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IN CHAD

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August 5, 1976

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August 5, 1976

AFR/DR/SFWAP  
Office of Development Resources  
Bureau for Africa  
Agency for International Development  
Department of State  
Washington, D.C. 20523

Attention: Mr. James M. Kelly

**SUBJECT: Transmittal of Grain Marketing and Fishery Reports, Chad  
(Work Order #6, Contract #AID/afr - C - 1149 )**

Dear Mr. Kelly:

Although our work order, signed in June, 1976 named Mr. John Pielemeier as Project Officer, we understand that you are now responsible for this project. Therefore, we are pleased to submit twenty-five copies each in English of our reports which analyze the grain marketing system and fishery in Chad. The field work for these reports was conducted in June/July, 1976.

Dr. Richard Maxon and Mr. Barry Hill served as MASI's Grain Marketing and Fishery Specialists respectively. Some of the translation into English of appendices in French plus editing and typing were done by MASI's staff in Washington. Please note that these reports elaborate upon material already submitted by our Specialists prior to their departure from Chad. The previously submitted material was in the form of a Project Identification Document (PID) or Accelerated Project Identification Document (A-PID).

We appreciate this opportunity to serve the Agency and your Office and look forward to doing so again in the near future.

Very truly yours,

Carl J. Metzger  
President

CJM:jm

Enc.

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## I. INTRODUCTION

### A. Background of Work Order

Work order #6 was issued effective June 7, 1976, to Multinational Agribusiness Systems Incorporated (MASI) under Contract #AID/AFR-C-1149. The work objective was to conduct an analysis of the grain marketing sub-sector and to determine if there is an opportunity for AID program to improve the efficiency and effectiveness of the "Fonds de développement et d'action rurale" (FDAR) in the conduct of price stabilization and storage programs.

### B. Scope of Work

The scope of work was identified as follows:

1. To determine if there is an appropriate AID technical assistance role.
2. To increase returns to farmers and thereby encourage increased production.
3. To encourage a more stable and better distributed supply of cereals to consumers in normal years or years of slightly abnormal production.
4. To ensure that emergency food stocks will be available for distribution by the Government, at least initially, during future years of serious drought.

An Agricultural Marketing Specialist, Dr. Richard C. Maxon, was approved by AID to perform the work. He arrived in N'Djamena on June 9, 1976, and reported back to MASI, Washington, on July 6. After arrival in N'Djamena, Dr. Maxon was directed by Mr. Robert MacAlister, Task Force Coordinator, and Mr. John Lundgren, Director, USAID/Chad, to work with Mr. Sabit Naim, Director of FDAR, N'Djamena, in carrying out this assignment. Dr. Maxon also participated in field trips to Massakory and Bol areas, and to the Mayo Kebbi, Tandjile and Logone occidental prefectures, to evaluate marketing systems and facilities and to make recommendations for grain marketing activities that could be incorporated into the Northern and Southern Zone Integrated Rural Development Project.

## C. Background of Project

### 1. Location and Demographic Data

Chad is the easternmost country of the seven countries in the Sahelian zone of Africa. Figure 1 identifies the Sahel countries and some of their demographic characteristics. Over 90% of the labor force of Chad is engaged in essentially subsistence agriculture. The 1973 per capita income of \$70 includes value of foods and other material produced for home consumption; thus, the capacity of the economy to accumulate capital and develop a physical and social infrastructure is extremely limited.

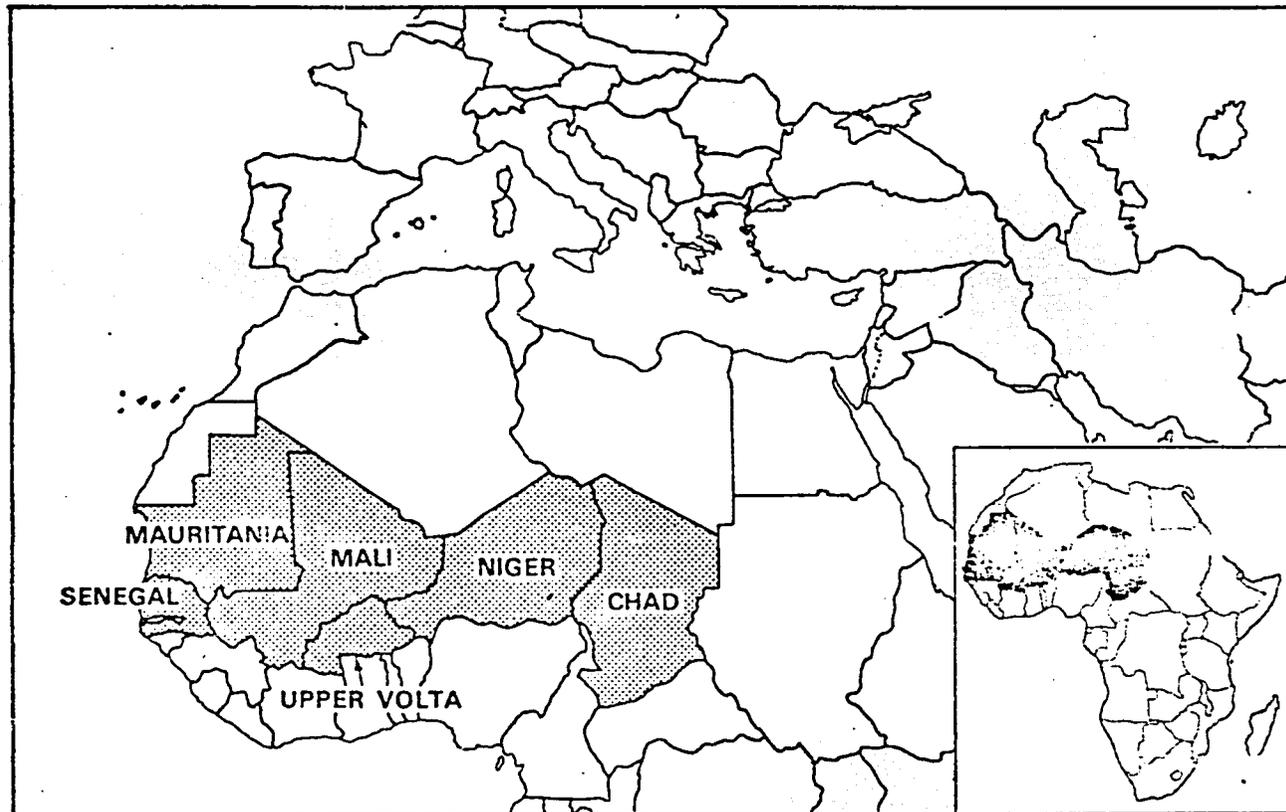
### 2. Administrative Divisions of Chad

Figure 2 indicates the location of population centers and major administrative sub-divisions of the Republic of Chad. The administrative hierarchy of Chad is as follows :

<u>Division</u>	<u>Authority in Charge</u>
Republic of Chad	Supreme Military Council
Prefectures	Prefect
Sub-prefectures	Sub-prefects
Administrative posts or counties	Chiefs (may be either civil servants or traditional chiefs or sultans)
Cantons (groups of traditionally related villages)	Chiefs
Villages groupments (democratically organized communities)	Council-Mayor
Villages	Traditional Chiefs
Communes-rural communities	Elected Councils

The hierarchy is a blend of traditional and modern civil administrative forms. In practice, traditional rulers are elected or appointed to the administrative positions and flexibility has been exercised to prevent conflicts between traditional government and civil government practices. Currently, there are 14 prefectures divided into 2 to 5 sub-prefectures each for a total of 54. There are 27 administrative posts.

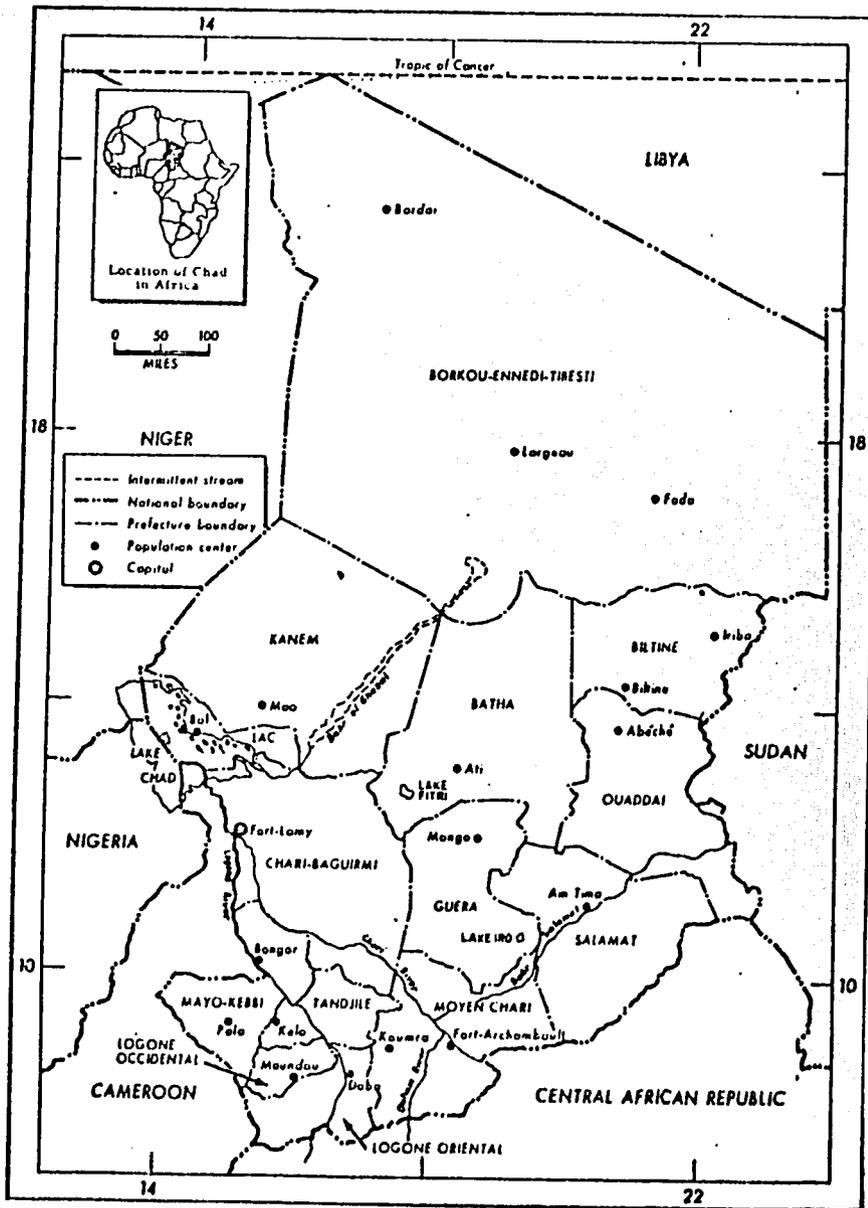
FIGURE 1: The Sahel Countries and Some of Their Demographic Characteristics



COUNTRY	POPULATION				ECONOMIC AND SOCIAL DATA				
	Total (mid-1975 millions)	Annual Growth Rate (percent)	Percent Urban (1975)	Labor Force in Agricul- ture (percent)	Per Capita GNP-1973*/ (dollars)	Life Expectancy (years)	People per Doctor	Literacy Rate (percent)	Students of 5-19 Age (primary/secondary)
Chad .....	4.0	2.0	14	91	70	38	64,800	5-10	14
Mali .....	5.6	2.3	13	91	70	38	39,600	5	12
Mauritania .....	1.2	2.1	11	85	190	38	17,600	1-5	10
Niger .....	4.6	2.8	9	91	90	38	42,100	5	7
Senegal .....	4.4	2.5	28	76	270	40	14,300	5-10	25
Upper Volta .....	6.0	2.0	8	89	70	29	59,600	5-10	7

\* - Estimates in IBRD 1975 Annual Report.

**FIGURE 2: Republic of Chad -  
Location of Major Administrative Sub-divisions  
and Location of Population Centers**



### 3. Overview of the Marketing Problem

Various studies have indicated that Chad has the potential to become self-sufficient in food production during years of normal weather. <sup>1/</sup> While droughts are not predictable, they do occur with sufficient frequency in the Sahelian zone to make reserve food stocks a necessity for the alleviation of hunger for a large segment of the population. But droughts are only a small part of the food marketing problem. A ministry of Land Management report on the drought relief program for 1975-1976 indicated a virtual national self-sufficiency in grain production for 1975, after short falls exceeding 50% on needs in the drought period of 1972-1973. The major problem, however, is one of internal distribution. The Northern prefectures had shortages totalling 33 metric tons (MT) of grain, while the Southern prefectures had a surplus amounting to 32.4 MT.

Food crop production is not generally possible in the upper half of the country, except for limited areas in oasis or small irrigated plots. Large portions of the country are isolated by seasonal flooding. It is during the season of rains and flooding that the "soudure" (literally "bridging the gap") occurs. "Soudure" is a time of food scarcity that occurs nearly annually when food stocks from the previous year's crops have been exhausted and food is not yet available from newly planted crops. Thus, food surplus and shortages can occur simultaneously in nearby locations due to a lack of a marketing and transportation system. Food prices can increase as much as five times above harvest levels in local markets within a few months time due to a lack of storage capacity and market supplies.

### 4. Topographical and Climatic Conditions

Chad extends North-South for nearly 1,000 miles from the 23.5° longitude, in the heart of the Sahara desert, through broad transitional zones of sub-arid and sub-humid savannah, to the edge of the tropical rain forest at 7.5°. The average East-West distance is 500 miles, giving the country a total land area of 496,000 sq. mi.

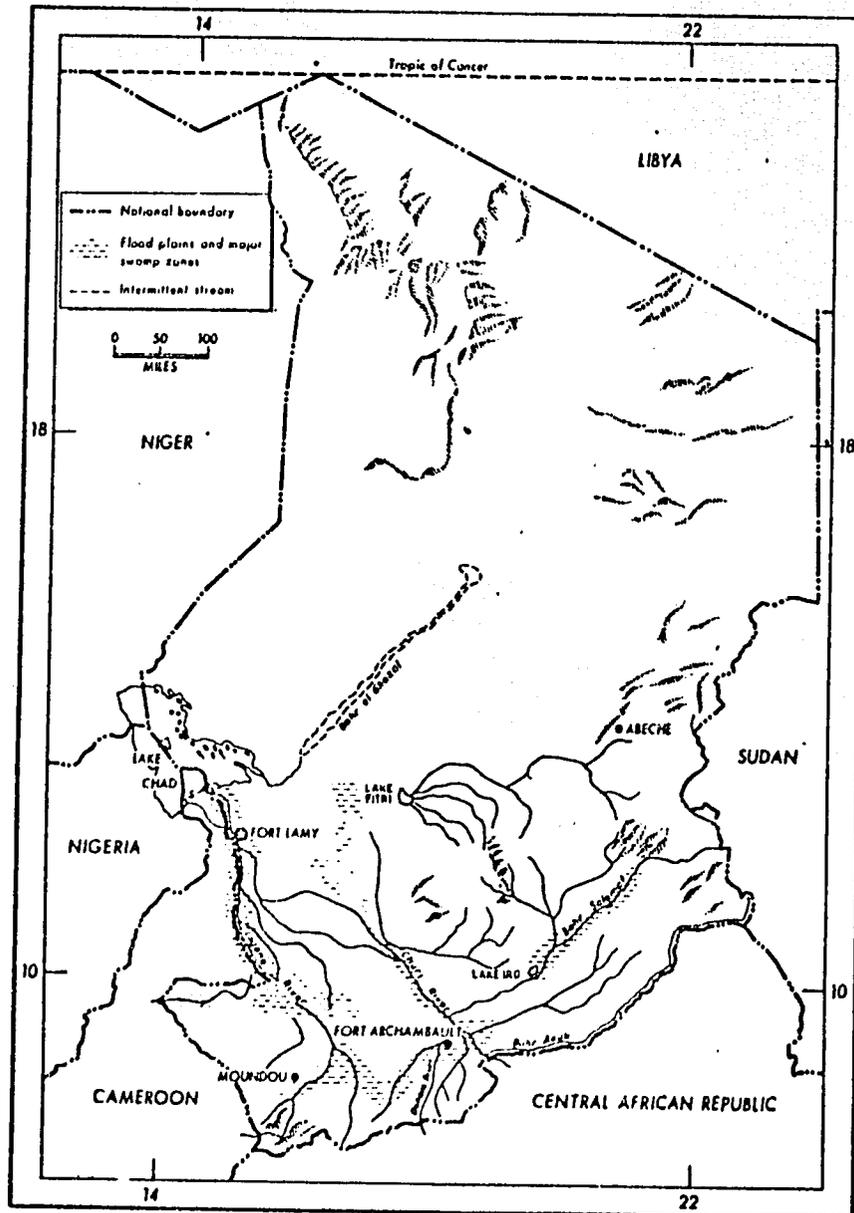
The major topographical features are a broad shallow central basin and Lake Chad (Figure 3). The Logone-Chari river system collects water from the rain forests of the Central African Republic and the Cameroons. The seasonal flow of water is so large that considerable portions of the central and southern areas are inundated from two to six months each year. From Lake Chad and the river basins, the land rises slowly to plateaus and ridges in the South and East, and to arid, extinct volcanoes in the North.

Annual rainfall patterns range from less than 3" in the desert North, to over 50" in the sub-tropical South. The availability of moisture and soil types give rise to three distinctive agricultural zones and profoundly influence the distribution of population within the nation.

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<sup>1/</sup> John A. Becker, An Analysis and Forecast of Cereals Availability in the Sahelian States of West Africa, Final Contract Report AID/CM/afr-e-73-20, Jan., 1974.  
B. M. Jellema "Improvement of Cercal Production and Marketing in the Central African Region". Mimeo, International Institute of Tropical Agriculture, Ibadan, Nigeria, Nov., 1973.

FIGURE 3: Topographical features



## 5. Agricultural Zones

Figure 4 indicates that livestock grazing is possible in the Southeast portion of the desert zone for two to three months per year, but the northern extremity for year-round grazing and crop production is at the 14°. The semi-arid Sahelian zone contains a mixture of migratory and sedentary farming patterns. Some livestock herders in the Sahel are true nomads, but most operate from essentially fixed locations and may range no more than 25 miles from the home. Accumulated years of custom and tradition establish tribal and family rights to grazing ranges and water sources. The area is interspersed with sedentary farmers who farm the small plots near stream beds or other fertile locations.

In primary river basins and Lake Chad area, farming, fishing and livestock herding are frequently combined. Family groups may divide seasonally with part of the family following their herds to grazing areas, while others remain to protect their farm land and engage in cereals and vegetable production. A symbiotic relationship exists in the Sahelian zone between the nomadic people and the sedentary farmers. Active trading exists for grains, vegetables, salt, hides, meat, milk and other products.

Livestock production is not feasible in the southern zone because of livestock disease, the tsetse fly and shortage of range due to population densities and use of land for cash crops. The traditional farming area below the Chari river comprises only about 10% of the total land area of Chad. This is the primary agriculture region of Chad, with sedentary farmers operating small landholding averaging 2.7 hectares. A great variety of crops is feasible in the southern area, with corn, beans, manioc, taro and fonio being secondary crops to millet and sorghum. Cotton is grown extensively in the area and is the principal source of cash income for 300,000 to 500,000 subsistence farmers.

## 6. Population of Chad

The last official census was held in 1964. It indicated a population of 3.3 million and estimates placed the population at nearly 3.8 million in 1973, based on an overall annual rate of growth of 2.15%. The growth rate is estimated to be 2.4% in the densely populated southern prefectures and 1.95% in the sparsely settled northern area. 1/

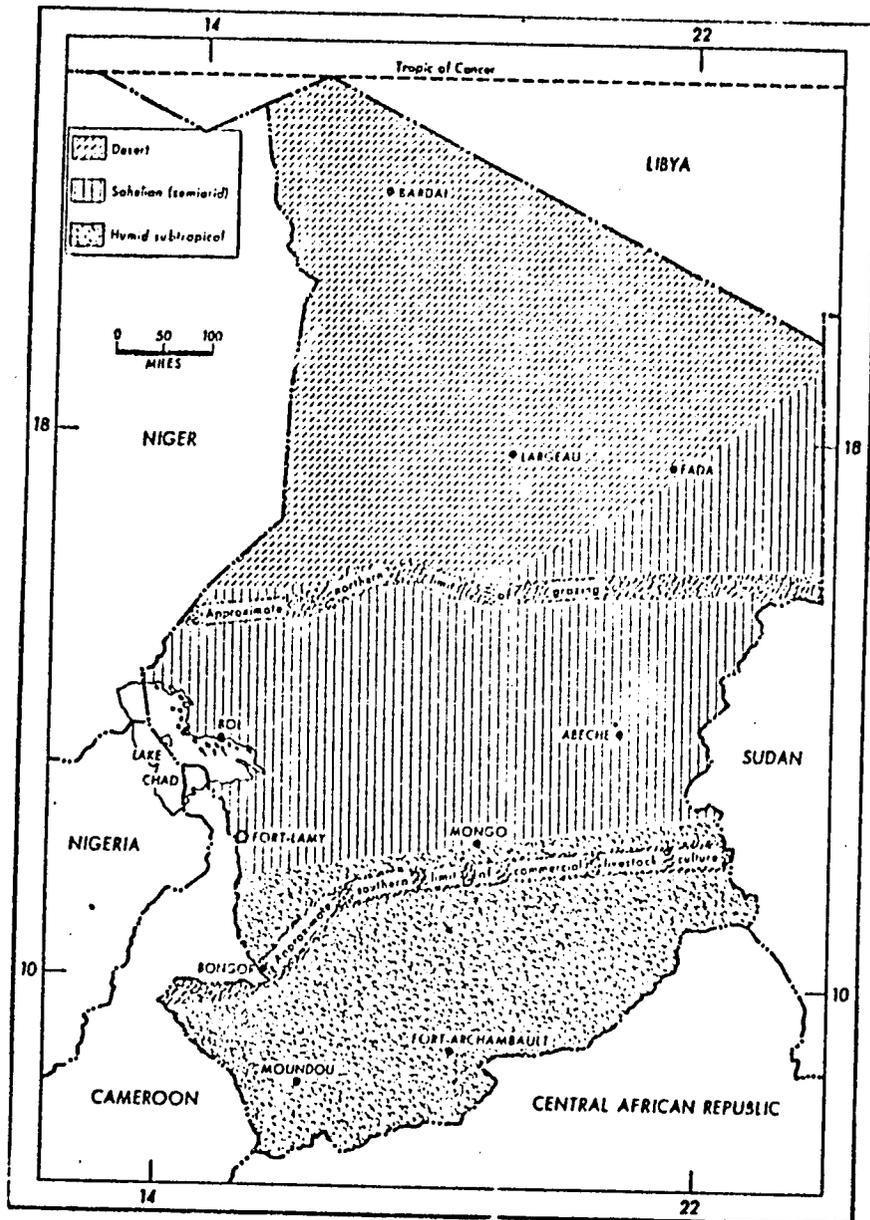
Over 45% of the total population live in the relatively small but densely populated five southern prefectures. The northern three prefectures contain over 50% of the total land area and less than 2% of the population. 2/

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1/ See Appendix F, page 107.

2/ See Appendix A for population densities per sq. km.

FIGURE 4: Climatic Zones of Chad



Only eight centers in Chad contain more than 10,000 residents. There are over 9,000 villages with an average population of 260. Over two-thirds of the population live in villages of less than 200 and about 30% live in villages of 200 to 1,000. In the southern prefectures, 4% of the population live in villages of 1,000 or more, while in the North less than 1% live in the larger communities. <sup>1/</sup> Even in the larger centers, most residents retain their food self-sufficiency by cultivating small out-lying plots or retaining food supply sources in their home villages. Thus, food self-sufficiency is an ingrained way of life, and various estimates indicate that only 5 to 10% of total food consumption passes through marketing channels. There is a very small and slowly emerging Chadian middle class, composed of civil servants, skilled workers and small business men, which will form the nucleus of market demand for food in the years ahead.

The harshness of life in Chad is suggested by an average life expectancy at birth of 29 years for men and 35 for women. Infant mortality ranges between 160 to 180 per 1,000 live births and continues to be high until infants reach age 5 or 6. <sup>2/</sup>

Custom and tradition prevent most women from working at tasks other than in the home or in agriculture. Relatively few women engage in the production for sale of handcrafted items, prepared foods, or engage in petty trading that is characteristic of many other West African countries.

#### 7. Cultural Affinity and Conflicts

The nomadic people of the northern desert zone and the sedentary and semi-sedentary people of the Sahelian zone, share religious and language bonds even though they are divided into 21 ethnic groups comprising about 46% of the total population. The largest ethnic group, the Arabs, comprised 14% of the total population of Chad in the 1964 census. Relationships between the ethnic groups range from perpetual hostility and conflict over grazing and water rights, to fraternal association through inter-marriages. The census data indicated that 94% of the population in these zones were Muslim, 4% followers of traditional religions and 1% Christians. Arabic is spoken by nearly all inhabitants of the region, either as a primary language or secondary language in inter-tribal communications.

The sedentary residents of the southern region comprise 54% of the total population and have substantially different ethnic, religious and cultural backgrounds. The population is divided into six ethnic groups of which the Sara form 70% of the total and Sara is the most predominant language. The religious composition was 48% Christian (primarily Roman Catholics), but 66% among the Sara, 47% traditional religion and 5% Muslim.

The southern prefectures were administratively a part of Oubangui-Chari (now Central African Republic) until 1946, and were well integrated into the economic,

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<sup>1/</sup> Area Handbook for Chad, p. 18.

<sup>2/</sup> Ibid, p. 20

cultural and ethnic systems of now neighboring countries during the existence of French Equatorial Africa. The arbitrary placing of the southern prefectures into Chad, just fourteen years prior to independence, resulted in creating a country with deeply divided factions at the outset.

The internal problems facing Chad cannot simply be reduced to conflicts between the Muslim North and the non-Muslim South. There are older and deeper cultural divisions within the country. The basic antagonisms revolve around the Arabized cultures of the Sahara and the traditional African cultures. The former regarded Africans who retained their traditional cultures as pagans and slaves. <sup>1/</sup>

#### 8. Internal Security

During the transitional period of government from colonialism to independence, the northern people were essentially left with their traditional governments through the French policy of indirect rule. In the South, direct government administration and participation in the government by Chadians were possible because of education, government jobs and cash crops. Political parties were first established in the South and, as independence was achieved, southerners occupied nearly all key posts in the central government.

Despite the parliamentary form of government, the real political power was concentrated in the presidency and the single legal political party. The central government removed most northerners from their local and area administrative positions and replaced them with non-Muslim southerners. By 1964, nearly all northerners in the central government were removed from office and many were imprisoned as threats to the government.

Rebellion became widespread in 1965 in the North and East. Support was given to the rebels by Sudan and Libya. By 1968, four eastern prefectures and portions of two others were out of control. Desert tribes in the far North started on unrelated but simultaneous revolts. The Chad army, with assistance from the French, campaigned from 1968 to 1971 and effectively crushed the many rebel bands. As the French withdrew, the army was retrained and re-equipped.

Some government reforms were initiated to reduce tension, but government control is tenuous at best in many areas. Remnants of rebel bands operate freely as bandits along transport routes. Central government officials are only able to fly in and out of the larger communities in the eastern prefectures, and do not attempt to enter large areas of the North.

The original government was overthrown by a military coup on April 13, 1975. The national President was killed and replaced by a Supreme Military Council. All is not yet resolved, and rebel activity is apparently on the increase in the eastern and southeastern areas. The Supreme Military Council was the target of a grenade attack that failed at an anniversary celebration in N'Djamena on April 13, 1976.

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<sup>1/</sup> Ibid, p. 75.

During the AID team visit to Chad in late June, 1976, a shake-up of ministry officials and a reorganization of government occurred. The effects of the reorganization are not yet apparent, but the internal political and security problems of the nation will divert potential development funds and personnel from urgently needed infrastructure projects for many years to come.

The present security situation does not diminish the need for development assistance. However, the scope and location of projects that can be undertaken will be severely limited. The availability of personnel that could be recruited for specific development projects could be seriously impaired. At this time, the central government is in firm control in the Lac, Mayo-Kebbi, Logone occidental, Logone oriental and Tandjile prefectures. The Government also is secure in the western and southwestern portion of Chari-Baguirmi and Moyen-Chari prefectures respectively. USAID is extremely cautious in permitting its personnel to travel beyond these areas, or in making project commitments in areas where on-site inspections and travel cannot be accomplished without risks.

## II. GRAIN PRODUCTION, CONSUMPTION AND MARKETING

### A. Agricultural Development

Of the four nations comprising French Equatorial Africa (Afrique equatoriale francaise, or AEF), Chad was the most deficient in resources which offered the potential for developing exportable commodities. Relatively little attention was thus given in the colonial period for developing an infrastructure which might serve the needs of modern agriculture.

The major agricultural development that did take place was in the production of cotton in five southern prefectures. The cotton economy represented 14% of the nation gross domestic product and 70% of its foreign exchange earnings, and 7% of government revenues in 1971. Cotton from Chad receives preferential buying treatment in the European Common Market and is heavily subsidized by the Chadian Government through the provision of subsidized exports, extension service and transportation. Considering the total costs of subsidies and diversion from food crop production, it is doubtful that the crop is profitable for the nation. 1/

In most instances, all farm operations are conducted by hand labor, using the traditional farm tools. The modernization of agriculture has consisted of the introduction of oxen for plowing and other field work, introduction of new seed varieties, fertilizer, insecticides and more precise cultivation practices.

An extension service follows along the French concept of "encadrement", in which districts for crop production are established and personnel are provided to encourage improved agricultural practices. 2/

The extension workers are under the supervision of ONDR (Office national de développement rural). ONDR is an administratively and financially autonomous service that is directed by an administrative council of the Ministry of Agriculture. ONDR provides agricultural inputs and extension services for all of Chad, except near Lake Chad, where SODELAC functions, and in some rice growing districts. In the cotton areas, ONDR provides the only commercial source of credit available to farmers. The semi-autonomous nature of ONDR is reflected in the fact that nearly all of their field agents are contract employees rather than civil servants. Presumably, the independence of ONDR can provide a freedom and flexibility of action that will permit rapid response to changing conditions.

1/ Area Handbook for Chad, p. 187.

2/ See Appendix B for the number of agricultural farmers per agricultural workers for 7 prefectures.

TABLE I

Production, Yield, Price for Major Crops

<u>Crop</u>	<u>Production</u> (metric tons)	<u>Yields</u> (kg/ha)	<u>Price</u> (CFA/kg)
Millet/sorghum	600,000 - 650,000	550 - 750	15 - 20
Maize	30,000 - 35,000	700 - 1,500	40
Groundnuts	90,000 - 100,000	650 - 750	30 - 40
Pois de terre	45,000 - 50,000	500	20
Cotton	100,000 - 140,000		
traditional		300	43 (1st grade)
improved		900	26 - 30 (2nd grade)
Rice	40,000 - 50,000	800 - 1,500	31

Sources : UNDAT "Production and Marketing of Cereals", FAO Agricultural Sector Study Report, FED, Ministry of Agriculture.

Notes :

- 1/ During the 1971-73 drought period, production of most crops fell by 50% overall.
- 2/ White sorghum prices usually exceed red sorghum prices in the South (20 versus 15 CFA/kg).
- 3/ All of the above yields reflect an optimistic picture; the upper limits represent yields achieved in good years by progressive farmers; for rice and cotton, good yields require application of fertilizer and insecticide.
- 4/ Many of these crops are usually interplanted, under which circumstances yields are lower : 500 kg/ha as opposed to 700 in pure stand for millet; 500 as opposed to 800 for groundnuts.

T A B L E 2

Chad: Production of Principal Food Crops, 1966/67-1974/75

(In thousands of metric tons)

	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75 <sup>1/</sup>
Millet et sorghum	630	647	661	651	610	639	490	430	559
Groundnuts (unshelled)	92	88	110	115	96	75	85	70	75
Rice (paddy)	28	28	31	36	40	51	42	30	36
Wheat	5	5	6	8	7	7	8	6	7

Source: Chad: Recent Economic Developments, June 2, 1975, IMF.

<sup>1/</sup> Provisional figures

## C. Consumption of Grain

### 1. Millet and Sorghum

Millet and sorghum consumption habits are nearly as varied as the population groups and agricultural production methods found across Chad. Table 3 presents estimates of per capita consumption by prefecture and urban centers for 1972. Consumption of sorghum and millet ranges from 105 kg/year in the Sahr region, where alternative foods are readily available, to 199 kg/year in rural Logone oriental where energy requirements for work in cotton fields are very high. Different varieties of sorghum and millet have different taste and texture characteristics, and very strong ethnic and regional preferences exist. Non-preferred varieties are heavily discounted or remain unsold in markets as long as preferred varieties are available.

### 2. Rice

There is limited evidence that rice has become a preferred food among the emerging urban middle class. <sup>1/</sup> Preparation of the traditional "boule" requires a considerable time effort and cooking fuels which are relatively expensive in the larger communities. While there is a growing preference for rice, it should be noted that the nutritional value of rice is less than that of sorghum or millet. Rice also has a relative price disadvantage on domestic markets compared to other grains. FDAR pays 20 CFAF per kg for paddy rice delivered to its mills. The official established selling price of rice is 80 CFAF per kg in one kg cartons and 7,500 CFAF per 100 kg bag.

### 3. Wheat

It has been grown in Kanem, Province of Chad, since early 1900s, and is a preferred food by some ethnic groups living in the desert areas. Bread is now very much part of urban diets throughout Chad, and a flour mill was built in N'Djamena in 1964. The flour mill has never been able to obtain a domestic supply of wheat sufficient to operate efficiently and imported 10,740 MT of wheat and flour in 1973. Purchasing prices by SODELAC, which has a monopoly on purchase and sale of wheat, have been lower than wheat producers could obtain in private (and illegal) trade with nomads. Extreme transportation difficulties from the Bol polder area have the further effect of making wheat imports less expensive to the flour mill.

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<sup>1/</sup> See Annex F, p. 141.

TABLE 3

Estimate of Total Consumption of Millet and Sorghum  
in Chad, 1972.

Prefectures and Cities	Population (1 000)	Consumption per capita (kg/yr.)	Total Consumption
Rural Moyen Chari	403	128	51 600
Sarh Region	40	105	4 200
Total Moyen Chari	443	126	55 800
Rural Logone Occidental	226	188	42 500
Moundou Region	42	150	6 300
Total Logone Occidental	268	182	48 800
Logone Oriental	277	199	55 100
Tandjilé	272	162	44 100
Hayo Kebbi	572	176	100 700
Total Southwest Zone	1 832	166,2	304 500
Rural Chari Baguirmi	300	148	44 400
Ndjamèna	220	125	27 500
Total Chari Baguirmi	520	138	71 900
Lac	120	123	14 800
Kancm	185	167	30 900
Batha	320	145	46 400
Guèra	184	150	27 600
Biltine	140	130	18 200
Ouaddaï	340	150	51 000
Salamat	98	135	13 200
B. E. T.	80	110	8 800
Total North and East Zones	1 937	142,3	282 800
Total Chad	3 819	153,8	587 300

Source: Production and Marketing of Cereals in Chad, p. 122, UN, 1974.

#### D. The Present Marketing System

The subsistence orientation of Chadian farmers results in 10% to 12% of the production of sorghum and millet being marketed in normal years. Grain may initially enter the market in one of two ways. Farmers may sell small quantities in local markets to raise cash to pay taxes or buy items for household consumption. The amount each farmer sells is based upon his assessment of family's needs, the desire to keep a reserve or safety stock and desire for money to purchase items which cannot be produced by the household. In some instances, farmers may sell a quantity larger than deemed to be in surplus, so as to raise money with the expectation of being able to repurchase grain at a later time if the need arises.

The second way in which grain enters the market is through local traders who finance the farmers production and/or provide the household with sugar, tea, cloth and similar items. At harvest, the trader will take the quantity of grain to satisfy the debts. Little is known as to the bargaining that precedes trader advances of cash and goods, but the presumption is that traders hold an extremely advantageous position in establishing the price of goods advanced and the purchase price of grain taken in payment. Reports of the 1975-1976 crops year indicated traders were paying as little as 400 CFAF per 100 kg bag (\$1.70) as against the official FDAR price of 1,600 CFAF (\$6.80). Traders were reported reselling the grain for more than 3,000 CFAF (\$12.75) in the larger markets.

Local and itinerant traders assemble quantities of grain for transport to more distant markets. In Chad, as in other African countries, there are a series of periodic markets in which traders tend to specialize. Markets are held in the smaller villages on weekdays, with markets in the larger villages on Sunday. Traders in the larger village market maintain connections with the larger city markets which are held daily, although market attendance fluctuates by the day of the week. Thus, grain may ultimately be sold or processed in the larger communities after passing through a series of small village and larger village markets and the hands of successive traders.

The relatively small grain surplus in the southern prefectures ultimately is sold in the markets of Sahr, Doba and Mondou. The latter city is the site of the nation's only brewery. Small quantities of southern grain may be sold in N'Djamena, although the principal grain source for the city is the Chari-Baguirmi and Guera prefectures of West Central Chad. The far northern prefectures receive their grain supplies from Guera, Salamat and Ouaddai in normal years.

The volume of grain moved in domestic trading is quite small. The estimated private marketing within the Sahelian zone was 5,000 MT and North-South grain movement was 28,000 MT for 1975. <sup>1/</sup> The difference between the 33,000 MT estimate of private grain trading and the commonly quoted 60,000 to 70,000 MT

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<sup>1/</sup> See Appendix G.

figure is not explained. One possible explanation is that the 33,000 MT movement refers to trade across prefecture boundaries, whereas the larger figures are estimates of total grain availability in all markets.

Transportation between markets is most commonly accomplished by head loading, pack animals, bicycles, motorcycles and/or ox cart, between the smaller markets and by truck between the larger markets. Most of the truck transport in Chad is controlled by the Chadian Trucking Cooperative. No valid information is available on land transportation costs, but a World Bank study indicates that rates for truck transport between Chad and Nigeria were 30% higher than seemed warranted by the costs involved. In any event, transportation costs in Chad are high because of the high initial costs of importing trucks and the poor road condition which increases fuel consumption, increases maintenance costs, substantially shortens the useful vehicle life, and reduces the distance traveled and loads carried per day. Load capacity is further reduced by having to carry sufficient water, fuel and spare tires and parts for a complete journey rather than obtaining them en route as needed. Virtually all long haul trucks carry several sections of military steel aircraft landing mats for crossing otherwise impassable road conditions. Four-wheel drive is essential in smaller vehicles that travel out of urban areas. In southern and central Chad, roads are barricaded during the rainy season and travel may not be permitted by local authorities. Trucks stopped may not be able to proceed for time periods ranging from a few hours to several weeks.

The present transportation system represents an insurmountable barrier to the development of an efficient marketing system. The current road network consists of 300 km of paved roads, 1,500 km of primary all-weather roads and 3,800 km of secondary seasonal roads. There is an additional 20,000 km of tracks which are only partially usable by motor vehicles. No railroad exists within the country. Some rivers are seasonally navigable. Large areas of potentially productive agricultural lands in the eastern and southeastern prefectures have no access to motor transport.

With normal supply and demand for sorghum and millet approaching 600,000 MT per year, the estimated market supply of 60,000 to 70,000 MT can create a very volatile price movement. Since farmers sell that portion of their production which they estimate will exceed their own food needs, the market supply depends upon the crop yield in any market area and the farmers' concern for their own requirements. In poor years for crop yields, they would tend to hold onto more because of the psychological fear yields would be poor for the next season too. Hence, in some poor crop yield years the market supply could be nil at any price.

On the demand side, since virtually all rural residents have access to home produced grain, the demand that exists in local markets in the southern areas is largely dependent upon itinerant traders. In the Sahelian zones, nomads occasionally buy from the market, but the major portion of their needs is obtained by barter.

In the large markets observed at N'Djamena, Massakouri, Kelo and Bongor, the estimated supply of grain visible was less than one metric ton, with only small sales observed during the visit. The majority of essentially consumer sales of grains in villages and the larger communities, including N'Djamena, takes place away from the main markets. Market women obtain their supplies from traders at the central market and sell by going from door to door, congregating at a street intersection, or by selling from their homes.

#### E. Domestic Grain Storage

Consumption estimates of sorghum and millet prepared by the United Nations estimated a 5% crop loss from destruction and deterioration of grain in storage. <sup>1/</sup> This estimate appears very low when compared to previous studies in Chad and other West African nations. An FAO study of world wide grain losses, computes insect damage in Africa at 23% of total crop value and total crop losses from all sources at 41.6%. A CARE rural family grain storage project proposal, submitted to USAID, conservatively estimated storage losses at the family and village level at 20%.

The typical family grain storage unit is a clay silo 2 to 2.5 meters in diameter, and 2 to 3 meters in height. The silo is built upon a mud brick or wooden foundation, and covered with a conical shaped thatched grass cap. Each unit holds from eight to ten MT and is located in the center of the family compound. A family compound might have two or three storage silos.

The major problem with the family storage silos is that termites weaken the wooden supports and eat the straw used in the foundations bricks. The weakened supports shift, causing the walls to crack and provide entry for insects and rodents. Replacing the silos is a laborious task that must be performed frequently by many families.

In the drier northern areas, home storage of sorghum consists of piling the grain heads on open racks and partially covering it with straw mats, where grain is subject to insect, fungus and bird damage. Other home storage methods consist simply of piling grain bags in the living quarters and constructing a small grain storage room with access only from the interior. Seed grains are frequently kept in calabash and earthenware containers above cooking fires, so that smoke will ward off insects and reduce moisture levels.

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<sup>1/</sup> See Table 4.

Use of Sorghum and Millet in Chad by Prefecture in an Average Year

Prefectures (1000 t)	Production	Requirements				Total	(+ Surplus) (-Deficit)	Corrected Result
		Human Consumption	Seed	Losses (5%)	Animal Consumption			
Moyen Chari	84.0	55.8	1.3	4.2	0.3	61.6	+ 22.4	
Logone Occiden.	44.1	48.8	0.8	2.2	0.2	52.0	- 7.9	
Logone Oriental	53.4	55.1	0.9	2.7	0.2	58.9	- 5.5	
Tandjile	32.6	44.1	0.5	1.6	0.2	46.4	- 13.8	
Mayo Kebbi	94.1	100.7	1.4	4.7	0.5	107.3	- 13.2	
<b>Total Southwest</b>	<b>308.2</b>	<b>304.4</b>	<b>4.9</b>	<b>15.4</b>	<b>1.4</b>	<b>326.2</b>	<b>- 18.0</b>	<b>0</b>
Chari Baguirmi	66.6	71.9	1.3	3.3	1.0	77.5	- 10.9	- 10.9
Lake	8.4	14.8	0.3	0.4	0.1	15.6	- 7.2	- 7.2
Kanam	16.0	30.9	0.6	0.4	0.1	32.0	- 16.0	- 16.0
Batha	50.0	46.4	1.3	2.5	0.2	50.4	- 0.4	- 0.4
Guera	33.0	27.6	0.8	1.7	0.1	30.2	+ 2.8	+ 2.8
Biltine )	99.0	69.2	2.3	5.0	0.5	77.0	+ 22.0	+ 22.0
Ouaddai (	19.5	13.2	0.3	1.0	0.1	14.6	+ 22.0	+ 4.9
Salamat	0.8	8.8	0.1	-	-	8.9	- 8.1	- 8.1
<b>Total North</b>	<b>293.3</b>	<b>282.8</b>	<b>7.0</b>	<b>14.3</b>	<b>2.1</b>	<b>306.2</b>	<b>- 12.9</b>	<b>- 12.9</b>
<b>Total Chad</b>	<b>601.5</b>	<b>587.2</b>	<b>11.9</b>	<b>29.7</b>	<b>3.5</b>	<b>632.3</b>	<b>- 30.9</b>	<b>- 12.9</b>

TABLE 4

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Source: Production and Marketing of Cereals in Chad, p. 124, UN, 1974

F. Commercial Storage

Prior to the drought relief programs, FDAR (Fonds de développement et d'action rurale) had 2,800 MT storage capacity, of which 1,600 MT were in N'Djamena and the remainder in Sarh and Mondou. No commercial storage exists other than at the N'Djamena flour mill and Mondou brewery. Funds supplied by the World Bank, the European Common Market and USAID resulted in construction of an additional 6,400 MT storage in N'Djamena and a total 9,200 MT storage capacity in 14 other communities. <sup>1/</sup> Present storage capacity of FDAR thus equals approximately 30% of the estimated quantity of sorghum and millet marketed. However, less than 3,000 MT of the storage outside N'Djamena are in areas not affected by internal security problems.

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<sup>1/</sup> Appendix G contains listing of warehouse location, size and donors.

### III. ANALYSIS OF FDAR

#### A. Administration of FDAR

FDAR is one of four agriculturally related semi-autonomous societies within the Ministry of Land Management. Its operating budget has ranged between 100 and 120 million CFAF (\$435,000 - \$500,000) for the past four years. <sup>1/</sup> Related societies are :

1. SODELAC - Society for Development of Lake Chad.
2. SONACOT - Society for Marketing Agricultural Products (Export monopoly).
3. OBLC - Office for Promoting the Development of the Logone-Chari River Basin.

#### B. Basic Responsibilities

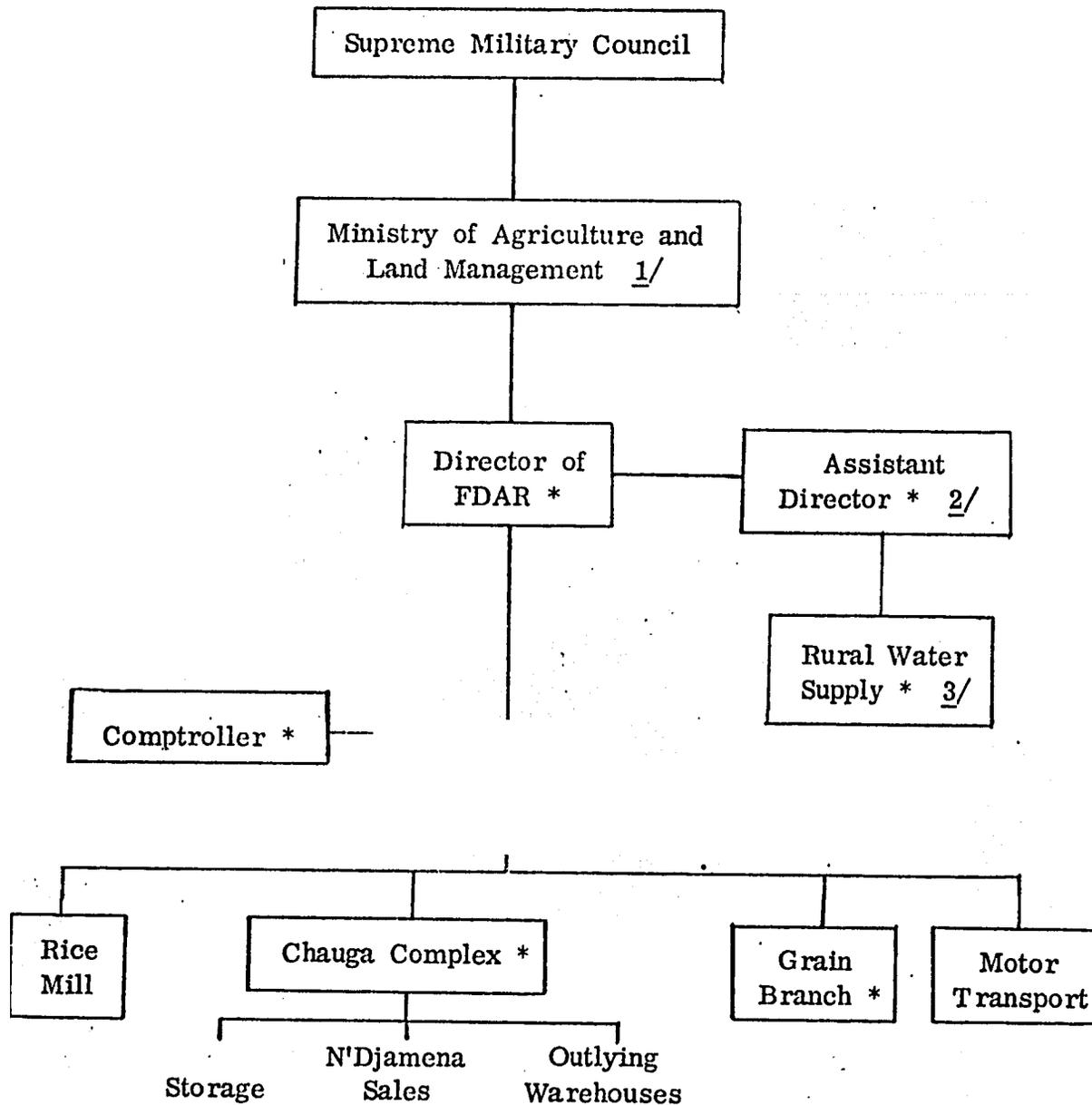
The basic responsibilities of FDAR are :

1. Acquisition and storage of national grain reserves.
2. Stabilization of grain prices at official government prices by buying and/or selling grain.
3. Distribution of donated food supplies received from various Sahel relief programs.
4. Providing water wells in rural areas.
5. Complete operation of one rice mill and marketing output of an OBLC rice mill.

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<sup>1/</sup> On June 24, 1976, a reorganization of government merged the ministries of Agriculture and of Land Management. No information was available at time of departure from Chad as to how FDAR's operation might be affected. FDAR personnel reported no changes were anticipated and that better cooperation between ONDR and FDAR was now possible.

C. Organization of FDAR



\* Expatriates sponsored by United Nations and/or other donor nations.

1/ Ministry of Land Management and Ministry of Agriculture were combined in Government reorganization of June 24, 1976. Official title of combined organization is not available.

2/ Position occupied by French volunteer serving in Chad in lieu of military service.

3/ Peace Corps Volunteers operate two well drilling rigs. The volunteers report to the Assistant Director.

The organization of FDAR as shown was prepared from discussions with FDAR personnel and from FDAR reports. No official organization charts were available. Total personnel in the organization is estimated to be between 150 to 175, with personnel costs in excess of 40% of its regular budget.

FDAR was established with assistance from the United Nations Development Program (UNDP) and the Food and Agriculture Organization (FAO). The upper management echelons of FDAR are staffed and financed largely by external sources.

#### D. The Operations of FDAR

##### Grain Acquisition and Grain Storage

FDAR maintains 6,400 MT of sack storage capacity in the Chauga district of N'Djamena. The facilities are comparatively new, well designed and maintained. Good inventory records are kept, stocks are rotated and pest control measures appear to be adequate. Due to cost of chemicals, stocks are fumigated only upon appearance of infestations. FDAR has 9,000 MT storage in 14 other communities, but maintains control over warehouses in Sahr and Mondou. In the other locations, the prefecture or sub-prefecture is in charge of operations. Approximately 3,600 MT of grains were stored in N'Djamena as of mid-June 1976.

##### 2. Market Operations

In the past year, FDAR's grain market operations consisted of buying and selling 2,200 MT of sorghum and millet, or less than .3 of 1% of the estimated national supply. The 2,200 MT is equivalent to 3 to 4% of the estimated market supplies of these grains. FDAR attempted to buy 3,000 MT of grain for the national reserve stock, but was able to obtain only 1,720 MT due to funding problems with donor agencies. FDAR also handled about 2,000 MT of rice through the Chauga warehouse.

FDAR has one sales point in N'Djamena at which the public is permitted to buy up to 4 bags (400 kg) of grain at one time. A trader who desires more than this amount must either go through the waiting line again or hire others to stand in line for him. Each sale to the public is checked by an official of FDAR. The military, police, hospitals, schools and other approved institutions requisition whatever amounts they need from the FDAR sale point.

##### 3. Providing Rural Water Supply

FDAR cooperates with the Peace Corps in operating two well drilling rigs in northern and southern areas of Chad. FDAR's primary contribution is the transport of well-pipe and supplies.

#### 4. Distribution of Donated Funds

Very little donated funds are being distributed in Chad at the present time. All free food distributions will end by December 31, 1976. FDAR cooperates with CARE in the distribution programs by storing some foods while CARE assumes responsibility for delivery and distribution.

#### 5. Operation of Rice Mill

The Biliam-Oursi rice mill is in the center of the Casier A rice project. It is in a low lying area 40 km North of Bongor, and unreachable by road for nearly three months per year due to flooding. The mill has an annual capacity of 3,800 MT. While the mill was not directly observed, it is the understanding of this writer that the mill was constructed with vertical grain storage silos and overhead conveyors which are seldom used due to mechanical problems and power requirements. Thus storage capacity for paddy rice and finished product is extremely limited, and FDAR tries to haul 15 ton loads to N'Djamena as soon as that amount accumulates at the mill. The result is much empty back hauling and tying-up of trucks which are needed for hauling grain from surplus to deficit areas.

The droughts of 1973-1974 and 1974-1975 caused the mill to operate at less than 10% of their capacity. The prices at which FDAR must buy and sell rice are established by the Supreme Military Council at levels below cost of production and marketing, and FDAR has been accumulating large deficits on the operation of this mill.

The rice production areas of Chad are concentrated along the Cameroon borders, and while official exports of rice are nil, smuggled or illegal exports are conservatively estimated to exceed 1,000 MT annually. .

#### E. Comments Upon the Effectiveness of FDAR

1. Maximum purchase and selling prices were established by decree of the Supreme Military Council in 1975. Although supporting data is lacking, the prices decreed are generally regarded to be below the farmers' cost of production so that farmers lack incentive to sell to FDAR and are able to sell for more than the official price in local markets. Near border areas, farmers sell to traders who smuggle the product to Nigeria, the Cameroon, the Central African Republic, where much higher prices prevail. In some south and east central areas, FDAR has been able to buy grain because no other cash buyers are available.

2. The Supreme Military Council has directed FDAR to deliver and sell grain in some distant areas at prices below prices levels established in the 1975 decree. When the costs of grain acquisition and delivery are considered, those forced sales represented substantial subsidies to the grain consuming areas; over

400 MT were sold in 1975 under such orders. While areas where the grain was sold at reduced rates do represent areas of need, the internal security problems seem to have been a primary consideration for ordering these sales. In any event, such directives reduce the working capital available to FDAR and divert personnel and equipment from areas of maximum effectiveness.

3. In areas outside N'Djamena, FDAR stocks controlled by sub-prefectures tend to be regarded as reserves for civil servants, the military and other institutions and thus not available for sale to the public. Local market supplies and prices are unaffected by these stocks within the community. Frequently, farmers will not sell to FDAR because of lack of assurance that they may repurchase in time of need.

4. FDAR lacks sufficient information concerning local crop conditions, supplies, market prices and price elasticities to forecast need for market intervention and the quantities to buy or sell to achieve their pricing objectives.

5. FDAR lacks the physical and financial resources to make a substantial impact upon the markets. In the Bokoro area, where FDAR was able to buy 1,400 MT of grain, 750 MT were evacuated before rains made the road impassable. Much of the remaining grain was in open or poorly protected storage and large losses occurred. Lack of storage and all-weather roads at the rice mills forces transport of rice to N'Djamena and then transshipment of rice back through rice production areas to consumption centers.

6. FADR must rely on donor funds for all major activities. Obtaining these funds takes time. The amount and time the funds will be received are uncertain, and funds may be earmarked for specific projects. Long range planning is not possible under such circumstances. Projects which were of high priority when initiated may no longer be feasible or important when funding becomes available. 1/

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1/ See Appendix G for a detailed account of problems in acquiring reserve stocks financed by donor funds.

7. FDAR is too reliant on expatriate staff and is not adequately preparing for nationals to assume ultimate responsibility for its functioning. An expatriate staff is subject to constant turnover, long absences for home leave and/or subject to withdrawal by supporting donor nations.

F. Requests for USAID Assistance

FDAR has recognized the need for additional facilities, personnel and improved operational efficiency. The following projects were proposed for USAID assistance.

1. Proposal submitted in June, 1976

	<u>Estimated Costs</u>	
	<u>(CFAF)</u>	<u>(\$)</u>
a. Personnel support, new office and distribution facilities in N'Djamena, plus some equipment and improvements of Chauga warehouse complex	390,000,000	1,660,000
b. 1,000 MT warehouse for rice mills at Lai, Biliam-Oursi, and 600 MT rice buying station at Kim	80,000,000	340,000
c. Construct 40 km all-weather road Bongor to rice mill at Biliam-Oursi	600,000,000	
d. 1,000 MT grain buying warehouses at Moyto, Bokoro and N'Gama	15,000,000	319,000
	<u>1,085,000,000</u>	<u>4,919,000</u>

2. Prior Proposals

- a. FDAR had also previously submitted a 109,500,000 CFAF (\$466,000) proposal for USAID assistance, through CARE, for the construction of ten 250 MT grain warehouses. Four of the warehouses would be used as buying stations in the grain surplus areas of Chari-Baguirmi prefecture, and six would serve as reserve stocks and sales points in larger villages of the southern prefectures. CARE would supervise the construction, provide some construction crews and assume some of the overhead costs.
- b. An A-PID for Fiscal Year 1977, for \$50,000, for support of additional accounting and statistical personnel was submitted by USAID/Chad. The project was rejected by USAID/Washington on June 25, 1976.

G. Recommendations on Requests for USAID Assistance

Personnel Support and Facilities for FDAR

The \$1,660,000 proposal for new facilities and supplemental staff support is broken down to \$85,000 (or 5%) for personnel, and \$1,550,000 (or 95%) for facilities. The personnel would primarily work in additional sales points in N'Djamena.

The proposals for facilities included a new headquarters building and equipment (\$211,000); additional construction at the Chauga warehouse complex (\$425,000); sales points in N'Djamena (\$191,000), and grain buying centers in the Bokoro area, Bousso, Bongor and Lai (\$638,000).

The request for the buying facilities in the above locations is duplicated in previous requests for assistance through CARE.

The additional capital investment in N'Djamena does not seem to be warranted at this time for the following reasons :

- a. FDAR has concentrated over three-fourths of its facilities and nearly 100% of its personnel in N'Djamena, whereas FDAR needs to establish its presence throughout the nation. N'Djamena has nearly all of the nation's government held grain reserves, and is in the best position to receive relief

shipments from international donors, should the need arise again. The "Grands Moulins du Tchad" (flour mill) currently receives over 60% of its milling wheat from imports.

- b. Present FDAR headquarters seem to be adequate for current needs and staff could be expanded without undue crowding.
- c. Facilities for additional sales points in Chad could be leased from existing facilities. Additional grain storage might be possible at the former French military base near the city.

Some additional grain handling and protection equipment is needed at the Chauga warehouse. The proposal anticipates equipping one vehicle with fumigating and pest control equipment for travel to outlying buying stations and warehouses. Given the distances, and the travel difficulties involved, each outlying facility should have basic capabilities to undertake pest control and inventory protective activities, with inspection, pest control materials, and technical assistance available periodically from N'Djamena.

Additional personnel support and training is most essential if FDAR is to function effectively, and is the subject of an A-PID submitted to USAID on June 30, 1976. 1/

The principal features of the A-PID proposal are : (a) development of a pilot program for field administration of FDAR activities in 10 to 12 sub-prefectures, (b) strengthening of the statistical analysis and cost control functions in FDAR headquarters, (c) developing a training program for FDAR employees in warehouse management, and (d) accounting and control procedures. Operational policies and guidelines would be developed and tested for uniform administration of FDAR buying and selling objectives in all parts of the nation.

## 2. Storage Facilities for Rice Mills

### Lai

The People's Republic of China has proposed replacing the 9,000 MT capacity mill at Lai with a 20,000 MT mill. The rice milling machinery at Lai is Italian made and appears to be efficient and in very good condition, except for the very old power plant engine. FDAR requested about \$40,000 for a replacement engine from USAID in 1975, but no response has been received. The Lai mill would be moved to Kelo, 58 km to the West if the Chinese mill is constructed.

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1/ See Appendix H.

Construction of the Chinese mill is not certain, and would require several years in any event. Additional storage facilities will be required for a new mill, and could make operations at Lai more efficient now if properly located.

b. Biliam-Oursi, Bongor

Construction of a warehouse in Bongor, which could serve as a rice buying and distribution center, could alleviate some of the problems. The very expensive FDAR proposal to build an all-weather road to the mill does not seem justifiable in that the road could not be incorporated into any regional or national road network and would serve a very limited population and other functions.

The most viable alternative would seem to be to relocate the rice mill where year around transportation can more easily be provided and any road constructed can serve multiple purposes. A feasibility study of relocating the mill and means of transporting paddy rice should be undertaken before any facilities are constructed at Biliam-Oursi.

Bongor is among FDAR proposed locations for other grain warehousing and the requirements for rice warehousing in the area could result in developing an active regional grain storage and market center.

c. Kim

Kim is located on the main road between Bongor and Lai in a rice producing area. However, it is the writer's understanding that FDAR has not been able to consistently buy rice in the area because of low FDAR buying prices. Kim is isolated by road during three to four months each year, but river transportation is available during the seasonal floods.

There is an active multipurpose cooperative at Kim with over 700 members. Among other things, the cooperative does limited rice and grain storage. A detailed feasibility study of constructing a rice buying facility for FDAR should be undertaken before any construction is done. One alternative that should be fully explored is that of contracting with cooperatives to perform the buying and storage functions.

3. Improve Road to Biliam-Oursi

Comment 2.b. above included this project.

4. Grain Warehouses at Moyto, Bokoro and N'Gama

The named locations are in the Chari-Baguirmi Prefecture, about 300 km North and East of N'Djamena. This area typically produces a large grain surplus, and in many respects could be considered as the "breadbasket" of N'Djamena. In the past year, FDAR had already purchased 1,400 MT of millet, and had tried to arrange financing for buying up to 3,000 MT. However, FDAR was only able to ship 750 MT, primarily to areas further to the North and East. The remaining 700 MT is in poorly protected open storage and has probably suffered considerable deterioration in quality.

The Moyto, Bokoro and N'Gama warehouses are in areas not under secure government control. Grain trucks must be moved in convoy with army escorts. Truck loads of grain that attempted to travel alone were hijacked. An FDAR source indicated that warehouses in the area would be secured because seizure of the warehouses would cause rebels to lose popular local support. At the present time, it does not seem advisable to undertake any projects in the area, particularly if any expatriate assistance were to be needed in the construction or operation of the facilities.

## IV. CONCLUSIONS

### A. The Background Situation

The danger of oversimplifying problems and posing pat answers is always present when "experts" make cursory examinations of a situation and look for ways of applying their experience and skill. This danger is particularly acute in Chad, for few other nations are so deficient in readily exploitable natural resources, lacking in physical and economic infrastructure, beset by internal strife, and constantly subjected to the vagaries of weather. Previous experience and standard solutions are of limited value under these circumstances.

The most outstanding feature of Chad, however, is the remarkable resilience and stability of its peasant communities, and their adaptation to their environment. The distinctive agricultural patterns of the desert, Sahel and southern semi-tropical regions attest to ingenuity in adapting to climatic conditions. Agricultural production has stabilized at low levels consistent with hard-earned knowledge and experience in dealing with the uncertainties of weather and the unyielding characteristics of Chadian soil. The gaps between traditional and modern practices in agriculture are thus magnified because peasant agriculture is geared to the avoidance of risk by recognizing existing environmental limits - whereas modern agriculture uses scientific techniques to modify the environment for higher productivity. Innovation involves risk, and to the majority of farmers, failure is hunger or starvation because reserves are so meager. Innovation within the community also threatens established social and economic systems, and leadership can become threatened.

### B. Improving FDAR

It is into this setting that the primary objectives of this project were addressed, that is, the strengthening of FDAR. A strong FDAR would then be able to :

1. Accumulate a grain reserve for the protection of the nation against food shortages.
2. Stabilize food prices at levels acceptable to both farmers and consumers.
3. Encourage food production by developing a marketing system and inducing farmer response to price incentives.
4. Improve income of farmers.

### C. Developing Reserve Stocks

The present goal of the Ministry of Land Management to develop reserve stocks of 10,000 MT is very modest indeed. Such reserves represent only the annual per capita consumption of sorghum and millet of 65,000 persons, or less than 1.5% of the population. From another perspective, the proposed reserves represent 6 days consumption nationally of sorghum and millet. The proposed location of reserves of 9,000 MT in N'Djamena and 1,000 MT in Abeche would do little to assure food relief for most of the nation, given the current status of transportation and the political pressures that would develop to keep an assured food supply for the high concentration of civil service and military personnel, and non-farming residents of urban areas.

Under present conditions, where consumption is so closely in balance with production, reserve stocks must be accumulated slowly to avoid disruption of the markets. The necessity to rotate millet and sorghum stocks also places constraints upon the amounts that can be sold in N'Djamena and Abeche without discouraging the present activity of traders who bring grain in from remote and scattered locations. If traders' activity is reduced in the central markets, the impact will be reflected back as lower demand and prices in the regional and small village markets. Thus, farmers might have even less incentive to produce and/or sell grain.

An alternative solution would be more widely dispersed reserve stocks. This alternative is not easily accomplished, however, as markets for grain are quite small outside of N'Djamena, Sahr, Mondou and perhaps one or two other locations. Stocks outside N'Djamena are under control of sub-prefectures. Present communications and administrative problems make rapid response to local needs difficult to accomplish. The management skills required and the complexities of physical handling and protection of inventories grow as size of inventory increases. Thus, dispersion of reserve stocks is not readily feasible until FDAR can maintain effective control over widely dispersed activities.

Another limiting factor to the rapid expansion of storage facilities is the limited number of technical and skilled personnel available among government and private contractors for building such facilities. While the storage facility design are highly standardized, the construction of storage competes with nearly all other public and private construction projects for transportation, equipment, skilled personnel and materials. Any large undertaking for storage projects risks inflating all construction costs and/or delaying other vitally needed projects.

### D. Improving Farmers' Income

The typical farmer markets only a very small quantity of grain - less than 100 kg per year. Doubling or tripling the market price would add relatively insignificant amounts to the farmers' income. The answer to rural poverty will come only

through increased economic activity in the total economy, plus increased productivity in agriculture. Opportunities for non-farm employment create demand for high valued agricultural commodities. Reduced employment in agriculture, plus greater productivity of those remaining in agriculture can raise the level of living in Chad. Substantial progress in Chad in these directions probably cannot be achieved in the next two or three decades.

#### E. Approaches to a Total Solution

The approach to solving the food and development problems of Chad with the highest probability of success will be one which attempts to involve all of its citizens at the local level. A detailed explanation of this approach has been clearly defined by Owens and Shaw, 1/ and is the basic format of the Integrated Rural Development Project. The fundamental objectives of this approach are to enable rural residents to :

1. Gain access to the social and economic system of the country.
2. Learn to use modern technology in the individual occupations and lives.
3. Work in groups such as local government and farmers' organizations to solve problems.
4. Be linked into higher levels of the economy and society.

Rural residents in Chad have demonstrated their capacity to survive under extremely adverse conditions. Developing national grain reserves and market price policies that enable people living at subsistence to gradually improve their standard of living will form only a small portion of the total effort that will be needed before Chad will be able to assume its place among the developed nations of the world. The resources and plans are available to assist Chad in taking these first small steps toward development.

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1/ Edgar Owens and Robert Shaw, "Development Reconsidered : Bridging the Gap Between Government and the People". Appendix 8 to Committee Report on Foreign Affairs, Sub-committee on Africa, 93rd Congress, "The Crisis of Development and Interdependence," US Government Printing Office, 1974.

## V. RECOMMENDATIONS FOR GRAIN PROGRAMS

### A. Recommendations for FDAR

#### 1. Development of a National Cereals Market Policy

Current market prices for cereals were established by the Chadian Government in 1975. Disparities between the Chadian official price and prices obtainable in neighboring countries have caused considerable marketing to be diverted from official channels. FDAR has been asked to report to Ministry officials on new approaches to its responsibilities, but lacks sufficient trained personnel to undertake comprehensive studies.

There is an urgent need for a national cereal market policy. Such a policy could be developed after investigation of these factors :

- a. Costs and methods of encouraging subsistence farmers to adopt a market orientation. <sup>1/</sup> Impact of increasing domestic food marketings on the production of cotton and other agricultural products having potential for earning foreign exchange or replacing commodities currently being imported.
- b. Possible costs and social impacts of subsidizing food prices in urban areas.
- c. Estimates of price elasticities in production and consumption, at various levels of market participation. The impact on national economic growth of increasing farmer income and encouraging farmer participation in an exchange economy is a further consideration.
- d. Alternative forms of market development, ranging from complete government control to encouraging large scale private commercial grain storage and trading.

#### 2. Development of Reserve Stocks

The goal of 10,000 MT reserve grain stocks should be expanded to a goal of at least 50,000 MT or 30 days supply, at current consumption levels. The possibility of attaining this goal within the next decade is very limited however, without substantial increases in foreign assistance. Reserve stocks that are accumulated

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<sup>1/</sup> Appendix I is a sub-PID of the Integrated Rural Development Project designed to develop this information.

should be more widely dispersed throughout the central and northern regions that are subjected to higher probabilities of crop failure. At the present time, there are very real difficulties in implementing this recommendation, as was discussed in the conclusions section of this report, but this recommendation is a long term objective that should be adopted.

### 3. Development of Additional Storage Capacity

FDAR should develop a long range strategy for the location of storage facilities and immediately begin construction of 3,000 MT storage per year for the next five years. Appendix J is a PID submitted to AID to accomplish this objective. In establishing a location strategy, the following factors should be considered :

- a. Accessibility of location under present transportation system.
- b. Probability that location will be included in any national or regional transportation plan for improving highways or other transport facilities.
- c. Grain supply and demand factors :
  - i) In grain surplus areas
    - number of farmers in area to be served;
    - accessibility of location to farmers;
    - estimates of marketable volumes of grain;
    - present grain marketing system and impact FDAR would have upon the markets;
    - stability of grain production (relative frequency of drought, crop failures, insect attacks, etc.);
    - grain production potential from new or improved technology;
    - methods or incentives necessary to get subsistence farmers to adopt a market orientation;
    - methods and cost of administration of the local facility;
    - cost of transportation from the proposed location to principal storage and/or consumption centers.
  - ii) In grain deficit areas
    - geographic area to be covered;
    - population to be served;
    - magnitude of grain deficits :
      - seasonably predictable shortages ("soudure"),
      - cyclically unpredictable (droughts, crop failure frequency and severity);

- ease of transport during periods of primary need;
- ability of local population to purchase grain and/or availability of the Chadian Government or international donor funds to support distribution.

d. Other considerations :

- i) location of proposed warehouse location in relation to farm input distribution centers of ONDR and/or agricultural extension personnel;
- ii) availability of local personnel that can be hired and trained to operate the facility;
- iii) political stability and security of the area and transportation routes to and from the area;
- iv) communication channels available between N'Djamena and the proposed location.

While it is not possible to assign a score or weight to each point raised above, an evaluation of each proposed site should enable FDAR to rank location in order of priority, based on the advantages and disadvantages revealed in the locational analysis.

4. Upgrading Operational Efficiency

FDAR should take immediate and more positive steps to develop Chadian personnel to replace expatriates in the upper level management positions within the next five years. FDAR's field staff must be expanded to maintain effective control over FDAR activities at the prefecture level. Accounting and statistical capabilities must be expanded to provide control and forecasting systems capable of responding quickly to needs for market intervention and the movement of supplies into potential shortage areas. The specifics of this recommendation are addressed in Appendix H.

5. Encourage Improved Home and Village Level Storage Development

It will not be possible, nor practical for FDAR, to assume primary responsibility for maintaining food reserves for the nation. For the foreseeable future, FDAR can only hope to partially alleviate the problems of hunger and wide fluctuations in market prices.

CARE has developed plans for improved home storage that should be implemented on as broad a scale and as quickly as possible. 1/ ONDR has begun an experimental program in five villages near N'Djamena in which a common storage unit, holding 100 MT of grain, is placed under village control. As previously mentioned the cooperative at Kim has some storage developed. All these activities need to be made priority projects of every ministry and organization associated with them.

B. Recommendations for the Ministry of Agriculture and Land Management

At the present time, Chad is the focus for many international agency aid and development programs. Each program has its separate objectives, requirements, funding systems, time schedules and levels of capability. The result has been duplication of effort and delays in implementing needed activities because of unavailability of funds or personnel. The Ministry needs to develop its own set of national priorities in agricultural development and utilize its own funds and personnel resources in cooperating only with those agencies willing and capable of supporting the Ministry's objectives.

APPENDIX APopulation Density Per Prefecture

(per sq. km)

Logone occidental	30.8
Mayo Kebbi	19.0
Tandjile	15.1
Logone oriental	9.9
Moyen Chari	9.8
Chari Baguirmi	6.5
Lake	5.3
Ouaddai	4.2
Batha	3.7
Guera	3.1
Biltine	3.1
Kanem	1.6
Salamat	1.2
BET	0.1

APPENDIX BNumber of Extension Agents

	<u>Number of Extension Agents</u>	<u>Number of Farm Families</u>	<u>Number of Farm Families per Agent</u>
Mayo Kebbi	170	82,000	482
Tandjile	80	43,900	548
Logone occ.	93	39,100	420
Logone or.	105	44,200	420
Moyen Chari	190	59,900	315
Chari Baguirmi	75	31,700	422
Salamat	22	Nd	-
Batha	11	Nd	-

Source : Production and Marketing of Cereals in Chad, p. 70, UN, 1974.

## APPENDIX C

Estimate of Areas Planted and Production of Millet  
and Sorghum in an Average Year.

	Area planted to single crops	Area planted to mixed crops	Total Area Planted	Production
Mayo Kebbi	79.4	55.6	135.0(1)	94.1
Logone Occidental	11.5	63.5	75.0	44.1
Logone Oriental	15.5	74.5	90.0	53.4
Tandjilé	20.2	29.8	50.0(2)	32.6
Moyen Chari	50.2	79.8	130.0	84.0
<b>Total South zone</b>	<b>176.8</b>	<b>303.2</b>	<b>480.0</b>	<b>308.2</b>
Chari Baguirmi	96.7	8.3	105.0	66.6
Lac	20.5	0.5	21.0	8.4
Kanem	40.0	-	40.0	16.0
Batha	100.0	-	100.0	50.0
B E T	2.0	-	2.0	0.8
Ouaddaï + Biltine	180.0	-	180.0	99.0
Guèra	60.0	-	60.0	33.0
Salamat	30.0	-	30.0	19.5
<b>Total North zone</b>	<b>529.2</b>	<b>8.8</b>	<b>538.0</b>	<b>293.3</b>
<b>Total Tchad</b>	<b>706.0</b>	<b>312.0</b>	<b>1.018.0</b>	<b>601.5</b>

Source: p. 28, Production and Marketing of Cereals in Chad, UN, 1974.

## APPENDIX D

Average Size of Agricultural Exploitations in Chad

	Total Number of Exploitations & Agricultural Surface Area	Exploitations Surface Area (ha)	Distribution of Exploitation According to Size (%)				Number of Workers per Exploitation	Average No. of Workers According to Size of Exploitations					Total No. of persons per exploitation	Surface area Cultivated per Person on Exploitation (m <sup>2</sup> )
			Less than 1 ha	From 1 to 2 ha	From 2 to 5 ha	More than 5 ha		Less than 1 ha	From 1 to 2 ha	From 2 to 5 ha	More than 5 ha			
			<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>		<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>			
<u>Western Logone</u>	39,100 on 126,000 ha	3.2	5.3	19.1	59.7	15.9	3.5 (9176)	1.3 (4630)	2.3 (6264)	3.6 (9317)	5.3 (12590)	5.5	5,900	
<u>Eastern Logone</u>	44,200 on 148,450 ha	3.3	6.4	17.7	59.7	16.1	4.2 (8000)	3.2 (2445)	2.9 (5283)	4.2 (7678)	6.0 (11493)	6.4	5,200	
<u>Mayo Kebbi</u>														
Cotton stratum	65,700 on 164,000 ha	2.5	13.1	33.3	45.0	8.7	3.9 (6466)	3.2 (6000)	3.4 (4344)	4.0 (7580)	5.6 (10515)	5.9	4,250	
Rice stratum	6,000 on 5,100 ha	0.85	75.8	18.5	55.7	-	3.3 (2570)	3.2 (1840)	3.9 (3394)	2.5 (11070)	-	5.0	1,690	
Mixed stratum	10,300 on 34,000 ha	3.3	16.7	16.0	49.8	17.5	4.0 (8200)	3.6 (2423)	4.1 (5555)	4.1 (8130)	5.2 (13578)	6.0	5,500	
<u>Tandile</u>														
Rice stratum	15,000 on 40,300 ha	2.6	15.3	27.6	48.1	9.0	3.0 (8430)	2.2 (2900)	2.7 (5660)	3.3 (9236)	3.8 (16657)	5.3	4,800	
Cotton stratum	28,100 on 88,800 ha	3.2	4.2	14.6	70.4	10.8	3.1 (10265)	2.7 (2500)	2.8 (5550)	3.0 (10550)	4.4 (14970)	6.2	5,130	
<u>Moyen Chari</u>	59,900 on 211,700 ha	3.5	4.4	19.4	58.3	17.8	4.2 (2400)	2.7 (2630)	2.8 (5400)	4.1 (7950)	6.6 (11300)	6.0	5,920	
<u>Lake</u>	27,400 on 27,700 ha	1.0	62.3	27.0	9.9	0.8	2.1 (4740)	2.2 (2480)	2.6 (6000)	1.9 (5435)	2.1 (10000)	3.5	2,965	
<u>Kanem</u>	17,050 on 23,400 ha	1.4	49.8	29.0	19.0	2.2	1.9 (7000)	1.8 (2800)	2.0 (6900)	2.1 (13900)	2.8 (25300)	4.3	3,190	
<u>Chari</u>	31,700 on 45,700 ha	1.4	43.8	31.5	22.7	1.9	2.4 (6040)	2.1 (2500)	2.4 (5800)	2.7 (10300)	3.6 (17700)	4.1	3,490	

1/ The figures between parenthesis show the average cultivated area (in sq. m) per worker.

APPENDIX E

Annual Income of Agricultural Farmers (in Francs CFA), 1973

	Mayo Kebbi			Tandjile		Western Logone	Eastern Logone	Moyen Chari	Lake	Kanem	Chari Bacirmi
	Cotton Stratum	Rice Stratum	Mixed Stratum	Rice Stratum	Cotton Stratum						
<b>Traditional Crops</b>											
Cotton	9,610	145	9,180	1,365	12,340	11,320	10,700	10,730	-	-	1,210
Millet	8,570	3,500	12,490	2,545	9,280	11,400	12,300	15,830	6,350	10,960	9,310
Unhusked Rice	350	3,840	4,880	25,730	700	750	250	450	-	-	-
Peanuts	3,810	75	3,280	850	3,650	5,260	3,420	3,600	-	-	1,080
Root Crops	1,370	1,600	430	140	700	460	4,440	3,850	-	-	-
Peas	1,740	400	3,500	460	3,560	2,900	2,840	3,480	100	60	540
Others	750	-	160	-	2,430	5,850	3,390	1,930	900	550	120
<b>Gross Total Income.</b>	<b>26,200</b>	<b>9,620</b>	<b>33,920</b>	<b>31,090</b>	<b>32,660</b>	<b>37,940</b>	<b>37,340</b>	<b>39,870</b>	<b>7,360</b>	<b>11,570</b>	<b>12,320</b>
Valorization of a day's work	125	135	135	155	130	155	150	150	110	130	130
Gross Income per Worker	6,720	2,920	8,480	10,360	10,530	10,840	8,890	9,490	3,500	5,990	5,150
Gross Income per Hectare	10,500	11,320	10,280	12,190	10,330	11,780	11,110	11,290	7,290	8,450	8,560
Cash Income	9,610	1/	12,300	7,100	12,340	17,300	17,900	20,200	1/	1/	1,210
<b>Modernized Crops</b>											
Cotton	24,700	370	23,560	3,530	31,750	29,080	27,500	27,590	-	-	3,070
Millet	12,150	4,900	17,650	3,600	13,100	16,030	17,290	22,380	9,060	15,660	13,270
Unhusked Rice	640	7,120	9,120	48,030	1,330	1,410	480	890	-	-	-
Peanuts	7,270	135	5,450	1,510	6,050	8,480	5,510	5,530	-	-	1,910
Root Crops	1,370	1,600	430	140	700	460	4,440	3,850	-	-	-
Peas	1,740	460	3,500	460	3,560	2,900	2,840	3,460	100	60	540
Others	750	-	160	-	2,430	5,850	3,390	1,930	900	550	150
<b>Gross Total Income</b>	<b>48,620</b>	<b>14,650</b>	<b>59,870</b>	<b>57,270</b>	<b>53,920</b>	<b>64,210</b>	<b>61,450</b>	<b>65,910</b>	<b>10,060</b>	<b>16,270</b>	<b>19,970</b>
<b>Net Total Income</b>	<b>42,250</b>	<b>12,440</b>	<b>51,070</b>	<b>44,190</b>	<b>50,460</b>	<b>56,230</b>	<b>53,950</b>	<b>58,160</b>	<b>9,460</b>	<b>15,450</b>	<b>17,500</b>
Valorization of a day's work	168	160	197	200	160	180	170	180	130	165	160
Net Income per Worker	10,830	3,770	12,770	14,730	16,280	16,060	12,850	13,850	4,500	7,880	7,320
Net Income per Hectare	16,900	14,630	15,475	17,330	15,970	17,460	16,050	16,470	9,370	11,250	12,150
Cash Income	20,760	1/	30,000	20,650	27,400	36,000	33,800	38,800	1/	3,000	3,500

1/ Too low for an estimation.

APPENDIX F

Included in this Appendix are pages 107, 132 and 141 of :

"Production et Commercialisation des Cereales", Vol. I,  
TCHAD, United Nations, July 1974.



1985 Forecast for Millet and Sorghum Needs for Human Consumption

	Rural Population			Urban Population			Total Request in 1985 (rounded T)	% of Increase Compared to 1972
	No. of Inhabitants (1,000)	Request/Person (kg/year)	Total Request (tons)	No. of Inhabitants (1,000)	Request/Person (kg/year)	Total Request (tons)		
					1/			
<u>Southern Zone</u>								
Moyen Chari	490	130	63,700	100	109	10,900	74,600	+ 33
Logone occidental	290	191	55,390	72	155	11,160	66,500	+ 36
Logone oriental	320	202	64,640	20	185	3,700	68,300	+ 24
Tandjile	300	165	49,500	50	151	9,550	59,000	+ 36
Mayo Kebbi	680	179	121,720	60	164	9,840	131,500	+ 31
<b>Total</b>	<b>2,080</b>	<b>170</b>	<b>354,950</b>	<b>302</b>	<b>150</b>	<b>45,150</b>	<b>400,200</b>	<b>+ 31</b>
<u>Northern Zone</u>								
Chari Baguirmi	360	151	54,360	455	129	58,695	113,100	+ 57
Lake	140	125	17,500	-	-	-	17,500	+ 18
Kanem	216	170	36,720	-	-	-	36,700	+ 19
Batha	370	147	54,390	10	135	1,350	55,800	+ 20
Ouaddai	342	153	52,326	40	140	5,600	57,900	+ 13
Biltine	180	132	23,760	-	-	-	23,800	+ 31
Salamat	122	138	16,354	-	-	-	16,800	+ 27
Guera	218	153	33,354	17	140	2,380	35,700	+ 29
BET	94	112	10,528	-	-	-	10,500	+ 19
<b>Total</b>	<b>2,042</b>	<b>147</b>	<b>299,774</b>	<b>522</b>	<b>130</b>	<b>68,025</b>	<b>367,800</b>	<b>+ 30</b>
<b>TOTAL TCHAD</b>	<b>4,122</b>	<b>159</b>	<b>654,724</b>	<b>824</b>	<b>137</b>	<b>113,175</b>	<b>768,000</b>	<b>+ 31</b>

1/ The estimate of the needs per person of the urban population were based on figures inferior by 10% to those projected for the rural population to take into account the higher consumption of rice and wheat in the cities.

Rice Consumption Variations According  
To Income in N'Djamena

<u>Monthly Family Income (CFAF)</u>	<u>Rice Consumption Per Family/Month (CFAF)</u>	<u>Monthly Income Per Family Per Professions (CFAF)</u>	<u>Rice Consumption Per Person/Day (in grams)</u>	
5,000 - 9,999	425.0	Women Heads of Family	10,263	31.8
10,000 - 14,999	497.1	Traders	16,826	16.6
15,000 - 19,999	360.2	Farmers	17,458	13.1
20,000 - 24,999	447.1	Artisans	18,007	13.7
25,000 - 29,999	506.0	Unskilled Workers	18,866	9.5
30,000 and over	571.3	Workers	19,409	9.0
		Civil Servants	21,052	7.8
		Fishermen	24,773	13.7

Appendix GREPORT ON THE AGRICULTURAL DROUGHT PROGRAM 1975-1976

Ministry of Land Management  
and Environment

GENERAL BACKGROUND

Of all the Sahelian countries affected by the drought, Chad has been the hardest hit.

In order to evaluate these countries' food requirements and the needs of the agricultural sector, OSRO organized a multidonor team which visited Chad between October 1973 and November 1975.

Their reports were based on estimates of production, and the objective was to call attention to the urgency of assisting Chad before the rainy season.

In 1975, the Tchadian Government decided to furnish the donors with a relatively precise estimate of the grain production for the 1975/1976 campaign, since rainfall had been abundant for that period.

In this view, the Office for Protection against natural calamities (Direction de la Lutte contre les Calamités Naturelles) together with PNUD, FAO/ORSO, PAM and USAID drafted this report to:

- i. Update the M.D.M. 1974/1975 Report
- ii. To present the different donors with requests for short and long term assistance programs.

The requests are presented as "Projects' Files" and are detailed in the Sub-Commissions' reports attached. The Chadian Government at this stage, will not provide the donors with financial data. These data will be furnished later to the donors who have shown a definite interest.

The following representatives were allowed to participate in the Sub-Commissions' discussion with "observers" status:

1. Delegates from the European Fund for Development (FED)
  - Delegates from the French Mission for Aid and Cooperation (FAC)
  - Delegates from the U.S.S.R. Embassy
  - Delegates from the People's Republic of China's Embassy

The Chadian Government hereby thanks them for their interest.

PART A: UPDATE TO THE M.D.M. REPORT 1974/1975

1. 1975 GRAIN PRODUCTION

Estimates for the grain harvest (millet, sorghum, paddy) are as follows:

- Sudanian Zone -----	372,580 tons
- Sahelian Zone -----	222,200 tons
TOTAL-----	594,780 tons

Total grain production per region is outlined in Annexes A.1.1 and A.1.2. Each area is presented separately, because there is more data available on the Sudanian Zone. The grain harvests for 1974 and 1975 can be compared as follows:

	1975 Harvest	1974 Harvest	Difference	
			Tons	Percentage
Sudanian Zone	372,580	360,000	+ 12,890	+ 3.4%
Sahelian Zone	222,200	199,310	+ 22,890	+10.3%
Total	594,780	559,310	35,470	+5.9%

Even with a 6% increase in yield and in view of the fact that this harvest follows a series of crop fails, the situation is still unsatisfactory and must be remedied.

2. ESTIMATED GRAIN REQUIREMENTS FOR 1976

Official demographic estimates are presented in Annex A.2.

-Grain Consumption in the Sahel:

It has been estimated that grain requirements are 125 kg/per person, per year.

-Grain Consumption in the Sudanian Zone

Since cash crops, especially cotton, have increased, field work has also increased, which resulted in increased dietary needs, the Government estimates that in this area, unit consumption of grain is 170 kg/per person/ per year.

Estimated consumption is as follows:

	<u>Production for 1975</u>	<u>Requirements</u>	<u>Difference</u>
Sahara-Sahelian Zone	222,200	255,250	-33,050
Sudanian Zone	<u>372,580</u>	<u>340,170</u>	<u>+32,410</u>
	594,780	595,420	- 640

## 2.1 RELATIVE DEFICIT IN THE TOTAL HARVEST

This table shows a deficit of 33,050 tons in the Sahelian Zone. This number represents the difference between an absolute deficit of 41,425 tons from 6 Sahelian Prefectures and a surplus of 8,375 tons harvested in the 7th Prefecture of the same zone.

<u>Sahelian Departments</u>	<u>Requirements</u>	<u>Production</u>	<u>Difference</u>	
	<u>125 kg/person</u>		-	+
B. E. T.	10,375	-	10,375	
Kanem	26,000	14,600	11,400	
Lac	17,500	12,100	5,400	
Chari-Babuirmi	66,250	65,000	1,250	
Batha	44,750	38,000	6,750	
Guera	24,125	32,500		8,375
Ouaddai/Biltne	66,250	60,000	6,250	
	255,250	222,200	41,425	8,375

$$41.425 - 8,375 = (\text{Relative Deficit})$$

This table shows a total deficit of 41,425 tons and relative deficit of 33,050 tons.

While this deficit can be filled in its entirety by the surplus harvest from the Sudanian Zone, the compensation can only be partial, because the road infrastructure is so poor that through traditional channels, the southern farmers are not able to transport more than 28,000 tons of their harvest. Transporting this supply requires a large Government effort for assistance. The Government is already helping with the transport, since normally, the established channels can only transfer 20,000 tons from the South to the North (see M.D.M. Report for last year).

Funds remaining from foreign aid will compensate for the 5,000 tons not transferred. This operation can proceed as follows:

-OSRO's local stock for marketing in 1975	1,720
-Remainder of food aid stock in N'Djamena to December 31, 1975	2,780
-Estimate of remainder from food stocks stored in sub-department areas	+ 550
	<u>5 050</u>

## 2.2 Total Deficit

As outlined above, the relative deficit of 33,050 tons is the result of a mathematical operation whose factors are on one hand a total deficit of 41,425 tons in the Sahelian Zone and on the other a surplus of 8,375 tons from the same area.

In order to fulfill dietary requirements of the total Sahelian population, there must be an horizontal compensation within the area.

Marketing experts calculate that the horizontal phase of customary trade cannot exceed the 5,000 tons. Some 3,355 tons must be hauled by the Government using the services of the Public Office for Grain Marketing (Organisme Public de commercialisation des cereales) the Grain Branch of the "Fonds de Developpement et d'action Rurale".

## 2.3 Summary

The total deficit for the Sahelian zone can be compensated in this fashion:

--Total Deficit	41,425	41,425	
--Horizontal Compensation through Sahelian customary trade	5,000		
--Horizontal Compensation through "76 local marketing" program	3,375	<u>-8,375</u>	
		33,050	33,050
--Relative Deficit	33,050		33,050
--Balance of Food Aid for 1975	5,050		
--Customary Trade (South-North)	<u>28,000</u>		
	33,050		33,050

### 3. DISTRIBUTION PLAN

Actually, it is not possible to establish, with precision, a distribution plan for the 3,375 tons to be purchased by the FDAR/DC for the Office of Protection against Natural Calamities (Direction de Lutte Contre les Calamites Naturelles (DLCN)). This Agency has been appointed for the distribution which in turn is conditioned by the process of traditional trade.

The Government of Chad wishes to assure its donors that the DLCN is in the process of creating a control system to determine in advance of which production area will have a deficit. In order to prevent the populations that have been hit from becoming overly dependent on the "aid provided", it has been decided, at the Ministerial level that all national cereal distribution will involve a small fee. This action is aimed at preventing dependence on the program which, in the long run, is dangerous for the country's economy.

- In the large cities, the grains would be sold for a small fee and the revenues from that sale would be allocated to the accounts of the "Local Marketing Operations OSRO" which were opened for that purpose last year.
- In the rural areas, the farmers would receive these grains gratuitously, but would use their next harvest to pay the Government in kind.

The DLCN nevertheless has the right to decide to distribute the stocks. The DLCN can, during emergencies, distribute gratuitously a limited stock to the farmers.

### 4. EMERGENCY STEPS DESIGNED TO FILL 1976 FOR THE LOCAL MARKETING ACTIVITIES

In its 1974/1975 Report, the M.D.M. proposed a series of activities for implementation of the buying activities in the South of 10,000 tons of intended for distribution in the North. As directed by the conclusions of this study, OSRO financed the purchase of 3,000 tons. However, since the buying activities were slowed by red tape, only 1,720 tons were purchased.

In September of 1975, the harvests were good, thanks to adequate rainfall, the Government requested that OSRO obtain the financial and technical assistance required for the purchase of 3,000 tons of grains in order to build the first nucleus of a reserve stock.

Unfortunately, the donors have not been able to comply with the Government's request. However, in order to make sure that Chad would have a sufficient amount of grains for distribution in case of emergency, OSRO has authorized the Government to use the balance of \$220,000 remaining from the "local purchases" of last year.

The FDAR/DC has just started the buying campaign financed by this amount. Since according to FAO procedures, it is not possible to disburse the funds needed for the purchase, the FDAR has asked the Chad Development Bank (B.T.D.) to grant a credit that would be reimbursed with ORSO funds, once the purchases are made.

The optimistic estimates of September were somewhat reduced during the last months of the agricultural campaign due to predators' attacks in certain areas of the country. This accounts for the fact that this year, the expected "bumper crop" turned out to be barely enough to fulfill the food requirements of the population.

In this case, 3,375 tons would be necessary, not to build a reserve stock, but for consumption during 1976. As pointed out in Paragraph 3, it is necessary to initiate a buying campaign, in order to supply non-productive zones through traditional trade channels.

In view of the fact that ORSO funds could only cover the purchase of what amounts to 1/3 of the financial needs, the Chadian Government reiterates its request to the donors in order to obtain funds for the FDAR to purchase the 3,375 tons needed. To this effect, a financial supplement in the amount of \$500,000 is necessary.

## 5. STORAGE

### Background

Storage facilities in Chad are as follows:

#### N'DJAMENA

2 warehouses (total capacity)	1,650 tons	financed by Government of Chad (F.D.A.R.)
6 warehouses " "	5,400 " "	" " USAID
2 warehouses " "	2,000 " "	" " the World Bank
	9,000 " "	" " "
ABECHE	1,000 " "	" " "
AM TIMAN	1,000 " "	" " FED
ATI	600 " "	" " the World Bank
BILTINE	600 " "	" " " "
BITKINE	600 " "	" " FED
BOL	600 " "	" " "
DOURBALI	600 " "	" " "
MAO	600 " "	" " the World Bank
MONGO	600 " "	" " " "
MOUNDOU	600 " "	" " Government of Chad (F.D.A.R.)
MOUSSORO	600 " "	" " FED
NOUKOU	600 " "	" " "
OUMHADJER	600 " "	" " "
SAHR	600 " "	" " Government of Chad (F.D.A.R.)
	<u>9,220 tons</u>	

TOTAL STORAGE CAPACITY: 9,000 + 9,200 tons = 18,200 tons

It should be noted, however, that FED has recently approved funds earmarked for the construction of 2 warehouses (capacity 600 tons) in Koro Toro and Kouba.

5.2 The experience of the last drought years has underscored the necessity of establishing reserve stocks for immediate distribution in case of need, while awaiting external assistance.

The Government of Chad, in view of its new grain policy, intends to expand the activities of the Grain Department, in order to stabilize grain prices.

#### 5.2/1 Reserve Stocks

Foreign experts as well as national officials, believe that in the end, the reserve stocks should be around 10,000 tons. Policy and technical reasons dictate that this reserve should be divided as follows:

—9,000 tons to N'Djamena

—1,000 tons to Abeche.

Since millet cannot be preserved for over two years, the management of the stock should budget for 50% stock renewal. Consequently, each year, 5,000 tons of grains must be disposed of, 4,500 tons to N'Djamena and 500 tons to Abeche.

#### 5.2/2 Grain Prices Stabilization

Efficiency and success of price stabilization is tied to the issue of decentralizing the stocks. Due to poor rural roads, exchanges between production areas and consumption zones are extremely difficult.

In N'Djamena and Abeche, price stabilization will be the result of stock renewal. The grain storage network should be strengthened within the existing centers and new storage facilities built both in the production and the consumption zones.

Considering the grain requirements in term of the existing network, the Government is requesting the donors to provide financing for the construction of warehouses in the following towns:

#### —BUYING CENTERS:

BOKORO	600 tons
MOTTO	250 tons
MELFI	250 tons
NGAMA	250 tons
AM-N'DJAMENA	<u>250 tons</u>

1,600 tons

-DISTRIBUTION CENTERS:

CORE	250 tons	
BEBEDJA	250 tons	
BERE	250 tons	
PALA	250 tons	
LERE	250 tons	
BONGOR	<u>250 tons</u>	<u>1,500 tons</u>
	TOTAL	<u>3,100 tons</u>

The distinction made between distribution and buying centers is not categorical, since each sector may face bumper crop or failing harvest as a result of the agricultural campaign.

5.2/3 CONCLUSION

The Chadian Government is hereby requesting the donors to finance construction of storage facilities with the following capacity:

N'DJAMENA	1,000 tons
OTHER CENTERS	<u>3,100 tons</u>
	4,100 tons

. . . . .  
Unofficial Translation of the "Rapport sur la Situation du Pays vis a vis de la secheresse - Campagne Agricole 1975/1976" N'Djamena, Tchad, 28 janvier 1976.

D. Benjamin/MASI  
August 1976.

## APPENDIX H

### ACCELERATED PROJECT IDENTIFICATION DOCUMENT (APID)

#### CEREAL MARKETING SECTOR

#### I. THE PROBLEM AND PROPOSED SOLUTION

##### A. The Problem

FDAR (Fonds de Developpement et d'Action Rurale) is the Chadian Government's agency for buying, storage and distribution of cereals. The agency, in principal, functions as a price stabilization force by buying or selling grains in the local markets in sufficient quantities to enforce official Government price regulations. In practice, FDAR is only moderately effective in N'Djamena.

Since the change in government in 1975, increasing responsibility has been assigned to FDAR for storage and distribution of grains on a nation wide basis. In the absence of a field staff, FDAR has appointed the sub-prefectures (local area administrative agents) as FDAR representatives in their respective jurisdictions. The sub-prefectures are not administratively responsible to FDAR. Communication and accountability for storage stocks and funds are lax. In practice, the primary beneficiaries of FDAR activities in rural areas are civil servants who are assured of a reliable food supply at relatively low fixed prices. The local populations are often unable to buy from the FDAR stocks, and farmers are understandably reluctant to sell to FDAR in many areas because there is no assurance that they will be able to buy grains back in case of need. In order to assure greater equity in food purchasing and distribution, FDAR management over the sub-prefecture operations needs to be firmly established.

In addition to the above problem, all accounting and financial controls of FDAR are vested in one expatriate who is increasingly unable to keep up with the growing volume of activities. There is an urgent need to train Chadian personnel to assume greater responsibility for the fiscal management and control of the financial stock management functions.

Total FDAR operations would be improved greatly by better market intelligence. FDAR could provide a higher degree of market stability and better distribution of food stocks if current data were available on local or regional prices, volumes traded in major local markets, and stocks available for sale.

## B. AID RESPONSE

### 1. Project Purpose

A pilot project will be initiated which will test systems for management of local stocks in sub-prefectures, collection of local market information, and strengthen accounting and inventory control systems. The number of systems tried should be small and evaluated continuously, with modification and expansion proceeding at a moderate rate until sub-prefecture operations are brought under effective control. It is envisioned that after gradual perfection of the control systems, additional revenues generated from the marketing operations, and from increased efficiencies throughout, should pay for the personnel and operating expenses of FDAR in the years ahead.

### 2. Project Details

#### a) Local FDAR Representation.

FDAR, in conjunction with other Ministry personnel, and periodic Regional consultants, will develop operating policies, procedures, communications and control systems for local representatives. Simultaneously, six to ten candidates for positions as local representative would be selected, and trained in basic accounting and control procedures pending completion of the more definitive operational guidelines. Upon completion of training, the local representatives will be placed in the sub-prefectures. The local representatives will be supervised closely by periodic visits from field supervisors operating from FDAR headquarters in N'Djamena.

Basic duties of the local representatives of FDAR would include:

1. Buying and selling of local stocks according to FDAR policies and procedures.
2. Encouraging local farmers to sell their surplus stocks to FDAR by assurances of honest weighing and pricing practices, plus assurances of availability of stocks in case of need to repurchase.

3. Collection of local market data concerning prices paid by local traders, quantities of grains sold, and levels of demand.

Basic duties of the field supervisors would include:

1. Auditing of local representatives records and verifying local inventories and account balances.

2. Evaluating the performance of the local representative.

3. Evaluating the operating procedures for operational efficiency and contribution to established objectives of FDAR.

b) Development of Market Intelligence

Quantative and statistical techniques need to be developed and tested for estimating the quantatives of grain being marketed, the market prices paid, and the impact of FDAR purchases or sales on local markets. Two to three key-sub-prefectures would be investigated to determine the practability of collecting market data directly from the markets or from observation of key road intersections in the area. Sampling procedures might be instituted in assessing the farmer's grain holdings and estimating probable farmer's surplusses above subsistence needs. Condition of grain and estimates of storage losses could also be developed.

c) Strengthening Accounting and Control Procedures

Present volume of FDAR activity does not seem to justify installation of data processing equipment. However, there are alternatives in accounting equipment and procedures which have the potential for upgrading the present system, and converting to automatic data processing procedures when the volume of activity justifies such a step. FDAR and possibly a short term consultant should investigate the practability of some alternative record keeping system and begin a training program for upgrading its accounting personnel.

### 3. Major Assumptions

Implicit in the project concept is that achievement of purpose will contribute to the goal of overall self sufficiency in food supply and protection of local populations from periodic food shortages and rapid increase in food prices. A recent reorganization in the Chadian Government has brought formerly separate agencies responsible for food production and distribution into one administrative unit. It is assumed that the Government of Chad has an increasing interest in the promoting of efficiency and equity in food production, distribution and pricing, and is willing to make further administrative changes to achieve these objectives.

### 4. Host Country and Other Donor Activities

The host country has initiated steps in the direction of implementing many of the activities proposed in this APID, but lacks sufficient resources to be completely effective. Much of the administrative, transportation, and other overhead expenses will be borne by the host government.

### 5. Project Alternatives

The pilot market management project could be developed as components dealing with local market representation, the development of market statistics and market forecasting techniques, and in developing model financed and inventory control systems.

### 6. Project Beneficiaries

The direct beneficiaries are the 60% of the population who live in the areas to be served by the FDAR representatives. Farmers will have a ready and more responsive access to cash buyers who will pay fair prices. This will strengthen farmers selling position in local markets and enable farmers to avoid dealing with unscrupulous traders who frequently take advantage of them. Consumers in local areas will benefit from having greater access to reserve food stocks in time of needs and benefit from greater stability in local food prices.

## 7. Spread Effect

The spread effect of expanded and more equitably distributed food stocks would be beneficial to the entire nation. As more is learned about market supplies, costs, and other essential data, the better the GOC will be able to respond to the need for developing adequate national policies for the production and distribution of cereals.

## II. FINANCIAL REQUIREMENTS AND PLANS FOR SUB-PROJECTS

### A. Dollar Amounts

1.	a) Sub-prefecture representation and supervision; selection, training, positioning of local personnel and supervisors	
	2 years at \$40,000 the first year and \$50,000 the second year	\$ 90,000
	b) Developing local operating procedures, control systems and headquarters supervision	
	\$30,000 the first year; \$25,000 the second year	55,000
2.	Developing statistical market information and training local staff for analysis: \$35,000 1st year; \$25,000 2nd year	60,000
3.	Evaluating alternative accounting and control systems, training and strengthening of local personnel	
	\$23,000 the first year; \$20,000 the second year	43,000
		-----
	TOTAL	\$ 248,000

B. AID assistance is to be primarily in the form of grants for project development, personnel training, and support during the test phases of the projects. Two months technical assistance desirable in start-up phase and project evaluation can be provided by regional technical personnel on TDY.

C. Chadian support for project will be in salaries and support of some personnel assigned to the project. Funds for continuation of project could come from increased cereals sales revenues and increased organizational efficiency, plus increased general revenue allocations.

### III. PROJECT DEVELOPMENT

A. Much preliminary planning for field staff expansion has been done within FDAR. The recent GOC reorganization provides access to more competent personnel not previously available for assistance in preparation of a PRP with the short term AID consultant. A detailed plan could be prepared within three weeks in October or November after approval of the APID.

B. The project will be designed with a six month report and review procedures in conjunction with local AID personnel, with recommendations to be made for improving the program after each six months review period. The project will continue for 24 months.

### IV. ISSUES

Some centralized planning and control is necessary in a developing economy to insure a degree of equity and efficiency in the production and distribution of essential food stuffs. As the economy and volume of food production grows, the complexities of management become increasingly difficult. It may be more desirable for GOC to gradually relax controls in favor of a more open or free market system. At present, the marketing system cannot function effectively due to lack of a modern infrastructure, and large disparities of economic power that exists between the traders, farmers and consumers. It is evident that the GOC desires to attain self sufficiency in food production and improve the standard of living of all its citizens, but lacks the resources to implement all of the projects that are vital to the attainment of these goals.

## APPENDIX I

### COMMERCIAL MARKETING OF AGRICULTURAL PRODUCTS

#### COMPONENT

#### PROBLEM

Virtually all grain marketed in Chad is from stocks deemed to be in excess of the subsistence needs of the rural peasants. Limited amounts of grain may be sold at harvest to pay taxes or buy the few necessities that cannot be home produced. The concept of deliberately producing agricultural products for markets is not widely held, and little is known of potential farmer response to market incentives.

Marketing on any large scale cannot become a reality until the transport system is vastly improved. However, improvement in transport will not automatically bring increased production. The producer must perceive benefits that outweigh the cash and opportunity costs of time, labor, and other resources. At the present time, very little is known as to how farmers would respond to increased opportunities for increased cash income if obtaining such income seriously conflicts with traditional goals and values.

#### PROPOSED SOLUTION

##### 1. Project Purpose

The purpose of the project will be to identify the methods or processes by which subsistence farmers can be induced to become commercial agricultural producers in the identified IAD areas.

The problem of determining subsistence farmer response to a market economy is very broad and may vary markedly among regions and language groups. However, approaches and knowledge gained in a specific project can accelerate progress made in other locations.

##### 2. Project Details

a. Discovery of motivational factors. The primary method employed will be teams of Peace Corps volunteers deployed in a limited number of cantons in the northern and southern IAD areas. The volunteers will work under the supervision of AID agricultural production and

**livestock specialists working in other components of the IRD project and in cooperation with appropriate Chadian ministries. The volunteers will be given a thorough grounding in desired production practices and techniques, but will be given wide latitude in choice of systems or methods for inducing farmers in their assigned areas to participate in deliberate production planning for the market. All efforts made, however, will be within the framework of existing cultural and social values.**

**b. Development of an on-farm business infrastructure.** A valuable element will be the introduction of new technology into the IRD areas, and the establishment of an infrastructure to promote agricultural production (see Agricultural Production components for SABID and LOVID). The volunteer teams will have the resources support to assist the farmers in developing needed economic facilities or organizations to remove potential barriers to participation in a market economy. In some cases, it may be necessary to stimulate a market by purchasing farmer output at varying prices to test various motivational forces. However, the stocks of agricultural products obtained can be sold to IDAR and other government agencies or private traders to recoup most of the expenses involved.

**c. Technical and physical resources.** The key to the total project will be four teams of two volunteers trained in agriculture and the social sciences. The precise location of the teams can be determined at later stages of PRP and FP preparation, and depends partly upon the type of personnel available. The teams will be physically supported by personal transport of light motorcycles or mopedettes, plus access to motor vehicles through AID or ONDR if needed for specific project purposes. Each team would have necessary production equipment and inputs needed for the IRD area. Technical assistance could be provided through AID and ONDR training, plus periodic visits by AID and ONDR supervisors.

### ASSUMPTIONS

**Implicit in the project concept is that the achievement of the purpose will contribute to the goals of the integrated rural development project**

and the continual development of a national food price policy. It is also assumed that, to achieve the purposes, the GOC will make personnel and resources available to Peace Corps volunteers in a manner in which other volunteers have been supported, and that CNER and other agricultural personnel will be available for consultation as needed.

#### HOST GOVERNMENT AND OTHER DONOR ACTIVITIES

As noted above, the GOC has an established pattern of support for Peace Corps volunteers. CARE has some programs for rural family grain storage and work for food that may be integrated into this project. FIDA has funds with which to purchase marketable quantities of cereals produced.

#### PROJECT ALTERNATIVES

This project could be established outside of the integrated rural development project if viable alternative locational opportunities are present. It could not be operational without Peace Corps volunteers due to difficulty and expense of locating personnel willing to live under conditions that the project will require.

#### DIRECT AND INDIRECT BENEFICIARIES

The direct beneficiaries of the project will be those in the project area with an estimated 500 to 600 farmers and the population of 2000 to 2500 benefitting from higher cash incomes.

The spread effect among neighboring centers is expected to be rapid and significant. In addition, merchants and others in the area should benefit from increased farm income.

#### FINANCIAL REQUIREMENTS

A. Dollar amounts: \$35,000 over three years, 1978-1981. Details given in Table at end of the PID.

**B. AID assistance is expected to be entirely in form of grants to Peace Corps.**

**C. Chadian support is expected to be in form of usual support items for Peace Corps personnel, plus availability of ONDR extension personnel for consultation in project area.**

### **DEVELOPMENT OF THE PROJECT**

**A. The major responsibility for project development will lie with the Peace Corps office in N'Djamena, in consultation with the Chadian government and AID. The project drafting and timing will have to fit with current Peace Corps requirements for requisitioning the desired type of personnel and interfacing with existing Peace Corps projects.**

**B. With assured Peace Corps support, a PRP should be in Washington by November 30, 1976. With the expectation that all relevant material for the PP will be assembled at the time of the PRP, this component of the PP should be available within 60 days after PRP approval.**

### **ISSUES**

**It is apparent that the GOC needs additional information on probable farmer response to major food policy decisions. It is also apparent that the Chadian government is not currently prepared to undertake or finance any studies at this time, and that other donor agencies are not readily accessible.**

**FINANCIAL TABLE**

	<u>APID</u> <u>Units Amt.</u>	<u>1978</u> <u>Units Amt.</u>	<u>1979</u> <u>Units Amt.</u>	<u>1980</u> <u>Units Amt.</u>	<u>1981</u> <u>Units Amt.</u>	<u>1982</u> <u>Units Amt.</u>
<b>1. Technical Assistance</b>						
<b>2. Commodities (vehicles, equipment, supplies)</b>		15,000	6,500	7,500	12,000	10,000
<b>3.</b>						
<b>4. Other Costs:</b>						
a. local training		8,000	4,500	5,000	7,000	6,000
b. operation, maintenance, repair		14,000	16,000	18,000	20,000	22,000
<b>10% contingency</b>		4,000	3,000	3,500	4,000	4,000
		<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
		41,000	30,000	34,000	43,000	42,000

APPENDIX J

## PROJECT IDENTIFICATION DOCUMENT (PID)

## CEREAL MARKETING SECTOR

I. THE PROBLEM AND THE PROPOSED SOLUTIONA. The Problem

Marketing is the arbitrage of commodities over time and space. Implicit in the definition is the ability of an economy to store, transport, transform, finance, and assume the physical and financial risks that marketing entails. At the present time Chad is woefully deficient in all aspects of the marketing process. Additionally, the marketing process begins with the farmer's decision as to the quantity and/or quality to produce in anticipation of a market price. Again normal marketing processes or forces are lacking in that less than 10% of cereal production, except for rice, is marketed, and marketed only because the farmer perceives the quantity he sells to be in excess of his family's needs.

The process of developing a grain marketing system is inexorably bound to the development of an infrastructure for all aspects of the Chadian economy. Two factors are crucially important -- transportation and storage. Both exist but only in rudimentary form for much of the nation. Various studies indicate that Chad could be on the verge of self-sufficiency in grain production, if the production could be properly distributed. The recurrent drought demonstrated the need for building up reserve stocks for years of low production, in addition to stabilizing the intraseasonal price fluctuations that now exist.

The problem of the immediate future is building of an infrastructure capable of forming a base for an increasing volume of grain marketing. It must be noted that any marketing or processing facilities to be developed must be done in coordination with a national transportation scheme.

Recent AID and other donor nation projects have started the nucleus of modern grain storage facilities in N'Djamena. Currently, much transportation effort is being expended upon bringing grain reserves to N'Djamena and then transshipping the grains back into rural areas because of lack of storage facilities in the areas of surplus production. Frequently, surplus stocks in rural areas are accumulated in poorly protected, makeshift storage facilities, and much is lost or destroyed before evacuation can be accomplished. On the other hand, when shortages develop in other rural areas, transport is not possible due to road conditions in the rainy season.

B. AID RESPONSE

## 1. Project Purpose

The first priority should be given to establishing a network of storage facilities in rural areas which can serve as reserve stocks now and form the basis for a modern marketing system as transportation and communication improves. The storage network should be integrated with improved family and canton storage facilities ranging in size from 3 metric tons to 100 metric tons at the local levels, to 250 metric tons to 1000 metric tons at the larger population and potential trade and/or processing centers.

Construction of facilities is not enough. Trained personnel must be available to adequately manage the physical facilities, transportation and communications network that must be developed. A considerable portion of AIC expenditures must be devoted to training sufficient Chadian personnel to operate the marketing system efficiently.

## 2. Project Details

### a) Rice Marketing Facilities

Rice milling facilities at Lai, Bilam-Cursi, and Bonger are in urgent need of additional storage for protection of the paddy rice prior to processing, and the processed rice prior to evacuation. Additional 1000 T storage units appear justified at Lai and Bonger, and should be constructed subject to a positive cost-benefit analyses conducted for each location. Additional facilities for Bilam-Cursi should be delayed until action is completed on a proposed access road, and in view of the extremely difficult transportation situation, the feasibility of relocating the mill should be studied. A paddy rice warehouse at Kiri appears only marginally justifiable at present and should be subject to a thorough cost benefit analyses. Estimated cost per 1000 T warehouse is \$140,000.

### b) Cereals Warehouses

FEAR has presented proposals for three 1000 T and ten 250 T warehouses to be constructed in some principal communities in the Sahelian and Southern sections of the country. Some locations are justifiable from the volume of grain production in the area, but may not be feasible due to the present security situation. Other locations appear to have been selected with an apparent desire for geographical dispersion rather than hard evidence of availability of grain surpluses available for purchase. The design of the 1000 T and 250 T structures are sound and practical to build, so little additional expense will be required from an engineering standpoint. Current estimated costs are \$140,000 and \$48,000 respectively. Each warehouse location approved should be on basis of local feasibility study that will coordinate the location wherever possible with a national or regional transportation system, the location of CNDR production input centers, and potential surplus grain production in the area.

### c) National Cereals Market Policy Alternatives

Current market prices for cereals were established by Chadian government in 1975. Disparities between the Chadian official price and prices obtainable in neighboring countries have caused considerable marketings to be diverted from domestic channels. An economic analysis of several cereals marketing policies could materially assist the GCC in establishing national production, pricing, and reserve stock goals that would adequately protect and provide equity for all its citizens. Technical assistance of \$125,000 could develop viable alternatives for consideration at the highest levels.

d) Training and Upgrading EMAB Personnel

An expansion in qualified grain marketing and warehousing personnel must accompany any expansion of facilities. Emphasis should be placed upon upgrading present personnel rather than mass hiring of new personnel. The bulk of \$375,000 for training expenditures over 5 years should be for on-the-job training and intensive short courses for middle management personnel.

3. Major Assumptions

Implicit in the project concept is that achievement of the purpose will contribute to the overall goal of self sufficiency in food supply and protection from periodic food shortages, particularly in the rural areas. To achieve this purpose, the sub projects must receive continuing GCC support in the provision of personnel for training. It is also assumed that other barriers to increased marketings, primarily in agricultural production and transportation, are being addressed in activities outside of this project.

4. Host Country and Other Sponsor Activities

FAO has interest in the above project area, but total resources available cannot be ascertained at this writing. CARE has technical expertise and administrative capability for construction of smaller warehouses, and is willing to provide some staff and administrative costs for construction projects. CARE has submitted an APID for FY 1977 for improved home storage which will effectively integrate into larger storage projects.

5. Project Alternatives

The sub-projects could be established as separate projects and not treated as part of any larger national marketing program.

6. Sub-Project Beneficiaries

The direct beneficiaries are the 71,000 farmers who will have access and higher cash incomes as a result of establishing marketing and storage facilities nearer to their farms. Other direct beneficiaries will be the unknown thousands of rural residents who will have access to greater food supply at potentially more stable and lower costs.

7. Spread Effect

The spread effect of an expanded rural cash income and reserve food supply is cumulative upon the entire population.

Additional farmers will be encouraged to produce an excess of their needs for market, and develop opportunities for more market centers. The national industrial sector will benefit from more assured and stable food costs, plus increased demand from rural residents.

## II. FINANCIAL REQUIREMENTS AND PLANS FOR SUB-PROJECTS

### A. Dollar Amounts

1. Rice marketing facilities -\$375,000 over 2 years (1978-1979)
2. Cereals warehouses - \$1,000,000 over 3 years (1978-80)
3. National Cereals Market Policy Alternative-(1978-1979) \$125,000--2 years
4. Upgrading FDAR personnel \$345,000 for 5 years (1978-1982)

B. AID assistance is expected to be primarily in the form of capital and technical assistance grants. AID resident personnel should include grain marketing technical and economic expertise.

C. Chadian support for the sub-projects is expected to be primarily in personnel salaries for Chadians assigned to the projects. Funds for the operating costs for warehouse and transportation network should be generated from increased grain merchandising activities and/or other donor projects associated with building reserve food stocks

## III. PROJECT DEVELOPMENT

A. Much statistical evidence and analysis exists that could be used as foundation for developing locational strategies and market policy alternatives. The ONDR is in the process of completing canton census maps which will show specifically population, hectares available and cultivated, and estimates of potential production for the southern area. The maps should be available by the end of the year. A consultant will be needed from approximately four weeks in October of this year to work on the PRP. A consultant will be needed in January to prepare the PP.

### 1. Rice Market Facilities

Work on the PRP for the cost benefit studies of the proposed warehouses at Bongor and Lai can proceed very soon after PID approval is received. Personnel from AID/CHAD and the affected agencies of the Chadian government can proceed to do this section of the PRP and the PP without further inputs from outside consultants. The completion of a feasibility study for Bilam-Oursi will have to be integrated with other transportation studies, the availability of which is uncertain at this time.

### 2. Cereals Warehouses

A general locational strategy PRP can be prepared within three months after approval of the PID. Minimal use of

of outside consultants may be required; but no additional inspection teams are needed and PRP preparation costs can be expedited and minimized by use of existing data. Length of time for preparation of this section of the PP for individual warehouse sites could take from one to two months, based on availability of AID and Chadian government personnel.

### 3. National Cereals Marketing Policy Alternatives

This section of the PRP will require a consultant with experience in agricultural policy issues and quantitative methods analysis for about one month. The length of the visit to Chad depends upon prior experience in similar situations. The total cost of the PRP preparation could be \$8,000 to \$12,000, depending upon time needed to finalize with Chadian officials proposed project details, and to receive their concurrence. Design completion of the PP could take another month, depending upon how much progress was made in defining the policy issues in the PRP. Final drafting and clearances in Chad and Washington could take an additional month.

### 4. Training and Upgrading PDAR Personnel

Much planning and projection has been done on future personnel requirements. A PRP should be drafted by AID and PDAR personnel within two months after approval of the P/D. No additional consultants are needed at this stage. It may be advisable to have brief involvement of consultants on the preparation of the PP, but this could be done without visits to Chad if consultants are available with Chadian or Sahelian experience within two months of approval of the PRP.

B. All of the above activities will contribute toward the solution of problems of national food supply as outlined in the DAP. The above proposals do not constitute a complete and effective cereals marketing program. Such a program is many years away, and contingent upon development of an infrastructure of transportation and communication, plus progress in agricultural production which can consistently generate surplus, an excess of the needs of the rural population. Also implied is a stable political situation with moderate rates of economic growth capable of generating effective urban demand for larger and more varied food stuffs.

## IV. ISSUES

It is readily apparent that Chad does not have sufficient resources for capital investments in urgently needed storage facilities and the accumulation of grain reserves. Many donor agencies are involved in the latter problem. It is probable that the 25 per cent minimum host country contribution will have to be waived, and some

operational costs underwritten. If warehousing facilities can be properly located and utilized by making proper cereals production and marketing policy decisions, the nation can take a large step toward independence in food production.

Before any grain marketing scheme can become effective in meeting the goal of self sufficiency in cereal production, top level government policy decisions must be made in relation to grains and grain prices as part of a national food policy. The AID budget submission for FY 1977 included \$280,000 for personnel development to improve management and technical competences in cereal stock management. But the development of effective long range cereals production and price strategy which will provide equity for producers, consumers, and national security from food shortages, remains to be developed.

V. Financial Information

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	
1. Technical	150,000	159,000	93,000	99,000	102,000	
2. Commodities, Construction	425,000	421,000	432,000	244,000	14,000	
3. Participant Training	20,000	22,000	24,000	26,000	29,000	
4. Other costs						
a. Local Training	25,000	25,000	32,000	36,000	40,000	
b. Other	30,000	33,000	36,000	40,000	45,000	
	(650,000)	( 663,000)	(617,000)	(445,000)	(230,000)	
5. 10% Contingency	65,000	67,000	62,000	46,000	23,000	
	<u>715,000</u>	<u>730,000</u>	<u>679,000</u>	<u>491,000</u>	<u>253,000</u>	<u>2,868,000</u>

Project Title: RURAL FAMILY GRAIN-STORAGE PROJECT  
Project Location: REPUBLIC OF CHAD (TCHAD)  
PVO Name and Location: CARE-Chad, B.P. 106  
N'Djamena, Chad  
Central Headquarters: CARE, Inc., 660 First Ave.  
New York, New York, 10016  
Contact Persons: Leo Pastore or Ralph Devone  
at Central Headquarters  
Date of Submission to A.I.D.: \_\_\_\_\_

Total OPG  
Request:  
US\$ : 466,000  
during the  
period FY 76-70

I. Project Purpose and Description

The purpose of this project is to establish a replicable system of low-cost grain storage facilities (Silos) at the village level. The project is designed to make maximum use of existing village-level construction technology, with indicated improvements to the footings and platform to assure that the facilities will last 15 years or longer with only a minimum of maintenance. At the end of this period a new silo can be built on the same base, which is made of cement and reinforcement rods, and is permanent.

The project will benefit small farm families by providing them with more grain storage capacity which will:

- a) Protect their crops from insects, birds and rodents and reduce losses equivalent of up to 20% of the entire annual crop yield,
- b) Increase the food supply available to each participating rural family by up to 20%,
- c) Increase the food supply of the village and adjacent areas by the amount saved from destruction by insects which is not sold elsewhere or consumed by the family itself,
- d) Increase the income of the rural family participating in the project by a percentage which will vary in accordance with seasonal price fluctuations the length of time the grain is stored, and the amount of grain which is sold.

The targets for the project are as follows:

TOTAL FOR ALL FOUR YEARS

Construction of 800 Silos benefitting 3,200 rural families each with an average of 6 members, or a total of 19,200 people.

The total storage capacity of all 800 silos is 6400,000 kilos or 6400 metric tons.

FY 1976

Construction of 200 rural family grain-storage silos, each with a capacity of 10 metric tons or 100 sacks (220 pounds) benefitting four families of an average size of 6 members, or a total of 4,800 people.

FY 1977

Construction of 200 rural family grain-storage silos, each with a capacity of 10 metric tons or 100 sacks (220 pounds) benefitting four families of an average size of 6 members, or a total of 4,800 people.

FY 1978

Construction of 200 rural family grain-storage silos, each with a capacity of 10 metric tons or 100 sacks (220 pounds) benefitting four families of an average size of 6 members, or a total of 4,800 people.

FY 1979

Construction of 200 rural family grain-storage silos, each with a Capacity of 10 metric tons or 100 sacks (220 pounds) benefitting four families of an average size of 6 members, or a total of 4,800 people.

A recent FAO estimate of annual worldwide crop loss, expressed as a percentage of the market value of the crop, puts the loss from insect damage at 13.8% (For Africa the figure is more than 23%), from diseases at 11.6% and from weeds at 9.5%. The annual regional losses, in percentage of crop market value, are estimated as follows:

North and Central America, 28.7%

South America, 33%

Europe, 25%

Africa, 41.6%

Asia, 43.3%

Annual losses, in millions of tons, for various crops are estimated as follows:

Cereals, 506  
 Potatoes, 129  
 Sugar Beets and Sugar Cane, 636  
 Vegetables, 78  
 Fruit Crops, 56½  
 Oil Crops, 42½

The food supply problems of the developed and underdeveloped countries is radically different. In the advanced countries, where the food production increases at 2.9% and the population at 1.21%, the problem is one of "supply management".

In the 64 principal developing countries the food production increase has averaged less than the 2% population growth rate. The FAO in discussing the world food supply in 1974 reports, "food production in developing countries is now even slightly below the level of the base period 1961-65. Only one region, the Near East, was able to increase per capita production. Hardest hit is the Far East, where per capita supplies dropped by 6% to a level of 3% below the 1961-65 average. If one compounds the annual growth from the base period 1961-65 through 1972, the annual rate drops to 2.5% as compared to a 2.6% population increase in developing countries. These figures demonstrate the precarious balance which exists between population growth and rising food production."

While the Gross National Product of the developing countries grew at an annual rate of 2% during the 1960's, the poorest and most undernourished of the population groups have often not benefited from their countries' income growth. They are usually unable to buy food commercially and therefore must store a years supply of grain from each harvest.

By 1985, simply to cover the expected population increases and modest increases in purchasing power in these 64 countries, the food supply will have to increase 142 percent over the 1962 level.

It is, therefore, essential that losses of existing crop production in the developing countries from insects, birds and rodents be minimized.

One essential approach to increasing food supplies is to cut down the wastage that occurs from improper storage. Storage losses are notorious. The US reports 3 to 7 % grain losses from improper storage, but in Africa the percentage is above 20 percent, almost all of it occurring from insects.

APPENDIX L  
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