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Honor — Fraternity — Justice

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RAMS PROJECT

Rural Assessment and Manpower Surveys

Rural Income in
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F O R E W O R D

This report is an assessment of household cash income in Mauritania's rural sector. Its conclusions are drawn from data gathered in the course of the survey of budgetary, consumption, nutrition and income patterns conducted from November 1979 to November 1980. The survey was an integral part of the RAMS project.

The survey comprised four trips each lasting three months, all focused on the sedentary rural sector. A limited, complementary survey was also conducted in the Adrar, Assaba, Tagant and Hodh El Charghi regions, this time focused on the nomadic rural sector.

It needs to be pointed out that this survey was conducted just a few years after the great drought which devastated all countries in the Sahel zone. The effects of this drought continue to be felt to this day.

This report is only a preliminary probe aimed at generating better knowledge of Mauritania's rural sector, a milieu where the dearth of statistical data is more the rule than the exception.

CHAPT. I -INTRODUCTION:

I-1. Aim of the Study:

The aim of this survey report, an integral part of the RAMS project, is to bring together data with a view to making an assessment of income patterns in Mauritania's rural sector, thus making it possible for planning administrators to diagnose the country's current condition.

Data on rural cash income were obtained by conducting polling surveys based on random samples necessarily restricted because of time and resource limitations. Data on non-monetary income were obtained from a study of household consumption patterns.

Cash income was evaluated on the basis of prices obtained by the households on local markets at the material time. Therefore, any comparison of the results of the Mauritanian rural sector income survey with data from other countries ought to be made in full awareness of the fact that in Mauritania, prices are high, and they fluctuate a great deal from season to season.

Data on income distribution are still scant. This report will treat the structure and the distribution of income in the sedentary rural sector in succession, then follow the same sequence with the nomadic sector. The sample base being narrow, the precision of survey data ob-

viously varies according to region and ethnic group. Still, these data make it possible to reach a valid assessment at the macro-economic level.

1-2. Methodology:

The methodology employed for analyzing Mauritania's rural sector income consisted mainly of the analysis of data generated by the Budgetary, Consumption, Nutrition and Income Survey of the sedentary and nomadic rural sectors conducted throughout the period from November 1979 to November 1980.

1.2.1. Survey Technique:

Surveys conducted in developing countries are difficult undertakings, and no satisfactory method has yet been worked out for their conduct. The method based on polling surveys held over a period of time was considered. On account of seasonal fluctuations, it was planned to make four trips, each lasting three months, to the 64 households covered by the sample.

The Budgetary, Consumption, Nutrition and Revenue Survey comprised 3 main sections:

- A food consumption Survey using weighted units and incorporating a survey of feeding habits, a market survey and a survey of infant nutrition.

- An income and production survey;
- A third section, added during the fourth trip, was a survey focused on budgetary, consumption, income and production patterns in the nomadic sector.

1.2.2. Method:

(1) - Sample Selection

The polling plan followed a population stratification schema based on agro-ecological zones.(2) Next, a random selection was operated at a level twice removed from the sample base.

(1) The four trips took place in December 1979, March 1980, June-July 1980, and October 1980. During the fourth trip, a supplementary sample of rural nomads was added.

(2) See the RAMS basic document, "The Major Agro-Ecological Zones of Mauritania.

In the first round 32 villages were selected by the lottery for polling, out of a sample of 2, 342 villages registered by the 1977 census. (3) These constituted the primary units. As a result of organizational, personnel and fiscal constraints, the sample was reduced by half, 16 out of the original 32 villages being selected at this point, again by lottery.

In the second round, 66 households were selected for polling, again using the lottery system of random selection. These constituted the secondary units.

Distribution of Primary and Secondary Units. +

Agro-ecological zone	Number of Villages	Number of Households	Number of Persons
1	4	24	320
2	2	4	88
3	2	14	137
4	3	6	78
5	4	8	94
6	1	8	82
TOTAL	16	64	799

+ Numbers of households and persons varied slightly from trip to trip, ranging between 64 and 66 households and between 600 and 800 persons.

(3). For details see information on methodology in Appendix 1, page 2.

The income survey was based on the same sample, and the data were drawn from readings obtained during the 3rd and 4th RAMS Budgetary - Consumption - Nutrition - Income surveys and correlations between income and expenditure figures for different households. A checking system was established to help detect errors and cross-check information. A balance sheet comparing each day's data with retrospective interviews on income was used to ferret out anomalies such as expenditure exceeding income, and to seek relevant explanations(possibly a matter of loans, remittances. etc.).

The survey of the rural sedentary sector was supplemented with 3 limited 6-day surveys of a random sample of the nomadic population during the 4th trip of the Budgetary - Consumption - Nutrition - Income Survey in the following regions: Adrar, Tagant, Hodh El Charghi, Western Hodh, and Assaba.

Size of Households:

The survey was conducted at the level of a homogenous unit, the household. A household was defined as follows : the basic family unit comprising the husband, the wife (or wives in polygamous households) and their children.

We defined a further concept, the budgetary Unit, as follows: a group

or persons dependent on a head who has authority over the totality of income and expenditure in component households within the unit.

In the interests of greater precision we added the concept of a commensal. A commensal is any person who partakes of the meals within a budgetary unit. For instance, guests and shepherds boarded by the budgetary units fall within this category. Among the various factors affecting income levels, the size and composition of households are the most important factors.

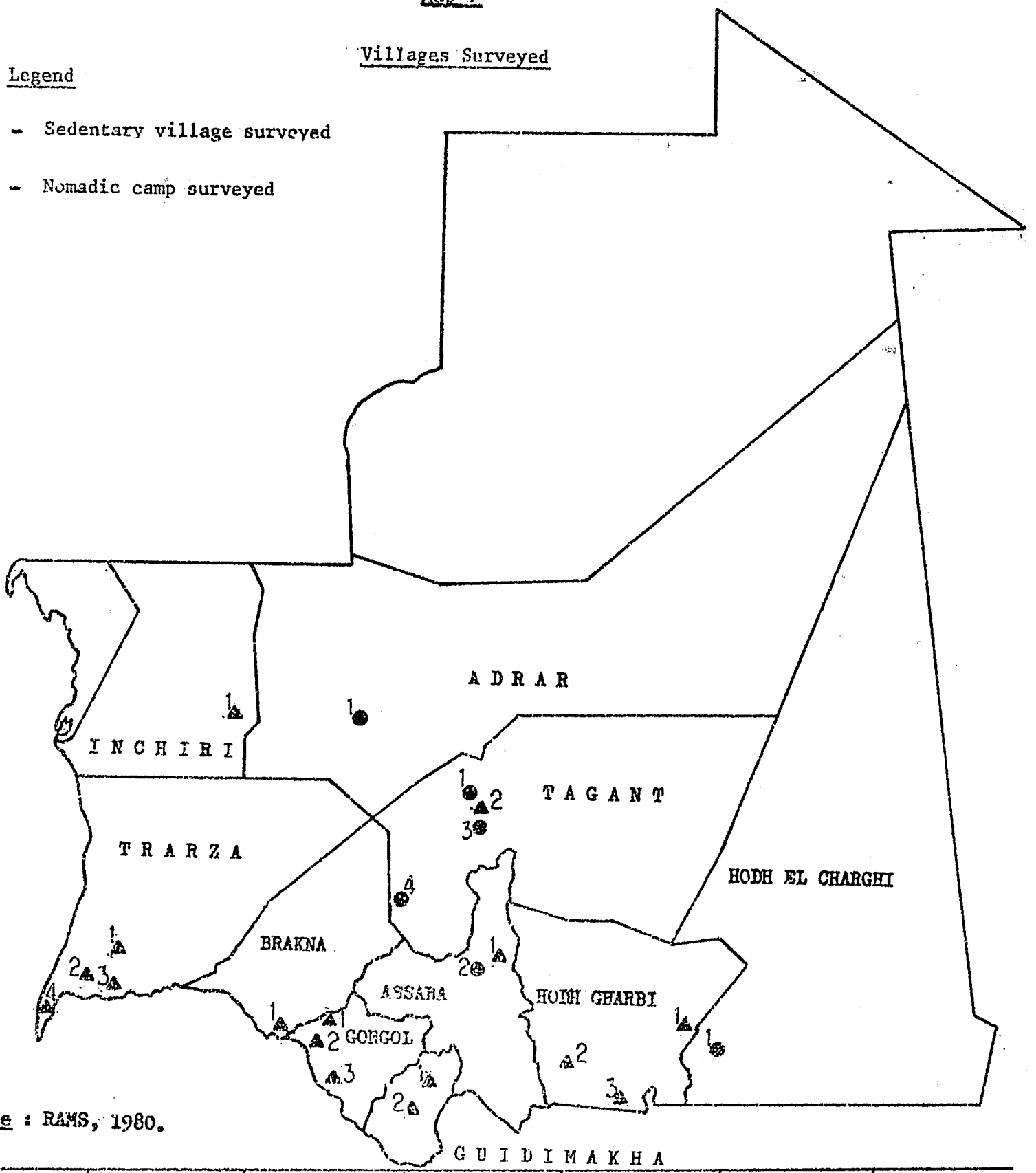
Map 1

Villages Surveyed

Legend

▲ – Sedentary village surveyed

● – Nomadic camp surveyed



Source : RAMS, 1980.

HODH CHARGHI	ASSABA	GORGOL	BRAKNA	TRARZA	ADRAR	TAGANT
Nomadic C	1 Legleib	1 Monguel	1 Ferralha	1 Taguillalet	1 Nomadic C	1 Nomadic C
HODH GHARBI	2 Nomadic C	2 Garley	GUIDIMAKHA	2 El aïdi	INCHIRI	2 Nimlane
Kassi Barke		3 Kaedi	1 Hassi Chegar	3 Abadah	1 Akjoujt	3 Nomadic C
in Farba			2 Bouenze	4 N'Diago		4 Nomadic C
Aguizamel						

AVERAGE SIZE OF BUDGETARY UNITS

	1st Trip		2nd Trip		3rd Trip		4th Trip	
AEZ	Budgetary Unit	Population	Budgetary Units	Population	Budgetary Unit	Population	Budgetary Unit	Population
1	22	241	24	348	24	302	24	285
2	4	77	4	78	4	87	4	56
3	14	111	15	117	16	136	15	136
4	6	67	6	78	6	80	6	87
5	8	81	8	64	8	72	8	71
6	8	92	8	82	8	86	7	66
TOTAL	63	669	65	767	66	763	64	701

AVERAGE SIZE OF BUDGETARY UNITS ACCORDING TO ETHIIC GROUPS

Ethnic Groups	1st Trip		2nd Trip		3rd Trip		4th Trip		Persons per Budgetary Unit According to Ethnic Groups
	Budgetary Unit	Population	Budgetary Unit	Population	Budgetary Unit	Population	Budgetary Unit	Population	
Moors	26	273	27	291	27	281	27	276	10
Toucouleurs	11	96	11	119	11	113	11	98	9.7
Peulh	13	120	14	190	15	176	13	126	11
Wolof	7	95	7	102	7	101	7	109	14.5
Soninké	6	107	6	100	6	109	6	92	17
TOTAL	63	691	65	802	66	780	64	701	11.5

AVERAGE SIZE OF BUDGETARY UNITS ACCORDING TO REGIONS

Region	First Trip		2nd Trip		3rd Trip		4th Trip		Persons per Budgetary Accord-ing to Regions
	Budge-tary Unit	Popu-lation	Budge-tary Unit	Popu-lation	Budge-tary Unit	Popu-lation	Budge-tary Unit	Popu-lation	
Hodh El Charghi	6	62	6	51	6	72	6	65	10
Assaba	2	18	2	20	2	18	2	17	9
Gorgol	27	280	29	374	30	348	28	277	11
Brakna	6	51	6	60	6	64	6	57	9.7
Trarza	8	87	8	99	8	79	8	98	11
Tagant	2	20	2	38	2	26	2	40	15.5
Guidimakha	4	81	4	78	4	87	4	69	19.8
Inchiri	8	92	8	82	8	86	8	78	10.6
TOTAL	63	691	65	802	66	780	64	701	11.5

At the end of the four survey trips, it was found that the average budgetary unit comprised 11.5 people.

For nomads, the sample surveyed comprised 34 budgetary units, i.e. precisely 33 % of the rural population sample.

AVERAGE SIZE OF NOMADIC BUDGETARY UNITS

	Hodh El Charghi	Assaba	Tagant	Adrar	Total
Budgetary Unit	10	1	15	8	34
Number of Persons	72	5	71	89	217
Persons per Budgetary Unit	7.2	5	4.7	8.6	6.4

Among rural nomads the average budgetary unit comprised 6.4 people.

AVERAGE SIZE OF BUDGETARY UNITS

	Sedentary	Nomadic	Total
Budgetary Units	64	34	98
Persons	744	217	961
Persons per Budgetary Unit	11.5	6.4	10

In the rural sector, the average size of Budgetary Units was 10 persons.

2) - Survey Organization

Survey Trips: In order to gauge fluctuations in consumption and production patterns, four trips were planned.

- the first trip took place in November 1979
- the second trip took place in March 1980
- the third trip took place in July 1980
- the fourth trip took place in November 1980

Personnel Recruitment:

The training course and the surveys were led by a team of RAMS personnel comprising an economist, a nutrition expert and a statistician.

Survey personnel were recruited from high school students who had graduated from junior high at least, as well as ENECOFA pupils. Fundamental selection criteria were basic knowledge and linguistic ability.

Personnel Training:

In the first instance, survey-personnel went through a theoretical course lasting 15 days. This was rounded off with practical field survey work. The survey personnel found the work in this last phase particularly tough and difficult.

Before each succeeding survey trip, a one week refresher course was organized to enable personnel to recapitulate lessons learned from previous trips and to discuss the new questionnaires dealing with income and production. Improvement possibilities were also discussed.

3) - Questionnaires:

A complete set of questionnaires used in the four survey trips plus the instruction manual used have been appended to the RAMS Statistical Methodology Manual.

- The Surveys:

Let us recall the fact that the overall survey comprised four trips. Survey personnel worked 6 days in each of the 16 villages surveyed. The survey covering nomads was added on only during the fourth trip.

On the whole, the surveys proceeded satisfactorily; but during the period of actual work, a number of problems surfaced.

- The first survey trip failed to yield the hoped-for results. This failure was due partly to the inexperience of the Mauritanian survey personnel, and partly to the difficulties attendant on the organization of a survey with a national coverage.

Problems encountered in the course of the pilot survey persisted. These had to do with checking the statements made by heads of budgetary units for accuracy, difficulties in getting accurate statements regarding income and production, and the people's distrust of our survey personnel: the fear being that the survey could be some sort of tool of the Internal Revenue Service.

In the course of succeeding trips, these problems were worked out, mainly through winning the trust of the people, as yet unaccustomed to this type of work.

One fact should be noted: income levels are dependent on prices. In Mauritania's rural sector, these prices are high on account of the shortage of transport facilities, the high cost of trans-shipment at Nouakchott, etc. The prices under consideration in this report are actual de facto prices, i.e., the market prices paid by the budgetary units.

CHAPTER 2 - SUMMARY AND CONCLUSIONS

1)) According to the RAMS survey of budgetary, consumption and income patterns, average cash income in the rural sector (inclusive of both sendentary and nomadic units) is 12,195 UM per head per year by 1980 prices. This is equivalent to $ 271 per head per year. Average annual income from the productive sector is 3,775 UM ($1C3) per head per year. Thus the average annual cash income coming from the productive rural sector makes up only 31 % of total income.

If a distinction is made between the sedentary and the nomadic sectors in the rural areas, average annual cash income in the sedentary sector is found to be 13,494 UM ($300) per head per year, while average annual cash income in the nomadic sector is 9,280 UM ($206) per head per year. (4)

Price levels are high in Mauritania's rural sector; therefore international comparisons should only be made with great circumspection.

2) - For our sample, cash income structure in the rural sector is as follows:

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(4) U.S.A) = 45 UM.

INCOME STRUCTURE IN MAURITANIA'S RURAL SECTOR, 1980.

SOURCE	PERCENTAGE OF TOTAL
Livestock Sales	22 %
Wages	22
Transfers, Internal and External	16
Trading Profits	16
Agricultural Sales	5
Loans (Customer Credit)	4
Pensions and Family Allowances	4
Fishery Sales	2
Handicraft Sales	2
Miscellaneous	7
TOTAL	100

Source: RAMS Survey, 1980.

This rural sector income structure reflects changes taking place within that sector:

2-1) - There has been a drop in the saleable surplus produced by the traditional

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farming surplus. Now these sectors account for only 29 % of total income. This drop in the saleable surplus is a result of a production drop in the various traditional productive sectors.

PERCENTAGE DISTRIBUTION OF OCCUPATIONAL INCOME

	Sedentary Sector	Nomadic Sector	Total
Income from Production:			
- Farming	23 %	70 %	31 %
- Animal Husbandry			
- Fishing			
- Handicrafts			
Income from Service Occupations:			
- Trading profits	44 %	11 %	36 %
- Wages			
Income from Cash Transfers:			
- Loans			
- Transfers			
- Gifts			
- Pensions, Family Allowances			
- Miscellaneous			
TOTAL	100 %	100 %	100 %

If we include handicraft occupations, business in the productive sector accounts for only 31 % of total income in the rural sector. The percentage is more remarkable when we compare the sedentary and nomadic sectors. In the sedentary sector, 23 % of business comes from the productive sector, while among nomads the productive sector accounts for 70 % of total cash income. The sedentary population is more dependent on tertiary sector business and cash transfers.

2-2) - In the rural sector the tertiary occupations are overcrowded, and wage labor has become prevalent. Wages and trading profits now make up a large slice of total income, an indication that rural occupations are shifting into the service areas. This shift involves 44 % of total income in the sedentary sector and 11 % in the nomadic sector. On this point, a comparison with data from the MISOES survey (5) is most interesting.

2-3) - Cash transfers originating from inter-regional and international migrations provide an important complement to rural cash income. In contrast to what happens in other countries, transfers are made from urban areas and foreign countries into the rural areas. Without this income from migrations, some regions would be unable to keep up a suitable level of consumption. For example, the Trarza region gets 58 % of its resources in the form of transfers. The transfers

(5) J. Boutillier, La moyenne vallée du Sénégal, PUF, Paris. 1962.

function both as a lifeline and as a magnet drawing all productive forces away from the rural sector. If loans contracted by the budgetary units as well as family allowances are included, income from transfers amounts to 33 % of the sedentary sector total and 19 % of the nomadic sector total.

The way the rural income basket is constituted, with its multiplicity of cash income sources, is a reflection of the peasants' shrewdness, their defensive reflexes, and their risk-cutting calculations - functional qualities in a living environment often ravaged by climatic hazards.

All developmental policies in the rural sector should take this "risk-cutting" calculation in the income area into account if they hope, to draw the rural population participation. Development policies should engender sufficient income security in the rural sector to help indirectly in raising productivity in this sector.

4) - There is a sizeable income gap between regions and between the sedentary and the nomadic sectors. In the rual sedentary sector, average cash income in the Tagant region (21,503 UM per head annually) is about 4 times that in the Assaba region (5,404 UM per head annually).

- The gap between the average cash income of the sedentary population (13,494 UM per head annually) and that of the nomads (9,280 UM per

per head annually) is 1.5 times. The cash income gap between sedentary and nomadic populations might be a reflection of the fact that the nomads have a special lifestyle. They produce a great deal of what they consume, and only sell livestock to make purchases falling beyond he range of self-sufficient consumption.

5) - The level of savings in the rural sector is low. Cash savings are made impossible by family bonds and showy expenditure. Among our sedentary sample, only 34 % of the budgetary units had bought jewelry since the previous year. The exception occurs among the nomads in our sample: with them, savings in the form of livestock amount to twice or three times their current income.

Moreover, rural sector savings, especially nomadic savings, dependent as they are on livestock, are vulnerable to climatic hazards and changes in social production relationships. (6) Losses occasioned by the drought, the recession in the productive sectors, and migration, all contribute to the impoverishment of the rural sectors The sector in fact suffers a negative saving, i.e. indebtedness, which accounts for 4 % of total income.

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(6) P. Bonté, Evolution des modes d'accumulation et transformation sociales en Mauritanie, RAMS, September, 1980. p.25.

6) - In the rural sedentary sector, income distribution patterns are clearly asymmetrical. The Lorenz curve shows that 70 % of budgetary units earn less than 35 % of total cash income's while 35 % of them get 65 % of total income. (The Lorenz curve makes it possible to gauge income distribution).

The Gini coefficient (index of concentration) for the sedentary sector is as follows :

R = 0.46.

The fact that income is more evenly distributed in the nomadic sector is due to the nomadic lifestyle, which stresses production for auto-consumption and savings in the form of livestock. The Gini coefficient for the nomadic sector is R : 0.4y.

7) - Budgetary data show that if production for auto-consumption is taken into consideration, average consumption levels are practically the same for the sedentary population as for the nomads. As far as savings go, nomads have an edge over the sedentary population.

8) - All the conditions described above show that Mauritania's rural sector is in a period of acute crisis, economically speaking: the traditional productive sectors, namely animal husbandry, farming,

fishing and the craft occupations, contribute less to total rural income than they used to; the rural sector is tending toward wage employment and drifting into the tertiary sector in particular; cash transfers have acquired great importance as a supplement to rural income; income distribution is uneven, with wealth concentrated in the hands of a small number of people, etc.

The crisis is a production crisis, and a crisis of mass impoverishment. It affects quantitative aspects as well as the quality of life. All these factors indicate that the authorities must take decisive action through the definition and inclusion of measures advocated within the context of the 4th Development Plan. That would be the way to check the present deterioration and to remedy it.

ASSESSMENT OF CASH INCOME IN THE RURAL SECTOR

The assessment is aimed at an examination of income in Mauritania's rural sector. It goes hand in hand with data on food consumption and budgetary patterns in the rural sector.

Tables and data used in this study come exclusively from field information gathered during the RAMS survey in the one-year period from November 1979 to November 1980.

The following items will be examined in succession:-

1) Sources and structural patterns of income in the sedentary rural sector according to regions.

2) Sources and structural patterns of income among rural nomads.

3) Rural sector income in Mauritania.

SOURCES AND STRUCTURAL PATTERNS OF INCOME IN THE SEDENTARY RURAL SECTOR

Mauritanian statistics (1) put the Gross Product at about 16,790 UM per head annually at current prices. The modern sector has a Gross Product per capita of 116,510 UM annually, while for the traditional sector the figure is only 5,007 UM per head annually.

Data gathered from the survey give a more current and more detailed picture of consumption and income patterns in the Sedentary Sector. According to these data, average cash income in the sedentary sector is 155,178 UM annually at 1980 prices. If the average budgetary unit comprises 11.5 persons, average cash income per head works out at 13,494 UM annually, equivalent to $300 per head.

However, income from the productive sectors (agriculture, animal husbandry, Fishing, handicrafts) only amounts to 3,106 UM per head

annually, i.e.,23 % of the total. Income from the service occupations is 5,889 UM per head annually, i.e.,44 % of the total. Income from remittances is 4,499 UM per head annually, i.e.,33 % of the total. (See Table 4,page 38).

As far as income structure is concerned, given that the economic context is underdeveloped,it is to be expected that the source of income would be the sale of products produced in the primary sector (animal husbandry, farming and fishing). The question is: what is the real picture like?

- The first characteristic is that income originates from a multiplicity of sources, with only one source accounting for more than 26 %. (See page 27). The multiplicity of income sources is an index of the peasants' shrewdness, their instinct for survival, and their wariness of risk (risk calculation). To come to terms with their environment, an environment often disturbed by the hazards of uncertain rain precipitation, and to reduce the incidence of risk though diversifica-

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1 Figures culled from the 1978 Annual Report of the Central Bank of Mauritania. Author's own computations.

tion, the rural population has to lessen its relianee on any single source of income, to diversify its income sources and thus to acquire a varied income portfolio. Such a portfolio might include income from walo, dieri, or irrigated soil farming, animal husbandry, wage employment, etc.

This fact indicates that in order to gain the rural population's participation in any agricultural development project, the planners have to take the 'risk' factor into account and develop a systematic Farm Budget approach so as to minimize risks impinging on rural incomes. Economic motivation is a potent lever for change; but if the changes envisaged are to arouse the rural population's interest, there has to be a certainty of their being economically viable. In other words, the risk they involve should be minimal.

Income structure in the sedentary structure may be summed up as follows :

RURAL SEDENTARY SECTOR INCOME STRUCTURE

Source	Percentage of total
Wages	26
Remittances	17
Trade	17
Animal Husbandry	14
Farming	6
Pensions and Family Allowances	5
Fishing	2
Loans (Negative Savings)	4
Handicrafts	1
Miscellaneous	8
TOTAL	100

The picture we get from these statistics is that income from traditional occupations (farming, animal husbandry, fishing, handicrafts) accounts for only about 23 % of total income. Moreover, we have to note that here cash income does not include savings in kind, nor does it take production for auto-consumption into account. The largest slice of cash

income comec from wages (26 % of the total), remittances from migrants abroad and those in other regions (17 %) and trade (17 %). Thus, income from the service sector and remittances accounts for 77 % of total income.

The second characteristic is the important place wages occupy in the total income picture (26 %). This reflects the increasing prevalence of wage employment and the advance of the cash

question whether this is evidence that the rural sector is getting integrated into the cash economy, or evidence that a profounder transformation is going on in the rural sector.

The third characteristic is the uneven geographical distribution of income. The Tagant, Gorgol and Inchiri regions lead with annual per capita income figures of 21,503 UM (478), 17,585 UM (391$) and 16,411 UM respectively. The regions with the lowest annual per capita income figures are Assaba, with 5,494 UM ($122), and Brakna, with 5,509 UM ($125). The disparity between the Tagant region (478$) and Assaba ($122) is about four-fold. (See table 1, Page31).

The fourth characteristic is the important place occupied by the category of remittances and gifts (17 % of the total). In some regions this category is of crucial importance, and overall, the fact is that 17 % of the rural sector's resources come from outside that sector. (7)

(7) See P. Bonte, Migration Study, RAMS. 1980.

In our sample, 85 % of the budgetary units had received remittances in one form or another, such as cash remittances from abroad, gifts, etc. And 9 % of this 85 % were in receipt of remittances from foreign countries. Only 15 % of the entire sample had not received remittances or gifts.

Cash remittances from foreign countries account for about 2 % of total income. But for some budgetary units such remittances make up 58 % of income. Trarza is a case in point. Broadly defined, remittances can make up over 70 % of total income in some regions. (See Table 3, page36').

The phenomenon of gifts or remittances in kind is also very widespread in the rural sector. In the traditional economy, remittances in kind, or gifts, are an integral part of the concept of income. Gifts are exchange transactions, given in return for other gifts already received. They are thus an indirect form of income. The significant fact at the moment is the spread of cash remittances as compared to remittances in kind.

According to Table 2, page 32 , the distribution of gifts is as follows:

Migrations function as a salutary relief mechanism in the rural sector, and the recent drought accelerated the phenomenon. The Trarza

region comes in the lead, with 58 % of its income resources taking the form of remittances and gifts. Next come the Tagant and Guidimakha regions, with 32 % and 27 % respectively of their resources coming in this form.

There is a striking correlation between the poorest regions and the level of remittances. In the Guidimakha region, income from Soninke migrations (8) is high, and the phenomenon has already been studied elsewhere. It is to be noted that a large part of the remittances is not sent back to Mauritania.

The fact that emerges is that some regions would find it impossible to maintain a satisfactory level of consumer expenditure if they did not receive income from migrations. We may safely assert that there is a complementary relationship between the rural economy and the migrant economy, between the rural sector and the modern sector, with the modern sector providing emergency relief to the rural sector. If we define remittances broadly so as to include family allowances, they come to 33 % of total income.

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(8) P. Bradley. The Guidimakha Region of Mauritania, War on Want, 1977. Chapter 7.

Table I

REGIONAL CASH TRANSFER PATTERN (in UM).

Source	Hodh El Gharbi	Assaba	Gorgol	Brakna	Trarza	Tagant	Guidimakha	Luchiri	Total
Internal (inter-regional remittances	32,600	16,000	261,600	-	459,950	189,800	10,000	67,000	1,036,950
International remittances	-	-	52,000	19,200	3,000	-	133,000		207,200
Total remittances	32,600	16,000	313,600	19,200	462,950	189,800	143,000	67,000	1,244,150
Total income	885,433	98,900	5416,118	326,446	882,530	666,600	763,230	1,391,656	9,931,413
Remittances as a % age of total income	(3 %)	(16 %)	(6 %)	(6 %)	(52 %)	(28 %)	(19 %)	(5 %)	(13 %)

SOURCE: RAMS Survey, 1980

Table 2

REGIONAL GIFT DISTRIBUTION PATTERN

Source	Hodh El Gharbi	Assaba	Gorgol	Brakna	Trarza	Tagant	Guidimakha	Inchiri	Total
Gifts	229,765	2,000	111,527	42,936	57,240	27,000	62,000	18,800	351,268
Gifts as a %-age of total income	(3 %)	(2 %)	(2 %)	(13 %)	(6 %)	(6 %)	(8 %)	(1 %)	(4 %)
Gifts and remittances as a %-age of total income	(16 %)	(18 %)	(8 %)	(19 %)	(58 %)	(32 %)	(27 %)	(6 %)	(17 %)

SOURCE: RAMS Survey, 1980

The fifth characteristic is the exremely low level of savings. Many obstacles, some financial, some cutural, prevent people from accumulating savings, particularly cash savings in the rural sector.

Savings accumulation is made impossible by the generally low level of income, the exigencies of family solidarity, and the penchant for prestige spending. What little savings do get accumulated take the form of hoarded property. The tradition of wealth accumulation in livestock form continues in rural society because the possession of livestock is a sign of prosperity and prestige, and enhances social esteem. (3) Jewels serve as a nest egg; many households were obliged to sell theirs during the drought-- a form of negative savings. It is noteworthy that only 28 % of the sample polled had bought jewels since last year. There is thus a substantial property transfer between the different social groups.

Is this a symptom of the rural sector's impoverishment and a tendency to migrate to the urban areas because the rural population no longer has the resources necessary to its survival in the countryside ? At any rate that is the situation of many budgetary units in the rural sector.

Among the rural farmers, the habit of laying up reserve supplies of cereal is well established, but the uncertain rainfall patterns has

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(3) See the RAMS Sociological studies, especially The Moors and The Future of Pastoralism.

driven the farmers into buying a great deal of their food on the market. The exceptions here are the Soninke..

There still is a tendency to save in those families still in a position to get interested in external symbols of prosperity such as radios and robes. But the recent drought accelerated the trend towards forms of savings less vulnerable to climatic hazards than livestock. Moreover, livestock has depreciated in value because livestock prices have dropped in relation to prices of manufactured goods.

The generally low level of income, the mind-set of the population, the lack of a savings repository system, and the fact that the population is spread out over a vast territory are all factors discouraging cash savings.

The sixth characteristic is the low percentage of income originating from the traditional productive sectors (animal husbandary, farming, fishing). These sectors account for only 23 % of total income in the rural sedentary milieu. Animal husbandry accounts for 14 %, farming 6 %, fishing 2 % and the handicraft occupations 1 %.

This low percentage means that production has dropped, causing a corresponding drop in the saleable surplus. On the other hand, we must note the importance of wages and family allowances (30 %), trade

(18 %) and remittances to the rural sector (17 %) in the total income picture of tne rural sedentary sector.

Does this indicate a tendency toward the exlipse of the productive rural sectors and a shift into the tertiary sector as a result of the encroachment of the cash nexus into the rural sector ?

TABLE 3

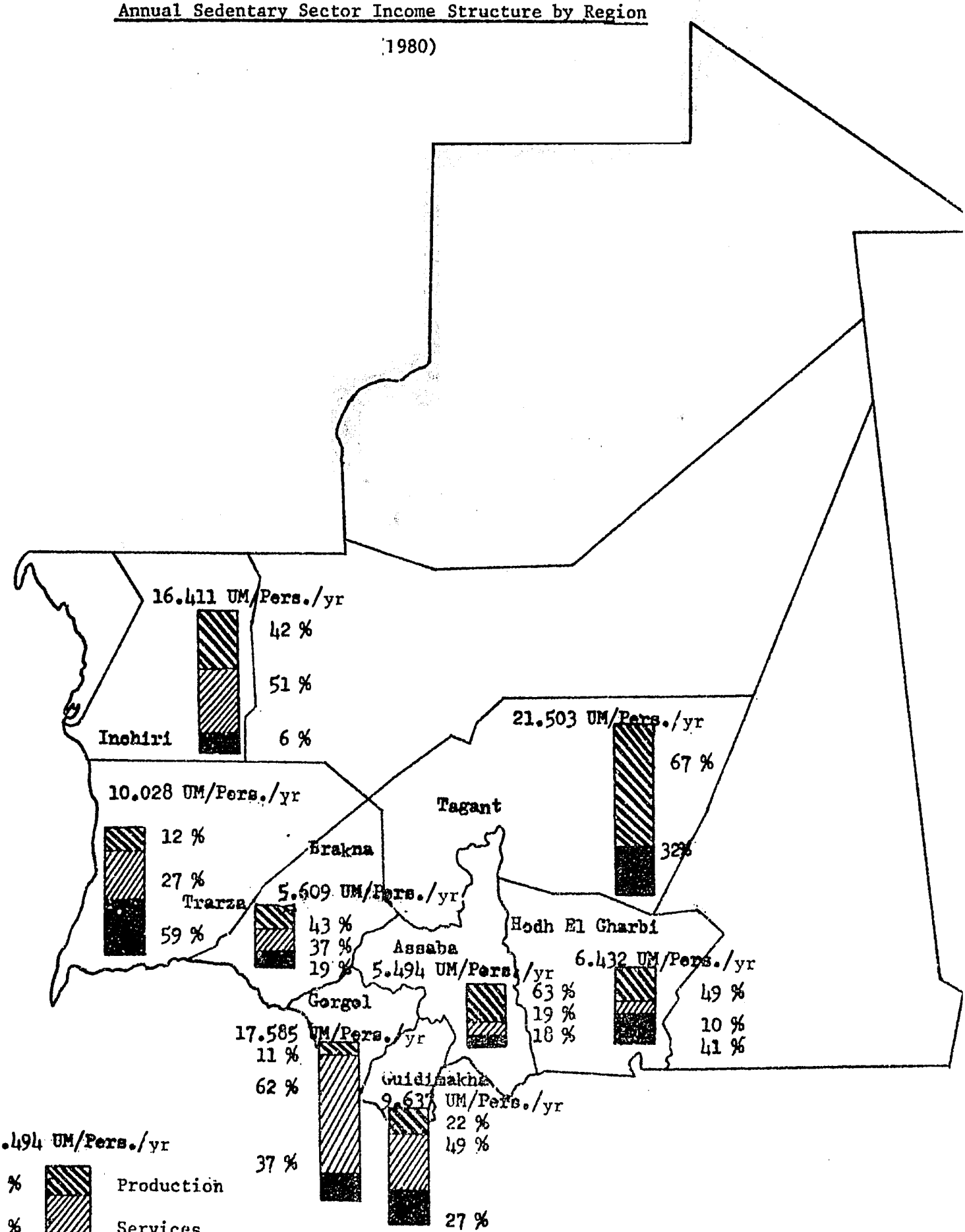
SEDENTARY ANNUAL INCOME STRUCTURE ACCORDING TO REGIONS (UM)

Products sold	REGIONS								
	Hodh El Gharbi	Assaba	Gorgol	Brakna	Trarza	Tagant	Guidimakha	Inchiri	Total
Sale of Agriculture products (%)	94,650 (25%)	60,000 (61%)	23,915 -	17,090 (5%)	60,750 (7%)	-	80,200 (11%)	253,700 (18%)	590,305 (6%)
Sale of Animal husbandry products (%)	92,050 (24%)	1,900 (2%)	415,120 (8%)	14,000 (4%)	24,300 (3%)	449,800 (67%)	449,800 (2%)	15,630 (24%)	334,00) (14%)
Sale of Fishery Products (%)	- -	-	150,000 (3%)	108,000 -	-	-	-	-	258,000 (2%)
Sales of Handicrafts (%)	-	-	-	4,800 (1%)	20,000 (2%)	-	66,000 (9%)	-	90,000 (1)
Trade Benefits (%)	27,000 (7%)	19,000 (19%)	1,507,300 (28%)	101,720 (31%)	27,000 (3%)	-	-	76,320 (5%)	1,758,340 (17%)
Wages (%)	800	-	1,858,886 (34%)	-	127,500 (14%)	-	195,000 (25%)	393,836 (28%)	2,576,022 (26%)
Loans (%)	12,200 (3%)	-	40,565 (1%)	-	62,560 (7%)	-	188,900 (24%)	80,000 (6 %)	384,255 (4%)
Family Allowances and Pensions (%)	36,500 (0%)	-	245,800 (5%)	18,000 (6%)	31,000 (4%)	-	-	168,000 (12%)	499,500 (5%
Transfers	32,600 (8%)	16,000 (16%)	313,600 (6%)	19,200 (6%)	462,950 (52%)	189,800 (28%)	143,000 (19%)	67,000 (5%)	1,244,150 (13%)
Gifts	229,765 (8%)	2,000 (2%)	11,527 (2 %)	42,936 (13%)	57,240 (6%)	27,000 (4%)	62,000 (8%)	18,800 (1%)	351,268 (4%)
Miscellaneous	60,368 (16%)	- (14%)	749,405	700 (I%)	9,000	-	12,500 (2%)	-	831,978 (8%)
TOTAL	585,933	98,900	5,416,118	326,446	882,530	666,600	763,230	1,391,656	9,931,413

Map 2

Annual Sedentary Sector Income Structure by Region

(1980)



Average monetary income in the sedentary sec r

Source : RAMS, 1980.

Table 4

ANNUAL PER CARTA INCOME STRUCTURE IN THE RURAL SECTOR ACCORDING TO REGIONS[1]

	Hodh El Gharbi	Assaba	Gorgol	Brakna	Trarza	Tagant	Guidimakha	Inchiri	Total
Total	585,933	98,900	5,416,118	326,446	882,530	666,600	763,230	1,391,656	9,931,413
Budgetary Units per Region	6	6	28	6	8	2	4	8	64
Average Income per Budgetary Unit per Region	97,656	49,450	193,433	54,408	110,316	333,300	190,808	173,957	155,178
Persons per Budgetary Unit	10	9	11	9.7	11	15.5	19.8	10.6	11.5
Average per Capita Income (UM)	9,766	5,494	17,585	5,609	10,028	21,503	9,637	16,111	13,494
Annual Per Capita Income from Productive Occupations (Farming, Animal Husbandry, Fishing & Handicrafts)	3,112	3,439	1,912	2,472	1,194	14,510	2,043	6,922	3,106
Percentage[2]	(32 %)	(63 %)	(11 %)	(44 %)	(12 %)	(67 %)	(21 %)	(42 %)	(23 %)
Service Occupation Income	463	1,056	10,929	1,748	1,756	-	2,462	5,544	5,889
Percentage[2]	(5 %)	(19 %)	(62 %)	(31 %)	(17 %)	-	(26 %)	(34 %)	(44 %)
Income from Remittances	6,191	1,000	4,743	1,389	7,079	6,994	5,131	3,936	4,499
Percentage[2]	(63 %)	(18 %)	(27 %)	(25 %)	(71 %)	(33 %)	(53 %)	(24 %)	(33 %)
Average Annual Per Capita Income in US $[3]	217	122	391	125	223	478	214	365	300

Source : RAMS Survey, 1980

1. Figures rounded off.
2. Percentage of total annual per capita income
3. U.S. $ 1 = 45 UM

3.2. INCOME STRUCTURE ACCORDING TO ETHNIC GROUPS

With regard to income structure according to ethnic groups, we have a total overview of the situation in the rural sector in Table 5, page 43. In our sample, the Toucouleur ethnic group leads with annual per capita income figures of 20,945 UM, while Peulhs come last, with 8,120 UM.

Also, according to our sample, the Moors obtain 39% of their income from productive occupations (farming, animal husbandry, fishing, handicrafts); the Peulhs come next with 36 %. The Wolofs come last, with 2 % of their income derived from productive occupations. (See Table 5, page 43.

1) - The Moors, the largest ethnic group, have a very varied income structure. Their leading income category is animal husbandry, accounting for 26 % of income; wages are tied in second place with remittances and gifts at 20 %; farming comes third with 12 %, follwed by trading profits at 11 %. The Moors are mostly involved in animal husbandry, especially the nomads. They also do some farming in the oases. The saleable surplus from farming is not large, but all the same it accounts for 12 % of the Moors' total income.

Their income structure is quite well balanced, with 39 % derived from the productive occupations, 31 % from the service occupations, and

30% of their total cash income form remittances.

2) - The Toucouleurs also have a varied income structure. They are sedentary farmers who do a bit of animal husbandry on the side. They derive their cash income mainly from trade (57 %), wages (14 %), fishing (12 %) and remittances (10 %). The Toucouleurs have the highest annual per capita income, 20,345 UM. They also earn a considerable income from fishing. 74 % of Toucouleur income comes from the service occupations, while 13 % comes from the productive occupations. Remittances also account for 13 %.

3) - As for the Peulhs, traditionally they are nomads; they themselves own some herds, but often they work as herdsmen for sedentary people. Their leading source of income is animal husbandry, with 34 % of total income. But the drought caused livestock losses among them, and many Peulhs have become sedentary or turned into paid herdsmen working for sedentary livestock owners. Thus, wage employment comes second, with 32 % of total income. The service occupations account for 39 % of total income, while remittances bring in 25 %.

4) - Wolof farmers work mainly on rain-irrigated land. Since this kind of farming is seasonal, the bulk of their income comes from wages, i.e. 40 % of total income, or 46 % if we include pensions and family allowances. Farm produce sales only account for 2 % of total income.

If we define cash transfers broadly, to include remittances, gifts, loans and family allowances, income from transfers makes up 58% of the total.

5) - Among the Soninke, who are mostly farmers, income from farming makes up a mere 6 % of the total; wages account for 36 %, loans 24 %, and handicrafts 6 %. It is noteworthy that it is the Soninke who receive the highest total of remitances from abroad. Broadly defined, remittances make up over 55 % of their total cash income; the service occupations account for 44 %, and productive occupations 23 %.

The status of the traditional productive sectors in the total income picture is now clear enough: these productive sectors provide only a paltry proportion of total cash income (1/4).

Table 5

ANNUAL INCOME DISTRIBUTION ACCORDING TO ETHNIC GROUPS

	Moors	Toucouleurs	Peulhs	Wolof	Soninke	Total
Total	3,498,749	2,170,851	1,161,222	1,991,091	1,109,500	9,931,413
Number of Budgetary Units	27	11	13	7	6	64
Average Income per Budgetary Unit	129,583	197,350	89,325	284,442	184,917	155,178
Persons per Budgatary Unit	10	9.7	11	14.5	17	11.5
Average per capita Income (UM)	12,958	20,345	8,120	19,617	10,877	13,494
Annual per capita Productive Sector Income	5,076	2,653	2,817	1,477	1,676	3,106
Percentage	(39 %)	(13 %)	(36 %)	(2 %)	(15 %)	(23 %)
Annual per capita Service Sector Income	3,929	14,963	3,158	7,921	3,956	5,869
Percentage	(31 %)	(74 %)	(39 %)	(40 %)	(35 %)	(44 %)
Annual per capita Income from Remittances	3,886	2,729	2,029	11,219	5,403	4,459
Percentage	(30 %)	(13 %)	(25 %)	(58 %)	(50 %)	(33 %)
Annual per capita Income in US $	288	452	180	436	242	300

Table 6

ANNUAL INCOME STRUCTURE IN THE RURAL SECTOR ACCORDING TO ETHNIC GROUPS

Ethnic Group / Income Source	Moors	Toucouleurs	Peulh	Wolof	Soninke	Total
Farming	427,750	20,290	13,690	48,375	80,200	590,305
(%)	(12 %)	(1 %)	(1 %)	(2 %)	(7 %)	(6 %)
Animal Husbandry	922,850		399,220		24,730	1,346,800
(%)	(26 %)		(34 %)		(2 %)	(14 %)
Fishing		258,000				258,000
(%)		12 %				(2 %)
Handicrafts	20,000	4,800			66,000	90,800
(%)					(6 %)	
Trading profits	381,500	1,294,520	78,000		4,320	1,758,340
(%)	(11 %)	(57 %)	(7 %)			(18 %)
Loans (Negative savings)	74,790	1,800	38,765		284,900	384,255
(%)	(2 %)		(3 %)		(24 %)	(4 %)
Wages	697,336	302,016	373,544	803,976	399,150	2,576,022
(%)	(20 %)	(14 %)	(32 %)	(41 %)	(36 %)	(26 %)
Pensions, Family Allowances	235,700	68,800	72,000	87,000	36,000	499,500
(%)	(7 %)	(3 %)	(6 %)	(5 %)	(3 %)	(5 %)
Remittances from Migrants	542,350	101,200	75,600	372,000	153,000	1,244,150
(%)	(16 %)	(5 %)	(7 %)	(16 %)	(14 %)	(13 %)
Gifts	127,105	98,520	38,403	22,540	64,700	351,268
(%)	(4 %)	(5 %)	(3 %)	(1 %)	(6 %)	(4 %)
Miscellaneous	69,368	20,905	72,000	657,200	12,500	831,973
(%)	(2 %)	(1 %)	(6 %)	(34 %)	(1 %)	(8 %)
TOTAL	3,498,749	2,170,851	1,161,222	1,991,091	1,109,500	9,931,413

SOURCE : Rams Survey (3rd and 4th Trips)

3) - We can use a curve of the form shown in Diagram 2, page to represent the cumulative income distribution pattern. These major groups may be distinguished along this curve:

- the first group, covering 50 % of the budgetary units in the sample, has an average annual income of less than 100,000 UM per budgetary unit;
- the second group, covering 20 % of budgetary units in the sample has an average annual income of less than 200,000 UM per budgetary unit ;
- the third group, covering 30 % of the budgetary units in the sample, has an average annual income higher than 200,000 UM per budgetary unit.

Within this third group, 10 % of the budgetary units have an income above 350,000 UM per budgetary unit annually.

4) - The Lorenz curve for the rural sedentary sector provides an overall view of income distribution. (See Diagram 3, page 49).

Reading the curve, we can assert that 70 % of the sedentary rural population in our sample possess about 35 % of total income, while

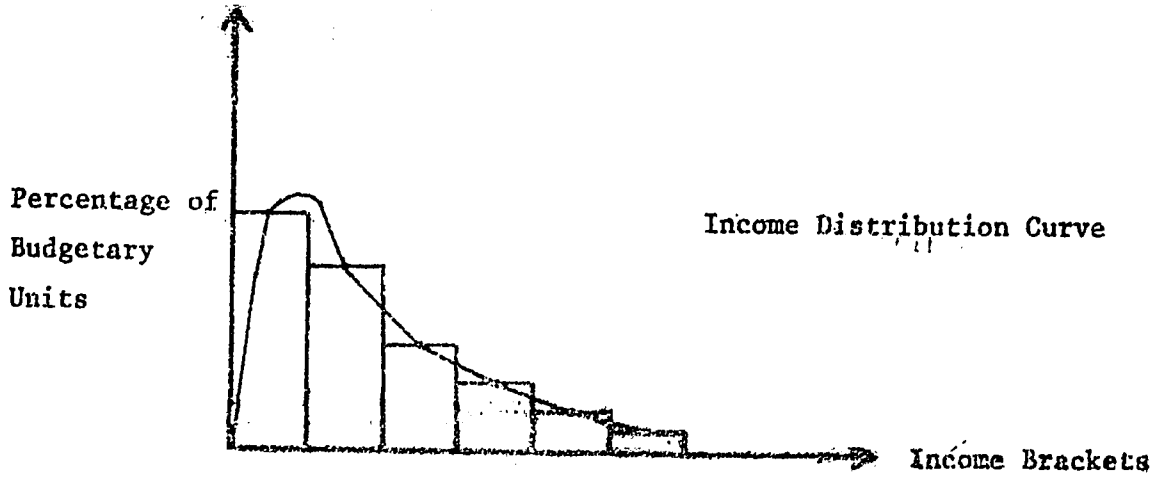
INCOME DISTRIBUTION IN THE SEDENTARY SECTOR

The distribution of budgetary unit incomes gives a picture of income inequalities and current social realities. The possession of wealth is one of the key elements conducive to social stability.

The Lorenz curve (1) is a quick method for gauging inequalities in the distribution of wealth. The distribution pattern of sedentary sector income makes it possible to bring out the following characteristics:

1) - Income distribution is clearly asymmetrical: about 60 % of the budgetary units in the sample have an average income below 120,000 UM each per annum, i.e., 10,435 UM per capita annually, (2) equivalent to $230. (3) (See Table 7, page 49.)

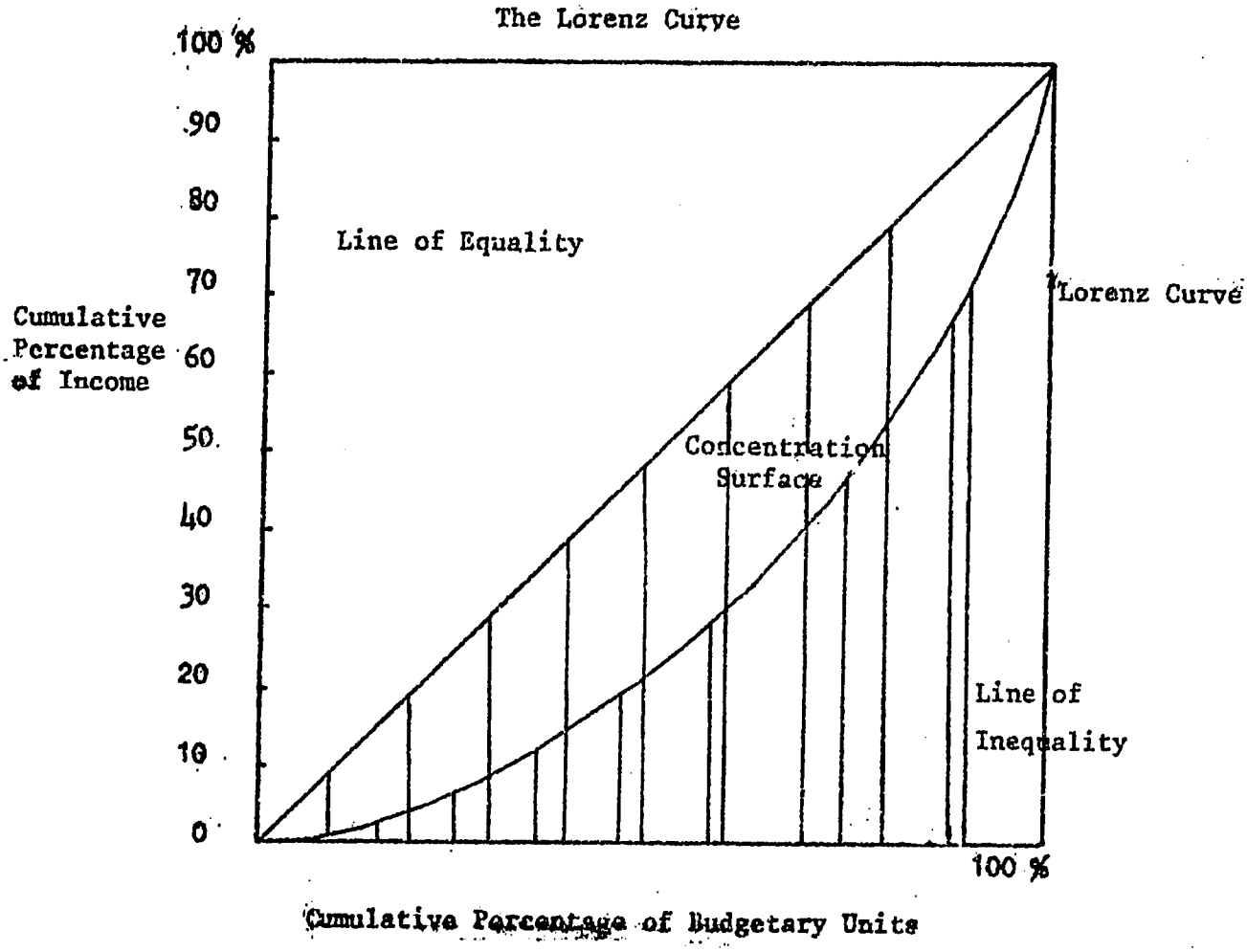
2) - The maximal frequency occurs in the income bracket between 40,000 and 80,000 UM per budgetary unit annually, a slice of 27 % of the sample. (See Diagram 1, page 50). The distribution of income frequencies by brackets follows the following curve:



(1) See Appendix for the computation of the Lorenz Curve.

(2) 1 Budgetary Unit = 15.5 persons.

(3) U.S. $ = 45 UM.



The Gini Concentration Index for the sedentary rural sector is:

$$R = 0.44$$

6) - Another complementary method used for measuring the degree of inequality in income distribution between the poorest and the richest brackets in developing countries is to compare coefficients expressing the following ratio:

$$\frac{\text{Income of the top 10 \% budgetaty units}}{\text{Income of the lowest 10 \% budgetary units}} =$$

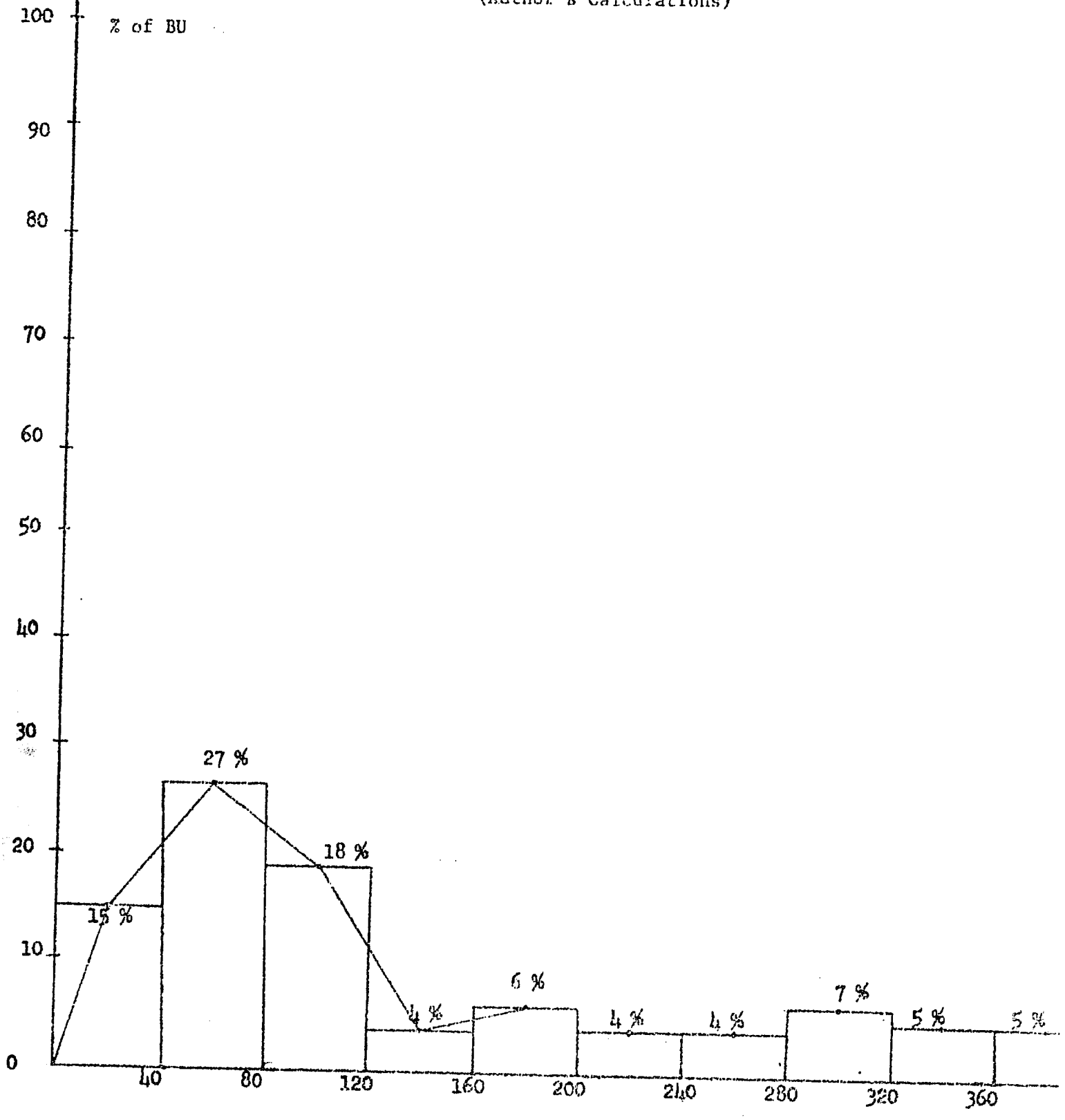
Where there is absolute equality, the coefficient is 1.

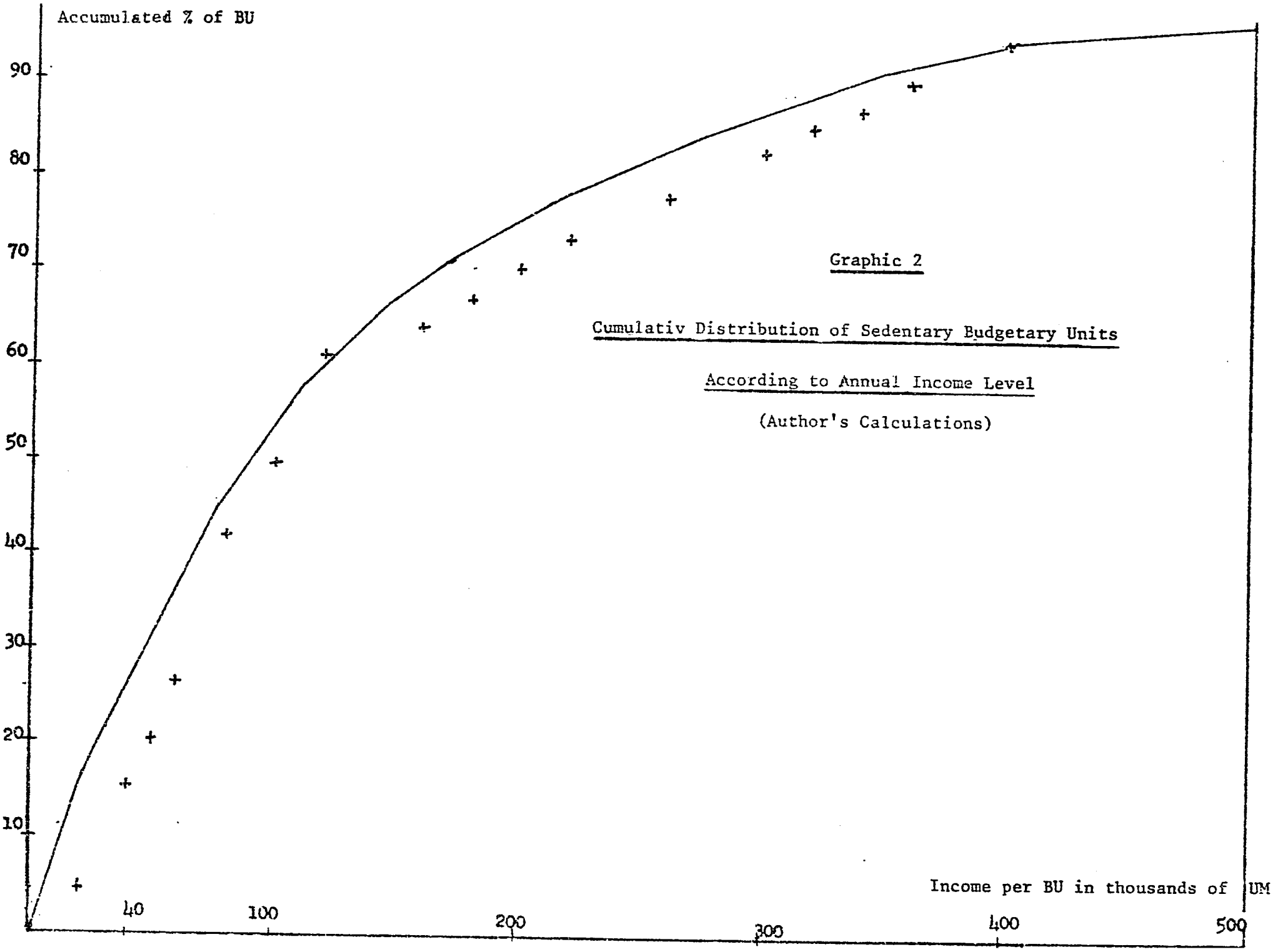
For the sedentary sector, we got a coefficient of 22.4.

Graphic 1

Percentage Income Distribution among Sedentary Budgetary Units

(Author's Calculations)





Graphic 2

Cumulativ Distribution of Sedentary Budgetary Units

According to Annual Income Level

(Author's Calculations)

Graphic 3

Lorenz Curve for the Sedentary Rural Sector

(Author's Calculations)

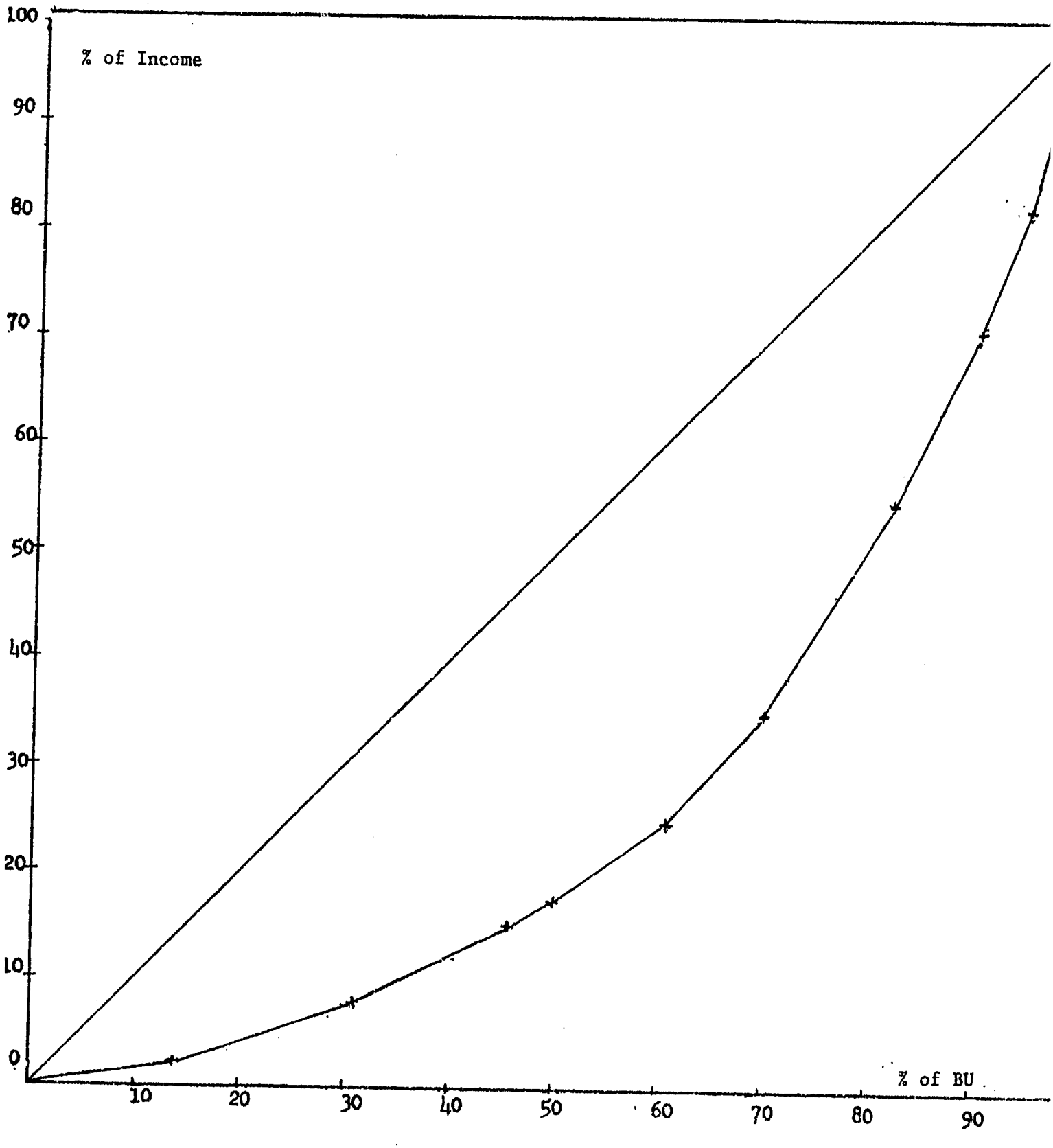


Table u7:

Distribution of HU according to Income Brackets

Income Brackets (UM)	N° of HU	Accum %	Income	% of Income
Less than 10.000	1	1,56	8.890	0,09
10.000 - 20.000	2	4,69	38.180	0,47
20.000 - 30.000	6	14,06	150.487	1,99
30.000 - 40.000	1	15,63	38.800	2,38
40.000 - 50.000	3	20,31	122.315	3,61
50.000 - 60.000	4	26,56	215.263	5,78
60.000 - 70.000	3	31,25	198.720	7,78
70.000 - 80.000	7	42,19	523.106	13,05
80.000 - 90.000	3	46,88	246.425	15,53
90.000 - 100.000	2	50,00	185.288	17,39
100.000 - 120.000	7	60,94	777.053	25,22
120.000 - 140.000	-	-	-	-
140.000 - 160.000	2	64,06	290.220	28,14
160.000 - 180.000	2	67,19	334.960	31,51
180.000 - 200.000	2	70,31	368.235	35,22
200.000 - 220.000	2	73,44	414.650	39,40
220.000 - 240.000	1	75,00	229.960	41,71
240.000 - 260.000	2	78,13	496.280	46,71
260.000 - 280.000	-	-	-	-
280.000 - 300.000	3	82,81	869.730	55,47
300.000 - 320.000	2	85,94	603.000	61,54
320.000 - 340.000	1	87,50	325.500	64,82
340.000 - 360.000	2	90,63	694.765	71,81
360.000 - 380.000	2	93,75	745.100	79,31
380.000 - 400.000	1	95,31	380.500	83,14
400.000 - 500.000	4	96,88	484.970	88,00
500.000 - 600.000	4	98,44	504.016	93,05
600.000 - 700.000	1	100,00	690.000	100,00

SOURCE : RAMS surveys (3rd and 4th trip)

CHAPTER IV - INCOME CASH BY NOMAD RURAL SECTOR

4.1 SURVEY OF THE NOMADIC SECTOR

According to 1977 census data, 36 % of the total population are nomads (10) Of this nomadic portion, 94 % are engaged in animal husbandry or agriculture. The percentage engaged in animal husbandry as its main economic occupation is 84 %.(11) Clearly, then, the nomads make up an important segment of the rural population.

During the 4th trip of the Budgetary-Consumption-Nutrition and Income Survey, a complementary survey was conducted in the Adrar, Tagant Assaba and Hodh regions. The purpose of this survey was to try and delimit data on different types of nomadism, such as nomadism concentrating on small livestock-- sheep and goats-- or on large livestock-- cattle etc.

Topis examined were:

- Income Sources and structure;
- Income distribution.

4.2. CASH INCOME SOURCES AND STRUCURE IN THE RURAL NOMADIC SECTOR

Surveys of the rural nomads showed that cash income per budgetary unit was 59,394 UM annually at current prices, that is, about 38.5 %

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(10) Demographic Projections, RAMS. p. 21.

(11) Employment Situation, RAMS. p. 62

of the average income of budgetary units in the rural dentary sector. But the average nomadic budgetary unit comprised 6.4 persons, thus nomadic per capita income averaged 9,280 UM annually, that is, 65 % of average per capita income in the rural sedentary sector.

Income from productive occupations (farming, animal husbandry, handicrafts) amounted to 6.495 UM per capita annually, i.e. 70 % of total cash income. Income from the service occupations (trade, wage employment) amounted to 1,013 UM per capita annually, i.e. 11 % of total income. Transfers, defined to include remittances, gifts, loans family allowances etc., amounted to 1,771 UM per capita annually, i.e. 19 % of total income.

These surveys yielded a number of data items:

1) - Animal husbandry product sales are important, in fact they constitute the leading source of income. Animal husbandry brings in 60 % of the nomads' total cash income. This income is derived almost entirely from livestock sales. Among nomads, livestock have always been the principal resource yielding cash as well as meeting domestic consumption needs.

2) - Income structure among the nomads differs somewhat from that in the rural sedentary sector; it may be summarized as follows:

INCOME STRUCTURE IN THE RURAL NOMADIC SECTOR

INCOME SOURCE	PERCENTAGE OF TOTAL
Productive Sector:	
Animal husbandry	60
Handicrafts	7
Farming	2
Service Sector:	
Trade	7
Wage Employment	4
Transfers:	
Remittances and Gifts	16
Loans	4
Total	100

Nomadic income shares this characteristic with rural sedentary sector income : it comes from a multiplicity of sources. The key source remains perennially that of animal husbandry, accounting for 60 % of total income. Because of this nomads are exposed to and more vulnerable to climatic hazards. Among them, every climatic change has an immediate impact on

income.

2-1 Animal husbandry product come in the lead with 60 % of total income.

2-2 Remittances and gifts are tied in second place with 16 % each. In pastoralist societies one of the uses of livestock is to meet the community's food and cash needs. These days herds numbering 200 head are quite uncommon. The important role placed by transfers is one of the symptoms of the nomads' impoverishment. Nowadays, they depend on remittances and gifts from already sedentarized relatives in order to meet their daily needs.

Also, the transfers come mainly from within the country, they do not come from abroad. Out of our sample of 34 budgetary units, only 2 had received remittances from abroad.

2-3 Trade and handicrafts are tied in third place with 7 % each of total income. The handicraft occupations concentrate mainly on the use of animal husbandry products, especially leather.

2-4 Next come wage employment and loans, each accounting for 4 % of total income. The incidence of wage employment within nomadic society signals an important change away from traditional pastoralist patterns. Most of the wages are paid by now sedentarized owners to herdsmen who

have stayed behind in the countryside to look after the livestock. Here we are dealing with a phenomenon of the encroachment of the cash nexus and the advance of wage employment. (12)

Loans, accounting for 40 % of total income, are merely an extension of mutual aid and remittances. They mostly take the form of consumer credit advanced to individuals.

2-5 Income from farming comes last; it accounts for only 2 % of the total. Some nomads dabble sporadically in farm work in the palm groves. Overall, nomadic involvement in farming is negligible, and is designed mainly to meet domestic consumption needs.

3) - Even though the nomads' cash income is not very high, their potential income or savings in kind is quite substantial, amounting to more than twice their total cash income. This is so because the practice of accumulating wealth in the form of livestock is still prevalent in pastoralist society. As far as our sample goes, we may summarize this potential income as follows:

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(12)Survey of the Animal Husbandry Sub-sectors, RAMS 1980, p. 38.

VALUE OF POTENTIAL INCOME (IN UM)

	Hodh El Gharbi		Assaba		Tagant		Adrar		Total
	No.	Value	No.	Value	No.	Value	No.	Value	Total Head
Value of Cattle		1,082,400		-		41,000		-	1,123,400
Number	132		-		5		-		137
Value of Sheeps and Goats		259,500		36,000		208,500		720,000	1,224,000
Number	137		24		139		504		840
Value of Camels		255,000		15,000		165,000		189,000	2,325,000
Number	17		1		11		126		155
Total		1,596,900		51,000		414,500		909,000	4,672,400

+ estimated price of cattle 8,200 UM per head. ((13)
+ estimated price of sheep or goats: 1,500 UM " "
+ estimated price of lambs or kids: 500 UM " "
+ estimated price of camels: 15,000 UM " "

(13)Survey of the Animal Husbandry Sub-sector. RAMS 1980. p.38

Thus, as far as our sample was concerned, total cash income at current prices amounted to 2,019,380 UM annually, i.e., 43 % of potential income which at average national prices was 4,672,400 UM.

The value of livestock was thus 2.3 times that of total cash income derived from all nomadic occupations. This potential income is a form of savings highly vulnerable to climatic factors. In addition, it is subject to devaluation because of the deterioration in terms of trade between livestock and manufactured goods.

Income distribution between the different regions depends on the kind of animal husbandry carried on by the nomads. In Adrar and the Tagant, the nomads mostly raise goats and camels, with very few cattle. As a rule, herds are small, normally totalling less than 100 head each. Cash income ranges from 12,110 UM per head in the Hodh to 5,280 UM per head in Assaba. (See Table 9, page 59).

TABLE 8

NOMADIC ANNUAL INCOME . . . STRUCTURE ACCORDING TO REGIONS

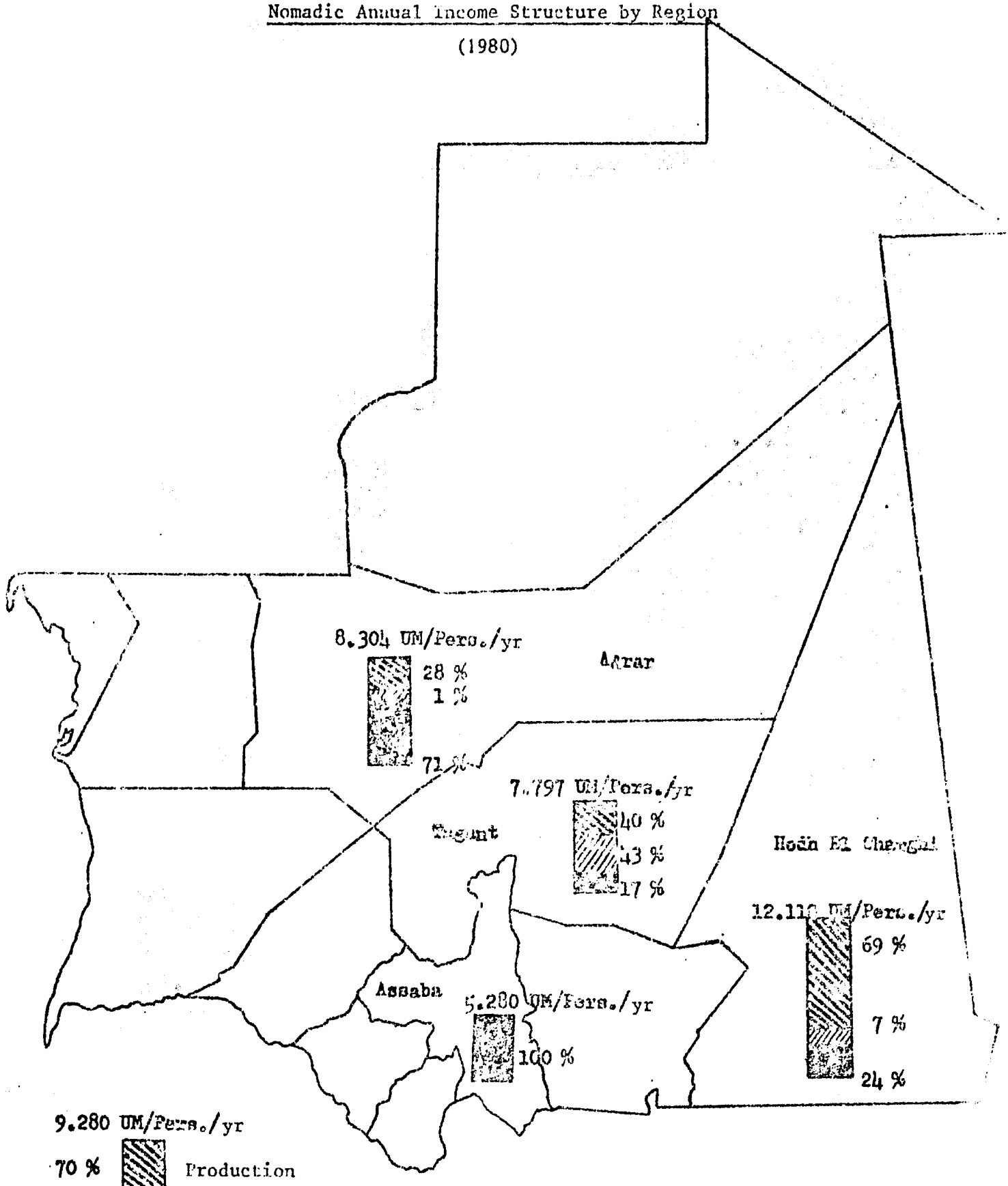
PRODUCT SOLD/ REGIONS	Hodh El Charghi	Assaba	Tagant	Adrar	Total
Animal Husbandry	531,200	26,400	153,850	515,900	1,228,350
(%)	(61%)	(100%)	(28%)	(20%)	(60%)
Farm Product Sales	-	-	-	45,850	45,850
(%)	-	-	-	(8%)	(2%)
Fish Sales	-	-	-	-	-
Handicrafts	72,000	-	67,200	-	139,200
(%)	(8%)	-	(12%)		(7%)
Trading Profits	-	-	138,000	-	138,000
(%)	-	-	(25%)	-	(7%)
Wages	-	-	82,500	-	82,500
(%)	-	-	(15%)	-	(4%)
Loans	60,000	-	15,000	-	75,000
(%)	(7%)	-	(3%)	-	(4%)
Pensions and Family Allowances	-	-	-	-	-
Remittances	94,000	-	31,550	7,000	132,550
(%)	(11)	-	(6%)	(1%)	(7%)
Gifts	114,740	-	61,610	1,600	177,930
(%)	(13%)	-	(11)		(9%)
TOTAL	871,920	26,400	549,710	571,350	2,019,380

RAMS SURVEY, 4th Trip.

Map 3

Nomadic Annual Income Structure by Region

(1980)



9.280 UM/Pers./yr

70 % Production

11 % Services

19 % Remittances

Average monetary income in the nomadic sector

Source : RAMS, 1980.

TABLE 9

ANNUAL PER CAPITA CASH INCOME OF RURAL NOMADS (IN UM)

	Hodh El Charghi	Assaba	Tagant	Adrar	Total
Number of Budetary Units	10	1	15	8	34
Persons per Budgetary Units	7.2	5	4.7	8.6	6.4
Average Annual Income per Budgetary Unit (in UM)	87,192	26,400	36,647	71,419	59,394
Average Annual Per Capita Income (in UM)	12,110	5,280	7,797	8,179	6,495
Per Capita Annual Income Productive Occupation (in UM)	8,378	5,280	3,135	8,179	6,495
Per Capita Annual Income from Service Occupation (in UM)	-	-	3,128	-	1,013
Per Capita Annual Income From Transfers (in UM)	3,732	-	1,534	125	1,772

4.3 INCOME DISTRIBUTION IN THE NOMADIC SECTOR

The Lorenz curve enables us to evaluate irregularities in income distribution. Income distribution in the nomadic sector features the following characteristics:

1) - Income distribution among the nomads is more balanced than in the rual sedentary sector. (See Graph 4, page). 76 % of our sample possessed 51 % of total income.

2) - The maximal frequency occurs in the income bracket between 40,000 and 80,000 UM per budgetary unit per annum.

Income bracket clusters follow the following pattern: 38 % fall between 0 and 40,000 UM; 38 % fall between 40,000 and 80,000 UM; 17 % fall between 80,000 and 12 ,000 UM per budgetary unit per year.

Beyond the 120,000 UM bracket, the percentage drops sharply (See Table 10, page , and Graphs 5 and 6). 3 % of budgetary units in the sample come within the 200,000 UM per budgetary unit per annum income bracket.

It must be noted that no budgetary unit in the nomadic sample exceeds the 220,000 UM annual income level. On the graph, income distribution

frequencies arranged according to income brackets form a half-bell pattern with 38.2 % of budgetary units possessing an average annual income of 40,000 UM coming nearest the handle.

3) - The Lorenz curve indicates that among rural nomads: 3-1 % of the nomadic population has 51 % of income. Only 3 % of nomadic budgetary units get very high incomes, over 200,000 UM.

Thus, there is a substantial degree of equality in income distribution among the rural nomads.

The reason for this may be that the greater part of nomadic consumption needs is supplied domestically, and cash income simply covers what is needed to purchase supplies falling outside this key auto-consumption range. Thus, it is the pastoralist lifestyle itself which makes for a measure of equality in cash incomes. (14) However, this phenomenon does not preclude the accumulation of potential revenue in the form of livestock, and it is the possession of livestock that accounts for the difference between rich and poor nomadic budgetary units.

3-2 The Gini Index of Concentration makes it possible to gauge the degree of inequality in income distribution. The smaller the index,

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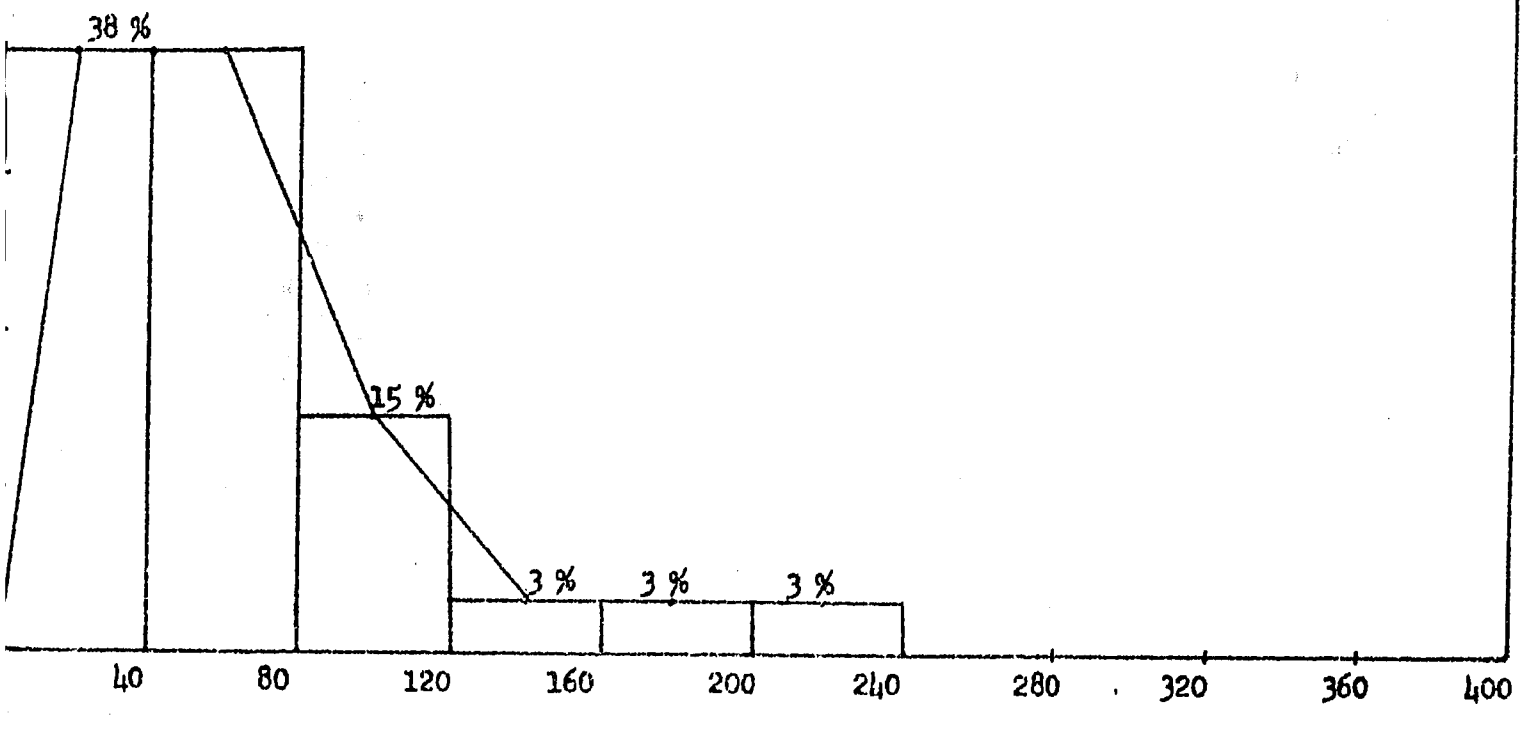
(14) See the RAMS sociological studies: The Moors, the Future of Pastoralism and the Evolution of Modes of Accumulation.

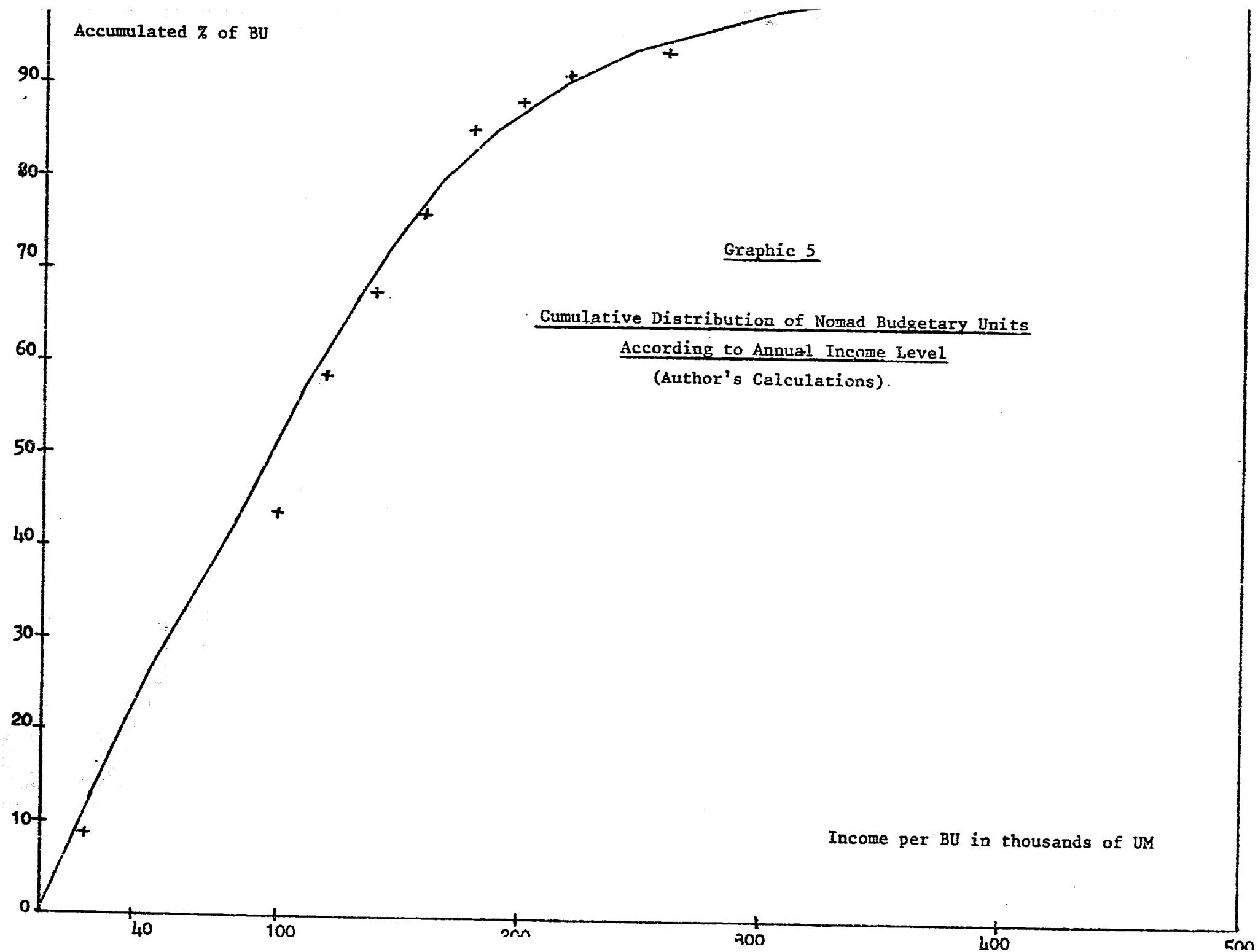
Graphic 4

Percentage Income Distribution Among Nomadic

Budgetary Units

(Author's Calculations)





Graphic 5

Cumulative Distribution of Nomad Budgetary Units

According to Annual Income Level

(Author's Calculations).

Graphic 6

Lorenz Curve for the Nomadic Rural Sector

(Author's Calculations)

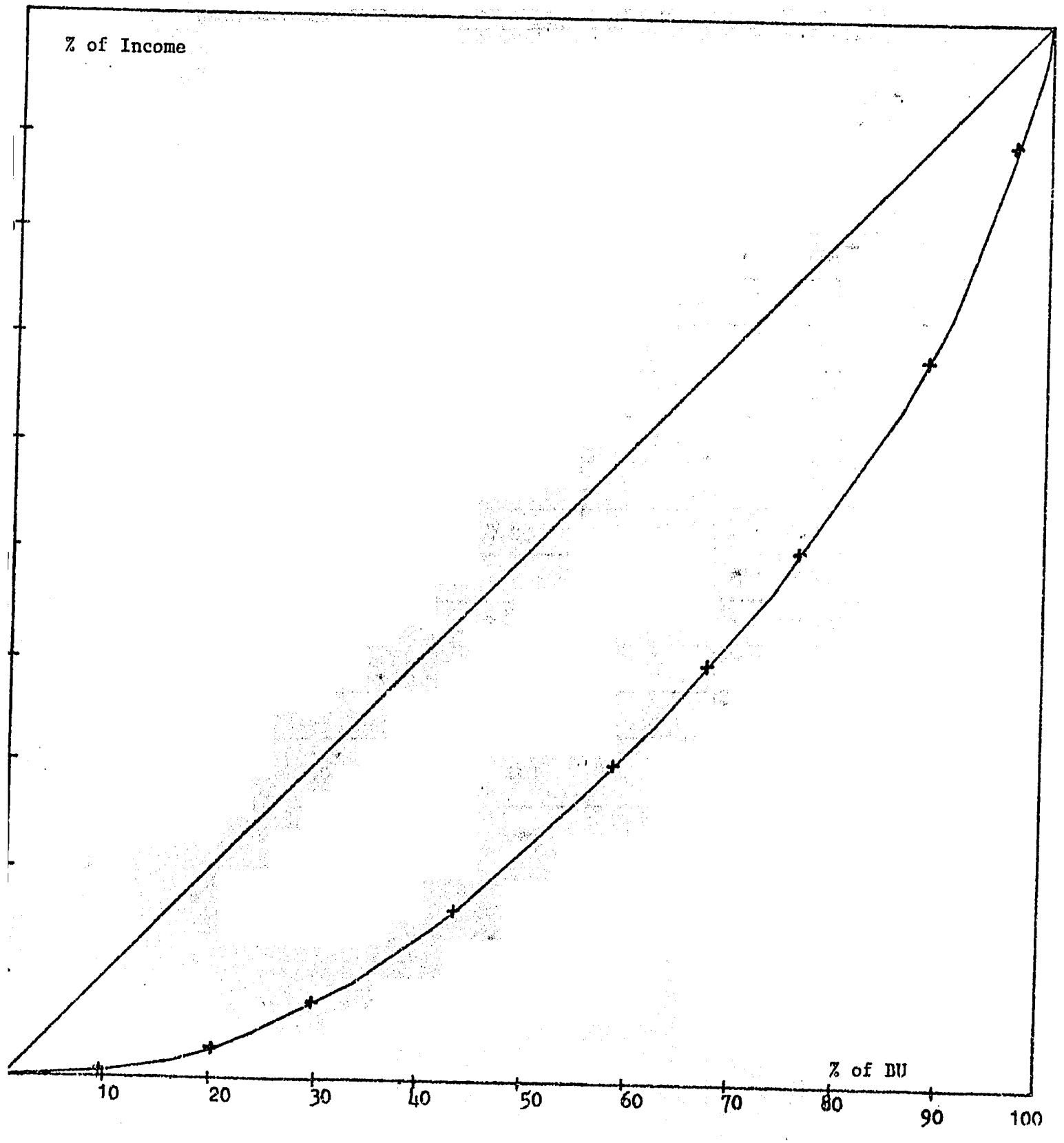


Table 18

Distribution of BU according to Income Brackets

Income Brackets (฿M)	N° of BU	Acgum % of BU	Income	Accum % of Income
Less than 10.000	3	8,8	16,870	0,8
10.000 - 20.000	3	17,6	36.800	2,7
20.000 - 30.000	4	29,4	100.740	7,6
30.000 - 40.000	3	38,2	95.100	12,4
40.000 - 50.000	2	44,1	92.750	16,9
50.000 - 60.000	5	58,8	266.600	30,2
60.000 - 70.000	3	67,6	192.950	39,7
70.000 - 80.000	3	76,5	216.415	50,4
80.000 - 90.000	3	85,3	257.755	63,2
90.000 - 100.000	1	88,2	96.000	67,9
100.000 - 120.000	1	90,[illegible]	102.400	72,[illegible]6
120.000 - 140.000	-	-	-	-
140.000 - 160.000	1	9[illegible],7	154.000	80,58
160.000 - 180.000	1	9[illegible],[illegible]	179.000	89,44
180.000 - 200.000	-	-	-	-
200.000 - 220.000	1	100	212.000	100

Source : RAMS, 1980.

the greater the degree of equality in income distribution.

Among the nomads, the Gini Index of Concentration is

$$R = 0_{41}$$

3-3 The ration of the

$$\frac{\text{Income of the top 10 \% budgetary units}}{\text{Income of the lowest 10 \% budgetary units}} = 26.9$$

This ratio gives a reading of the difference between the richest and the poorest.

CHAPTER V CASH INCOME STRUCTURE IN THE RURAL SECTOR

V.1 Income cash structure

We surveyed the sedentary rural sector and the nomadic in succession. The income survey concluded in our "limited" sample for the entire Mauritanian rural sector yielded the following points:

TABLE 11

PER CAPITA INCOME IN THE RURAL SECTOR +

INCOME	Sedentary Sector	Nomadic Sector	Total
Total Income	9,931,413	2,019,380	11,950,793
Income from Productive Occupations: Farming, Animal Husbandry	2,285,905 (23%)	1,413,400 (70%)	3,699,305 (31%)
Income from Service Occupations: Trade, Wage Employment	4,334,362 (44%)	220,500 (11%)	4,554,862 (38%)
Income from Transfers: Loans Remittances: Gifts	3,311,146 (33%)	385,480 (19%)	3,696,626 (31%)
Number of Budgetary Units	64	34	98
Persons per Budgetary Unit	11.5	6.4	10
Average Annual Cash Income per Budgetary Unit	155,178	59,394	121,947
Average Annual Per Capita Cash Income	13,494	9,280	12,195
Proportion of Above from Productive Occupations	3,106	6,495	3,775
Proportion of Above from Service Occupations	5,889	1,013	4,648
Proportion from Transfers	4,449	1,772	3,772
Average Annual Per Capita Income in U.S. $ (1)	300	206	271
Proportion from Productive Occupations	69	144	84
" " Service Occupations	131	22	103
Proportion from Transfers	100	40	80

SOURCE: RAMS Surveys, 1980. + 1980 Prices in UM. (1) U.S.$ = 45 UM.

1) - According to Table 11, page 58, annual per capita cash income in the rural sector is 12,195 UM, equivalent to $ 271.

A breakdown of this total figure shows that income from the productive occupations (farming, animal husbandry, fishing, handicrafts) is only 3,775 per head per annum, or 38 % of the total; income from transfers is 3,772 per head per annum, or 31 % of the total. It is to be noted that income from the service occupations is even higher than that from the productive occupations. It should also be borne in mind that for our limited sample, average annual per capita income is calculated according to market prices, and subsistence income is excluded. Prices in the rural sector are high; therefore any international comparisons should be handled with a great degree of circumspection.

2) - As far as income structure is concerned, income from sales in the animal husbandry sector and that from wage employment come in the lead, each making up 22 % of total income. Remittances from migrants in other regions and abroad (16 %) and trading profits (16 %) come second. Third comes income from farming, with 5 % of total income. (See Table 12, page 72).

This income structure in the rural sector reveals the following features:

3-1 There is a multiplicity of income sources. People in the rural

sector minimize risks attendant on climatic uncertainties by engaging in several occupations; they combine animal husbandry with farming and employment in the service sector. Income from these occupations is often supplemented with remittances originating outside the rural sector.

3-2 The rural sector is getting increasingly monetarized and wage employment is on the rise. Wages, with 22 % of total income, and trade and remittances, with 16 % each, are income sources accelerating the advance of the cash nexus into the rural sector and that sector's integration into the market economy.

This advance of the cash nexus and the rise of wage employment have led to changes in the traditional mode of production. For instance, livestock herding has become a full-time wage-earning occupation.

3-3 The proportion of cash income derived from the traditional occupations (farming, animal husbandry, fishing) has fallen. Farming has become a mere sideline income supplement, bringing in only 5 % of total income, while animal husbandry continues to play an important role, with 22 % of this income.

The drop in the proportion of income derived from the above occupations reflects the drop in rural production and the dwindling of the saleable surplus.

3-4 Running parallel to this drop, the trend is toward a shift into the tertiary occupations in the rural sector. Wages (paid employment) and trading profits are tangible evidence of current changes in the rural occupations.

3-5 The rural sector has grown dependent on remittances. Remittances have become an integral part of rural cash income. We must note that in the traditional economy, transfers in kind fit in with the conception of income, since gifts were items of reciprocal exchange. The significant fact that nowadays migrant remittances make up a high percentage of income.

In other countries development proceeds by virtue of the contribution and the surplus invested by the rural sector in industry; in Mauritania, on the other hand, the pattern is reversed: it is the modern sector which supports the rural sector by means of remittances. A very large part of the rural population would starve if they did not get remittances from migrants. So the migrant economy is turning out to be complementary to the rural economy.

4) - According to Table 13, page 75, showing income distribution by occupational sector among the sedentary and the nomadic rural population, 70 % of nomadic income comes from the productive occupations, 19 % from transfers and 11 % from the service occupations. For the sedentary population, productive occupations account for just 23 % of total income

while income from the service occupations and transfers make up 44 % and 33 % of total income.

Thus, the encroachment of the cash nexus, the advance of wage employment, and the shift into the tertiary occupations in the rural sectoR are more pronounced among the sedentary population than among the nomads. Sedentarization also creates greater needs, causing the sedentary rural population to become more dependent on remittances from migrant earnings.

5) - All these data on income make it possible to delineate the current income pattern in the rural sector. And they all show that Mauritania's rural sector is going through a period of profound change, thorough-going mutation, and acute crisis.

TABLE 12

RURAL SECTOR INCOME STRUCTURE IN MAURITANI

	Sedantary Population	Nomads	Total
Farm Product Sales (%)	590,305 (6%)	45,850 (2%)	636,155 (5%)
Annual Husbandry Product Sales (%)	1,346,800 (14%)	1,228,350 (60%)	2,575,150 (22%)
Fishery Sales (%)	258,000 (2)		258,000 (2)
Handicraft Sales (%)	90,800 (1%)	13 ,000 (7%)	230,000 (2%)
Trading Profits (%)	1,758,340 (17%)	138,000 (7%)	1,896,340 (16)
Wages (%)	2,576,022 (26	82,500 (4%)	2,658,522 (22%)
Loans (%)	384,255 (14%)	75,000 (4%)	456,255 (4%)
Pensions, Family Allowances (%)	499,500 (5%)		499,500 (4)
Transfers (%)	1,244,150 (13)	132,550 (7%)	1,376,700 (12%)
Gifts (%)	351,268 (4%)	177,930 (9%)	529,198 (4%)
Miscellaneous (%)	831,973 (8%)		831,973 (7%)
TOTAL	9,931,413	2,019,380	11,950,793

TABLE 13

INCOME STRUCTURE ACCORDING TO SECTORS

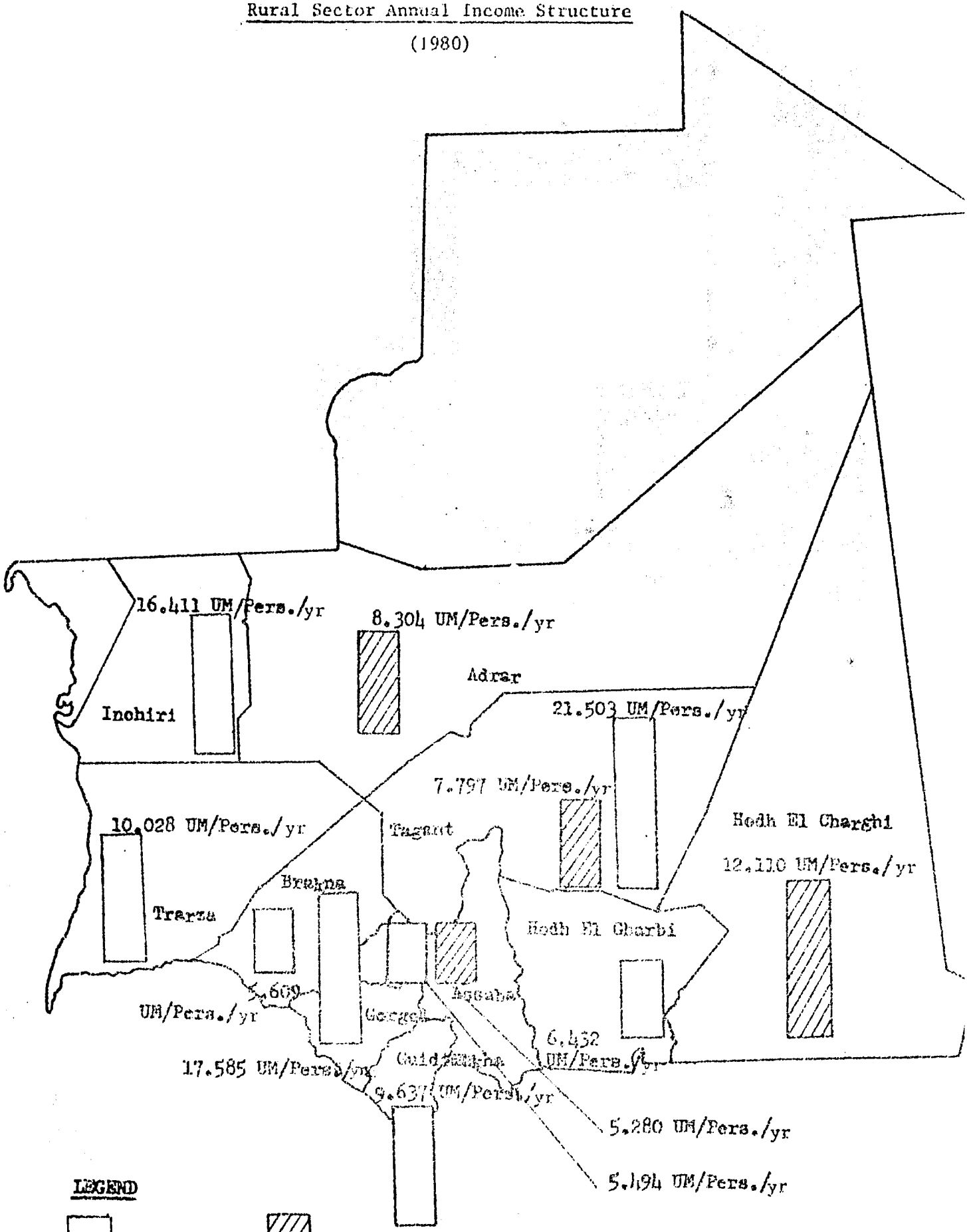
	Sedentary Population	Nomads	Total
	9,913,413	2,019,380	11,950,793
Productive Sector:			
- Farm Product Sales	590,305	45,850	636,155
- Animal Husbandry Sales	1,346,800	1,228,350	2,575,150
- Fishery Sales	258,000	-	258,000
- Handicraft Sales	90,800	139,200	230,000
Total	2,285,905	1,413,400	3,699,305
% of Total Income	(23 %)	(70%)	(31 %)
Service Sector:			
- Trading Profits	1,758,340	138,000	1,896,340
- Wages	2,576,022	82,500	2,658,522
Total	4,334,362	220,500	4,554,862
% of Total Income	(44%)	(11%)	(38%)
Transfer Sector:			
- Loans	384,255	75,000	456,255
Pensions and Family Allowances	499,500	-	499,500
- Remittances	1,244,150	132,550	1,376,700
- Gifts	351,268	177,930	529,198
- Miscellanesous	831,973	-	831,973
Total	3,311,146	385,480	3,696,626
% of Total Income	(33%)	(19%)	(31%)

Source: RAMS Survey, 1980.

Map 4

Rural Sector Annual Income Structure

(1980)



Source : RAMS, 1980.

Table 14

ANNUAL PER CAPITA INCOME IN THE SEDENTARY SECTOR ACCORDING TO REGIONS*

	Hodh El Gharbi	Assaba	Gorgol	Brakna	Trarza	Tagant	Guidimakha	Inchiri	Overall Average
Cash Income (I)	6,432	5,494	17,585	5,609	10,028	21,503	9,637	16,411	13,494
Auto-Consumptions (II)	3,070	1,611	1,187	2,752	4,401	3,918	1,328	[illegible]	1,927
Total Income (I)+(II)	9,502	7,105	18,772	8,361	14,429	25,421	10,965	17,114	15,421
Expenditure[1] for Food Non-good Hems (IV)	10,411	12,948	13,793	8,468	12,636	19,912	17,499	15,738	13,780
Savings (+) (III)-(IV)			+ 4,979		+ 1,793	+ 5,509		+ 1,376	+ 1,641
Negative Savings (—	- 909	- 5,843		- 107			- 6,534		

* Current 1980 prices in UM.

[1] See the RAMS Study : Rural Sector Consumption Patterns, 1980

5.2. BUDGETING

On the basis of data from the Consumption and Income Survey, we may formulate the following equation:

Cash Income + Auto-consumption = Consumer expenditure + Savings (positive or negative)

This equation makes it possible to evaluate the budgets of budgetary units in the various regions:

5.2.1. BUDGETING IN THE SEDENTARY SECTOR

For the rural sedentary sample, budgeting patterns may be surmarized as follows: (See Table 14, page 75).

In the rural sector as a whole, there is a small surplus amounting to 1,641 UM per year. However, we must point out that in our survey, expenses for investment in durable goods or durable property (houses, major repairs) were underestimated. Four regions produced savings, while four others ran deficits.

The deficits were small in two regions -- Hodh and Brakna -- but large in two regions -- Assaba and Guidimakha. Three hypotheses may account for these two special cases:

- there may be negative savings at the level of the people themselves;
- Income and transfers in this region may be underestimated;
- there may be both negative savings and income plus transfer underestimation.

The most plausible hypothesis is the third, combining both negative savings and underestimation of resources. It is easier to gauge the population's income level from the consumption aspect than from the pure income aspect; the reason being that the whole population lives in fear of the Internal Revenue Service.

5.2.2 BUDGETING IN THE "NOMADIC" SECTOR

In our nomadic sample, we can discern a greater degree of homogeneity, except in the Tagant region. The budgeting patt (15) among nomads may be summarized thus:

PER CAPITA ANNUAL BUDGET IN THE "NOMADIC" SECTOR

	Hodh El Charghi	Assaba	Adrar	Tagant	Overall Average
Cash Income (I)	12,110	5,280	7,797	8,304	9,280
Auto-consumption (II)	22,643	2,555	3,705	3,504	6,982
Total (I) + (II)	34,753	7,835	11,502	11,808	16,262
Expenditure (1) Food and Non-food Items (IV)	27,265	8,002	8,757	15,708	13,748
Savings (+) (III)-(IV)	+ 7,488		+2,745		+2,514
Negative Savings (-)			- 167	-3,900	

* Current 1980 Prices in UM

(15) See Rural Sector Consumption Patterns, RAMS, 1980.

The emergent conclusion is that the nomadic population, on account of its abstemious lifestyle and the high level of auto-consumption it practices, produced a net saving, except in the Tagant region.%

The nomads have few needs: for food all they take as a rule is one main meal a day throughout the season of transhumance; as for clothes, they acquire new ones only twice or thrice a year. So they only resort to livestock sales to meet the minimal demands of the budgetary unit.

As far as the Tagant sample is concerned, the income there was difinitely underestimated. (16) If we concentrate solely on cash income, the level of consumption, 9,280 UM per capita annually, is slightly lower among the nomads than that of the sedentary population, which is 13,494 UM per capita annually. However, bearing in mind the fact that throughout the whole country the level of auto-consumption is higher among nomads than among the sedentary population, we may safely conclude that nomadic consumption levels (13,748 UM per capita annually), are practically the same as those of the sedentary population (13,780 UM per capita annually).

It must be admitted, in addition, that in the wake of the drought, a process of natural selection has taken place, with those least fit

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16) See Appendix for bias evaluation.

for the nomadic lifestyle dropping out and getting sedentarized or emigrating.

1) - This appendix is designed to provide information of the sampling plan followed, the way calculations were made on the basis of observations of our sample, and the degree of accuracy to be expected from them.

2) - THE SAMPLING BASE

The sampling base was made up of the list of 2,343 villages registered in the "Village File" drawn up after the 1977 census.

This list gives the names, geographical locations, administrative status and population of the villages. This information facilitated the selection of a sample of villages for the conduct of our survey.

The population of the villages was not updated nor were seasonal fluctuations of the number of their inhabitants taken into account.

The large urban areas of the modern sector were excluded from the list contained in the "Village File". As a result, we came up with a sampling base involving the whole of the rural population.

3) - THE SAMPLING PLAN

3-1 Sample representativity:

As a first step the villages were stratified. Next a came a process of random selection at two levels for each stratum.

At the first level the draw involved primary units (villages), drawn and sorted according to a probability factor proportional to their size within the relevant stratum.

At the second level the draw involved secondary units (households), drawn without prior sorting, with the probability factor even.

This random selection is considered representative because every statistical unit has a known chance of becoming part of the sample.

3-2 Village stratification

On the basis of each village's agro-ecological features, determined by the geographcal unit, the 2,343 villages were divided into 5 agro-ecological zones (AEZ). This classification preceded the design of the polling plan and was later modified. It was retained for two main reasons:

1) - First, though no numerical evaluation had been conducted, it was apparent that these agro-ecological zones (ZAE) showed sufficient internal homogeneity and enough differences among them to make the stratification exercise appreciably meaningful.

2) - Secondly, this division made zonal estimates possible. Still, the fact that only a small number of villages were accounted for in each zone should not obscure the basic weakness of these estimates.

3-3 Primary unit selection

In each stratum a random selection - cum - resorting operation was conducted for primary units (PU), i.e. the villages. In the conduct of this selection each village was assigned a probability proportional to its size within its particular stratum.

A systematic selection based on cumulative populations of the villages made it possible to conduct a draw based on a probability factor proportional to size. This method yelded unbiased estimates with min[illegible]al variance as compared with estimates based on an even probability factor17/

17) Cochran, Sampling Techniques, 3rd edition, Wiley, 1977 p. 295

3-4 Secondary unit selection

Within the primary unit (PU), individual households constituted the statistical unit surveyed. In the polling plan this unit was called the secondary unit (SU). Secondary unit selection followed a simple method, generally involving a chance shift in the primary unit. Since no household could be drawn twice, this kind of selection is termed a selection without resorting.

3-5 Primary and secondary unit sizes

To determine the total number of PU's and their number per AEZ, we had to take organizational constraints such as the number of vehicles available, the number of survey personnel, and geographical distances into consideration. As far as SU's were concerned, in more than half of the villages selected, two households were polled per village. However, on-the-spot decisions coupled with the availability of a large number of survey personnel made it possible to conduct more polls in some villages. The following table gives the number of villages and the number of households polled in each village.[18] The only households represented are those which yielded useable information on income.

AEZ	Number of villages	Number of households		
1	4	10 + 5 + 6 + 2	=	23
2	2	2 + 2	=	4
3	3	2 + 2 + 11	=	15
4	5	2 + 2 + 2 + 2 + 2	=	10
5	2	2 + 8	=	62
Total	16			62

18) Income of first trip.

3-6 Polling rates

The number of households may be estimated at 60,000, a figure obtained by dividing the total rural population by the number of persons in the average budgetary unit. This means our final polling rate came in the neighborhood of 1 in 1,000. Variations between individual zones range from 1 in 400 (AEZ Number 1) to 1 in 4,000 (AEZ Number 2). At the level of the villages, the highest polling rate occurred in COGUIZEMAL, with 10% while KAEDI had a rate lower than 1%. As a result, in all the computations, factors relating to polling rates will not be taken into account. (See Section 5-2).

4) - ESTIMATORS

4-1 Introduction

An estimator is a mathematical factor whereby a particular characteristic of a population may be evaluated on the basis of results obtained from each element in the sample. The form taken by an estimator depends on the specific polling plan adopted.

An estimator may or may not be weighted. The value of the weighting factor is a measure of the difference between the average for all estimates conducted on all the samples made possible by the polling plan and the population's characteristics. Clearly then, it is advisable to use non-weighted estimators.

4-2 Average estimators

With regard to the polling plan delineated above, an average estimator for the stratum h may be written thus:

$$\underline{A}\ Y_h = \frac{1}{n.Mo} \sum_{i=1}^{n} \frac{M_i}{Z_i\, mi} \sum_{j=1}^{mi} y_{ij} \qquad (1)$$

where n = the number of PU's in the stratum h.
M_i = the size of the ith PU
m_i = the number of SU's in the ith PU
Z_i = the probality the ith has of being in the sample
Y_{ij} = the polling in the ith PU of the jth SU

$$Mo = \sum_{i=1}^{n} M_i$$

In our polling plan a village's probability of being in the sample was proportional to its size in the stratum. In other words,

$Z_i = M_i/M_o$. With this last expression (1) may be written thus:

$$Y = \frac{i}{n} \sum_{i=1}^{n} \frac{1}{m_i} \sum_{j=1}^{m_i} Y_{ij}$$

$$\frac{i}{n} \sum_{i=1}^{n} \overline{yi}$$

$$\hat{\overline{Y}} = \overline{\overline{y}} \qquad (2)$$

At this point the average estimator for a stratum may easily be calculated by figuring out the average of observations obtained in each village, then the average of all the averages obtained from all the villages in the stratum. It can be proved that the estimator thus arrived at is non-weighted.

For the totality of the strata, and thus for all the base population, the average estimator is expressed in the following form:

$$\hat{\bar{y}} = \sum_{h} \frac{N_h}{N} \hat{\bar{Y}}_h \qquad (3)$$

This estimator is lightly weighted because of the hypothetical operation involving a proportional relationship between population size and the number of households. There would be no bias at all if N_h was in fact equal to the number of households in the stratum, divided by the total number of households in the base population.

4 - 3 AVERAGE VARIANCE ESTIMATOR

Using the same notations as above, and using a selection probability proportional to the size of the PU in question, it can be proved (19)

19)Cochran, op. cit., p. 308

that the variance estimator for the stratum h takes the following form:

$$V(Y_h) = \frac{1}{n(n-1)} \sum_{n} (y_i - \hat{Y})^2 \quad (4)$$

For the totality of the strate (since selection within each stratum took place independently) the variance estimator is formulated thus :

$$\hat{V}(Y) = \sum_{n} \frac{N_h^2}{N^2} \hat{V}(Y)_n \quad (5)$$

As in the case of the average, this estimator is slightly weighted. The computation of the variance makes it possible to evaluate the degree of chance fluctuation derived from the polling plan. It also indidentally provides an index of the degree of error in the sample.

5 - ACCURARY OF RESULTS

5 FACTORS

In this polling plan, the magnitude of total variance in an estimate is a function of two factors :

- first, the stratification of the universe makes it possible to lower the total variance to the extent that the variable in question is correlated with the stratification variable. In a survey of budgetary and consumption patterns, the number of variable factors under scrutiny is high (this kind of survey is ofton referred to as an omnibus survey). As a result, the gain in precision resulting from stratification varies. As Cochran 20) has pointed out, howover, in general the gain in precision obtained from geographical stratification is small. We should note

20) Cochran, op, cit., p. 102

that the establishment of agro-ecological zones prior to the design of the polling plan (an operation for which estimates were necessary) imposed the stratification base adopted.

- Secondly, polling at two levels of abstraction, being less expensive than simple random polling, is also less efficient for a sample of the same size, since it produces a bigger variance. This is due to the cluster effect : i.e. the tendency of elements presenting similar characteristics to cluster together in the same primary unit. In addition, with polling at two levels of abstraction, total variance depends on the respective sizes of PU's and SU's. In a situation where the number of PU's is small in comparison with that of SU's, we may expect the sampling error derived from the first level of abstraction to have the greater weight. From the foregoing, we may envisage the computation of the minimal value of the sampling error, i.e. the value obtainable from simple random selection from the sixty odd secondary units polled, at just one level removed, and without stratification.

5 - 2 MINIMAL MARGIN OF ERROR DUE TO CHANCE

The process by which a proportional estimate is arrived at is as follows : Assuming P is the proportion of individual elements presenting a specific characteristic within a set of populations, the variance of the estimator for P equals 21) :

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21) See DEROO and DUSSAIX, Pratique et analyse des enquêtes par sondage IUP, 1980. p.65.

$$v(P) = \frac{N - n}{N - 1} \qquad \frac{P(1 - p)}{n}$$

where p is the unweighted estimator for P,

N is the size of the population, and

n is the size of the sample.

In cases where the size or the population is much higher in relation to the sample size, as is the case in our survey, the variance is then expressed thus :

$$V(P) = \frac{(50)^2}{60} = 41.7$$

This yields a $\sqrt{\ }$ type differential of 6.5 % and a coefficient of estimate variation amounting to :

$$C.V\ (P = 50\ \%) = \frac{1}{\sqrt{n}} = 0.13$$

Hypothesizing a Gauss test, with a 95 % threshold, we may state that the proportion P as estimated according to results obtained from the sample falls somewhere within the range from

$50 - 1.96 . \sqrt{\ } = 37.3\ \%$ to $50 + 1.96 . \sqrt{\ } = 62.7\ \%$

A TYPICAL RESULT FROM OUR SAMPLE

Taking the cash income of the 62 households as recorded during the first trip as an example, and using the estimators formulated in Section 4, we may estimate average income at 126 000 UM and put the standard error for this estimate at 42 000 UM.

The following table synthesizes the results of the calculations:

Agro-Ecol. Zone	N_h/N	$\bar{y}(x10^3)$	$V_h(x10^9)$	Nbr Villages	Nbr Households
1	0.16	178	2.96	4	24
2	0.30	191	10.90	2	4
3	0.28	167	7.03	3	15
4	0.18	79	0.56	5	10
5	0.07	104	20.60	2	10

Average revenue is equal to the average weighted by the N_h/N of the $(\bar{y})$ of average income in each stratum. As for the total variance of the estimate of average revenue, it is figured by means of the average weighted by the N_h/N squared of the estimations of partial variance (V_h) in the corresponding strata.

This table shows clearly that the largest contributions to total variance derive in the first place from the small number of primary units. This is particularly clear for zones 4 and 5, which have an equal number of households and present a variance ranging from about 1 to 35 when the number of villages goes from 5 to 2.

Here we have a rather high standard error which could turn out to vary considerably on account of the limited number of villages per stratum. Nevertheless, this result yields a coefficient of estimate variation amounting to 0.33, which is two and a half times higher than the minimal coefficient calculated above. Because of the asymetrical pattern of income distribution and the small size of the primary unit sample, it would be foolhardy to calculate a confidence interval for average income.

A similar calculation done on household size (on the fourth passage) gives results whose form is comparable to that which was observed with revenues. The average size is estimated at 13.3 persons per budgetary unit with an estimated differential error of 1.43. These results give a variation coefficient of 0.11. Since the distribution of household sizes is nearly Gaussien (which is easily verified on a Gausso-arithmetical function chart of accumulated members), it is possible to calculate a confidence interval. At the 95% confidence level, the data of the sample permit one to state that the value of the average size of the budgetary units of the population studies lies between 10.4 and 16.2 persons. The chance error of this estimate is thus around 22%.

It is interesting to compare this measurement of chance error with that which is obtained by assuming that the sample of sizes was obtained by drawing from a single degree without previous stratification. The average value of the size is thus equal to 11.3, or 15% less than the estimation cited above. The standard error is then about .54, or two and a half times less than that which is obtained from calculations on

the survey base. The latter result is close to observations made of the revenues.

The preceding discussion of the value of standard error and the variation coefficient of estimate variation establishes the value of the chance error: the precision and reliability of the results obtained from the sample can thus be established

THE USE OF SIMPLIFIED ESTIMATIONS

The calculations relating to the estimators in paragraph 4 is a cumbersome operation. Furthermore, as mentioned in the text, the fact that the sample population was not brought up-to-date and that the seasonal fluctuations of the population of the villages were not taken into account means that the actual size of the villages is uncertain. Thus there is a certain bias in the sample. In addition to the preceding factors, there is a further biasing factor stemming from the assumed ratio between population size and number of households.

For this reason, as well as for the reason that variance calculations reveal sizeable margins of chance error, averages and percentages have been worked out on the sample as if the sample base had been a straightforward random sample at only one level of abstraction, without stratification. The observed difference between the two methods of calculation does not go beyond 20%. Given the magnitude of the characteristic differentials we have been dealing with, this estimate falls well within the margins of error typical of the sample.

Assuming a Gaussien test at the 95% level, it is then possible to establish that the proportion P as calculated by the sample results, lies within the interval of 50 - 1.96 . [illegible] = 37.3% to 50 + 1.96 . [illegible] = 62.7%. In other words, the probability that the actual value of the proportion in the population is between 37.3 and 62.7% is calculated to be 95%.

CONCLUSION

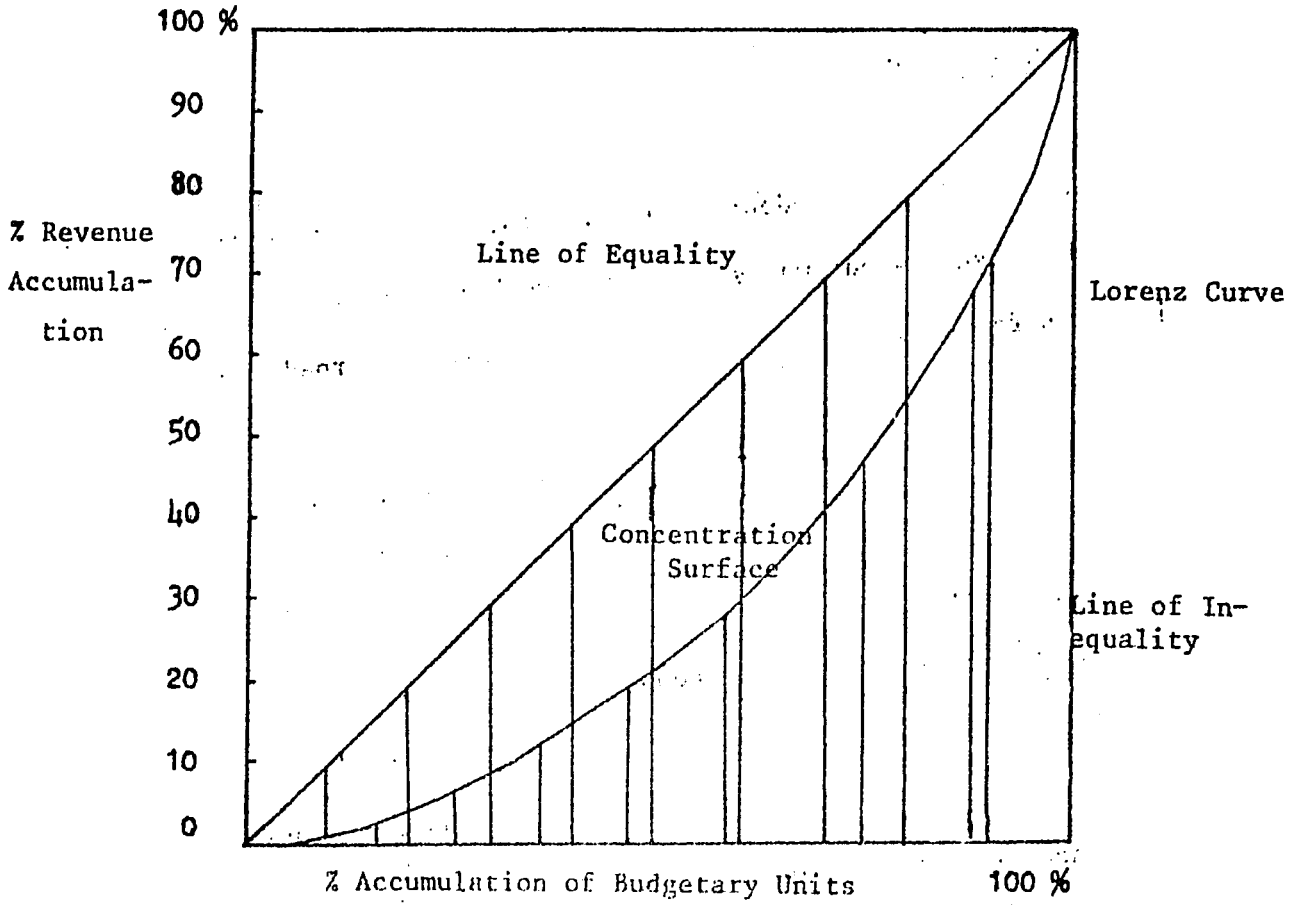
The sampling plan adopted made it possible to cut costs in carrying out the survey but was still far from being an optimal plan, especially as far as absolute PU and SU sizes were concerned.

Confidence intervals turned out to be wider than might have been wished. Nevertheless, the randomness of the selection gives the sample a representative character making it possible to locate both structures and tendencies within the base population. Thus, as mentioned in the foreword, this report lays no claim to being anything grander than being a first step in the study of the rural milieu in Mauritania and that is how it should be judged.

Appendix 2 : Calculation of the Gini Concentration Index

The Lorenz curve and the Gini index are used to measure the degree of inequality in the distribution of revenue.

The Lorenz curve (1) graphically shows the distribution of revenues.



When the same percentage of the totality of revenues is given to an equal percentage of budgetary units, the Lorenz curve is equal to the diagonal "line of equality".

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1) See M. Bronfenbrenner "Income Distribution Theory, Mac Millan, chapter 3. Also N.C. Kakuwani, "Income Inequality and Poverty", World Bank, Oxford University Press, 1980.

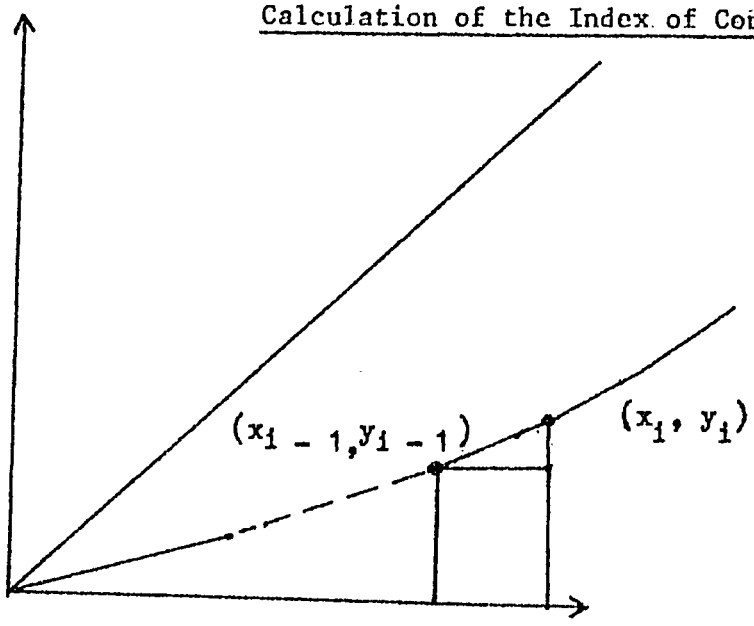
- The further one goes from a situation of equal distribution (line of equality), the more the Lorenz curve bends toward a "line of inequality". This line describes the extreme situation in which a tiny percentage of budgetary units encompasses almost the whole mass of revenues.

- The Gini index of concentration gives a numerical measure of the degree of inequality in the spread of revenues. It is defined by the ratio between the area lying between the line of equality and the Lorenz curve and the surface of the triangle:

$$\text{Gini Index } R = \frac{\text{Surface A}}{\text{Surface of the Triangle}}$$

This ratio is expressed by values between: no concentration (and therefore equal distribution) and 1 (maximum concentration and therefore extreme inequality of revenue distribution).

Calculation of the Index of Concentration



The surface of the area beneath the Lorenz curve can be broken down into a series of trapezoids

Surface of the Trapezoid $= \frac{(y_i + y_{i-1})\ (x_i - x_{i-1})}{2}$