3,510	3,330
Sweet Potatoes		700	1,600	1,700	1,700	1,800	1,800	2,000
Hectares		200	430	440	450	460	460	500
Waste		70	160	170	170	180	180	200
Food	96	630	1,440	1,530	1,530	1,620	1,620	1,800
Yams		1,700	1,800	1,800	1,900	2,000	2,000	2,000
Hectares		320	320	330	340	350	350	350
Waste		170	180	180	190	200	200	200
Food	96	1,530	1,620	1,620	1,710	1,800	1,800	1,800
Root Crops		1,900	5,000	5,300	6,100	6,300	7,960	8,000
Hectares		620	870	920	990	1,010	1,060	1,150
Seed		96	120	160	160	200	240	280
Waste		384	492	524	606	623	790	790
Food		3,420	4,388	4,616	5,336	5,477	6,930	6,930
K-cal, m		2,968	3,880	4,065	4,599	4,744	5,775	5,820

Source: Derived from FAO 06/28/80 computer print-out.

Exhibit 6-57

Groundnuts, Oil and Meal Production (in metric tons)

Item	K-cal 100 g.	1973	1974	1975	1976	1977	1978	1979
In Shell		980	1,000	2,000	3,000	3,000	3,200	3,500
Hectares		1,700	2,000	4,000	4,500	4,500	4,700	5,000
Seed		140	280	315	315	329	350	350
Waste		20	20	39	59	60	64	70
Shelling input		820	700	1,646	2,626	2,611	2,786	3,080
Shells		246	210	494	788	783	836	924
Shelled		574	490	1,152	1,838	1,828	1,950	2,156
Food use	549	150	150	150	150	150	150	150
Oil mill input		424	340	1,002	1,688	16,78	1,800	2,006
Feed cake		178	143	421	709	705	756	906
Waste		55	44	130	220	218	234	347
Oil/Food	884	191	153	451	759	755	810	753
K-cal, m.		2,512	2,176	4,810	7,533	7,498	7,984	7,480

Source: Derived from FAO 06/28/80 computer print-out.

Exhibit 6-53

Production of Cattle (Domestic)

Item	K - cal 100 g.	1974	1975	1976	1977	1978	1979	1980	1981
Cattle Slaughter, 000		95	97	99	100	100	101	101	105
Carcass Wt. Kg.		100	105	110	120	120	120	120	120
Food MT	159	9.50	10.19	10.89	12.00	12.00	12.12	12.12	12.60
Offal, Wt. Kg.		24	24	24	24	24	24	24	24
Food MT	95	2.28	2.33	2.33	2.40	2.40	2.42	2.42	2.52
Fat, Wt. Kg.		3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Food MT	685	.34	.35	.36	.36	.36	.36	.36	.38
Milk Animals,000		168	173	200	171	194	200	173	179
Yield, Kg.		500	500	500	500	500	500	500	500
Production MT		84.0	86.5	100.0	85.5	97.0	100.0	86.5	89.5
To Calves (150 kg.)		25.2	25.9	30.0	25.6	29.1	30.0	25.9	26.8
Waste		2.8	3.0	3.5	3.0	3.4	3.5	3.0	3.1
Net Production		55.9	57.6	66.5	56.9	64.5	66.5	57.6	59.6
Food, MT	92	44.7	46.1	53.2	45.5	51.6	53.2	46.1	47.7
Input to Butter, MT		11.2	11.5	13.3	11.4	12.9	13.3	11.5	11.9
Extract Wt. Kg.		42	42	42	42	42	4.2	4.2	4.2
Food, MT	862	.47	.48	.56	.48	.54	.56	.48	.50
Input to Cheese MT		11.9	11.5	13.3	11.4	12.9	13.3	11.5	11.9
Extract Wt. Kg.		125	125	125	125	125	125	125	125
Food, MT	250	1.49	1.44	1.66	1.43	1.61	1.66	1.44	1.49
Hides, Slaughter, 000		95	97	99	100	100	101	101	105
Waste		19	19	20	20	20	20	20	21
Utilized, 000		76	78	79	80	80	81	81	84
K - cal, m.		68,500	70,963	79,363	73,399	79,978	81,957	74,185	76,550

Source : Derived from FAO 06/20/80 computer printout.

6.75

Exhibit 6-59

Products of Sheep (Domestic)

Item	K - cal 100 g.	1974	1975	1976	1977	1978	1979
Sheep Slaughter, 000		507	518	530	543	556	570
Carcass wt. Kg.		10	10	10	10	10	10
Food MT, 000	199	5.07	5.18	5.30	5.43	5.56	5.70
Offal, wt. Kg.		2	2	2	2	2	2
Food MT, 000	95	1.01	1.04	1.06	1.09	1.11	1.14
Fat, Wt. Kg.		.3	.3	.3	.3	.3	.3
Food MT, 000	685	.15	.16	.16	.16	.17	.17
Milk, Sheep, 000		723	763	892	761	886	964
Yield, Kg.		100	100	100	100	100	100
Production MT, 000		72.3	76.3	89.2	76.1	88.6	96.4
To Lambs		36.2	38.2	44.6	38.1	44.3	48.2
Waste		3.6	3.8	4.5	3.8	4.4	4.8
Food MT, 000	83	32.6	34.4	40.1	34.3	39.9	43.4
Wool, Sheep, 000		1,552	1,661	1,788	1,621	1,723	1,925
Yield Wt. Kg.		.4	.4	.4	.4	.4	.4
Utilized MT, 000		.62	.65	.72	.65	.69	.77
Skins, Slaughter, 000		507	518	530	543	556	570
Waste		51	52	53	54	56	57
Utilized 000		456	466	477	489	500	513
K - cal m.		39,134	40,944	45,933	41,406	46,400	49,613

Source : Derived from FAO 06/28/80 computer printout.

Exhibit 6-60

Products of Goats (Domestic)

Item	K - cal 100 g.	1974	1975	1976	1977	1978	1979	1980	1981
Goat, Slaughter, 000		507	518	530	543	556	570	585	600
Carcass, Wt. Kg.		9	9	9	9	9	9	9	9
Food MT, 000	134	4.56	4.66	4.77	4.89	5.00	5.13	5.27	5.40
Offal, Wt.Kg.		2	2	2	2	2	2	2	2
Food MT, 000	95	1.01	1.04	1.06	1.09	1.11	1.14	1.17	1.20
Fat, Wt. Kg.		.3	.3	.3	.3	.3	.3	.3	.3
Food MT, 000	685	.15	.16	.16	.16	.17	.17	.18	.18
Milk, Goats, 000		623	656	753	769	817	870	926	926
Yield, Kg.		120	120	120	120	120	120	120	120
Production, MT, 000		74.8	78.7	90.4	92.3	98.0	104.4	111.1	111.1
To Kids		37.4	39.4	45.2	46.1	49.0	52.2	55.6	55.6
Waste		3.7	3.9	4.5	4.6	4.9	5.2	5.6	56
Food MT, 000	85	33.7	35.4	40.7	41.6	44.1	47.0	49.9	49.9
Wool, Goats, 000		1,449	1,478	1,514	1,524	1,639	1,750	1,864	2,071
Yield, Wt. Kg.		.4	.4	.4	.4	.4	.4	.4	.4
Utilized, 000		.58	.59	.61	.61	.66	.71	.75	.23
Skins, Slaughter, 000		507	518	530	543	556	570	585	600
Waste		51	52	53	54	56	57	59	60
Utilized		456	466	477	489	500	513	526	540
K - cal, m.		36,742	38,418	43,090	44,044	46,404	49,072	51,827	52,024

Source : Derived from FAO 06/28/80 computer printout.

Exhibit 6-.1

Products of Camels (Domestic)

6.77

Item	K - cal 100 g.	1974	1975	1976	1977	1978	1979	1980	1981
Camel, Slaughter, 000		51	52	53	54	55	57	58	60
Carcass, Wt. Kg.		150	150	150	150	150	150	150	150
Food MT, 000	95	7.65	7.80	7.95	8.10	8.25	8.55	8.70	9.00
Offal, Wt. Kg.		30	30	30	30	30	30	30	30
Food MT, 000	95	1.53	1.56	1.59	1.62	1.65	1.71	1.74	1.80
Fat, Wt. Kg.		5	5	5	5	5	5	5	5
Food MT, 000	685	.26	.26	.27	.27	.28	.29	.29	.30
Milk, Camels,000		70	72	75	76	81	83	82	83
Yield, Kg.		530	530	530	530	530	530	530	530
Production MT, 000		37.1	38.2	41.3	40.3	42.9	44.0	43.5	44.0
To Calves		19.6	20.2	22.1	21.3	22.7	23.2	23.0	23.2
Waste		1.9	1.9	2.1	2.0	2.1	2.2	2.2	2.3
Food MT, 000	53	15.6	16.1	17.7	17.9	18.1	18.6	18.3	18.5
Hair, Camels , 000		571	584	599	592	607	625	637	643
Yield, Kg.		.5	.5	.5	.5	.5	.5	.5	.5
Utilized MT, 000		.29	.29	.30	.30	.30	.31	.31	.32
Hides, Slaughter, 000		51	52	53	54	55	57	58	60
Waste		10	10	11	11	11	11	12	12
Utilized, 000		41	42	42	43	44	46	46	48
K - cal, m.		19,565	20,036	21,269	20,984	21,901	22,597	22,564	23,133

Source : Derived from FAO 06/20/80 computer printout.

6.78

Total Livestock Production and Off-Take (Cattle and Sheep, in thousands of head)

Year	Cattle			Sheep		
	Gross Production	Total Off-Take	Ending Herd	Gross Production	Total Off-Take	Ending Flock
1967	314	197	2,507	1,418	1,055	4,563
68	-31	190	2,286	685	1,359	4,239
69	314	197	2,403	1,403	1,091	4,602
1970	100	193	2,310	980	1,106	4,476
71	-61	182	2,067	548	990	4,034
72	-369	154	1,544	-286	843	2 905
73	-231	140	1,173	-51	705	2,149
74	168	143	1,198	723	597	2,275
1975	173	145	1,225	763	614	2,424
76	200	150	1,275	892	636	2,680
77	-23	144	1,102	339	637	2,382
78	194	146	1,150	886	659	2,609
79	200	148	1,202	954	584	2,889

Source : Derived from FAO 06/28/80 computer printout.

Exhibit 6-63

Total Livestock Production and Off-Take (Goats and Camels, in thousands of head)

Year	Goats			Camels		
	Gross Production	Total Off-take	Ending Herd	Gross Production	Total Off-take	Ending Herd
1967	853	763	2,790	72	49	673
68	785	778	2,797	56	50	679
69	877	795	2,879	75	52	702
1970	907	815	2,971	76	52	726
71	800	714	3,056	53	53	726
72	62	644	2,475	0	54	672
73	140	577	2,038	10	55	627
74	632	589	2,081	70	56	641
1975	656	603	2,134	72	57	656
76	753	620	2,267	79	58	677
77	659	633	2,293	50	59	668
78	817	653	2,456	81	61	688
79	870	675	2,650	83	63	708

Source: Derived from FAO 06/28/80 computer printout.

Exhibit 6-64

Products of Cattle (Domestic)

Item	K - cal 100 g.	1974	1975	1976	1977	1978	1979	1980	1981
Cattle Slaughter, 000		95	97	99	100	100	101	101	105
Carcass Wt.Kg.		100	105	110	120	120	120	120	120
Food MT	159	9.50	10.19	10.89	12.00	12.00	12.12	12.12	12.60
Offal, Wt. Kg.		24	24	24	24	24	24	24	24
Food MT	95	2.28	2.33	2.38	2.50	2.40	2.42	2.42	2.52
Fat, Wt. Kg.		3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Food MT	685	.34	.35	.34	.36	.36	.36	.36	.38
Milk Animals,000		168	173	200	171	194	200	173	179
Yield, Kg.		500	500	500	500	500	500	500	500
Production MT		84.0	86.5	100.0	85.5	97.0	100.0	86.5	89.5
To Calves (150 kg.)		25.2	25.9	30.0	25.6	29.1	30.0	25.9	26.8
Waste		2.9	3.0	3.5	3.0	3.4	3.5	3.0	3.1
Net Production		55.9	57.6	66.5	56.9	64.5	66.5	57.6	59.6
Food, MT	92	44.7	46.1	53.2	45.5	51.6	53.2	46.1	47.7
Input to Butter, MT		11.2	11.5	13.3	11.4	12.9	13.3	11.5	11.9
Extract Wt. Kg.		42	42	42	42	42	42	42	42
Food, MT	862	.47	.48	.56	.48	.54	.56	.48	.50
Input to Cheese MT		11.9	11.5	13.3	11.4	12.9	13.3	11.5	11.9
Extract Wt. Kg.		125	123	125	125	125	125	125	125
Food, MT	250	1.49	1.44	1.66	1.43	1.61	1.66	1.44	1.49
Hides, Slaughter, 000		95	97	99	100	100	101	101	105
Waste		19	19	20	20	20	20	20	21
Utilized, 000		76	78	79	80	80	81	81	84
K - cal, m.		66,500	70,963	79,363	73,399	79,978	81,957	74,185	76,950

Source : Derived from FAO 06/20/80 computer printout.

Exhibit 6-65
Poultry and Egg Production

	K-cal: 100 g.	1974	1975	1976	1977	1978	1979
National Flock (Thousands)		2,780	2,800	2,850	2,300	2,950	3,000
Layers (Thousands)		1,390	1,400	1,425	1,450	1,300	1,408
Eggs Produced (Millions)		67.48	67.97	69.18	70.40	62.40	67.60
Eggs Available for Consumption (Millions)		53.98	54.37	55.34	56.32	49.92	54.08
Metric Tons - Eggs for Consumption (35G)	145	1,889	1,903	1,937	1,971	1,747	1,893
Waste Factor (Millions)		6.75	6.80	6.92	7.04	6.24	6.76
Eggs set for Hatching (Millions)		6.75	6.80	6.92	7.04	6.24	6.76
Baby Chick Production (Thousands)		2,970	2,992	3,045	3,168	2,933	3,042
Baby Chick Mortality (Thousands)		135	132	105	148	125	135
Number of Birds Slaughtered (Thousands)		2,835	2,860	2,940	3,020	2,808	2,907
Carcass Weight		.8	.8	.8	.8	.8	.8
Poultry Meat Production (MT)	165	2,228	2,288	2,352	2,416	2,246	2,326
K-cal, m.		6,181	6,535	6,689	6,844	6,239	6,583

Source: Derived from FAO 06/28/80 computer print-out.

Exhibit 6-66

Miscellaneous Fishery Production (in metric tons)

6.82

Item	K - cal.	1974	1975	1976	1977	1978	1979	1980	1981
Crustaceans									
Cephalopods	87	600	600	500	500	500	600		
K - cal, m		402	402	402	402	402	402		

Source : Derived from FAO 06/28/80 computer printout.

Exhibit 6-67

Forestry: Utilised Production

	Demand kg/capita	Wood equiv. mt	Other Wood mt	Gum Arabic mt
1967	434	471,630	10,300	4670.0
68	438	486,530	10,630	5324.0
69	441	500,760	10,940	7318.0
1970	445	516,510	11,280	5368.0
71	449	532,740	11,640	5738.0
72	453	549,400	12,000	885.0
73	457	566,590	12,210	916.0
74	461	584,220	12,430	510.0
1975	465	602,360	12,640	1635.0
76	469	621,050	12,860	441.0
77	473	639,700	13,070	298.0
78	477	661,170	13,290	122.0
79	481	682,730	13,500	485.0
1980	485	704,900	13,710	171.3

Source: RAMS