

1. SUBJECT CLASSIFICATION	A. PRIMARY Food production and nutrition	AE70-0000-G190
	B. SECONDARY Distribution and marketing—West Africa	

2. TITLE AND SUBTITLE
Marketing, price policy and storage of food grains in the Sahel: Chad

3. AUTHOR(S)
(101) Mich.Univ. Ctr.for Research on Economic Development

4. DOCUMENT DATE 1977	5. NUMBER OF PAGES 95p.	6. ARC NUMBER ARC
---------------------------------	-----------------------------------	-----------------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Mich.

8. SUPPLEMENTARY NOTES (*Sponsoring Organization, Publishers, Availability*)
(In English and French; French,108p.:PN-AAF-402)
(Complete country studies available; English,666p.:PN-AAF-399; French,760p.:PN-AAF-400)

9. ABSTRACT

10. CONTROL NUMBER PN-AAF-401	11. PRICE OF DOCUMENT
12. DESCRIPTORS Africa Chad Grain crops Price policy	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/afr-C-1143 GTS
	15. TYPE OF DOCUMENT

PN-9717-401
AID/2000-111365

CILSS
CLUB DU SAHEL
Working Group on Marketing,
Price Policy and Storage

MARKETING, PRICE POLICY AND
STORAGE OF FOOD GRAINS
IN THE SAHEL

A SURVEY

Volume II: Country Studies

Submitted by

CENTER FOR RESEARCH ON ECONOMIC DEVELOPMENT
UNIVERSITY OF MICHIGAN

Financed by

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

August 1977

THIS DOCUMENT HAS BEEN EVALUATED AS SUBSTANDARD COPY FOR ROUTINE REPRODUCTION. EFFORTS IN AID/W TO OBTAIN A MORE ACCEPTABLE COPY OF THE DOCUMENT HAVE NOT BEEN SUCCESSFUL. DESPITE THIS DISADVANTAGE, WE HAVE CHOSEN TO REPRODUCE THE DOCUMENT BECAUSE OF THE SUBJECT TREATED AND TO MAKE THE DISCERNIBLE INFORMATION AVAILABLE.

ERRATA

Chad

- p. 2 line 5
- p. 16 footnote 1, line 6
- p. 30 line 15
- p. 32 bottom of table

- p. 47 footnote 1
- p. 48 line 3
- p. 51 Table IX, line 3
- p. 56 line 23
- p. 56 line 25
- p. 58 line 4
- p. 60 footnote 1, line 5
- p. 61 line 9
- p. 80 line 22
- p. 84 Appendix 5, ONDR

However, imports of wheat and flour...
 ...must be less than for the rural areas.
 Its monetary costs on this operation
 year under each section should read, in
 order: 1973, 1974, 1975, 1976
 Conseil Militaire Supérieur.
 (See Appendix 2)
 "official" producer price 45 13 (13.95) 45 ..
 (See Appendix Table 7B)
 (See Table XIV)
 ...products, price increases for millet have...
 See Appendix Table 8...
 Handling, protection
 ...ONDR has...
 Mr. S. Souillanriba, Director of Extension Services

Ivory Coast

- p. 13 line 13
- p. 17 line 10
- p. 73 line 10
- p. 75 Table 4, line 2

... yields per acre from 1000 to 1500 lbs.
 ...which will utilize modern inputs and reach, during
 ...in June or July.
unsubsidized price

Mali

- p. 6 line 15
- p. 10 line 16
- p. 10 line 17
- p. 14 line 12
- p. 43 Table XIX

- p. 51 line 16
- p. 68 line 19
- p. 69 line 8
- p. 84 footnote 1
- p. 100 line 20

...Mopti and the bottom-land
 There are three prices...
 ...parboiled whole rice.³ (See Diagram 1)
 ...to a price schedule (French: barème)
 table heading should read: Monetary Costs Return
 per workday
 These credit bills are rediscounted at the Banque...
 ...two channels: one private and one official.
 ...has been distorted.
 ...p. 84.
 ...cases, the lack of adequate...

Niger

- p. 9 footnote 1
- p. 11 footnote 3, line 2
- p. 15 line 16
- p. 16 line 12
- p. 17 line 5
- p. 29 line 5

- p. 39 line 18

- p. 45 lines 17,18
- p. 46- Table IV
48
- p. 59 line 1
- p. 62 line 19
- p. 75 line 19
- p. 120 line 2 after Table 2
- p. 121 line 2 after Table 4
- p. 126 Glossary

FAC-..., the French foreign assistance agency
 ...illustrates. During the team's visit,...
 ...than twice the figure of 2000 CFA/ton...
 ...of the 2000 CFA/ton reported...
 ... (see page 15).
 The commission to UNCC has been raised from 1100
 CFA/ton in 1975/76 to 1500 CFA/ton in 1976/77.
 Of interest is only r, the coefficient of correlation
 $((Cov. (AB) / [Var. (A) \cdot Var. (B)]^{1/2})$
 the unit of measurement should read CFA/ton-km.
 should be Table VI
 ...the problem but there are...
 (see page 56)
 (see Appendix Table 10)
 ...cooperatives buy the paddy from...
 ...which it buys at 38 CFA/kg...
 add: SNTN Société Nationale des Transports Nigériens,
 National Transportation Company

Senegal

- p. 17 footnote 1
- p. 20 line 20
- p. 27 line 20
- p. 30 line 15
- p. 39 line 26
- p. 48 diagram

- p. 49 line 22

This is true at any realistic...
 ... as well as by country of origin,...
 BUD is a private enterprise.
 ...for first quality grain cotton...
 ...there are 13 wholesale depots.
 broken arrow should appear between "Approved
 Wholesaler" and "Trader"
 ...due to the small volume of these purchases.

UPPER VOLTA

- p. 69 line 9
- p. 94 line 20

...these are matters...
 ...a correlation coefficient $(r = Cov(AB) / [Var(A)]^{1/2})$

Preface to Volume II

Because some readers of this volume may not have access to Volume I, it is worth repeating here some of the remarks made in the general introduction to the study. The study originated at the request of CILSS/Club du Sahel Working Group on Grain Marketing, Price Policy and Storage. At its Dakar meeting in July, 1976, the Working Group requested that a "diagnostic survey" be undertaken, in order to bring together existing information on marketing, price and storage, and to identify main issues. This study was undertaken in response to that request. It was financed by the Sahel Development Program of the Agency for International Development.

The country studies in this volume are based on field trips, on the study of documents and reports gathered in the field as well as from multilateral and bilateral aid agencies, on a survey of published literature and on responses to questionnaires sent to the CILSS countries in August, 1976.

The field trips took place between November 1976 and February 1977. At least three work-weeks were spent in each country; in most cases, it was closer to a month. During the ensuing write-up in Ann Arbor, the team benefitted from the presence, for brief periods, of the President of the Working Group, M. Ibrahima Sy; the Rapporteur of the Group, M. Charles Leroy; and M. Serge Michailof of the Caisse Centrale de Coopération Economique, Paris. Also, the final report benefits from a review of preliminary findings, held during a Working Group meeting in Brussels, March 16-18, 1977.

Considerable autonomy has been given to the authors of the country studies. They, of course, had guidance of several sorts. The terms of reference set down a long list of specific questions about which information was to be sought. The entire team spent some 10 days together in the Upper Volta, and three of the four authors of country studies went to Niger together. In Niger, a more detailed set of analytic questions was worked out, and this was used to guide the inquiry in the remaining field work. In Ann Arbor, we have had much discussion, and each draft country study underwent extensive editing.

It nonetheless remains true that each country study is the responsibility of its author, and will reflect his perceptions and ideas to a considerable extent. Such a devolution of responsibility seemed desirable for several reasons. (a) The field work could only be organized by specializing individual team members in given countries; it would have been too difficult for any one or two individuals to visit all seven Sahel countries. (b) Attribution of individual responsibility has obvious positive effects on the authors' incentives. (c) Perhaps most important, the study of marketing systems is peculiarly subject to the preconceptions of the investigator. It therefore seemed preferable, as well as necessary, to allow each country study to reflect its author's understanding and insight, which is to say, also his biases. This has resulted in differences of emphasis and outlook in the country studies--differences which are

accounted for also by the fact that marketing and price policy problems arise in different contexts in each of the Sahel countries.

The authors responsible for the country studies are: Boubacar Bah, Mali and Mauritania; Elliot Berg, Upper Volta; Daniel Kohler, Niger and Chad; Clark Ross, Senegal and the Gambia. In addition to overall editing by me, Aimée Ergas made major editorial contributions. Judy Brooks assisted on the Upper Volta, Charles Steedman worked on Mali and Mauritania, and Annick Morris was responsible for the French translations. Greg Conboy and Bijan Amini helped with statistical material.

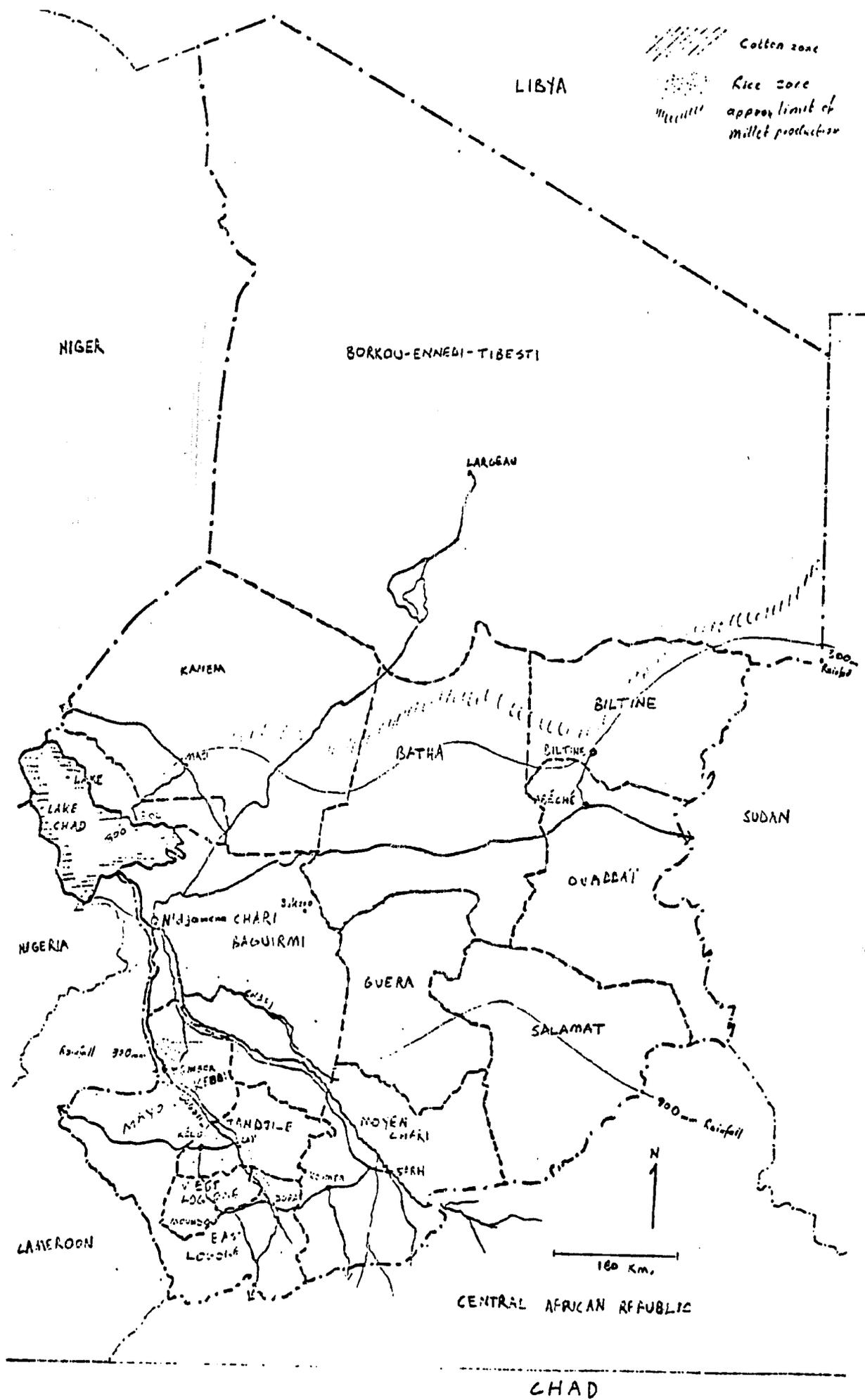
The major emphasis in all the country studies in this volume is on marketing and price policy. Each study discusses storage issues, but these receive less intensive attention than marketing and prices. The reason is that we were originally requested to survey only marketing and price policy; storage was to be the responsibility of another group of consultants. For various reasons the Club Working Group was not able to find storage consultants, so we did some work on storage, but necessarily gave it less attention than the other issues.

Finally, this is an étude diagnostique, a phrase for which there is no good English translation. It means an analytic survey, but without recommendations on policy. Authors of country studies were instructed to avoid drawing policy conclusions, but the line between assessment of options and recommendations on policy is difficult to draw. The basic purpose of these studies, in line with the mandate we were given by the Working Group, is nonetheless fact-finding: bringing together what is known, underscoring what needs to be known for more effective policy-making, setting out options and describing these options in the light of existing constraints. The reader will therefore not find here detailed and specific recommendations on what grain marketing agencies such as ONCAD or OPVN ought to do, how they might be made more effective organizationally, whether and by how much millet and sorghum prices in Mali or Niger ought to be raised. These are the kinds of questions appropriate to more focussed policy studies, not to an étude diagnostique such as we were requested to do.

Elliot Berg
Project Director

Ann Arbor, Michigan
July 1977

CHAD



CHAD - TABLE OF CONTENTS

	Page
I. Introduction.....	1
II. The Agricultural Sector.....	5
III. The Regional Production and Consumption Balance.....	11
A. Production.....	11
B. Consumption.....	13
C. Trade Flows Equalizing Regional Millet Surplusses and Deficits.....	18
D. Restrictions on the Transfer of Cereals.....	21
IV. Structure of the Cereals Market and the Major Participants.....	22
A. Private Trade.....	22
B. Official Marketing.....	26
1. Millet and Sorghum.....	26
2. Rice.....	30
3. Wheat.....	33
C. Efficiency of the Market System.....	37
V. Price Policy.....	47
A. The Decision-Making Process.....	47
B. The Level of Cereal Prices.....	48
C. Fluctuations of Cereal Prices.....	55
D. Relative Prices of Cereals in Comparison to Other Consumer Goods.....	56
VI. Storage Policy.....	59

Appendices

1. Statistical Tables.....	64
2. Marketing of Cash Crops.....	77
3. Supply of the Rural Areas with Consumer Goods, Credit and Inputs.....	80
4. Notes on a More Recent Study Mission.....	83
5. People Contacted in Chad.....	84

CHAD-TABLES IN THE TEXT

	<u>Page</u>
I. Variability of Rainfall in Chad.....	3
II. Population, Per Capita Consumption and Total Consumption Needs by Individual Prefecture in Chad.....	17
III. Marketing Costs for a Private Trader.....	25
IV. Purchases and Sales by DC/FDAR.....	28
V. Technical Yields from Paddy in the FDAR Rice Mills.....	31
VI. Surface, Production of Wheat and Official Purchases by SODELAC.....	34
VII. A. Cost Structure of SODELAC.....	35
B. Cost per Kilogram of Wheat Marketed by SODELAC.....	35
C. Comparison of Total Costs and Total Revenue for SODELAC.....	26
VIII. Surfaces in Cereals and Cotton Production in the Southern Zone.....	50
IX. Comparison of Production Costs and Revenues Between Cotton and Millet in the Southern Zone.....	51
X. Fractions of Income Spent on Total Food Consumption.....	52
XI. Fractions of Total Expenditure Spent on Cereals.....	53
XII. Fractions of Total Income Spent on Cereals.....	54
XIII. Consumer Prices for Millet in N'djamena.....	55
XIV. Recent Changes in Consumer Prices in N'djamena.....	57

DIAGRAMS IN THE TEXT

1. Flows of Millet and Sorghum in a "Normal" Year.....	20
2. Organigram of the Ministry of Agriculture.....	28
3. Paddy and Rice Prices in the Southern Prefectures.....	32
4. Correlation Coefficients of Millet Prices between Various Markets in Chad.....	39
5. Differences in Prices	
A. Between N'djamena and Sarh.....	41
B. Between N'djamena and Abâché.....	42
C. Between Sarh and Moundou.....	43
D. Between N'djamena and Moundou.....	44
6. Organigram of the Ministry of Economic Affairs, Planning and Transportation.....	48

CHAD

I. INTRODUCTION

Chad had a population of approximately 4.02 million¹ in 1976, 13.9% of which live in urban centers. This percentage, already high for Sahelian conditions, is expected to grow to 19.5% by 1985.² The resulting increase in urban demand, coupled with a relative reduction of the agricultural labor force, will put enormous pressures on Chadian agriculture and will pose one of the foremost problems for the future.

The total land area of Chad is estimated to be 1,284,000 square kilometers. Judging from Chad's geographical location, reaching southwards below the 8th parallel, with considerable areas in the soudanese zones, one would expect a more favorable ratio of agriculturally usable land to total surface than in most other Sahelian countries. Unfortunately, there are no figures available which would allow an estimate of such a ratio. A UNDP study³ based on average rainfall patterns over the past 15 to 25 years places the northern limit for millet production on the line of Mao, Moussoro, Biltine. The area south of this line is the total potentially arable land in Chad, yet it constitutes only 40% of the country's total area.

¹Figure arrived at by extrapolation of World Bank estimates: population mid '71: 3.7 million, growth rate 2.1%. Other sources (i.e. UNDP) quote slightly higher figures (4.1 million).

²International Bank for Reconstruction and Development, estimate.

³PNUD (UNDP), Groupe de conseillers en développement d'Afrique Centrale, Production et commercialisation des céréales, volume I - Tchad, July 1974.

Millet and sorghum are still the major staple foods in Chad, despite considerable efforts to increase the production of rice and wheat. Indeed, Chad is self sufficient in rice (with even a slight export surplus, especially if the illegal border trade with Cameroon is included). However, wheat and flour (measured in wheat equivalents) rose from 10,000 to 16,000 tons between 1969 and 1973, and imports of other grains, particularly millet and sorghum, increased from 122 to 598 tons during the same period.¹

A disturbing fact about Chad's food problem is the apparent drastic reduction in cereals productivity per capita of rural population. According to estimates by the World Bank,² this decrease amounted to 33% over the period 1965-70. However, such productivity calculations usually rely on production and population estimates which are rather unreliable and which can, at best, be taken as rough estimates.

Large parts of Chad are under the control of rebels. Acreage and production estimates for these areas are largely guesses and extrapolations of past trends. The only region for which reliable data exist is the southwest, where cotton and rice production are predominant, the immediate surroundings of the city of N'djamena and the shores of Lake Chad. Data that is consistent over time is difficult to find because the area of influence of the rebels changes constantly.

Like all other Sahelian countries, Chad suffers under the variability of rainfall. Considering the fact that most agricultural production is

¹IBRD, 1976.

²IBRD, *ibid.*

quite marginal, even small changes in rainfall can cause large variations in yield and production. If the rainfall changes are substantial, which is quite frequently the case (as Table I shows), the resulting fluctuations in production will be amplified accordingly.

Table I. Variability of Rainfall in Chad¹

<u>Location</u>	<u>Prefecture</u>	<u>Long-run Avg. (20 or more yrs.)</u>	<u>Maximum (yr.)</u>	<u>Minimum (yr.)</u>
Djedaa	(Batha)	370.1	843.7 (1961)	96.9 (1965)
Guereda	(Biltine)	431.4	969.0 (1955)	13.0 (1965)
N'djamena	(Chari-Bag.)	712.5	990.1 (1959)	134.7 (1973)
Bouso	(Chari-Bag.)	839.4	1,350.6 (1958)	283.3 (1949)
Biltine	(Guera)	651.7	895.2 (1970)	300.3 (1957)
Mao	(Kanem)	315.7	637.4 (1946)	64.6 (1943)
Bol	(Lac)	314.0	698.8 (1954)	62.0 (1972)
Moundou	(Logone-occ.)	1,187.0	2,186.9 (1950)	797.2 (1968)
Goré	(Logone-or.)	1,271.7	1,975.0 (1969)	780.0 (1972)
Bongor	(Mayo-Kebi)	837.8	1,155.0 (1943)	67.0 (1952)
Kyabé	(Moyen-chari)	968.7	1,226.8 (1955)	330.9 (1961)
Abéché	(Ouaddai)	452.0	898.5 (1946)	142.1 (1935)
Haruze-Man.	(Salamat)	973.7	1,198.5 (1954)	544.8 (1960)
Lai	(Tandjile)	1,069.2	1,517.9 (1956)	668.5 (1973)

Source: Chad, Ministry of Agriculture. L'Agriculture et l'Elevage Tchadiens à travers les Chiffres 1962-71, update 1976.

It is apparent that the deviation from the mean in either direction can easily exceed 50%. It is also noticeable that, in only three instances,

¹An important aspect of rainfall patterns, not reflected by these figures, is the distribution of rains during the year. It appears that, during the latest drought, the irregular timing of the rains often caused far greater damage than the insufficiency of rainfall in millimeters.

two locations had their maxima in the same year, and, equally, in only three instances were the minima of two stations in the same year, even though most of these observation periods do not extend over more than 30 years. It is a strong indication of how much rainfall patterns can vary, not only over time, but also geographically.

Large fluctuations in agricultural output and food availability are a logical consequence of such variable rainfall patterns. Appendix 1 gives an overview of production estimates for different crops. One can understand that, in the light of such evidence, food crop policy is of major concern to the Chadian government.

II. THE AGRICULTURAL SECTOR

The marketing of cereals cannot be analyzed without at least a brief overview of the agricultural production sector. Agriculture is by far the largest sector of the Chadian economy. Considering that practically all farmers grow their own foodcrops, and taking into account that a large number of people living in the cities own fields (almost one in five urban residents are estimated to live off agriculture)¹ or are supplied by their relatives who live in the country, one realizes that only a small minority (maybe 5 to 10 percent of the total population) are pure consumers of cereals. Therefore, the consumption side of the marketing system (retailing, consumer prices etc.) affects only a small fraction of the total population. However, it is a growing fraction, and because it is located in the cities and is composed of the more influential segments of the population, its voice carries more weight in governmental marketing and price policy decisions than the numbers suggest.

Agriculture employs almost 90% of the total Chadian population, but its contribution to total value added is estimated by the World Bank to be less than 50%. This reflects low agricultural productivity (annual value added per worker - \$185).² Nevertheless, cotton, beef and cattle account for over 90% of Chad's foreign exchange earnings.

¹UNDP (PNUD, op. cit.)

²Such calculations have to be used cautiously. When the official agricultural prices, at which agricultural output is valued, are artificially low and the prices of industrial products overstate their social resource costs, value added calculations will overestimate the industrial sector's contribution to GNP and underestimate the value added in agriculture.

Cotton is by far the most important cash crop. It is grown in the far southwestern corner of the country, the area bounded on the northeast by the Chari River. On approximately 300,000 ha, 100,000 tons of cotton are produced annually, and all the government's efforts go into producing this export crop. Some experts¹ feel, however, that this emphasis on cotton has already caused the expansion of acreage farther north than is advisable and they advocate a reduction of this acreage by 10 to 20%. An alternative crop for this region is rice. The floods of the Logone River provide sufficient water to allow traditional flood rice cultures in some areas. In addition, the government subsidizes some irrigated rice projects in this area.

Some wheat is grown in the polders of Lake Chad. Polders are formed by damming any of the numerous lagoons of the lake. After the water has evaporated, a piece of fertile land remains which is below the level of the lake. This land can be farmed for 12 to 15 years before the salt content in the groundwater increases above the tolerable level. By opening the dam and flooding the polder, it can be turned back into a lagoon. Reclosing the dam and letting the water evaporate will render the polder usable again after 3-4 years.²

Other agricultural products are gum arabic, collected in the east, some groundnuts in the center and south, cattle and livestock in the northwest and southeast. Only camels are suited for raising in the Borkou-Ennedi-Tibesti district in the north.

¹UNDP, op. cit., for example.

²The World Bank recently approved a large polder project that will also provide gravity irrigation. This will allow permanent use of the polders because the irrigation will keep the salt content of the ground in check.

Millet and sorghum are grown wherever possible.¹ In the southwest, sorghum is grown in crop rotation with cotton. All extension efforts of the Chadian Government go into cotton production. Farmers devote little time to subsistence crops which they only grow to cover all or part of their families food requirement.

The major production zone for millet and sorghum is the zone northeast of the cotton zone and south of the northern limit of agricultural production (approx 350 mm isohyet), running from the Lake through Mao-Moussoro, south of Biltine and then northeast to the Soudanian border. The limit of sorghum and peanut production runs parallel to this line approximately through N'djamena. But millet is the predominant cereal, even south of this limit. Peanuts, as a cash crop, are not serious competitors against the food crops. They are mainly grown in mixed cultures with either sorghum or millet, and marketed quantities are very small. The main source of cash income to these farmers is livestock.

The UNDP² study notes about this zone:

"Cette région est pourtant la grande zone de production de mil. La densité relativement faible de la population, l'abondance des terres, l'absence de contrainte de la culture cotonnière, la proximité du centre de consommation de N'djamena, la facilité des transports par la route N'djamena-Abêché qui draine toute la zone, enfin la possibilité de faire une double récolte vivrière grâce au sorgho de décrue, tous ces facteurs expliquent qu'en année de pluviométrie moyenne, cette région fournisse les trois quarts des besoins en mil de N'djamena et ravitaille également les éleveurs nomades de la zone située plus au nord ainsi que les oasis traditionnellement déficitaires de la zone saharienne."

¹There are only a few exceptions to this rule. Besides wheat in the polders, we find maize in the deep southwest and manioc in the south-east as major food crops. These products are not yet very noticeable, but their importance is expected to increase in the future.

²UNDP (PNUD, op. cit.)

This area coincides largely with the areas controlled by the rebels. Under the circumstances, governmental marketing of cereals in this region is not practicable. Private traders, however, seem to be able to operate freely in the millet-peanut zone. They are the only ones who buy and collect the grain. The Department Céréaliier (DC)¹ has to buy from them.

Estimates of the acreage in millet and sorghum production vary between 850,000 ha and 1,000,000 ha.² Most data and documents cover only the southern regions of the country. Political unrest in the northern regions, where approximately 60% of the total cereals production is located has made it very difficult to obtain information on that part of the country.

Production of millet and sorghum in a normal year is estimated to be around 600,000 metric tons. Recently, this figure has dropped to approximately 430,000 tons, despite a considerable increase in the area planted.³ The reduction in yields per hectare must therefore have been proportionately even larger. The main reason for this decrease was the recent drought. But a comparative study by the World Bank suggests a greater reduction of productivity in cereals in Chad than in the other Sahelian countries,⁴ indicating an additional drop in productivity in Chad.

¹DC: Département Céréaliier, the official grain marketing agency. It is a subdivision of the FDAR: Fonds du développement et de l'action rurale. (see organigram, page 28).

²See Appendix Table 2.

³See Appendix Table 2.

⁴International Bank for Reconstruction and Development, 1976.

The significance of this drop in per capita and per hectare productivity, real or imagined, is unclear. The major statistical source states:¹

"Les chiffres des superficies ne sont que des estimations très grossières... Les chiffres des productions, quant à eux, sont entachés d'une double erreur - d'une part par l'estimation grossière des superficies - d'autre part, par la mauvaise détermination des rendements. Nous pouvons néanmoins signaler que la diminution de ces chiffres n'est pas une régression, mais une certaine tendance vers la réalité."

There seems to be no consensus on the issue of whether Chad is approaching a structural deficit in cereals, as is claimed to be the case for some other Sahelian countries (e.g. Niger). To the contrary, experts and government officials commonly hold the opinion that there are still exploitable reserves in rice, and possibly even in millet and sorghum production, which could be mobilized to meet future needs.

Cereals production profits only indirectly from modern inputs. In the southern zones, farmers customarily plant millet or sorghum in rotation with cotton. This way, this small fraction of grain production profits from fertilizers applied to cotton. In the central and eastern parts of the country, farmers raise livestock and grow grain. They use no modern inputs, but sometimes rotate their millet crops with sorghum.

The share of expenditure on agriculture in Chad's government budget has declined steadily, from 5% (465 million CFA) in 1969 to 2% (343 million CFA). Furthermore, these diminished funds have been devoted almost exclusively to the production of cash crops, especially cotton. Rice production has received some attention, and Chad has indeed been able

¹ République du Tchad, Ministère d'état chargé de l'agriculture, L'agriculture et l'élevage tchadiens à travers les chiffres 1962-1971, N'djamena, July 1972.

to reduce the amounts of rice which need to be imported to practically zero. But there seem to be no provisions in the government's plans to encourage the production of millet and sorghum.

III. THE REGIONAL PRODUCTION AND CONSUMPTION BALANCE

A. Production

As most Sahelian countries, individual farms in Chad are very small. A recent agricultural census¹ shows that almost 90 percent of all farms are smaller than 5 hectares. This atomistic structure is also underlined by the fact that, in almost 60 percent of all cases, the area farmed per agricultural labor equivalent is less than one hectare. (See Appendix Table 3)

94.7 percent of all the farms in Chad produce millet and/or sorghum. One-third of them do so exclusively for the purpose of covering their families needs, while the remaining two thirds also sell a small share of their output. The fraction of producers who grow millet exclusively for subsistence-consumption increases to 57.6 percent in the surroundings of the city of N'djamena. This probably reflects the large proportion of city residents who grow their own cereals on nearby land plots. In the southern prefecture of Logone-West only 10.6 percent of all farmers produce millet and or sorghum exclusively for subsistence purposes. (See Appendix Table 4)

There is unfortunately almost no information available regarding the sahelien zone (prefectures: Kanem, Batha, Biltine, Ouaddaï and the eastern portion of Chari Baguirmi). This region has traditionally been the main production zone for millet and sorghum. Together with the sparsely populated north it contains approximately 45 percent of the total population. The majority of these people are sedentary farmers.

¹Census conducted by the statistical division of the Department of Agriculture. Results as yet unpublished.

While they probably still supply most of the grain available to the nomads in the north, their role as suppliers of the city of N'djamena has diminished and is now primarily fulfilled by the farmers in the southern zone. Two factors account for this switch: the great communications and transportation difficulties, associated with the rebellion and the impact of the drought which reduced output in the Sahelian zone by more than in the south. The resulting price increase in N'djamena induced many southern farmers to switch into cereals production in rotation with the customary cash crop (cotton).

Unlike millet and sorghum which are grown wherever possible, the production of rice is confined to specific regions in Chad: the southern prefectures Tandjilé, Mayo-Kebi, Logone-East and -West, Moyen-Chari and the southernmost portion of Chari-Baguirmi. In these areas, the annual floodings of the Logone river make floodland rice production possible. But only about 50,000 hectares (of 500,000 total flooded) are suitable for rice production. In 1973, the FAO¹ recommended controlling the floods in certain areas in order to increase the usable portion of land and to better control the water level. The unpredictability of the floodings is the major constraint on this particular form of rice production.

Besides the traditional floodland rice production, there are a few controlled and irrigated "casiers" (perimeters) where individual farmers grow rice.² The government maintains the perimeter and provides the inputs. Mobile buying teams should buy the paddy at the official price of

¹ FAO, Etude des Ressources en eau du Bassin du Lac Tchad en vue d'un programme de développement, April 1973.

² A considerable fraction of these "farmers" are government officials. They live in the cities and hire laborers to work in their fields.

25 CFA/kg. However, market prices are higher (see diagram, page 32), so that the farmers prefer to sell to private traders or clandestinely export the paddy to Cameroon.

Of the roughly 45,000 tons of paddy produced each year, about half is consumed by the producers themselves. This includes small trades from producers directly to consumers. 15,000-17,000 tons are handled by merchants who mill the rice in small informal rice mills, while only about 6-8,000 tons enter the official marketing channels of FDAR and are processed in the rice mills of Bongor and Laï.

B. Consumption

Population data on which consumption estimates could be based are very scarce. Probably the most reliable source of detailed information is a study by B. Gil, Projections Demographiques pour le Tchad de 1963 à 1985 (1963). This study has been updated for 1968 by the Ministry of Planning. However, these figures are extrapolations of results from rather small samples.

All studies of this type attempt to estimate growth rates and then extrapolate the figures for a base year into the future. It is clear that errors in the basic data or in the growth rate estimates are amplified by this method, the longer the period of extrapolation. However, in the absence of a systematic population census, this method has to be accepted as a reasonable alternative.

The available population data are summarized in Appendix Table 5.¹ While the figures for total population in the individual departments and,

¹The official population statistics of the Department of Agriculture and the growth rates as estimated by Gil serve as the basis.

even more so, the figure for total overall population are likely to be relatively accurate, the distribution between urban and rural population is certainly biased. It is based on the assumption that a constant ratio between urban and rural population will prevail. Instead, forecasts¹ show a generally increasing proportion of urban population. By 1985, the city of N'djamena is expected to contain approximately 55 percent of the entire population of the department of Chari-Baguirmi (1975: 43 percent).

Despite all the inaccuracies, the figures show clearly the uneven distribution of population throughout the country. The south is very densely populated (Logone-West: over 30 hbts./km²), while the north is very sparsely populated (B.E.T.: .1 hbts./km²). However, this distribution coincides very closely with the regional distribution of production of grain, so that the implied necessary trade flows are relatively small.

Estimates of per capita consumption are almost as unreliable as population estimates. There is a tendency to overestimate consumption needs in order to dramatize the deficit brought about by the drought. Figures of 190 and more kgs per capita per year are sometimes quoted.² While it is true that certain ethnic groups do indeed consume considerable amounts of grain, such an average for the total population, including women, the elderly and infants, is probably an overestimate.

¹ i.e. International Bank for Reconstruction and Development.

² i.e. United Nations, Food and Agriculture Organization.

Nomads, who make up over ten percent of the total population, are a group which typically consumes small amounts of cereals. Milk and meat have a very important place in their diet. The UNDP study¹ estimates their annual consumption of cereals to be around 100 kg. per capita, a large portion of which is made up of paddy and wheat.

While the sedentary and semi-sedentary farmers in the Sahelian zone probably consume more grains than the nomads, it is not at all clear why they should consume much more than the sedentary farmers in the south. Meat and milk still play a large role in their diet, as do peanuts, which are primarily grown for self-consumption. Reliable estimates or studies are lacking here as well.

For the five southern prefectures, there is a study available which was conducted by SEDES in 1966.² According to this study, the average consumption of grain, including processed foods ("beignets", millet beer), does not exceed 165 kg. per capita per year. Millet (including millet beer) amounts to only 146 kg. in this total. In the prefecture with the highest consumption however (Logone-East), the consumption of millet amounts to 186 kg.

The same study also shows that the urban populations consume considerably less cereal, and especially less millet and sorghum, than the farm population. A budget study³ among families of a low income section (Chagua) of the capital city, however, shows that the lower income

¹UNDP (PNUD), op. cit.

²SEDES, Enquête Socioéconomique au Tchad, 1965, Paris, 1966.

³Centre National de Nutrition et de Technologie Alimentaire, internal study, July-December, 1966.

groups in the city consume essentially the same amount of millet and other cereals as do the farmers. Consumption of bread was higher but consumption of other grains (Fonio) was lower. Overall millet consumption (including millet beer) was 140 kg per capita per year, only 6 kg less than the average¹ for the farmers of the southern zones. The major results of these two studies (SEDES and Centre National) are summarized in Appendix Table 6.

Overall, there seems to be no evidence supporting the claim of annual per capita consumption in excess of 160 kg. The UNDP study finds the upper limit to be 154 kg on the average. Their estimates all use upper limits for observed daily consumption, even though it has been shown that consumption of cereals over the year varies considerably.² Table II gives an overview of annual consumption needs per prefecture using these per capita consumption estimates and the population estimates from Appendix Table 6.

1

This low income section is not representative for the city of N'djamena as a whole; the upper income groups certainly consume less millet than the lower groups (preference for rice and bread). But if the results for the lower income groups show essentially the same consumption of millet as for rural populations, it is safe to say that the average per capita consumption for N'djamena must be less than for the urban areas.

2

SEDES, op. cit.

Table II. Population, per Capita Consumption and Total
Consumption Needs by Individual Prefectures in Chad

<u>Prefecture</u>	<u>Population ('76)* in Thousands</u>	<u>Consumption, kgs** per Cap., per Yr.</u>	<u>Total Annual Consumption (t)</u>
Mayo Kebi	607	176	106,800
Logone-West	276	182	50,200
Logone-East	302	199	60,100
Tandjilé	293	162	47,500
Moyen Chari	465	126	58,600
<hr/>			
Total South	1943	166.3	323,200
<hr/>			
Chari Baguirmi	572	138	78,900
Guéra	193	150	28,900
Salamat	101	135	13,600
Ouaddaï	370	150	55,600
Batha	355	145	51,500
Biltine	157	130	20,400
Lac	138	123	17,000
Kanem	204	167	34,100
B.E.T.	85	110	9,400
<hr/>			
Total North	2175	142.3	309,400
Total Chad	4118	153.6	632,600

*

SOURCE: See Appendix Table 5

**

SOURCE: UNDP, op. cit.

The figures in Table I. represent, upper limits.¹ The average annual per capita consumption is at most 154 kgs of rough grains, and it is probably declining. Nevertheless, millet and sorghum are by far the most important staples in the Chadian diet and the most widely grown agricultural product.

There is unfortunately no such detailed information available regarding rice consumption. Presently total consumption is estimated to be slightly above 50,000 tons as well, so that there is only a slight deficit, if any. With increasing urbanization, however, consumption demand is expected to grow and, unless ways are found to induce additional production of rice, a deficit might soon develop.

C. Trade Flows Equalizing Regional Millet Surpluses and Deficits

The consumption demand per prefecture is given in Table II. By making allowance for losses, seed and animal feed, figures for total demand can be derived. Subtracting production in the individual prefectures and allowing for export and import flows, a map of cereal flows can be constructed.

¹These figures are, at best, only estimates and contain a considerable upward bias. The main reasons for this bias are:

-Millet consumption per capita is rather unstable during the course of a year. The above consumption estimates are based on extrapolations of daily observations which at least in the case of the study for N'djamena (Centre National de Nutrition et de Technologie Alimentaire, op. cit.), were conducted during a period of high millet consumption.

-The average consumption figures for prefectures with urban as well as rural populations stem from 1972 data. Because the portion of the urban population has increased considerable, and because rural populations generally consume more rough grains (millet and sorghum) than city populations, the averages for 1976 should be lower.

-Even barring shifts in the composition of the population, it is uncertain that the consumption patterns remained the same over time. The increased availability of rice in the cities, maize in the south-west and tubers in the south-east may well have led to a shift of consumption away from millet and sorghum.

-The consumption studies were made in years of adequate availability of millet and sorghum. One would expect, therefore, the relative price of these grains versus the luxury foods (rice, bread), which were still relatively scarce at the time to have been quite low. The general increase of millet and sorghum prices and the relatively smaller rise of bread and rice prices must have lead to a substitution away from rough grains into rice and bread.

Trade across the borders is generally considered to be small in a normal year. Depending on the demand and supply conditions, it could flow in either direction. There are few established patterns¹ of millet trade across national borders.¹

Using consumption estimates for 1972 and production estimates for an average "normal" year, the UNDP study constructs such a trade flow diagram, which is reproduced in Diagram 1. It shows a total net deficit of 13,000 tons, 2% of the assumed production of 620,000 tons. It further allows a rough estimate of the total trade flows. The UNDP study estimates the flows between prefectures to be around 50,000 metric tons. Adding an estimate for the supplying of cities from the surroundings (within same prefecture) of 20,000 tons, UNDP arrives at a figure for total domestic marketings of 70,000 tons, 11.3% of total "normal" domestic production.

These estimates are very rough and are, at best, only indicative of the situation. It is, first of all, doubtful that anything like a "normal" year for production exists. While total production may well be relatively stable, it is clear, by reference to the appendix tables, that production by prefecture does vary considerably more. It is possible that a normally deficit prefecture has surpluses in some years and vice versa, so that these trade flows may be reversed. Further, both production and consumption estimates are very crude. It is clear that when one operates with the differences between inaccurate measures, as is here the case, these resulting differences contain a proportionally much larger error. Diagram 1 should therefore be used cautiously. It is a possible explanation of trade flows, not necessarily a correct one.

¹The city of N'djamena receives about 4,000 tons of grain from Cameroon, and the southern prefectures along the border with Cameroon and CAR are, to the extent that they are in deficit, supplied from these two countries. Some of the nomads in the north import the grains they need from the Sudan.

It is also possible that grain exports and imports are used as a means to circumvent currency exchange restrictions. Traders are willing to accept a loss on their cereals sales abroad, if these enable them to obtain scarce foreign exchange and buy consumer goods for import. This type is most frequent with Nigeria.

D. Restrictions on the Transfer of Cereals

The most obvious restriction on cereal flows is, of course, the rainy season. Large areas of the southern prefectures are cut off, sometimes for several months. This can lead to large local shortages and price increases.

The availability of trucks can be another constraint on the flow of cereals. Price differences between different markets have to be quite large to cover the generally high transportation cost. Because grain is moved on general purpose trucks, the transportation demand from other products (i. e. cotton) has a large influence on how much transportation capacity is available for shipping grain.

In addition to these "natural" constraints, it has happened (eg. in 1973) that individual prefects set up barriers to prevent the outflow of cereals from their prefectures. This should prevent the increase of prices in the particular prefecture, but it leads to even larger increases in the deficit regions. Such restrictions benefit the consumers of the surplus prefectures, who enjoy lower cereal prices. The total social costs, however, are large in that regional shortages are aggravated. These restrictions must be regarded as undesirable from an economic point of view.

IV. STRUCTURE OF THE CEREALS MARKET AND THE MAJOR PARTICIPANTS

A. Private Trade

Millet is only in rare cases a major source of cash income to Chadian producers. An exception is in the band stretching from N'djamena to Abéché, which has traditionally supplied the capital city. But even in this region, revenue from the sale of grain plays a secondary role to revenue from livestock and peanuts. Rice and wheat are more often grown as cash crops. Even in these cases, subsistence consumption absorbs about one-half to two-thirds of total production.

Farmers can sell their grain to essentially three buyers: on the market, to a trader or assembler; within the village, to another farmer or a tradesman; or before the harvest, by taking credit from a money lender (who is a trader at the same time). The UNDP study notes, however, that this form of selling to repay debts is rather rare. According to their estimates, at least 50% of all marketed grain is sold by the farmer on the weekly village market. Another large fraction is exchanged within the village between households.

There are several reasons which explain the farmer's preference for selling on the market. First of all, he probably receives the best possible price. His additional costs for transporting his products to the market are usually small. Most farmers attend markets anyway, for social reasons, in order to buy oil and consumer goods or to sell some other products. If they combine these activities with the sale of grain, they make better use of their time.

There is some evidence for timed sales by farmers. According to government officials, a quite common transaction is for the farmer to "buy" one loaf of sugar (2 kg) and one bag of tea (100 gm) during the soudure

against payment in the form of one bag of millet at harvest time. According to consumer price statistics in the City of N'djamena, the sugar would cost about 650 to 700 CFA and the tea between 100 and 125 CFA.¹ One sack of millet contains, on the average, about 90-100 kg. of grain. In other words, the trader pays the farmer during the soudure about 8-9 CFA/kg for millet delivered after the harvest.

This "troc" (barter) is often maligned as usury. Government officials and foreign advisers alike regard it as a principal means of exploiting the peasants. However, one must keep in mind that in the region of Bokoro, where the above transaction occurs, post-harvest millet prices (in good years) are commonly around 10 CFA/kg and rarely exceed 12 to 13 CFA/kg.² The trader, therefore, demands usually not more than about 2 CFA/kg (20%) for his service and risk premium. Such a return can hardly be termed usury.

Cereals traders usually handle a whole array of other goods. Thus, they are present at the market for other reasons than just to buy cereals. The traders who were interviewed by the study team all claimed that it was not worth their time to visit farmers on their farms in order to purchase grain. This explanation sounds reasonable particularly if we keep in mind that most farmers sell only a small quantity of grain (1 to 2 sacks). Thus, the trader, even if he could buy the grain considerably cheaper, would only make a small additional profit.

In the rural areas, traders usually work on a small circuit of village markets, providing the link between these markets and from the markets to

¹Outside of the capital city, these prices would probably be considerably higher.

²UNDP, op.cit. A Chadian government memo states that in a very good year prices fall as low as 6-8 CFA/kg and in a normal year are around 10 CFA/kg.

the chef-lieu. They buy from the farmers in small quantities and sell either directly to consumers or to a retailer in the chef-lieu by sack or in bulk quantities (5-10 sacks) to wholesalers. Trading is usually only a part-time activity for them.

A Chadian government memorandum¹ gives an estimate of traders' costs:

- 1) A trader buys on a village market with the help of an intermediary ("rabatteur") who is responsible for filling the sacks and sewing them closed. One sack is filled with 40 "koros." One koro contains between 2.25 kg (UNDP estimate) and 2.75 kg (size quoted by government officials). A sack of millet costs the trader, according to this source, between 1000 and 1200 CFA (assuming a koro at 2.5 kg and, therefore, a sack of 100 kg).
- 2) The sack and string cost about 300 CFA.
- 3) For his services, the intermediary receives 50 CFA per sack plus 2 koros of grain out of the sack.

Taking into account the remaining costs (transport, losses, security, etc.), the total marketing costs can be roughly estimated as follows:

¹ Chad, Ministry of Agriculture, "Note sur les possibilités de structuration du Marché," 1976.

Table III. Marketing Costs for a Private Trader Buying in Bokoro and selling in N'djamena (CFA/sack)

Buying price	1000 to 1200
Sack and string	300
Commission to intermediary	50 (+ 5 kg of grain)
Loading and unloading	30
Transport Bokoro - N'djamena	500
Protection, security ("gardienage")	100
Losses on the transport	(= 1 koro {2.5 kg})
Transport from storage to market	200
Protection on market	50
Commission to retailer	100
	<u>2330 to 2530 for 92.5 kg</u>

Full cost price net of traders income and profit:

25.3 to 27.4 CFA/kg

Marketing Costs: Approximately 15.3 CFA/kg (63% of full cost price)^a

^aThis margin is in the order of magnitude commonly found under similar conditions. It is consistent with results from a study on cereals marketing in Northern Nigeria. (See H. M. Hays, "The Marketing and Storage of Foodgrains in Northern Nigeria," Samaru Miscellaneous Paper No. 50, Ahmadu Bello University (Nigeria), 1975). See also Appendix 4.

The UNDP study estimates that, in the southern zones, approximately 25,000 tons of grain are traded from producer to consumer directly, or through at most one intermediary. It is probably true that in the north, where a larger proportion of farmers grow millet and sorghum, smaller quantities are exchanged on this level (15,000 tons).

The long distance trade has, according to the same source, a volume of approximately 30,000 tons. (See preceding section). It is handled by large wholesalers who are usually based in the different cities. They frequently are transporters at the same time and own their own trucks. The UNDP study notes that the larger wholesalers never specialize in cereals alone. The broader their financial base (the larger their yearly sales figures), the larger will be the variety of products available to the traders. This observation is consistent with the experiences of this study

team. For all the major traders interviewed, cereals are only a sideline business. They rarely store grain to speculate on a price increase. They prefer to trade in consumer goods and typically only handle cereals to utilize backhauls which otherwise would be empty. Only a few trade in cereals on a regular basis.

Another interesting characteristic of the market structure is the large fraction of "informal" trade. Any traveller visiting the city or any chauffeur who has empty space to fill on his vehicle might participate in the market by buying a few sacks of grain to sell at his destination. The markup which these "traders" demand is usually very small, because their opportunity costs are negligible.

B. Official Marketing

1. Millet and Sorghum

In 1966/67, Chad was faced with a serious shortfall in cereals production. This alerted the government to the problem of cereals availability and induced it to initiate public intervention on the grain markets. The following year (harvest of 1967), cereals were generally available in excess of needs. The Société Nationale de Commercialisation du Tchad (SONACOT) had to buy at the government imposed floor price of 12 CFA/kg. After buying 2,000 tons, it ran out of funds and had to suspend purchasing. The prices for cereals subsequently dropped to about 6 CFA/kg, in Mongo even to 2 CFA/kg. Being unable to maintain its stocks properly, SONACOT had to sell all its grain after a few months at the then-prevailing market price (approximately 10 CFA/kg). Even if it could have kept the grain longer, it is doubtful whether SONACOT could have found a buyer at a price above 12 CFA/kg. It lost several million CFA.

In the meantime, Chad applied for assistance from the world food program to establish an emergency stock of grain. The WFP was obviously reluctant to entrust the nearly bankrupt SONACOT with further responsibilities in cereals trading. The Fonds du Développement et de l'Action Rurale (FDAR) was much better suited for the task. It owned warehouses in several parts of the country and, in the person of the prefects, had agents in every prefecture.

The WFP was to furnish 4,000 tons of wheat which were to be sold to the Grands Moulins du Tchad (GMT) in order to build up an operating fund. However, only 2,000 tons were delivered, most of the remaining promised aid arriving as cash transfers.

FDAR formed a new subsection, the Département Céréaliier (DC) which began buying cereals in 1968 (See Diagram 2). FDAR also operates rice mills, and DC is the official marketing agency for rice. The operations have been limited in scale. Since its creation, it has succeeded only twice (1970 and 1974) in buying more than 1250 tons of millet and sorghum, mainly from private traders. Only in 1971 and 1976 were FDAR's two rice mills able to buy 1000 tons of paddy. Of a total production of paddy of 50,000 tons and a marketed surplus of millet and sorghum which is estimated to be 65,000 to 70,000 tons, the officially marketed quantities are very minute (see Table IV).

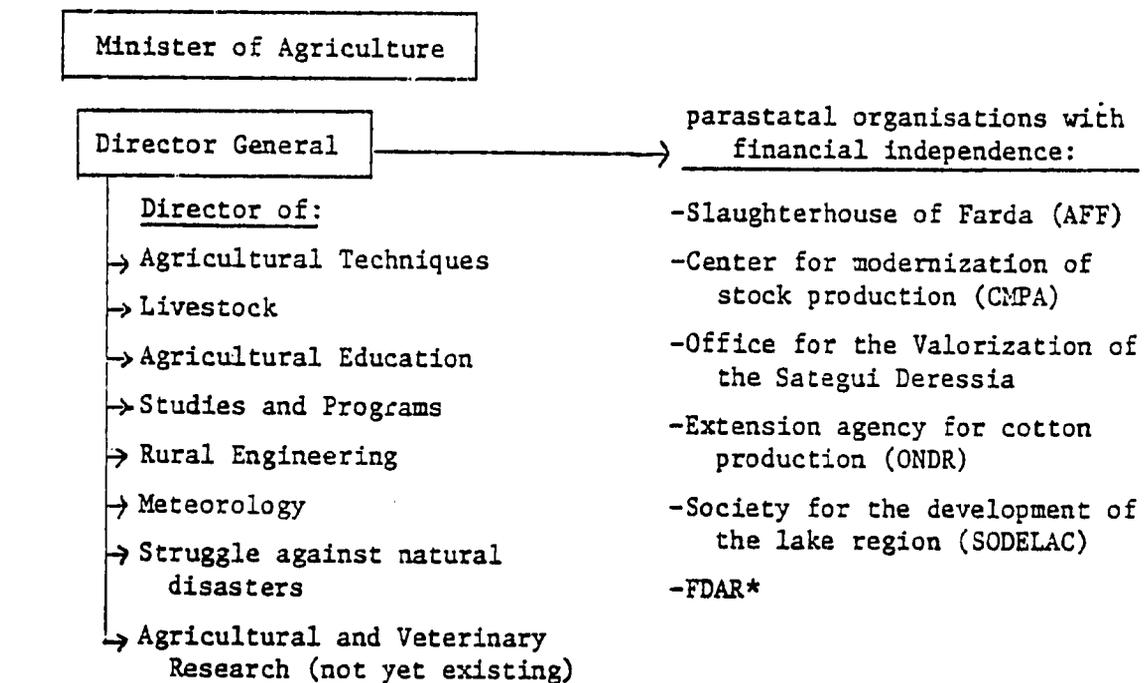
In addition to buying from private traders, DC/FDAR also tried to buy grain from the Union Regional des Sociétés d'Action Rural (URSAR). This is an organization of several small producer cooperatives located in the region of Bokoro. Founded in 1962, its activities were suspended during the civil war. Presently, an effort is being made to reactivate the

Table IV. Purchases and Sales by DC/FDAR (in metric tons)

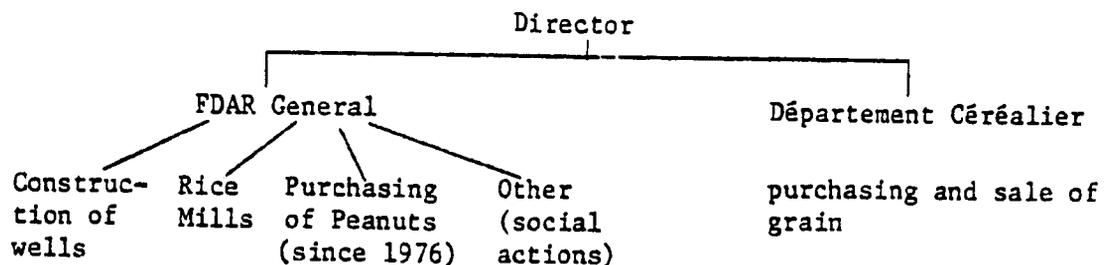
	Purchases		Sales		Stocks on 12-31	
	millet and sorghum	rice	millet and sorghum	rice	millet and sorghum	rice
1968	n.a.	n.a.	-	-	n.a.	n.a.
1969	660	340	n.a.	n.a.	107	38
1970	1,853	578	1,113	581	691	38
1971	1,242	1,061	1,007	1,049	894	46
1972	1,214	795	1,953	824	115	2
1973	907	120	949	122	50	-
1974	1,776	73	947	34	850	39
1975	931	225	1,519	262	235	1
1976	1,168	2,491	1,034	2,051	n.a.	n.a.

SOURCE: DC/FDAR

Diagram 2. Organigram of the Ministry of Agriculture



*Organization of FDAR



cooperatives.¹ In 1974/75, DC/FDAR purchased 100 tons of millet from URSAR. In 1975/76, DC/FDAR bought directly from the farmers. During the present campaign (1976/77), DC/FDAR has not succeeded in buying any grain from URSAR because the prices offered to the cooperatives by the private traders are more attractive.

Today, the DC/FDAR, in principle, buys also through the prefects. However, all officials to whom the team spoke, stated that only a very small proportion of the DC/FDAR's millet and sorghum is bought in this fashion. Since 1975, some grain has also been bought directly by the DC/FDAR through a mobile buying team.² But the largest quantities are bought from traders in N'djamena. The effects on the producers and producer prices are, therefore, very small.

Nor, given the small quantities involved, are the effects on consumers very significant. The Supreme Military Counsel tends to fix the official selling price, at which DC/FDAR must sell grain from its warehouse, below the market price; the present ceiling price is 26 CFA Francs per kg. During periods of very high market prices, the private traders frequently hire individuals to purchase grain from FDAR for them. They then sell this grain on the free market at prevailing prices. In the rural prefectures, where only a small quantity is available at the official ceiling price (all prefects together purchase only about 600 tons for DC/FDAR), it is only a small minority of consumers who can enjoy

¹Efforts are concentrated on seed multiplication and production of peanuts. Planting in 1977/78, URSAR officials hope to be able to start marketing peanuts in large quantities.

²The team was informed that purchases from traders cost the DC less than purchases from producers directly.

the benefit of buying cheap cereals during the soudure.¹

Up to now DC/FDAR has been able to cover its financial costs. This is, in part, due to utilization of public manpower and facilities for which no costs are imputed. For example, the DC uses the general purpose trucks of FDAR for grain transport. At the prefecture level, prefects act as agents of DC, and trucks of the general administration are used. DC/FDAR also received considerable foreign assistance in money and manpower.

As of the present time, DC/FDAR has been operating with a very rudimentary accounting system which does not consider these complex cost elements, so it is difficult to assess its efficiency. An interesting example of the order of magnitude of the costs not supported by DC/FDAR is mentioned in the government's response to the questionnaire sent out by the study team. According to this source, DC/FDAR bought grain in 1975 at 18 CFA/kg from traders in N'djamena. Its momentary costs on this operation amounted to 3 CFA/kg. During the same year, grain was bought for OSRO at 15 CFA/kg. The total costs on this operation, including fuel, trucks etc. amounted to 19 CFA/kg. It seems, therefore, that the portion of real costs which is not borne by DC/FDAR must lie in the neighborhood of 16 CFA/kg. This would be equivalent to a subsidization of DC/FDAR by this amount.

2. Rice

Rice is handled by DC/FDAR, together with millet, and there exists no separate accounting for the two grains. Itinerant buying teams purchase

¹ Soudure: time before the harvest, when supplies are usually scarce and prices high.

the paddy from the farmers at the official price of 25 CFA/kg. However, this price is considerably below the usually prevailing market prices. Diagram 3 gives average prices¹ for the rice and paddy in the rice producing zones since 1973.

It is obvious that, under these circumstances, FDAR's rice mills can only buy a small fraction of total paddy output because they can only pay the official price.² Last year the rice mill in Bangor succeeded in buying 2,400 tons of paddy, and the mill in Lai bought 1,900 tons. The total capacity of the two rice mills is about 13,000 tons annually.

The technical efficiency of the rice mills seem to be satisfactory. The percentage yields (from paddy) for the two rice mills are summarized in Table V.

Table V. Technical Yields from Paddy in the FDAR Rice Mills

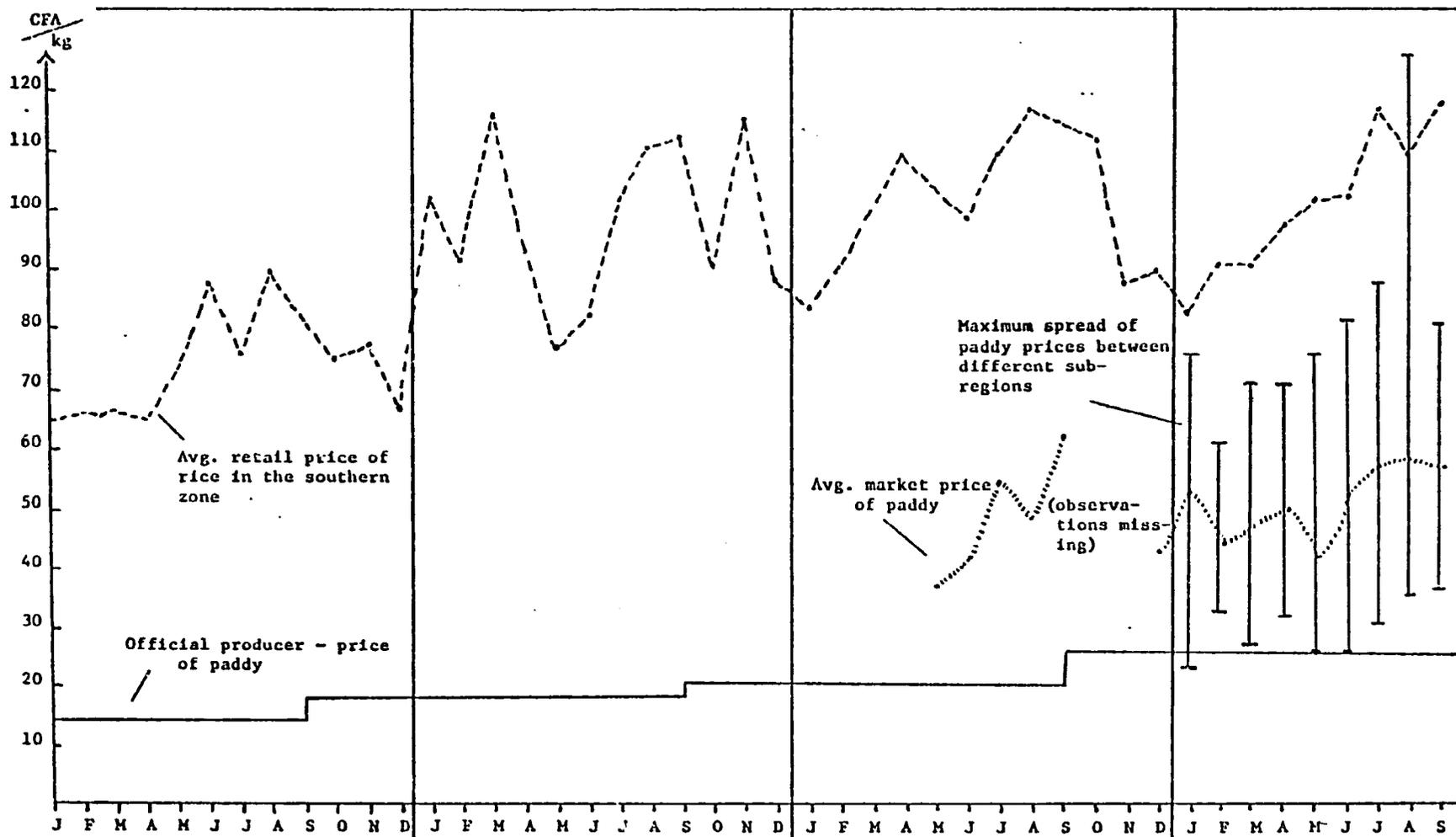
	<u>Lai</u>	<u>Bangor</u>
Deluxe rice	-	1.9%
First quality	21.7%	30.0%
Broken rice	31.8%	26.5%
Rice flour & small pieces	<u>12.5%</u>	<u>9.9%</u>
Total rice as percentage of paddy	66.0%	68.3%

SOURCE: Annual Reports

¹Prices can vary widely between different subregions. They can also drop below the official prices temporarily when the FDAR buying team is not operating in a certain region.

²For 1976/77, FDAR has received an official monopoly for rice marketing. FDAR hopes to buy practically the entire marketed output and thus obtain enough paddy to fully utilize the capacity of the rice mills. The results of this campaign are as of yet unknown, but during the team's visit it became clear that FDAR was determined to enforce this monopoly.

Diagram 3. Paddy and Rice Prices in the Southern Prefectures
Diagramme 3. Prix du Paddy et du Riz dans les Prefectures du Sud



SOURCE: ONDR, Mercuriales.

The installations are in good condition. However, Lai with a capacity of 3,000 tons of rice per year is probably below the limit of economically profitable size. Different problems, insufficient power generator, insufficient paddy, etc., never allowed the rice mills to turn out an appreciable profit.

DC/FDAR buys the rice from the rice mills at an average price of 35 CFA/kg and sells it to consumers at prices ranging from 30 to 140 CFA/kg according to quality. DC does not handle rice separately from millet, so rice enjoys about the same subsidy as millet, due to the provision of free services to DC by FDAR General.

Until this year the rice mills were free to also sell to private traders. However in 1975/76, DC/FDAR bought almost the entire output of the two mills, and from 1976/77 on, it will legally be the sole purchaser of rice.

3. Wheat

The wheat which is produced in the polders of Lake Chad is purchased by the Société du Développement du Lac (SODELAC).¹ However, in this case as well as in the case of rice, the official price cannot compete with the market price. Table VI gives an overview of estimated surface and production, as well as quantities bought by SODELAC.

¹ SODELAC also provides the farmers with seed and extension services. The costs of these services should be covered by SODELAC's profit on its marketing operation.

Table VI. Surface, Production of Wheat and Official
Purchases by SODELAC

	<u>Surface (ha)^a</u>	<u>Estimated Production (t)</u>	<u>Bought by SODELAC (t)</u>	<u>Official Price (CFA/kg)</u>
1973	n.a.	6,700	500	20
1974	3,000	5,500	150	20
1975	2,000	3,000	600	32/40
1976	1,300	2,000	500	40

^aThe reduction in surfaces is due to dehydration and salination of the polders.

SOURCE: SODELAC

SODELAC sells the grain to the Grands Moulins du Tchad (GMT), a subsidiary of the Grands Moulins de Dakar, a privately owned company, at 65 CFA/kg. The installations of the GMT operate only for about 1/2 day out of the entire year, to process the approximately 500 tons of wheat bought from SODELAC. Bakers in N'djamena complained that GMT's flour was of poor quality. They prefer to import their wheat flour from Nigeria, where they can further purchase it at a lower price than the GMT flour.

One of SODELAC's major problems is the isolated location of the polders. The margin of 25 CFA/kg does not cover the costs. Transportation by road from Bol to N'djamena costs, according to SODELAC figures, around 15 CFA/kg. By boat, this cost could drop to around 6 CFA/kg. However, the lake is very shallow and a new channel would be required to allow large barges to reach Bol.

The last year for which figures of SODELAC's marketing costs are available is 1974. They are reproduced in Tables VIIA-C.

Table VII-A. Cost Structure of SODELAC (1974)

	<u>Fixed Costs (CFA)</u>	<u>Variable Costs (CFA/100kg)</u>
Extension Services	3,400,000	40
Seed	1,320,000	-
Collection and assembling of bulk quantities	-	210
Maintenance and amortiza- tion of warehouse at Bol	360,000	-
Transport by truck and storage in N'djamena.	420,000	1,020
Losses and general expenses	-	750
TOTAL:	5,500,000	2,030

SOURCE: SODELAC

It needs to be pointed out that the figure for transportation costs (1,020 CFA/100 kg) is certainly too low for present conditions. Trucking costs have increased approximately 40% since 1974.

In order to estimate SODELAC's costs on a per kilogram basis, we must take into account the quantities marketed per year. This allows the distribution of fixed costs.

Table VII-B. Cost per kilogram of Wheat
Marketed by SODELAC (1974)

	Volume marketed per year (tons)			
	500	1,000	1,500	2,000
Fixed costs-CFA/100 kg sack	1,100	550	367	275
Variable costs per sack	2,030	2,030	2,030	2,030
Total costs per sack	3,130	2,580	2,397	2,305
Total costs (CFA/kg)	31.30	25.80	23.97	23.05

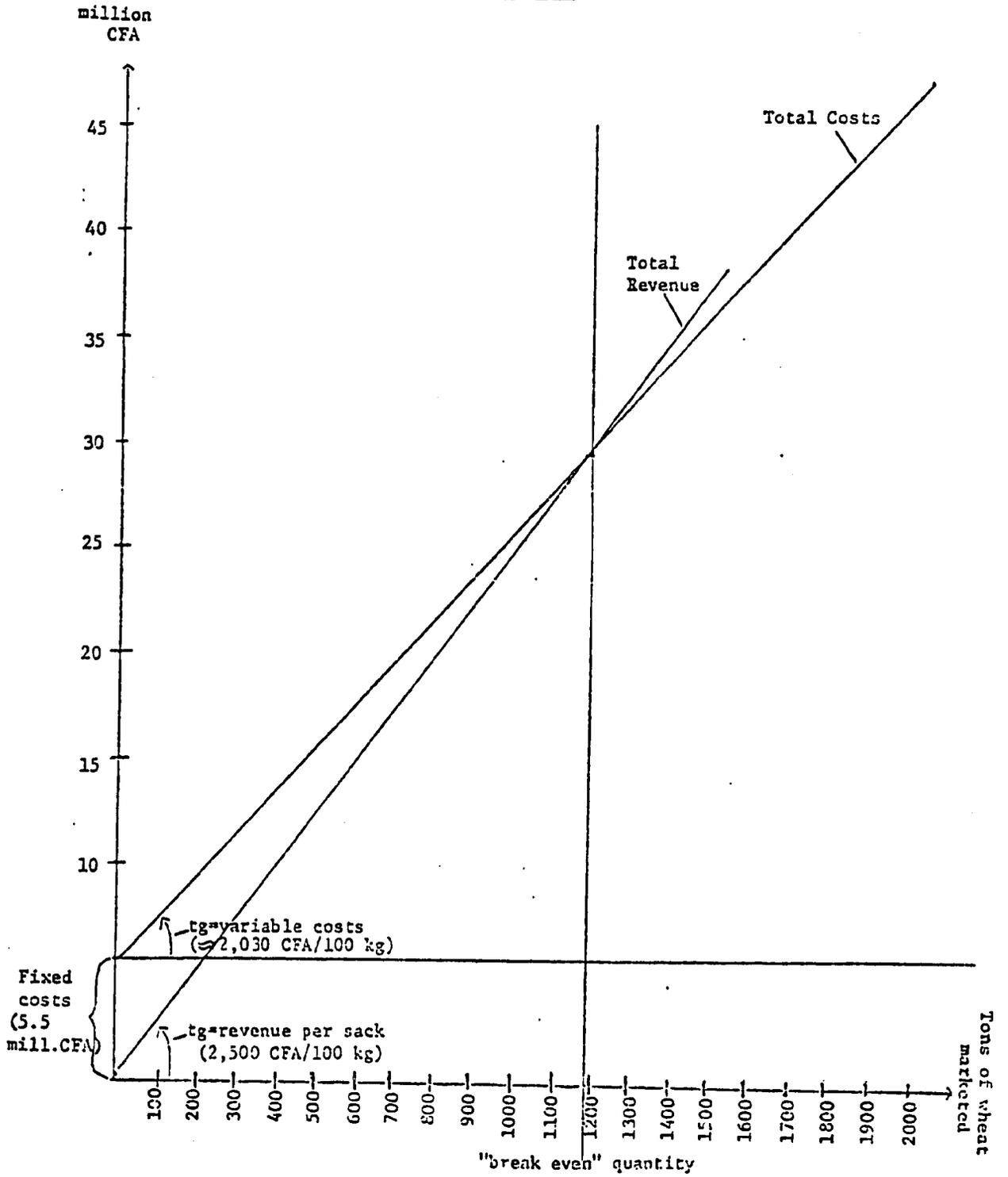
SOURCE: SODELAC

It becomes clear that a marketing span of 25 CFA is reasonable only if SODELAC markets at least 1200 tons of wheat at 1974 costs.¹ Today, these costs are considerably higher and the break-even quantity is, accordingly, larger. As Table VI shows, SODELAC has never come even close to this

¹See Table VII-C.

Table VII-C: Comparison of Total Costs and Total Revenue for SODELAC

Tableau VII-C: Comparaison entre Cout Total et Revenu Total de la SODELAC



Source: SODELAC

break-even point during the past few years and the company must have suffered considerable losses.

C. Efficiency of the Market System

There is little information available which would allow an adequate evaluation of the markets' performance in Chad. Quantity estimates are few and extremely rough and price information is very scanty and unreliable. The study team tried, however, to collect as much data as possible and to subject it to some crude tests of market efficiency.

The results of these tests are of course only indicative. The available data base cannot support a rigorous analysis. Some of the reasons are:

- 1) Missing observations. Frequently it was necessary to interpolate data to obtain at least some time series extending over one year.
- 2) Gaps in the data. There is absolutely no price data available for the years 1971/1972.
- 3) Unsystematic collection of information. Most data used comes from the statistical division of the Ministry of Planning. Theoretically, the observations are collected on the market day closest to the 15th of the month. Shortages of manpower, however, make a careful observation of this rule impossible. The data has never been published due to lack of funds and were copied from the handwritten worksheets for this study.
- 4) It is unclear which prices apply to the retail level and which to the wholesale level. They are quoted per kilogram or per 100 kilograms even though sales are never weighted. On the retail level, merchants use "koros" (containers containing 2.2 to

2.7 kgs. of millet and a wholesale bag can weigh anywhere from 75 to 100 kgs.

- 5) There are no distinctions made for different quality grain, even though good quality millet can command a premium in excess of 100% over poor quality grain.

But none of these limitations seem to introduce a systematic bias. The results are, therefore, qualitatively correct even though the resulting confidence intervals will be very large. Tests could turn out to be inconclusive.

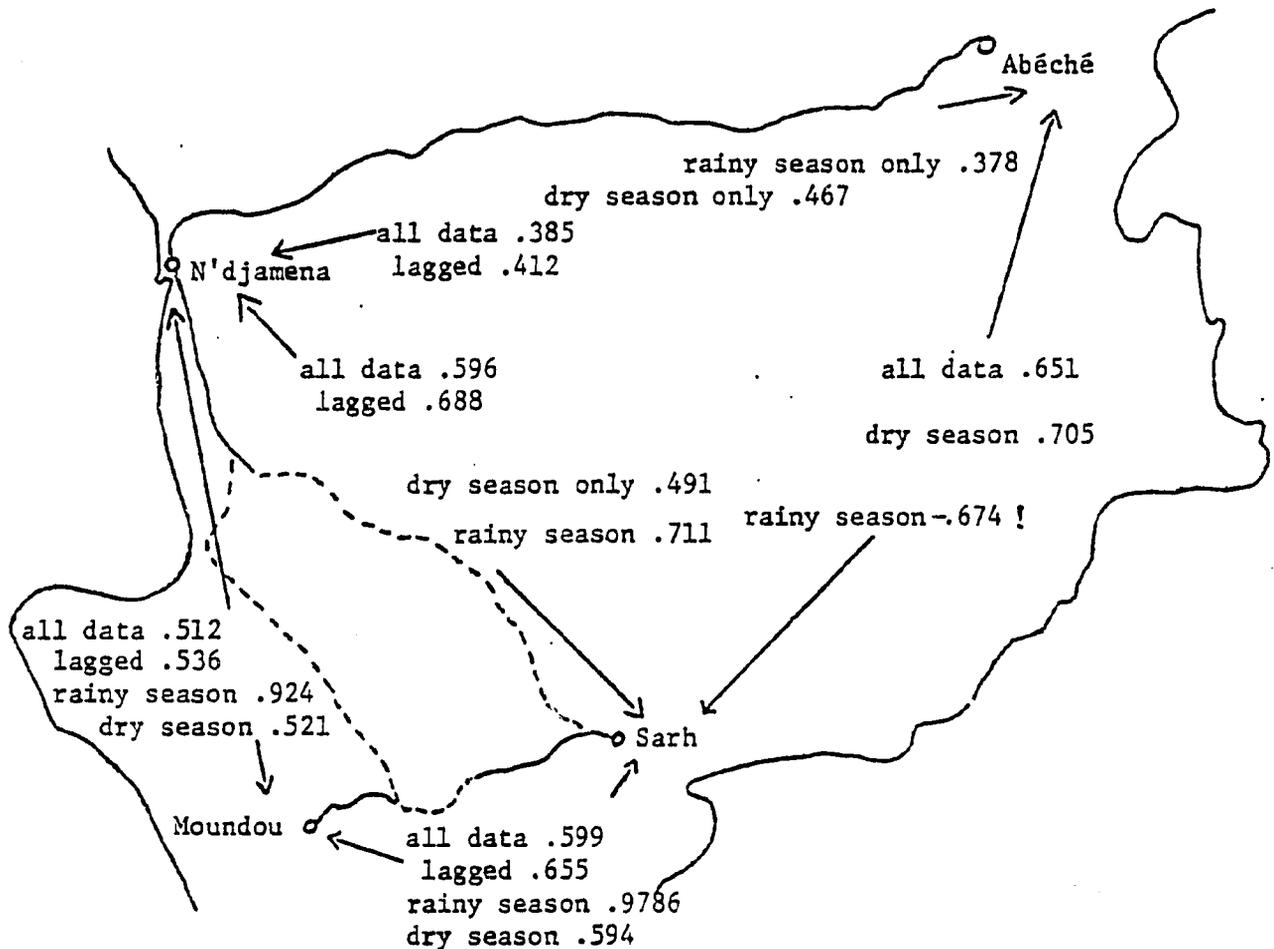
A very crude measure of the degree of integration is given by the coefficients of correlation between price series in different markets. This test is based on the hypothesis that, in a perfectly operating market, prices in different market places should move parallel to each other. That means that, if prices were to rise in N'djamena, for example, there would also be a price increase in other markets because traders would attempt to buy grain and ship to N'djamena. The more efficient the marketing system, the closer will be the parallel movement of prices and the higher the degree of correlation. Diagram 4 gives an overview of the results of this analysis which was done for the four cities for which data was available.¹

The degree of correlation is not very impressive.² One of the reasons is probably that only monthly data was available. These prices

¹The time period covered is 1968 to 1969 (Abéché à N'djamena 1969 to 1970) and 1974 to 1976 (except Abéché). For this later period, average prices for the prefecture Logone west were used as data for Moundou, because no information for the city itself could be found.

²Correlation coefficients of .5 imply that only about 25% of the price variation in one city can be explained in terms of prices in the other market. ($R^2 = .25$) This is a very low proportion. The correlation coefficients usually found for such analyses are around .9, implying that about 80% of the price variations in one market are probably due to variations of prices in the other market. See Uma Lele, Food Grain Marketing in India, Cornell University Press, 1971. See also the country study on Niger.

Diagram 4
Correlation Coefficients of Millet Prices between
 Various Markets in Chad*



* Another study team obtained considerably higher coefficients of correlation by estimating drought years and "normal" years separately. It seems that the inflow of food aid to N'djamena during the drought and the subsequent reversal of traditional price relationships has jolted the existing marketing structure considerably. (See Appendix 4) A "missing data" correlation, using also the information found for partial years and smaller village markets, and covering the years 1968-1976, yielded 41 correlation coefficients, of which 35 (85.4%) were significant at the 5% level and 29 (70.7%) were significant at 1%. A 5% level of significance implies that there is only a 5% chance that the correlation between prices in these two markets is accidental.

are not even monthly averages but observations presumably taken from a particular market day. In this way, momentary shortages and surpluses on individual markets can carry a lot of weight. For the case Abéché - N'djamena, the influence of the restricted traffic, due to the military situation, contributed to the partial isolation of the two markets from each other.

Introducing a one month lag improves the correlation somewhat. This lag is based on the assumption that price changes in the main market, N'djamena, are transmitted with a certain lag to the regional markets. The improvement of the correlation coefficients is not sufficient however to firmly support this hypothesis.

An interesting feature is the fact that the correlation is generally better during the rainy season than if all observations are considered. This is due to the usual increase of prices in all markets, independent of movements in other markets. Such trends necessarily bias correlation coefficients upwards.

Another test of the market's efficiency investigates the differences of prices between markets. If transfer costs were zero and the market worked perfectly, these differences should be zero as well. The less efficient the market, and the higher the transfer costs, the wider the band in which price differences can oscillate without inducing equalizing grain transfers.

For the major cities, price differences are calculated and plotted in graphs A through D. Based on the freight rates of the Coopérative des Transporteurs Tchadiens (CTT), which has the transport monopoly, transfer

Diagram 5-A

Differences in Prices between N'djamena and Sarh
Différences des Prix entre N'djamena et Sarh

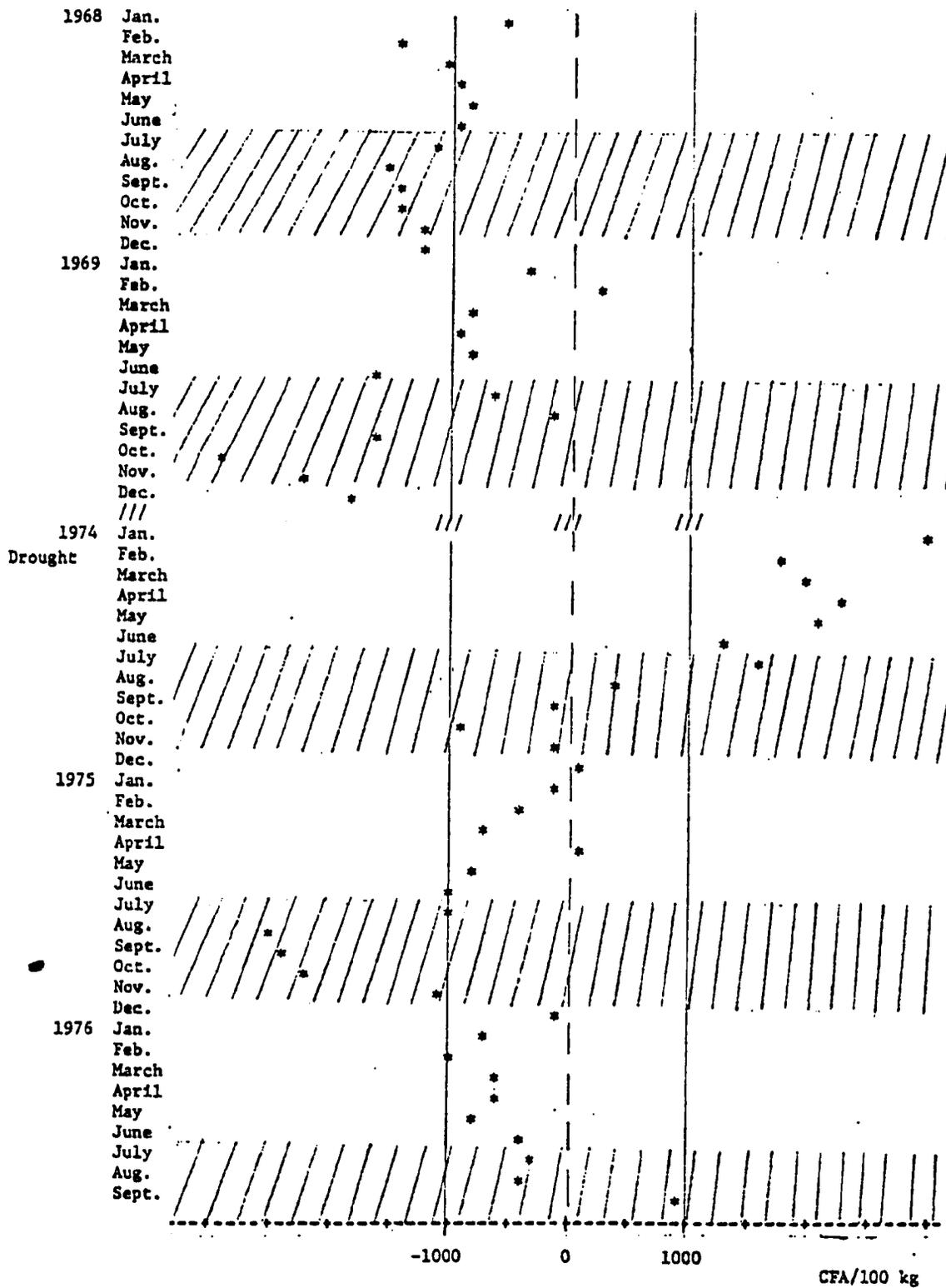


Diagram 5-B

Differences in Prices Between N'djamena and Abéché

Différences des Prix entre N'djamena et Abéché

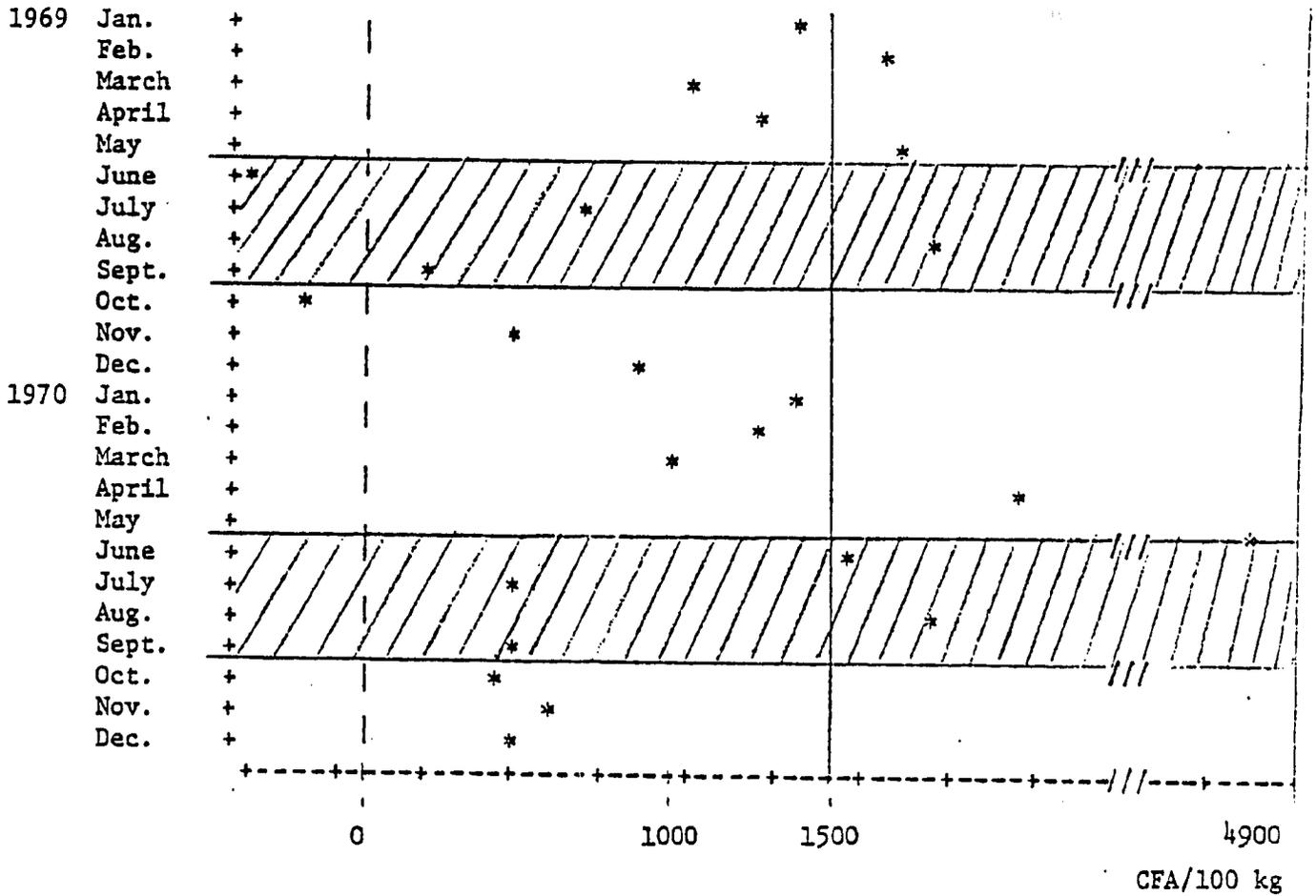


Diagram 5-C

Differences in Prices Between Sarh and Moundou

Differences des Prix entre Sarh et Moundou

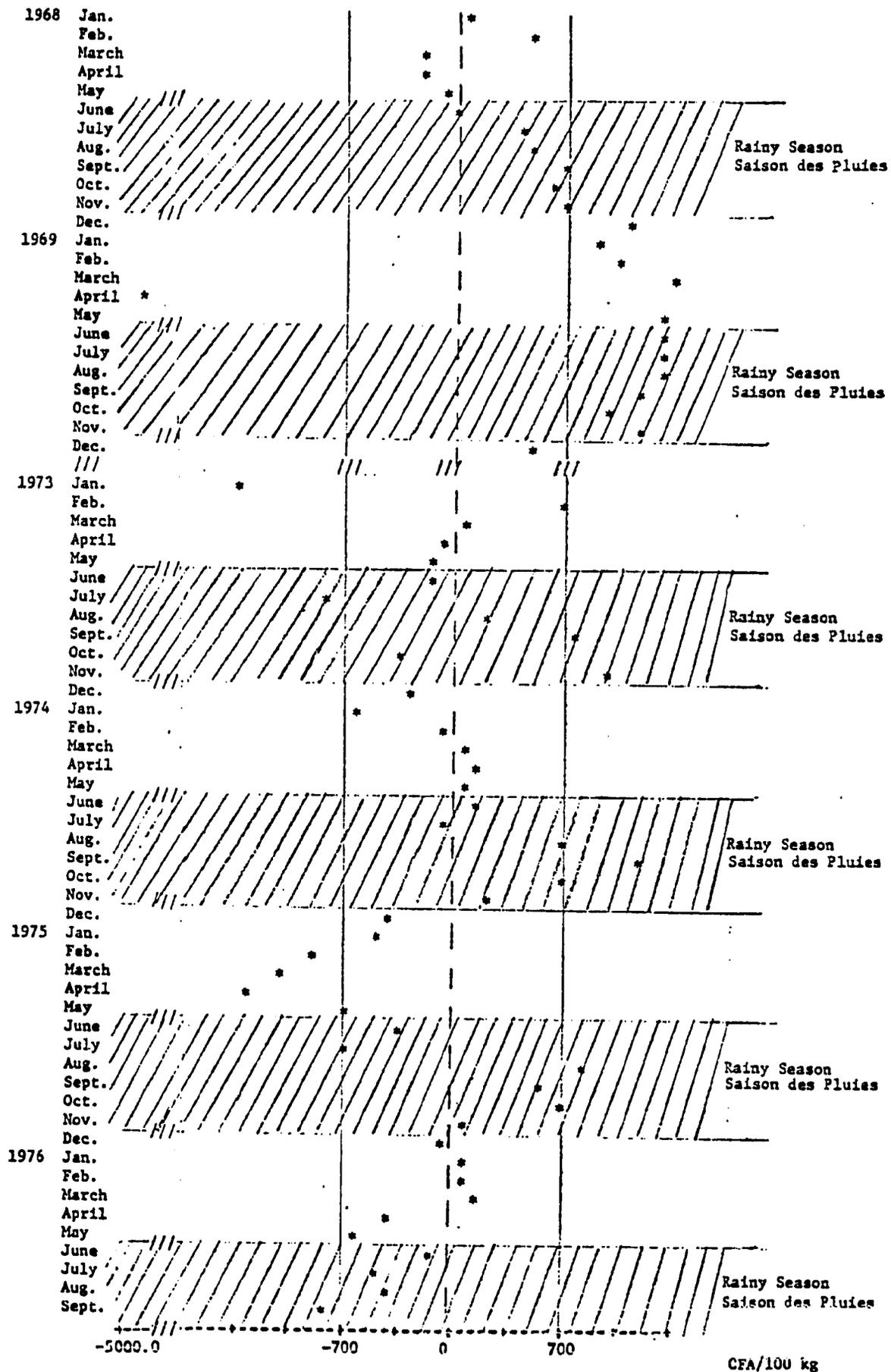
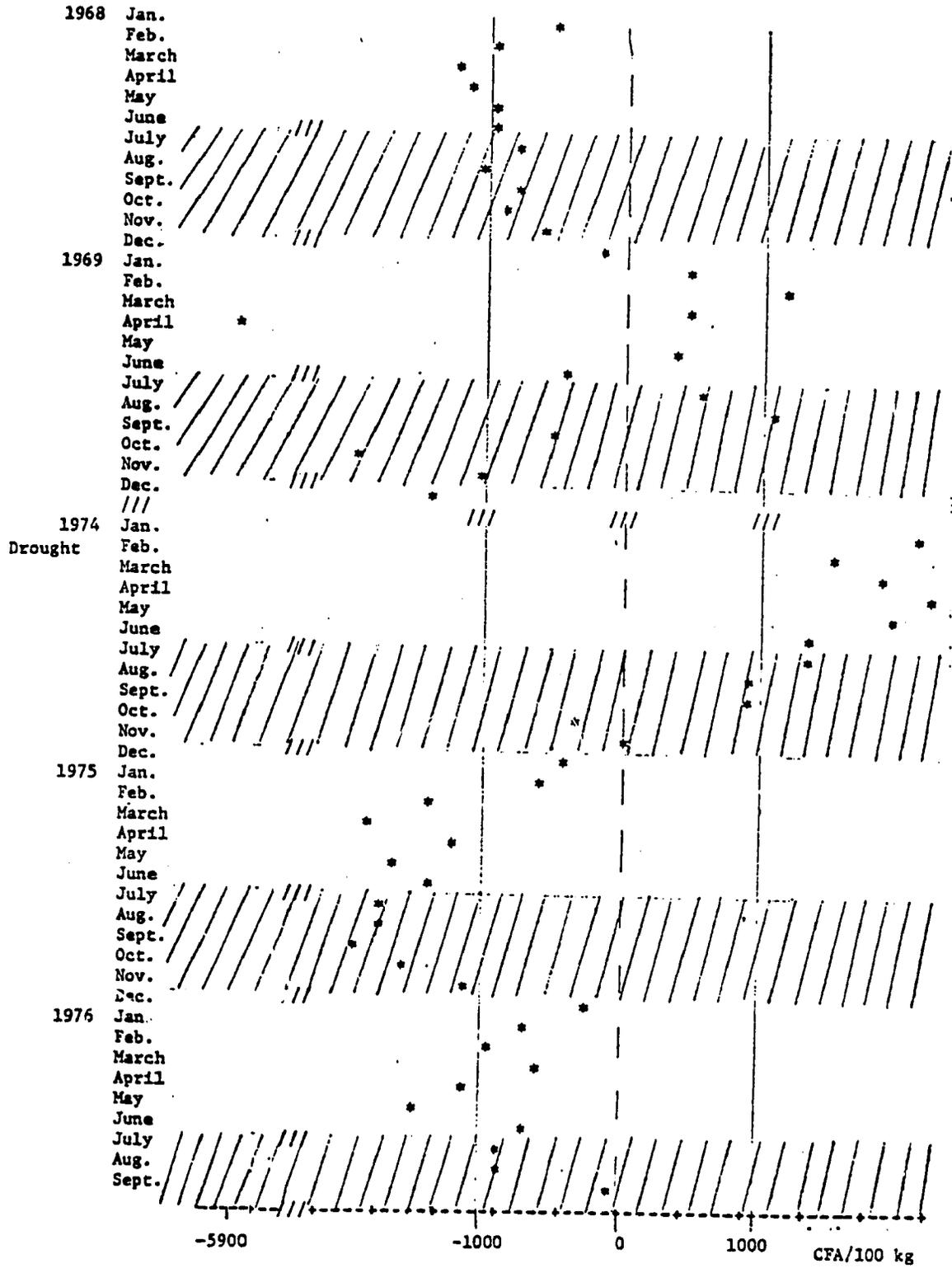


Diagram 5-D

Differences in Prices Between N'djamena and Moundou (Logone West)

Differences des Prix entre N'djamena et Moundou (Logone Occidental)



costs were estimated¹ and a band marked in the graphs. If the difference between prices in the two markets exceeds transfer costs, the corresponding point will lie outside of this band. In other words, the market has not fulfilled its role as an equalizer of prices.

Various reasons can account for such market failure: lack of information on prices prevailing in other markets, monopolistic practices of traders preventing the free flow of grain, other conditions making it impossible to transfer grain. To account for at least one of the unavoidable constraints, the periods during which the roads are impassable due to rain and flooding have been marked. The limits of these bands are not clearly defined because the rainy seasons vary considerably in time and duration and, frequently, even after the rains have stopped, truckers refuse to go some routes for fear of wrecking their vehicles.

The difference between millet prices in N'djamena and Sarh (Graph A) exceeded transfer costs 15 of 45 times (excluding the drought year 1974, when trucks were used for grain shipments from the coast). Eleven of those occurrences were during the rainy season, leaving only four instances of unexplained price differences in excess of transfer cost. Thus, in about 92% of all cases, the market seems to have worked reasonably well. Note further that three out of those four cases were during a month immediately adjacent to a rainy season. Considering the dry seasons only, the fraction of price-differences exceeding transfer costs is 15%.

¹ As an average figure, 1974 freight rates were used, augmented by 1 CFA/kg for loading, unloading and bagging. A more detailed estimation of the transfer costs would hardly be warranted, given the crudeness of the data. It is furthermore uncertain that the official rates are actually applied. Given the demand for transportation services, a transporter might be willing to haul the grain for less, or ask a higher price if demand is high. Such premiums and discounts are usually applied on the quantity (i.e. ship more than one ton at the one ton price), because, theoretically, the official price is fixed and it is illegal to deviate from it.

For Moundou - N'djamena, these ratios are somewhat higher as well as for N'djamena - Adéché and Sarh - Moundou. The latter case, particularly during the early part of 1969, seems to imply a continuous profit opportunity for transfers from Moundou to Sarh, which was not eliminated by arbitrage. In April of 1969, this was dramatically reversed. Such wild jumps very strongly suggest "noise in the data," inaccuracies, errors and unknown external effects.¹

All in all, however, the market seems to keep price differences in check quite efficiently. The main reasons for diverging prices are the high transfer costs. It is possible for millet prices to be 20 CFA/kg in one city and 30 CFA/kg in another, a difference of 50%, without there being any incentive to transfer cereals.

¹This stresses the tentative nature of these calculations.

V. PRICE POLICY

A. The Decision-Making Process

It is not easy to identify price policy in Chad. While everyone agrees that it plays an important role, opinions differ greatly when it comes to specifying this role. Price policy, particularly food-price policy is burdened with the task of fulfilling income policy goals as well as stimulating production and controlling consumption. Priorities are not clearly specified and many conflicts are inherent in the contradictory policy targets.

In addition, official structures to identify policy problems, recommend alternatives to the government and to implement the chosen alternative, are not well-defined. As is common in much of the world, it is difficult to find out exactly how and where, in the public sector, marketing and price policy decisions are made. It is not clear to what extent the different interest groups have input in the decision-making process.

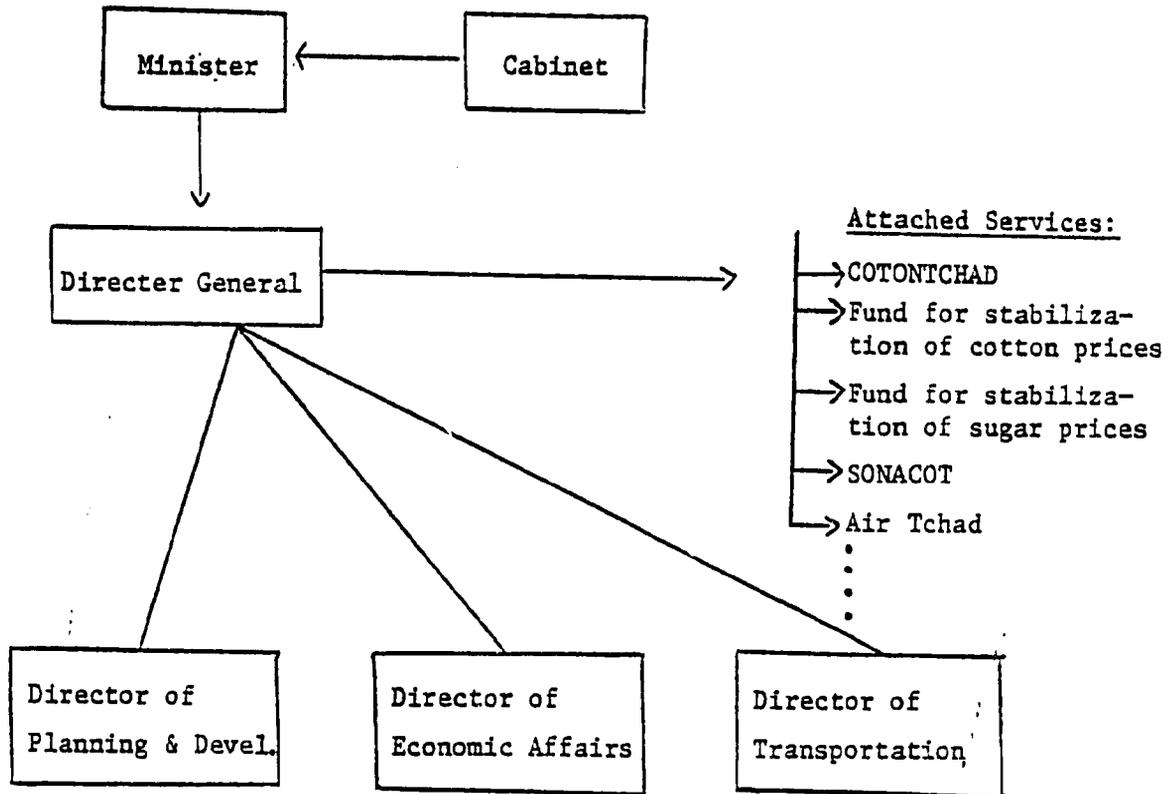
FDAR, which should implement marketing and price policy, is integrated into the Ministry of Agriculture (see diagram 2.). Most policy decisions, however, seem to be made in the Ministry of Economy, Planning and Transportation (see diagram 5.).¹ This leads to one of the most fundamental contradictions in Chad's price policy. FDAR, as part of the Ministry of Agriculture, should defend the interests of the producers. However, its DC, bound by a ceiling price decision made in the Ministry of Economy and clearly only favoring the consumer, must work in the opposite direction.

Cash crops are treated differently. "COTONTCHAD" and the "Caisse de Stabilisation du Prix du Coton" handle the marketing of cotton. They are part of the Ministry of Economy. The "Office Nationale du Développement Rural" (ONDR, in the Ministry of Agriculture) concerns itself primarily with cotton

¹The final decision on official prices is made by the Conseil Militaire Suprême, the ruling military junta.

production. It is by law funded, at least partially, out of the "Caisse de Stabilisation." This clear division simplifies the policy-making process and helps avoid conflicts. (See Appendix I.)

Diagram 6. Organigram of the Ministry of Economic Affairs,
Planning and Transportation



B. The Level of Cereal Prices

Cereals prices fulfill multiple roles in Chad. For one, they have considerable influence on the real-incomes of consumers as well as producers. It is this effect which has led to assigning income-political targets to price policy. This has often been done without regard for the frequently undesirable side effects which arise because prices influence not only incomes but also distribution, production and general grain availability.

These latter effects are often disregarded. In a peasant economy, so the argument goes, a producer grows for his own needs and any marketable surplus is purely incidental. A producer will never sell his families reserves, no matter how high the price. Only the size of the harvest and estimated family needs determine the available commercial supply.¹ While such an argument may be valid for a given level of production, it disregards completely the fact that farmers have the possibility of shifting their resources and increasing the area planted with more profitable crops. These shifts in production can be traced in Table VIII where, due to the lack of reliable price data, qualitative distinctions were used and to indicate availability and price level for grain.

¹See i.e. Becker, An Analysis of Cereals Availability in the Sahel, AID, 1974.

Table VIII. Surfaces in Cereals and Cotton Production
in the Southern Zone (1000 hectares)

<u>Year</u>	<u>Millet and Sorghum^a</u>	<u>Cotton^a</u>	<u>Type of Crop Year^c</u>	<u>Food Aid Imports in Metric Tons^d</u>
1965/66	417.4	276.0	very bad	
1966/67	492.0	299.5	mediocre	
1967/68	504.0	298.4	excellent	
1968/69	516.0	294.4	medium	
1969/70	469.0	291.2	medium	
1970/71	455.2	301.6	medium	
1971/72	448.5 ^b	301.9	mediocre	
1972/73	515.5	275.6	North-very bad South-normal	15,750
1973/74	546.1	269.0	North-very bad South-normal	37,000
1974/75	607.1	272.3	mediocre	36,000
1975/76	609.8	335.9	medium	8,700

^aSOURCE: Ministry of Agriculture, "L'agriculture et l'élevage tchadiens à travers les chiffres, 1962-1971", N'djamena, 1972.

^bSOURCE: Office National du Développement Rural.

^cClassification of years according to UNDP study, op. cit.

^dFood aid figures: Direction de la Lutte contre les Calamités Naturelles.

In the early 1960's, the area planted with grain was around 420,000 ha. By 1967, the acreage in cereals had increased to 504,000 ha after a "very bad" and a "mediocre" year. Then, the area of cereals production declined steadily, during a succession of excellent and medium years.¹ A "mediocre" year (1971-72)

¹After a succession of bad years, it takes at least two good years before prices start falling. During the first year, farmers replenish their stocks and it takes a second abundant harvest to break the price.

and a "very bad" year (1972-73) increased the acreage almost 100,000 ha, but as the dampening effects of the inflowing food aid began to be felt to the full extent, this increase was checked, and cotton production (after an increase in the official producer price) was restored to and above its previous level.

The relative prices of cotton and millet, in 1976, leave the farmer practically indifferent between producing one or the other (See table IX). The apparent income differences are within the margin of error given the rough estimates for labor time and yield. Slight changes in these assumptions could easily alter the profitability ranking of the crops. Under these circumstances, it takes only small changes to induce some farmers to shift production.

Table IX. Comparison of Production Costs and Revenues
Between Cotton and Millet in the Southern Zone

	<u>Traditional Method</u>		<u>Modern Method¹</u>	
	<u>Cotton</u>	<u>Millet/Sorghum</u>	<u>Cotton</u>	<u>Millet/Sorghum</u>
work days of work/ha	100	62	150	67
avg. yield kg/ha	350	700	900	1,000
"official" producer price (CFA/Kg)	45	12 (13.95)	45	12 (15.97)
revenues per ha (CFA)	15,750	8,400 (9,765)	40,500	12,000 (15,970)
monetary prod. costs (CFA)	negligible	negligible	6,100	600
revenue per work-day (CFA)	157.50	135.50	229.30	179.10

SOURCE: UNDP - study, op. cit., prices adjusted for 1976.

The figures in parentheses give the producer prices and revenues per ha which would be necessary for earnings-possibilities to be equal.

¹ According to ONDR estimates, only slightly more than 1/3 of total cotton acreage is farmed by modern methods. A FED project is attempting to increase this fraction to eventually cover all cotton farmers.

A millet price increase has two contradictory effects on the real incomes of farmers. For one, it raises the price of their output and thus their income. However, it also increases the price of their main consumption staple, thus reducing their real income. The net effect is an increase in farm incomes only to the extent that farmers sell millet. Therefore, a millet price increase does not have the same effect on the farmers real income as an equivalent cotton price increase, even though the above calculations seem to suggest that the effect on revenue per work day would be about the same. An increase in millet prices by 40% (from 12 CFA/kg to 17 CFA/kg) would increase real farm incomes only by about 5% (assuming 1/8 of output marketed, 7/8 consumed by the farmer and his family).

There is little data available which would allow a careful estimation of the impact of a cereals price increase on the real incomes of urban consumers. The above mentioned budget study¹ among families in the low income section of N'djamena gives only fractions of total income spent on total food consumption. They are summarized in the following table (Table X).

Table X. Fractions of Income Spent on Total Food Consumption

Workers	65%
Fishermen	95%
Domestic Employees	58%
Shopkeepers	33%
<hr/>	
Average	55%

¹Centre Nationale de Nutrition et de Technologie Alimentaire, op. cit.

The fraction for fishermen is probably so high because it includes a considerable amount of fish as subsistence consumption. The study also gives the quantitative breakdown of the market basket. Using average yearly prices on the N'djamena market, we can calculate the fraction of millet to be between 30 and 40% of total food expenditure. Fishermen and shopkeepers being closer to 30%, workers and domestic employees about 40% and the average being about 35%. The fraction of total food expenditures spent on rice is 3 to 4%. The following table (Table XI) is constructed, from these figures giving very rough approximations for fractions of total expenditures spent on millet/sorghum and rice for low income groups.

Table XI. Fractions of Total Expenditure Spent on Cereals

	<u>Millet and Sorghum</u>	<u>Rice</u>
Workers	26%	2.0%
Fishermen	28%	2.5%
Domestic Employees	23%	2.3%
Shopkeepers	10%	1.5%
Average	20%	2.0%

On the average, low income households spend about 1/5 of their incomes on rough grains and 1/50 on rice. A price increase of 50% in millet prices would, therefore, equal a 10% reduction of real income to them. This cannot be termed a large influence and the effects of a price increase on rice are truly insignificant.

For salaried employees, these fractions are even smaller. Another consumption study¹ for employees earning between 5,000 and 20,000 CFA/month gives the following ratios:

¹ Conducted in 1971/72, quoted without source in UNDP, op. cit. p. 119.

Table XII. Fractions of Total Income Spent on Cereals

	<u>Mid Nov.-Mid June</u> (<u>"Harvest period"</u>)	<u>Mid June-Mid Nov.</u> (<u>"Soudure period"</u>)	<u>Yearly Average</u> (<u>1971/72</u>)
<u>Millet</u> , including beer, galette and flour:	7.4%	10.5%	8.7%
<u>Wheat</u> , including bread pas- tries, pasta and flour:	3.5%	3.5%	3.5%
<u>Corn</u> , including flour:	.3%	.2%	.3%
Rice:	2.2%	2.7%	2.4%
Total cereals:	13.4%	16.9%	14.9%
Total food expenditures:	50.7%	47.9%	49.5%

These figures reinforce the above findings that changes in cereals prices have little influence on the real incomes of urban consumers. While a 50% price increase in millet reduced the incomes of the lower income groups by about 10%, this effect is reduced to about 4.4% for the middle income groups. Changes in rice prices have even less of an influence.

In summary, it can be said that cereals price policy in Chad is an inefficient instrument of income policy because the effect of cereals price changes on the incomes of producers and consumers are small. Nevertheless, producers, at least in the southern zones, react to such changes because cotton seems to be not much more profitable than cereals. Effects of price changes on production decisions are, therefore, quite noticeable.¹

1

There is another reason why cereals production increases by more than one would expect given the small influence of price changes on farm incomes. A bad year which gives rise to price increases depletes a farmer's stock of grain and he will plan to increase crops to replenish this stock for his own needs, independent of the market price increases.

C. Fluctuations of Cereal Prices

The demand for cereals in Chad is very inelastic and as a consequence even small variations in quantity can cause considerable fluctuations in prices. This problem is aggravated by the fact that quantity variations are often themselves quite large, due to the instability of weather conditions and other factors (i.e. small fraction of output marketed) which influence the available commercial supply.

In addition to these interannual price fluctuations, which are quite random and unpredictable, one can observe rather systematic and predictable price increases from harvest to soudure time. However, even these fluctuations do not occur regularly, as Table XIII. shows.

Table XIII. Consumer Prices for Millet in N'djamena

	Price at Harvest		Price at "Soudure"		Increase in CFA/kg		Increase in %
	Dec.	Jan.	Aug.	Sept.	Avg. - Dec. Jan.	Avg. Aug. Sept.	
66/67	--	32	51	45	16.0		50%
67/68	16	16	13	15	-2.0		-13%
68/69	15	28	49	35	20.5		95%
69/70	27	33	40	23	1.5		5%

73/74	--	53	55	49	-1.0		-2%
74/75	24	26	26	26	1		4%
75/76	26	22	35	43	15		63%

SOURCE: Ministère du Plan, Service de Statistique

One of the aims of cereals price policy in Chad, and the main reason for the creation of DC/FDAR, is to eliminate these intrannual price variations. They are regarded as a major source of windfall profits to speculators and

traders, who buy cereals after the harvest and sell them with large profits during the soudure. DC/FDAR could, by essentially conducting the same transactions, smooth out the price fluctuations and render speculation unprofitable.

Table XIII. suggests that this speculation is already unprofitable. In two of the seven years, prices declined from harvest to soudure and if we take into account handling and storage costs and losses, speculation would not have been profitable in 1969/70 and 1974/75 either. Unfortunately, there is not more data available, but for the years in which official price statistics could be found, speculation would have been profitable in less than half the cases.

The observation is consistent with the information gathered through interviews with several traders. They all agreed that cereals trading was not very profitable and speculation was too risky. They were not willing to tie up their scarce financial resources in speculative stocks. Some of them bought cereals only after they had a purchaser to whom they could deliver at an agreed price (i.e. FDAR, military, etc.). Others use cereals only to fill up empty backhauls. Only a very few (2 or 3) handle more than 500 tons per year.

DC/FDAR's intervention does not seem to have stabilized consumer prices in N'djamena considerably. However, it had to operate during the drought years when supplies of grain were far from normal. It would be unfair to take its performance over the past years as an indicator of its capabilities.

D. Relative Prices of Cereals in Comparison to Other Consumer Goods

Comparing the development of millet prices to other consumer prices, it becomes clear that millet has not fueled a large inflation (Appendix Table 8). On the contrary, millet prices have declined, certainly relative to most other goods and in absolute terms as well (see Table XIII).

Table XIV. Recent Changes in Consumer Prices
in N'djamena over 1969 levels.

<u>Product</u>	<u>Unit</u>	<u>% change in price between 1969 and</u>		
		<u>1971</u>	<u>1974</u>	<u>1976</u>
millet	1 kg	-55%	+12%	-23%
rice (1st qual.)	1 kg	- 8%	+54%	+48%
bread (loaf)	250 gr.	+20%	+20%	+20%
manioc	1 kg	+16%	+120%	+110%
salt	1 kg	+ 8%	+48%	+43%
beef (incl.bones)	1 kg	+53%	+153%	+72%
chicken	1 pc	+38%	+95%	+98%
shelled peanuts	1 kg	- 3%	+113%	+70%
peanut oil	1 litre	+14%	+107%	+141%
sugar (cubes)	1 kg	+22%	+58%	+93%
tobacco (local)	100 gr.	+35%	+52%	- 6%
petrol for lanterns	1 litre	- 2%	+54%	+52%

SOURCE: See Appendix Table 7B.

These comparisons depend very heavily on the base year chosen.¹ However, even if we chose 1971 (the year when millet prices were lowest in N'djamena—19 CFA/kg) as a basis, the price increase to 1976 is only about 70%. This translates into an annual inflation rate of approximately 11%, less than most other consumer goods.

Given the unreliability of the basic data and the sensitivity of such an analysis to arbitrary circumstances (i.e. available data for choice of base years), very few positive conclusions can be drawn. However, the following inferences are probably correct:

¹1969 has been chosen because it is the earliest year for which complete data sets are available.

1. Prices for millet have not increased exorbitantly over the past years. They have been highly volatile, however, depending on the size of the harvest.
2. Relative to other products, price increases have probably been less, so that millet has become relatively cheaper.
3. Rice prices have increased more than millet prices, but still less than most other consumer goods (manioc, meat, peanuts, oil, sugar).

Considering the fact that the period concerned includes the years of one of the worst droughts ever to occur in Chad, these results are quite remarkable. However, the tentative nature of this analysis cannot be understated. Nevertheless, the data clearly does not support the opposite claim—that grain prices have increased more than the overall price level.

VI STORAGE POLICY

The DC/FDAR has a total storage capacity of 17,600 tons at its disposal.¹ Most of these warehouses are in generally good condition, dry and with sufficient ventilation. Given the fact that the quantity bought by the DC in recent years have rarely exceeded 5000 tons (cereals and rice), it would appear that this capacity is more than sufficient under present conditions.

This storage capacity is intended for the interseasonal stabilization operations of the DC/FDAR. In addition, a proposal exists for establishment of an emergency stock of 10,000 to 15,000 tons. This emergency stock would be turned over every 2 to 3 years, but its level would never sink below a certain minimum.² The stabilization stock, in turn, will theoretically be depleted to zero at the end of each year's soudure.

The FAO proposes that the emergency stock not be physically separated from the stabilization stock and that it should be maintained by the DC. However, the authority to release quantities from this stock should rest with the government and not with FDAR. This would certainly bring up problems of control and would require extensive supervision.

Much more important are the policy issues concerning the necessary level of the various stocks needed. Traditionally, it was assumed that a market share of about 20%³ should be sufficient to stabilize prices over the course

¹Total storage capacity in Chad is according to another source 18,200 tons plus 1,200 tons under construction. For details see Appendix Table 8.

²In order to raise funds for such an emergency stock, the FAO is presently administering a program financed by Holland in which the DC/FDAR buys paddy in the production regions of Bongor and Lai directly from the farmers and sells it in the northern deficit regions. The revenue from this operation should provide the operating fund for the emergency stock.

³Checchi and Company, "Food Grain Production and Marketing in West Africa", Washington, March 1970.

of one year. This would translate into a needed storage capacity for the DC/FDAR of 18,000 to 20,000 tons, approximately the presently available amount.¹ But experiences in other Sahelian countries have made it clear that, under prevailing conditions, 20% may not be enough. Effective price stabilization may not be possible at all or maybe not even desirable, given the costs of such an operation. Chad, like all other Sahelian countries relies for a large portion of its storage needs on the peasants, who keep grains in their granaries. If prices were effectively stabilized, it may well be that the farmer would no longer store such large quantities. If he could buy anytime from the government at a stable price, it might be more profitable for him to sell all his output and then buy from the government, instead of incurring the costs and risk of storing grain himself.

The efficiency of these farm level granaries has often been disputed. In fact, there are practically no studies available which address this issue. The figures quoted most often, 20% and more losses during the first year of storage, seem incredibly high. Swedish technicians found, under comparable conditions in Ethiopia, figures of less than 5%. This dispute can only be resolved by a careful village level study, investigating storage techniques and measuring their effectiveness.

Presently an emergency stock is being considered which would give Chad a first line of defense against possible future production shortfalls. Millet would be stored in warehouses; 8,000 tons in N'djamena and 2,000 tons in Abéché. The grain would have to be renewed every 2 years due to the poor storage characteristics of millet.

¹In the governments response to the questionnaire sent out by the study team, it was pointed out that the geographical distribution of the available storage capacity is not ideal. Too much capacity is concentrated in the capital city and some of the areas which are particularly difficult to reach during the rainy season need more warehouses. See Appendix Table for an inventory of the available and planned storage facilities.

An FAO memo in 1976 estimated the costs of such a stock as follows:

	<u>CFA/kg</u>
Buying price	18
Cost of bag	3
Commission, handling	2.5
Transportation costs	<u>10</u>
Cost of placing grain in storage	33.5 CFA/kg
 <u>2 years storage</u>	
Handling, production	.5
Insecticide Treatment	2.5
Losses (2% per year)	1.5
Administrative Costs	<u>1</u>
Cost exit warehouse after 2 years	<u>39 CFA/kg</u>

Additional Costs (not accounted for):

Interest on equipment, funds and warehouses

Depreciation

Under the assumption that this grain could be sold in normal years for 29 CFA/kg, the total net storage costs for two years are estimated at 10 CFA/kg. This calculation, however, embodies a number of very strong and not necessarily realistic assumptions:

- 1) A buying price of 18 CFA/kg is only realistic in years of sufficient production. Presently, (early 1977) DC/FDAR is unable to buy millet at this price.
- 2) A sales price of 29 CFA/kg (including bag), in turn, presumes no excess supply. It contradicts therefore point 1) above. There is also a considerable price differential between "new" and "2 year old" grain, which makes 29 CFA/kg for old grain seem overly optimistic.
- 3) The grain would have to be sold during the soudure which coincides largely with the rainy season. It could not be shipped away from N'djamena, so the full impact of an additional supply of 4000 tons would be felt on the N'djamena market. This is about 15% of total annual consumption in that city, or 50% of

consumption during the soudure period. Such a massive dumping of grain on the N'djamena market cannot fail to depress the prices.

- 4) Losses of 2% per year seem very low, particularly when one considers the fact that the same paper points out the poor storage characteristics of millet.
- 5) Excluding interest and amortization costs unduly biases the calculations downward. At 7% interest on the invested funds (cost of placing grain in storage), this would amount to 2.35 CFA/kg/yr or 4.7 CFA for two years. The FAO paper estimates amortization costs to be 1.25 CFA/kg/year or 2.5 for two years.

These minimal adjustments would bring the costs of storing grain for 2 years to 16 or 17 CFA/kg. It is estimated that serious production shortages occur with a frequency of once every 5 to 7 years. We can therefore compare the costs of storing grain for an average of 5 years to the cost of importing grain in case of such a shortage.

Storage costs alone would amount to 30,000 CFA/ton if we exclude interest charges and amortization, 48,000 CFA/ton if we include these costs. To this, we must add the initial cost of purchasing the cereals, 18,000 CFA/ton. The World Bank¹ projects prices for rough grains to be about \$84/ton (21,000 CFA) gulf port during the 1980's. Transatlantic freight amounts to about 10,000 CFA/ton and the UNDP² study estimates overland freight costs from Douala to N'djamena to be 30,000 CFA/ton. This makes the import alternative more expensive only if amortization and interest charges are excluded. A fuller evaluation of costs, including interest charges and making more reasonable assumptions regarding losses and waste, suggests that the storage alternative is more expensive.

¹IBRD, 1976

²UNDP, op. cit.

This, of course, is widely understood; emergency grain stocks are instruments of national security, not economic policy. The analysis is only intended to underscore the need to balance economic growth needs with those of national security.

It is worth mentioning also, in conclusion, that there is an economic argument in favor of an emergency stock. If relief efforts must be organized hastily, their costs are almost certainly higher. In this sense, an adequate "first aid" stock can help win time and arrange necessary actions. However, the better anticipated an emergency, the more carefully planned the foreseeable transport needs and the better the coordination between donor and recipient countries, the smaller will be the size of a needed emergency stock.

Appendix 1

Statistical Tables

1. Agricultural Production in Chad-Major Crops
2. Millet and Sorghum by Prefecture: Area, Production, Yield
3. A. Structure of Farms in Chad
B. Number and Percentage of Farms
4. Percentage of Farms Producing Various Agricultural Products
5. Regional Population
6. Consumption of Cereals in Southern Chad
7. A. Retail Prices of Millet on Various Markets
B. Consumer Prices in N'djamena
8. Storage Capacity
9. Imports and Food Aid

Table 1.
Agricultural Production in Chad - Major Crops (000s tons, 000s hectares)
Production Agricole au Tchad - Produits Principaux (milliers de tonnes, milliers d'hectares)

		Total Chad									Southern Zone ^a , Zone Sud Seulement ^a			
		1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76
Millet & Sorghum	A	1257	1080	704	995	1012	1021	921	890	965	318	292	613	646
Mil et Sorgho	P	895	708	614	630	646	661	651	610	672	415	380	N.A.	363
Rice	A	(2.3)	(2.2)	-	6	6	6	11	13	28	50	N.A.	43	40
Paddy	P	(3.5) ^b	(3.4) ^b	-	37	32	32	37	40	79	N.A.	N.A.	37	39
Groundnuts-unshelled	A	162	-	-	126	127	145	162	131	135	54	53	158	168
Arachides-coques	P	113	49	-	87	83	104	110	96	52	75	70	N.A.	82
Wheat	A	2	2	2	3	4	5	5	4	5	5	3	2	1
Blé	P	4	4	1	5	5	6	7	6	7	8	6	3	2
Maize	A										6	6	6	9
Maïs	P													
Roots & Tubers	A										7	14	13	23
Tubereuses	P													
Cotton-unginned	A	105	99	297	299	298	295	291	302	301	276	269	272	337
Coton-graine	P	372	345	87	123	102	149	117	95	109	104	115	144	174

A - Area, Superficie. P - Production.

^aAfter 1971/72, data are available only for government-controlled areas. The figures are, therefore, not comparable to preceding years. Après 1971/72, les données ne sont disponibles que pour les zones sous contrôle gouvernemental. Les chiffres ne sont donc pas comparables avec ceux des années précédentes.

^bThe figures are surprisingly low. Il est suprenant que ces chiffres soient si bas.

SOURCES: 1963/64-1971/72 (except cotton, sauf coton) - République du Tchad, Direction de la Statistique, Annuaire Statistique du Tchad 1974.
 1972/73-1975/76 (Area data except wheat, rice and cotton, données de superficie sauf blé, riz et coton) - Organisation Nationale du Développement Rural. Production data for same products, Données de production pour les mêmes produits - Banque Centrale.
 1972/73-1975/76 (Wheat production and area, Production et superficies du blé) - République du Tchad, Direction de l'Agriculture, L'Agriculture et l'Elevage au Tchad, 1976.
 Cotton production - production de coton: Caisse Centrale de Coopération Economique.

Millet and Sorgho by Prefecture: Area, Production and Yield (000s hectares, 000s metric tons, tons/ha)
 Mil et Sorgho par Prefecture: Superficies, Production et Rendement (milliers d'hectares, milliers de tonnes metrique, tonnes/ha)

		1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74 ^a	1974/75	1975/76	1976/77
MAYO KEBBI	A	124	140	142	145	91	83.9	127	135				
	P	110	112	113.5	130	90	85	108			130.7	115.2	108.1
	Y										68.4	45.3	63.9
LOGONE OCCIDENTAL	A	35.6	42	43	44	59	77.1	66	93.8				
	P	28	29	30	40	50	60	52.8			102.3	111.3	87.4
	Y										41.5	49.5	38.1
LOGONE ORIENTAL	A	42	50	52	53	66	60.2	70	91.9				
	P	30	30	30	40	55	55	56			126.8	124.7	126.8
	Y										92.3	76.9	130.4
TANGHILE	A	40.2	49	50	51	44	46.9	50	49.8				
	P	33	35	37	45	40	40	40			82.6	93.5	71.8
	Y										38.5	42.1	36.8
MOYEN CHARI	A	78.6	107	110	113	83	79.1	102	127.8				
	P	50	52	55	55	70	68	71.4			153.7	163	154.4
	Y										77.6	83.3	87.1
CHARI BAGUIRMI	A	97	104	107	110	126	95	108	25.2 ^b				
	P	60	63	64	60	85	65	70			43.1 ^b	42.8 ^b	
	Y										24.9	24.5	
GUERA	A	64.1	59	60	60	58	41.5	53					
	P	34	35	35.5	35	50	32	70					
	Y												
SALAMAT	A	28.2	35	35	35	35	30	32					
	P	20	22	23	22	30	25	19					
	Y												
QUADRAI-BILTINO	A	279.7	249	250	250	210	180	182					
	P	171	171	173.5	165	105	90	100					
	Y												
BATHA	A	100	97	100	100	100	104.9	103					
	P	50	50	56	45	50	50	56					
	Y												
KANEM	A	36.9	40	40	40	32	48	46					
	P	16	16	16	15	15	25	18					
	Y												
LAC	A	13	15	15	15	15	30	26					
	P	6	7	6	4	10	15	10.4					
	Y												
B.E.T.	A	7.3	7.5	7.5	5.0	2.0	-	-					
	P	6	6	7.5	5.0	1.0	-	-					
	Y												
TOTAL	A	946.6	994.3	1011.5	1021	921	889.6	965					
	P	614	630	647	661	651	610	671.6					
	Y												

A - Area, Superficies. P - Production. Y - Yield, Rendement.

^aFor 1973/74, there are no usable data series available. Pour 1973/74, il n'y a pas de series de donnees disponibles qui soient utilisables.

^bAfter 1972, data are available only for government controlled areas. During this period, data for Chari-Baguirmi represent only the northeast part of the prefecture. Après 1972, les donnees ne sont disponibles que pour les zones sous controle gouvernemental. Pendant cette periode, les donnees concernant Chari-Baguirmi ne representent que la partie sud-est de la prefecture.

- SOURCES: 1. 1965/66-1971/72 - République du Tchad, Direction de la Statistique, Annuaire Statistique du Tchad 1974.
 2. 1972/73 - Nations Unies, Production et Commercialisation des Cereales, Juillet 1974.
 3. 1974/75-1975/76 - République du Tchad, Office National du Développement Rural (ONDR), 1976.
 4. 1976/77 - Caisse Centrale du Tchad.

TABLE 3A.

Structure of Farms in Chad
Structure des Exploitations au Tchad

Size of Farms (Ares*) Taille des Exploitations	Rural N'Djamena		Logone-Occidental		Total Chad**	
	Number	Percent	Number	Percent	Number	Percent
less than 25 moins de 25	1,962	12.3	218	0.5	10,527	2.9
25 - 50	2,457	15.5	217	0.5	16,950	4.6
50 - 75	2,056	12.9	1,122	2.8	22,759	6.2
75 - 100	2,021	12.7	640	1.6	22,141	6.0
100 - 150	2,147	13.5	3,038	7.6	44,061	12.0
150 - 200	1,116	7.0	4,457	11.2	44,389	12.1
200 - 250	1,788	11.2	5,874	14.7	45,087	12.3
250 - 300	889	5.6	5,673	14.2	39,355	10.7
300 - 400	1,031	6.5	8,448	21.2	50,734	13.8
400 - 500	364	2.3	3,923	9.8	31,082	8.5
500 - 1000	71	0.5	6,113	15.3	36,476	10.0
1000 and more et plus	-	-	219	0.5	2,914	0.8
TOTAL:	15,902	100	39,942	100	366,475	100

* 100 Ares = 1 Hectare

**"Total Chad" excluding areas not controlled by the central government.
"Total Tchad" sauf zones non-contrôlées par le gouvernement central.

Source: République du Tchad, Ministère d'Agriculture, Service de Statistique Agricole, unpublished census, recensement non-publié, 1976.

TABLE 3B.

Number and Percentage of Farms* (by average area per worker)
Nombre et Pourcentage d'Exploitations* (superficie moyenne par travailleur)

<u>Area per worker (ares)</u> <u>Superficie par travailleur (ares)</u>	<u>Number</u> <u>Nombre</u>	<u>Percentage</u> <u>Pourcentage</u>
moins de 25 less than 25	34,815	9.5
25-50	55,338	15.1
50-75	68,164	18.6
75-100	59,369	16.2
100-125	51,307	14.0
125-150	38,480	10.5
150-175	21,622	5.9
175-200	12,460	3.4
200-250	14,659	4.0
250 and more et plus	9,895	2.7
TOTAL:	366,475	100
Median Ares/Worker Médiane Ares/Travailleur	85	

*government controlled areas only.
 uniquement zones sous contrôle gouvernemental.

SOURCE: See Table 3-A. Voir le Tableau 3-A.

Table 4.
Percentage of Farms Producing Various Agricultural Products
Pourcentage des Exploitations Produisant des Produits Agricoles Divers

Produced for: Produit pour:	1			2			3			(1 + 2 + 3)		
	Sale Only			Subsistence Consumption			Sale and Consumption			Total Produce		
	Vente en Totalité			Uniquement Autoconsom.			Vente et Autoconsom.			Total Produit		
	N.R.	L.O.	T.C.*	N.R.	L.O.	T.C.*	N.R.	L.O.	T.C.*	N.R.	L.O.	T.C.*
Mais-Maize	0	0	0	28.4	5.7	27.3	2.9	6.2	10.1	31.3	11.9	37.4
Millet & Sorghum Mil et Sorgho	0	0	0	57.6	10.6	32.7	26.0	84.8	62.0	83.6	95.4	94.7
Riz-Rice	0	0	0.3	0	1.3	2.8	0	4.3	8.4	0	5.6	11.6
Groundnuts- Arachides	5.7	0	0.7	3.7	14.9	21.1	5.1	62.7	38.4	14.5	77.6	60.2
Cotton-Coton	1.9	84.8	66.5	0	0	0	0.7	0.3	0.1	1.9	85.0	66.6
Livestock- Bétail	0	0	1.2	11.2	13.2	18.9	15.4	51.3	36.8	26.6	64.5	56.8

N.R. = N'djamena Rural, L.O. = Logone Occidental, T.C. = Total Chad

*"Total Chad" excluding areas not controlled by the central government, "Total Tchad" sauf zones non-contrôlées par le gouvernement central.

SOURCE: See Table 3-A. Voir le Tableau 3-A.

Table 5.
Regional Population (in 1000 Persons)
Population Régionale (en milliers de personnes)

	1975 ^a Adjusted Estimates Estimations Ajustées	Rate of Growth ^b Taux de Croissance	1976 Total	1976 ^c Rural	% Rural/Tota
Total Chad	4,030	2.15	4,118	3,406	82.7
<u>Southern Zone-Zone du Sud</u>					
Mayo-Kebbi	592	2.5	607	559	92.0
Logone Occidental	268	3.0	276	212	76.9
Logone Oriental	296	1.9	302	263	87.1
Tandjilâ	287	2.0	293	254	86.7
Moyen Chari	<u>454</u>	<u>2.35</u>	<u>465</u>	<u>383</u>	<u>82.3</u>
TOTAL	1,897	2.4	1,943	1,571	80.9
<u>Northern Zone-Zone du Nord</u>					
Chari Baguirmi	552	3.55	572	327	57.2
Gouza	189	1.9	193	177	91.9
Salamat	99	1.7	101	97	95.7
Quaddai	367	0.9	370	338	91.4
Batha	350	1.3	355	339	95.6
Biltine	154	2.0	157	153	97.5
Lac	136	1.15	138	135	97.5
Kanem	202	1.2	204	191	93.8
B.E.T.	<u>84</u>	<u>1.3</u>	<u>85</u>	<u>78</u>	<u>91.8</u>
TOTAL	2,133	1.95	2,175	1,835	84.4

^a SOURCE: République du Tchad, Direction de l'Agriculture, L'Agriculture et l'Élevage au Tchad, 1976.

^b Benjamin Gil, Projections démographiques pour le Tchad de 1963 à 1985. Adjusted estimates, estimations ajustées, 1972/1973.

^c Rural population as a fraction of total population probably overestimated. Calculations based on 1968 distribution between rural and urban population. Population rurale en % probablement surestimé, de la population totale. Calculs basés sur la répartition de la population rurale et urbaine de 1968.

Table 6.

Consumption of Cereals in Southern Chad, 1965 (Kg/Year)
Consommation des Céréales au Sud du Tchad, 1965 (Kg/Année)

	Moyen Chari	Logonne Oriental	Logonne Occidental	Tandjilé	Mayo Kebbi	Moyenne Rural	Sarh	Moundou	N'djamena ^c
Millet & Sorghum Mil & Sorgho	100.0	160.2	128.1	121.9	138.3	128.5	66.8	104.0	137
Rice-Riz	0.4	0.4	2.2	18.3	14.6	8.0	5.1	29.2	4
Wild Grains-Fonio	-	-	22.3	10.2	7.3	6.9	-	-	-
Maize-Mais	1.8	4.0	1.5	4.7	6.2	4.4	0.7	0.7	2
Prepared dishes ^a Plats préparés	14.2	14.9	31.8	23.4	28.1	22.3	18.3	22.6	14
Millet Beer-Bière de Mil ^b (Millet Equivalent)	42.7 (14.2)	77.7 (25.9)	93.1 (31.0)	54.4 (18.1)	35.4 (11.8)	51.8 (17.3)	67.2 (22.4)	71.2 (23.7)	10 (3.3)
TOTAL Cereals	130.6	205.4	216.9	196.6	206.3	187.4	113.3	216.2	160.3

^a"Beignets," etc.

^bEquivalent in millet given in parentheses, same figure used in total. 1 kg millet 3 kg beer. Equivalent en mil entre parenthèses, même chiffre utilisé dans le total. 1 kg mil à 3 kg bière.

^cLow income families from the Chagua section of the city only. Familles pauvres du quartier Chuaga seulement. Source: Centre Nationale de Nutrition et de Technologie Alimentaire, 1966.

SOURCE: SEDES, Enquête Socioéconomique au Tchad 1965, Paris, 1966.

TABLE 7A

CHAD—RETAIL PRICES OF MILLET ON VARIOUS MARKETS
TCHAD - PRIX DE DETAIL DE MIL, DIVERS MARCHES

Marché Market	Année Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
N'Djamena	67	3200	3300	4100	4600	4200	4200	4900	5100	4500	2100	2000	1600
	68	1600	1400	1200	1200	1300	1500	1700	1300	1500	1500	1500	1500
	69		4000	3600	3600	4000	3200	4300	4900		2100	3000	2700
	70	3300	3100	3100	4500	7100	3700	3100	4000	2300	2200	2000	2000
	74	5250	4833	5833	6766	6900	6583	6600	5500	4883	3000	2750	2500
	75	2600	2583	3050	3600	3567	3483	2600	2600	2500	2600	2316	2550
	76	2216	2233	2600	2733	2750	3250	3416	3533	4250	5000	4750	
Sarh	68	2100	2800	2200	2100	2100	2400	2800	2800	2900	2900	2700	2700
	69	3100		4400	4500	4800	4800	4900	5000	5100	5000	5200	4500
	73	1520	2760	3180	3425	3566		4360	5266		3283	3900	2530
	74	2266	3066	3850	4500	4850	5250	5000	5125	5000		2825	2375
	75		2991	3728	3500	4416	4500	3600	5140	5020	4800	3450	2625
	76	2870	3200	3210	3350	3600	3700	3750	3900	3350			
Moundou	68	2100	2400	2500	2400	2300	2500	2500	2400	2300	2400	2100	
	69	2300	2800	3100	9500	3600	3600	3700	3800	4000	4100		
Abéché	69	1300	2300	2500	2300	2200	3600	3600	3000	3300	2300	2500	1800
	70	1900	1800	2100	2300	2200	2100	2600	2100	1800	1800	1400	1500

Pour les notes, voir fin du tableau.
See end of table for notes

Suite Page Suivante
See following page

TABLE 7A (CONTINUED, SUITE)

CHAD-RETAIL PRICES OF MILLET ON VARIOUS MARKETS
TCHAD - PRIX DE DETAIL DE MIL, DIVERS MARCHES

Marché Market	Année Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mayo-Kebbi Ouest	73	2750	2875	2920	3200	3000	3500		6500	5000	3500	3000	
	74	2875		3000	3500	3750	4333	4050	4375	3750	3166	2833	2875
	75	3225	3500	5250	3500	4610	4450	4500	5000	5000	4165	3500	3666
	76	4500	5200	4566	4583	5200	5416	5500	5583	5625			
Mayo-Kebbi Est	73	2680	2900	4500	4166	5200	5500	6666	7750	5500	4000	4850	2500
	74	3166	3000	3666	4666	4833	5333	5250	5333	4000	3750		3433
	75	3750	3750	6075	6500	5125	5938	6000	7500		2750	2433	2666
	76	3620	3562	4150	4210	4062	4450	4900	5062	4750			
Tandjile	73	2675	3043			4306	5000	6425	5750	7150	5666	2612	
	74	3380	3583	4350	5187	4937	5375	4900	4112	4125	3000	3312	2900
	75	3350	3775	3550	4400	5012	4750	5250	3876	3500	3000	2683	3300
	76	3416	3675	3750	3750	4350	4487	4880	5100	4575			
Logone Occidental	73	3000	2185	3207	3614	3778	4200	5321	5142	3600	3740	3000	2900
	74	3007	3257		4471	4883	5183	5183	4535			2720	2914
	75	3250	4028	4980	4900	5233	4930	4371	4425	4560	4203	3514	2825
	76	2918	3200	3200	3892	4314	3954	4350	4392	4285			

Suite Page Suivante
See following page

TABLE 7A (CONTINUED, SUITE)

CHAD - RETAIL PRICES OF MILLET ON VARIOUS MARKETS
TCHAD - PRIX DE DETAIL DE MIL, DIVERS MARCHES

Marché Market	Année Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Logone Oriental	73	1871	2075	2438	2805	3000	3833	4755	5022	5022	4900	3916	3177
	74	2633	3488			3907	4953	4750	4857	3250		3250	3485
	75	2860	3625	3807	4061	3720	3833	3623	4385	4000	4500	3160	2631
	76	2603	3144	3331	3467	3208	6549	3520	4065	4077			
Mandoul	73	2200	2750	3000	3500	3750	4000						
	74							4500	4333	4000	4266	3100	1975
	75	1700	2946		3750	3928	4125	5000	6357	5392	4583	2840	2107
	76	2468	2571	2975	3014	3571	3857	3687	4287	4187			
Guelengdeng	73	3300	3362	3950	4300	4580	5125	6440	6483	6420	4000	3283	2780
	74	2943	3891	4575	4500	4555	4945	4025	3558	3625	2429	1906	1897
	75	1917	2050	2633	2533	2958	2541	2425	2541	2720	2350	2391	2100
	76	2566	2541	2666	2970	2416	3125	3454	3312	3541			

¹ Source of data for 1967-1970; Source des statistiques 1967-1970: République du Tchad, Ministère du Plan, service de statistique, unpublished, non-publié.

² Source of data for 1973-1976, Source des statistiques 1973-1976: République du Tchad, O.N.D.R. Service vulgarisation, mercuriales zone cotonniere 1973-1976.

TABLE 7B

Consumer Prices in N'djamena (in CFA)
Prix au Consommateur à N'djamena (en CFA)

	Unit Unité	1969	1970	1971	1972	1973	1974	1975	1 9 7 6					1 9 7 6					1975 Average-Moyenne (11 months only - 11 mois seulement)		
									J	F	M	A	M	J	Jul	A	S	O		N	
Millet-Mil	1 kg	42	34	19	39	52	47	27	22	20	28	27	29	24	34	35	37	59	42	32.5	
Rice (1st quality) Riz (1ere qualité)	1 kg	84	98	77	94	128	129	111	105	61	120	120	122	84	170	106	135	165	176	124	
Bread (loaf) Pain (long)	250 g	25	25	30	--	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Manioc	1 kg	25	25	29	46	41	55	45	40	40	40	44	58	60	60	51	55	42	88	52.5	
Salt-Sel	1 kg	48	49	52	67	59	71	96	80	62	78	72	68	66	74	65	65	57	65	68.4	
Beef (incl. bones) Boeuf (avec os)	1 kg	87	89	133	144	188	220	194	150	150	150	150	150	150	150	150	150	150	150	150	150 (?)
Chicken-Poulet	1 pc	170	237	235	261	306	331	350	300	300	341	300	312	350	316	325	375	383	408	337.3	
Peanuts (shelled) Arachides (decortiquées)	1 kg	63	63	61	137	87	134	115	66	100	69	68	197	159	163	89	85	98	85	107.2	
Peanut Oil Huile d'arachide	1 liter	132	138	150	172	150	273	285	297	325	308	307	300	310	320	350	400	325	263	318.6	
Sugar (cubes) Sucre (morceaux)	1 kg	128	139	169	155	164	202	296	262	250	250	238	225	250	265	250	245	236	240	246.4	
Tobacco - Tabac	100 gr	52	58	70	--	--	79	59	35	71	41	39	38	32	50	50	56	71	56	49	
Petrol for lanterns Essence pour lanternes	1 liter	46	45	45	--	--	71	73	70	70	70	70	70	70	70	70	70	70	70	70	70 (?)

(?) Accuracy of data doubtful, précision des données incertaine.
Source: Ministère du Plan, Service de Statistique des Prix.

Table 8

Storage Capacity (Tons)
Capacité de Stockage (Tonnes)

Location	F.D.A.R. ^a		Rapport Multidonateurs ^b	
	Number & Capacity Nombre & Capacité	Financing Financement	Number & Capacity Nombre & Capacité	Financing Financement
N'djamena	3 x 1000	USAID	3 x 1000	USAID
(Chagoua)	1000	DC/FDAR	1000	DC/FDAR
	2 x 600	USAID	4 x 600	USAID
	600	DC/FDAR	600	DC/FDAR
	2 x 1000	Banque Mondiale	2 x 1000	Banque Mondiale
Abéché	1000	Banque Mondiale	1000	Banque Mondiale
Am-Timan	1000	FED	1000	FED
Ati	600	Banque Mondiale	600	Banque Mondiale
Biltine	600	Banque Mondiale	600	Banque Mondiale
Bitkine	600	FED	600	FED
Eol	600	FED	600	FED
Dourbali	600	FED	600	FED
Mao	600	Banque Mondiale	600	Banque Mondiale
Mongo	600	Banque Mondiale	600	Banque Mondiale
Moundou	600	DC/FDAR	600	DC/FDAR
Moussoro	600	FED	600	FED
Noukou	600	FED	600	FED
Oum-Hadjer	600	FED	600	FED
Sarh	600	DC/FDAR	600	DC/FDAR
(Financing Approved)				
(Financement Approuvé)				
Koro Toro	600	FED	600	FED
Kouba	--	--	600	FED
Total	17,600		19,400	

SOURCES: ^a Club des Amis du Sahel, "Commercialisation-politique des prix-stockage des céréales," N'djamena, Juillet 1976.

^b Rapport Multidonateurs, "Rapport sur la situation du pays vis-à-vis de la secheresse," N'djamena, 28 janvier 1976.

Table 9

Chad: Imports and Food Aid, 1976/77
Tchad: Importations et Aide Alimentaire, 1976/77

Product- Produit	1975/76 or 1976 ACTUAL IMPORTS IMPORTATIONS EFFECTIVES		1976/77 or 1977 IMPORT REQUIREMENTS IMPORTATIONS NECESSAIRES						
	Total	%FA*	Total	of which covered by: partie couverte par		Total covered, couvert	Estimated to be not yet covered Partie estimée non encore couverte		Estimated ocean freight cost coût estimé d frêt maritime
				Commercial Purchases Achats Commerciaux	FA Committed Allouée		quantity quantité	value valeur	
(.....Thousand tons.....) (.....Million US \$....)									
en milliers de tonnes									
Wheat-Blé	0.6	0.5	5.0	0.1	0.5	0.6	4.4	0.5	0.1
Coarse Grain- Céréales	1.5	0.6	25.0	0.0	8.7	8.7	16.3	1.7	0.3
TOTAL	2.1	1.1	30.0	0.1	9.2	9.3	20.7	2.2	0.3

SOURCE OF SUPPLY-SOURCE D'APPROVISIONNEMENTCommercialFATotalWheat-Blé

EEC	0.1	0.0	0.1
USA (Title II PL 480 Alloc. F.Y. 1977)	0.0	0.5	0.5
TOTAL	0.1	0.5	0.6

Coarse Grain-Céréales

USA (Title II PL 480 Alloc. F.Y. 1977)	0.0	3.3	3.3
WFP	0.0	5.4	5.4
TOTAL	0.0	8.7	8.7

REFERENCE PERIOD: July/June

PERIODE DE REFERENCE: Juillet/Juin

Marketing of Cash Crops

A. Cotton and Peanuts

Cotton is by far the most important cash crop in Chad and the only crop which receives attention from the government. COTONTCHAD, the semi-public enterprise which buys, processes and exports cotton, accounts for about 40% of total industrial activity and 10% of total government revenue.

Farm employment in cotton production is about 600,000 workers. Annual production, acreage and yield estimates are summarized in Appendix Table 1. Plans are to expand production to about 300,000 tons by the mid 1980's.¹

Cotton seeds are provided by COTONTCHAD free of charge. All other inputs (insecticides, fertilizer), as well as extension services, are provided by the Office National du Développement Rural (ONDR). Despite its broad title, it concerns itself almost exclusively with cotton.

In the late sixties, a large productivity improvement program was initiated by ONDR with the help of the Fonds Européen de Développement (FED). After a slow start, the improved production techniques are applied presently on over 1/3 of the entire cotton acreage.

The program essentially relies on a subsidization of modern inputs (fertilizer, insecticides). The input package presently costs about 20,000 CFA/ha.² The farmer pays about 6,500 CFA/ha, the remaining amount being borne by the FED and the Caisse de Stabilization du Prix du Coton (CSPC) in varying proportions depending on the type of input. In 1976, FED paid 850 million CFA of the total cost of 3,154 million.

¹This might pose considerable problems along the export routes. According to COTONTCHAD officials, the capacity of these routes is about 70,000 tons of ginned cotton, equivalent to about 220,000 tons of grain cotton.

²Initially (1969/70), the cost had been 12,000 CFA/ha. During 1975/76, it rose to 27,000 CFA/ha, primarily due to the dramatic increase in fuel and fertilizer prices.

COTONTCHAD buys throughout the entire cotton producing zone, using itinerant buying teams. Depending on production, these teams visit each market 2 to 3 times at predetermined dates. The prices that COTONTCHAD pays are determined by the government and are presently fixed at 43 CFA/kg for first quality seed cotton.

Cotton is ginned and pressed into balls in the 22 factories distributed throughout the cotton producing region. Transport costs on the export routes are very high (at least 30 CFA/kg) and the time required to reach a sea port is considerable (up to 280 days). COTONTCHAD uses its own trucks for most of its transportation needs.

Most of the profits of COTONTCHAD go to the CSPC. If world market prices should drop, the CSPC covers COTONTCHAD's losses. The accumulated funds of CSPC are transferred to ONDR to finance extension work and subsidize inputs.

Over 60% of the weight of raw grain cotton is seed. The cotton seed obtained from ginning cotton is used for seed, animal feed, oil production or as fuel. Because the individual factories are widely dispersed and each processes only a relatively small quantity, it is very difficult to find ways of processing cotton seed on an economical scale. COTONTCHAD is now operating an oil press and tries to supplement the cotton seed by buying peanuts. However, so far, the quantities of peanuts bought by COTONTCHAD are very small (1974: 240 tons; 1975: 125 tons).

These officially marketed quantities are also small in relation to total production. Marketed output is estimated to be about 15% of total production,¹ thus hardly exceeding 15,000 tons. Most of the marketings go through private traders who press the groundnuts in small informal oil mills or resell them unprocessed to consumers.

¹PNUD (UNDP), Economie des Oléagineux au Tchad, Groupe de Conseillers en Développement d'Afrique Centrale, April, 1976.

Efforts to increase peanut production are under way. URSAR, a group of producer cooperatives in the region of Bokoro, completed a seed multiplication project and is expected to begin producing considerable quantities. Whether COTONTCHAD will be able to purchase these groundnuts at official prices or whether the producers will choose to sell to private traders is unclear.

B. Sesame, Karkade,¹ Gum Arabic

Sesame, karkade and gum arabic are marketed and exported by the Société Nationale de Commercialisation au Tchad (SONACOT). SONACOT has an effective, but not official, monopoly on karkade and sesame in the Sahelian zone. Sesame, which is produced in the southern zone, is primarily purchased by private traders who export it to Cameroon.

SONACOT has an official monopoly in gum arabic. The buying price is set by the government at about 70 CFA/kg. On the world market, SONACOT receives about 200 CFA/kg. However, it must pay 12 CFA/kg in export duties and 5 CFA/kg as a contribution to the fund for the development of gum arabic production, as well as general income taxes. Nevertheless, gum arabic remains the primary source of profit for SONACOT.

¹The flower of the hibiscus, used for food coloring additives.

Appendix 3

Supply of the Rural Areas with Consumer Goods, Credit and Inputs

The private traders are the major source of consumer goods and credit to the rural areas. There are no official credit agencies and SONACOT reaches only a small minority of the total rural population. It operates 8 permanent stores and 17 seasonal stores during the harvest season, when it buys agricultural products. In the southern zone, a private French company (CFAO) is still rather important. It handles primarily the sale of French-made consumer goods.

Up until 1970, SONACOT purchased, stored and sold millet and rice. After large losses, due to unrealistic price fixing policies by the government, it terminated these activities. The only foodstuffs handled presently by SONACOT are local sugar and cotton oil purchased from COTONTCHAD.

Consumer goods such as bicycles, lamps, blankets, etc. come to Chad from the Peoples' Republic of China. SONACOT receives the products in Douala (Cameroon) and assures transport and sale in Chad. The proceeds of this operation, after deduction of expenses and commissions, are used by the Chinese in their development projects (i.e. a bridge across the Chari River, rice production projects and a sports stadium).

The only crop which presently utilizes modern inputs is cotton.¹ Cotton seed is provided free by COTONTCHAD. Other inputs are given to the farmer by ONDR on a credit basis at the beginning of the year. Since 1969, INDR has imported and distributed fertilizer and insecticides, as shown in Table 1.

¹This applies to the surfaces under the productivity program only.

TABLE 1.

Fertilizer and Insecticide Imported by ONDR

<u>Year</u>	<u>Fertilizer (tons)</u>	<u>Cost incl. Trans- port (CFA) *</u>	<u>Insecticide (1000 litres)</u>	<u>Costs incl. Trans- port (CFA/L) *</u>
1969/70	5,280	37.43	480.0	318.00
1970/71	6,600	42.56	517.5	278.00
1971/72	5,800	46.42	576.0	356.00
1972/73	3,818	52.17	201.1	371.00
1973/74	4,150	51.86	450.0	374.13
1974/75	7,850	69.25	730.0	515.60
1975/76	12,300	103.43	1130.0	1065.24
1976/77	12,000	90.00 (e)	1483.5	559.87

* Costs vary according to import route. The figures used are averages.

(e) Estimate

SOURCE: ONDR

The farmers pay only a fraction of the costs in the form of a fixed contribution (presently 6,500 CFA/ha). This amounts to about 25 to 30% of the total costs (including extension services, 100 kg of fertilizer, 8 to 12 litres of insecticide, spraying equipment, etc.).

The repayment ratio is reportedly very good. According to ONDR, 96.3% of all farmers repaid their debt in 1975. Apparently, the penalty (the threat of refusal of further credit in case of default) is quite effective. This seems to indicate that the present private profit-to-cost ratio to the farmer for using modern methods as opposed to traditional planting (3.5:1)¹ is attractive

¹The modern inputs allow an increase in production of about 550 kg/ha (from 350 to about 900 kg/ha). At an average price of 40 CFA/kg for grain cotton, this could earn the farmer about 24,000 CFA/ha. Compared to monetary investments of 6,500 CFA/ha this yields a benefit - cost ratio of about 3.5:1.

enough to make the farmer desire to continue using modern methods. This idea is reinforced by the observation that acreage, under the productivity program, increased dramatically (50%) after the cotton price was increased, even though overall cotton acreage increased by only 10%.

Other agencies which provide services and inputs are:

- SODELAC provides the farmers in the polders with extension services and seed. SODELAC's activities will increase in importance when the IBRD project for irrigated polders is built.

- FDAR has a program of constructing wells in rural areas.

- Direction d'Agriculture provides extension services in some of the rice-producing zones. The rest of the rice production zones are serviced by ONDR.

The Sahelian zone, and particularly the north, are decidedly undersupplied with inputs and producer credit. Apart from the small cooperative in Bokoro (URSAR), few efforts at extension work and production modernization are undertaken. Only 238 extension agents operate outside of the cotton producing zone, more than half of them in the two prefectures Chari-Baguirmi (around N'djamena) and Ouaddai (around Abéché).¹

¹ONDR, Rapport Annuel, 1975-1976

Appendix 4

Notes on a More Recent Study Mission

Another study team under the direction of Mr. Richard D. Maxon from the University of Iowa investigated the cereals trade in Chad after this study team had returned. The results are not yet published, but a few interesting points can be mentioned:

1) The team under Mr. Maxon was able to observe merchants who seem to be growing millet for the market in N'djamena. They buy or rent land and plant the crops with hired hands who act as producers on a contractual basis. However, the volume of this commercial production is estimated to be only about 800 tons, 5% or 6% of the total market supply in the market of N'djamena.

2) A correlation analysis between the city of N'djamena and the southern markets revealed some interesting points. The usual price differential (prices in the capital higher than in the southern markets) was reversed during the drought relief operations and, for about 35 months, the prices in N'djamena were lower than in the production zones. However, for each period taken separately, Mr. Maxon observed a surprisingly high degree of correlation.

3) Based on various sources, marketing margins were estimated. The resulting estimate of overall marketing costs, 1280 CFA/bag (excluding bag and string), is consistent with the results of the correlation analysis for "normal" years.¹ In the years of the drought, in which food aid shipments interrupted the usual flow of grain, traders' margins seem to have collapsed to only about 50% of their former level.

¹Our estimates were 1230 to 1440 CFA/bag, excluding bag and string. See page 25.

Appendix 5

People Contacted in Chad

Chadian Agencies:

FDAR:

Mr. Sabit Naïm, Director
Mr. R. DiFuria, Technical Advisor, FAO

Ministry of Agriculture:

Mr. Touade, Director General
Mr. Lere Wapi Houli, Director of Agriculture
Mr. Peysson, Technical Advisor, Studies and Projects
Mr. DeKerimel, Technical Advisor, Statistical Service

Ministry of Economy, Transportation and Planning:

Mr. A. Y. Ndjiaye, Director of Economic Affairs
Mr. T. Dine, Direction of Planning
Mr. Rari Kingar, Direction of Planning
Mr. K. Ngarhodjoro, Statistical Service
Mr. B. Nimora, Statistical Service

Central Bank:

Mr. D. Nendigui, Director of Studies

ONDR:

Mr. Hindi Wordougou, Director
Mr. S. Souillanriba, Director of Vulgavisation
Mr. Djobcréo, Agent, Statistical Service

SODELAC

Mr. J. -C. Ménager, Technical Advisor

GMT:

Mr. Bailleux, Director

SONACOT:

Mr. S. Coelo, Technical Advisor

Chamber of Commerce:

Mr. Pelissard, Technical Advisor to the Rice Mills

CTT:

Mr. Z. Abdel-Razak

International Agencies:

AID:

Mr. J. Lundgren, CDO
Mr. S. Kreschevski

CARE:

Mr. P. Reitz, Director

WFP, PAM:

Mr. Franco Siciliano

Caisse Centrale:

Mr. M. Joseph, Director
Mr. Y. Terracole

FAO:

Mr. H. Creupelandt

IBRD:

Mr. F. Filippi