WESTERN SUDAN
KORDOFAN REGION
AGRICULTURAL CREDIT STUDY

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Any comments in the report which may seem critical are intended in a constructive way. It is sincerely hoped that this report will contribute to the development of the Kordofan Region.

EXECUTIVE SUMMARY

The purpose of this study was to identify ways that agricultural production and the net income of traditional farmers, in the Kordofan Region, can be increased and to recommend what changes are necessary, especially in the present agricultural credit system, to bring this about.

The areas selected for study were the administrative divisions of Um Rawaba, El Obeid, En Nahud, Dilling, and Kadugli. This selection was based primarily on three factors:

(1) The areas include major concentrations of traditional farmers' villages;

(2) The areas give a broad representation of soil types found in the region; and

(3) Agricultural production is considered far below its potential.

There are about 3,400 villages in the study area, encompassing about 23,400 households cultivating about 4.5 million mukhamas[1/] each year. Interviews with farmers and agriculturalists indicated that, on the average, production of the principal crops of sorghum, millet, groundnuts, sesame, gum arabic, and cotton could be increased at least 2-1/2 times, on the condition that a number of inputs were provided and the present neglected agricultural organization improved and expanded to, among other services, teach farmers how to use more effective methods and techniques of farming.

Inputs that are needed to increase production include improved seeds, treatment, crop protection, chemicals, gun arabic seedings, and better tools.

Facilities needed to enable farmers to realize a greater return for their produce include making available more crop storage and better transport.

1/ One mukhama = 1.75 feddans.
One feddan = 1.038 acres.

Services needed by farmers to enable them to absorb the inputs and facilities for increased production and income include an expanded and improved extension service, cooperative organization and management service, crop protection service, veterinary service, range management service, and an appropriate system of credit to finance the necessary inputs and facilities.

The Agricultural Bank of Sudan (ABS) has over six years developed a successful system of delivering credit to traditional farmers through a village cooperative approach. On the basis of a weighted average since 1977, the recovery rate has been 85 percent (source: ABS). This system should be encouraged and expanded. In fact, the ABS is the only formal credit institution in the Kordofan Region providing credit to traditional farmers. There are opportunities for a variety of agribusinesses to become established to provide some of the inputs and services that traditional farmers need. Medium and long-term credit will be needed for most agribusiness to get started.

Recommended list of priorities for the development of the study area are:

(1) Provide funding for adequate improved seed multiplication.

(2) Provide funding to improve the infrastructure of the entire agriculture organization of the Kordofan Region.

(3) Provide funding to improve the infrastructure of the Department of Cooperatives in the Kordofan.

(4) Provide administrative and loan capital funding to the ABS to expand its credit system to traditional farmers.

(5) Provide funding for the establishment of agribusinesses to provide certain input services and facilities for farmers.

Estimated funding levels for the recommended program are detailed in Chapter V. Most of the funds needed are in the form of local currency, Sudanese pounds.

Chapter I

INTRODUCTION

1.1 Purpose

The purpose of this study is to provide an analysis of the existing credit systems in the Kordofan Region area in order to identify interventions required to improve the delivery of credit through the Agricultural Bank of Sudan and other agricultural credit institutions. The purpose of the study is to also document specific methods to facilitate (1) farmer access to seasonal and investment credit for agricultural labor inputs; and (2) availability of larger loans to increase processing and marketing capacity in the Western Sudan region.

USAID is designing a proposed Western Agricultural Production and Marketing project. This study is intended to provide substance for the preparation of an agricultural credit component of the above-mentioned project proposal.

1.2 Authority for the Report

The authority for the report is contained in the program development and support/study of agricultural credit (project No. 698-0135) and under the Indefinite Quantity Contract, PDC-1401-1-00, Work Order No. 3, between the United States Agency for International Development and Checchi and Company, 1730 Rhode Island Avenue, N.W., Washington, D.C. 20036.

Under these contracts and agreements, Russell B. Gregg, Agricultural Credit Specialist and employee of Checchi and Company, had responsibility for coordinating the progress of the study and the final report.

1.3 Period of Study

The study was carried out during the period October 4, 1983 to November 28, 1983.

1.4 Participants Involved in the Study

The study and the report are co-authored by:

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1.5 Statement of Work

A. Background

The Sudan's two Western Regions, Kordofan and Darfur, are the center of the country's rainfed agriculture and livestock production. They supply nearly half the nation's oilseeds (peanut and sesame), almost all of the gum arabic, 40 percent of the food grains (millet and sorghum), and one-half of the livestock production. The Western Regions export surpluses in virtually all these production areas, supplying the rest of the Sudan and export markets.

The principal constraints to further development are: declining agricultural productivity due to poor quality seeds, pests, diseases; insufficient credit and marketing facilities; water, which is in short supply due to inadequate funds for wells and ponds; transport; and desertification. If these problems can be addressed, increased marketable surpluses have the potential for contributing to the improvement of the country's economic situation in the intermediate term.

B. Detailed Scope of Work

1. Identify potential borrowers by type and number, estimate the demand for credit with the volume broken down between agribusiness and agricultural production. Based on this information, determine local currency and foreign exchange needs.

2. Recommend appropriate loan policy including eligibility criteria, e.g., creditworthiness purpose of loans, income of prospective borrowers, etc. Interest rates, collateral payback period, loan amount requirements, and other procedures associated with the making and collection of loans should be addressed.

3. Recommend appropriate credit delivery system(s) which may include loans to individual farmers and entrepreneurs, cooperative farmer groups, and private traders for re-lending to farmers.

4. Perform an institutional review of agricultural credit institutions serving the Western Region with recommendations for improvement in policy, capabilities, staff levels, and qualifications and focus.

5. Explore and discuss alternative agricultural credit distribution systems.

6. Estimate available resources for lending and recommended methods for mobilizing rural savings.

7. Prepare a detailed proposed program for the undertaking of an agricultural credit/agribusiness program for the Kordofan Region, including loan capital, technical assistance, training, and associated commodities.

1.6 Areas Visited

The team traveled by jeep furnished by USAID from Khartoum to Um Rawaba to El Obeid to El Nahud to Dilling to Kadugili to El Obeid, and then returned to Khartoum. Contacts were made with the Minister of

Finance in El Obeid and with Department of Agriculture officials (extension, crop protection and veterinary and economics divisions). Also contacted were officials from the Forestry Department of Cooperatives, Commercial Banks, Cooperative Societies, Agricultural Bank of Sudan branch offices, district commissioners, farmers union, Western Sudan Agricultural Research Stations, Mechanized Farming Corporation, and the Nuba Mountain Agriculture Corporation. En route, many traditional farmers were interviewed to obtain their views on their most important problems, yields, and costs of production.

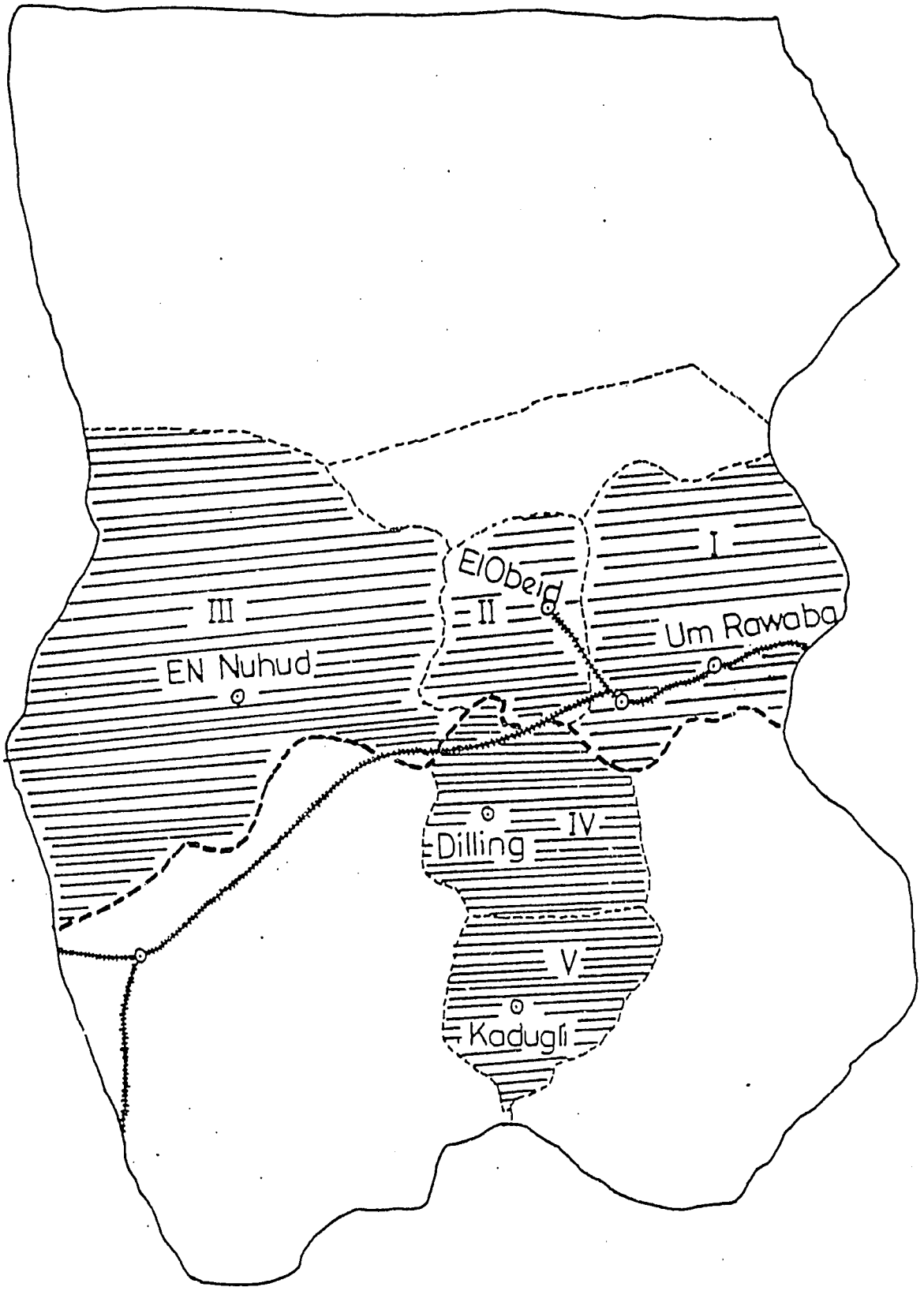
In Khartoum, interviews were held with officials of the National Seed Administration of the Ministry of Agriculture, several banks and credit institutions, Central Office of the Agricultural Bank of Sudan, Range Management Division of the Ministry of Agriculture, and several economists working with USAID and the Government of Sudan on studies related to agricultural development.

1.7 Project Definition and Justification

The areas selected for study and possible inclusion in an Agricultural Production and Marketing Project, including a system of credit to traditional farmers, are the administrative divisions of Um Rawaba, El Obeid, El Nahud, Dilling, and Kadugli (Figure 1). The rationale for the choice of these areas for concentrated efforts to increase total agricultural production per unit area can be summarized as follows:

1. The five areas include major concentrations of traditional farmer villages.
2. Each area has a major town with most administrative services to support project activities.
3. The areas give a broad representation of the different soil and rainfall patterns found in the more productive areas of Kordofan.
4. Agricultural production of the traditional farmers in all of these areas is considered far below the reasonable potential.

Fig. I. Proposed Project Area,
Kordufan Region,
Western Sudan.



Administrative Division

I Um Rawaba
II El Obeid
III EN Nuhud
IV El Dilling
V Kadugli

5. The administrative division boundaries also provide ideal project boundaries to coincide with administrative responsibilities of various Government agencies, sub-offices, and branch banks through which the project should coordinate its activities.

Chapter II

BACKGROUND

2.1 Location and Population

Kordofan Region is located in the central part of the Sudan roughly between Latitudes 9.5 and 17 North and Longitudes 27 and 32 East. The total area of Kordofan Region is about 90 million feddans. Half of that is cultivatable land but only an average of six million feddans are put under cultivation each year. Of the total production of the major crops grown in the Sudan, the region contributed 35 percent of the groundnuts, 25 percent of the sesame, 60 percent of the gum arabic, 20 percent of the sorghum, and an appreciable amount of watermelon seeds, karkadi (Roselle), millet, and cotton. The animal population is estimated to be more than 10 million head. Human population is estimated to be three million individuals constituting about 15 percent of Sudan's population. The population density is about 7.5 per square kilometer. About 90 percent of the population live in the rural areas.

2.2 Soils

Soils vary between sand clay and bare rocks. In the Northern Region, the Qoz soils dominate. Qoz soils are sandy with little clay or silt and nutrients, but are highly permeable. The Nuba Mountains lie in Southern Kordofan Region. They may be described as black or brown clay plains with hills and mountains, isolated or in ranges. These usually consist of rugged granite boulders of different shapes and heights ranging from a few hundred feet to 3,000 feet above the plain which is itself 1,400 to 2,200 feet above sea level. The soils formed by the weathering of these rocks at the foot of these mountains (locally known as gardud) are fertile and produce good crops. The southern part of the region is dominated by clay and cracking clay soils which are also rich but whose use is limited by distance, lack of water supply during the dry seasons, water-logging in some areas due to non-existence of Khour (small seasonal watercourse during the rainy season), outlets, and tenant resources (manpower and money).

2.3 Water

The climatological zones and rainfall ranges from arid zone in the North with rainfall between zero to 75 mm to the high rainfall savannah of 900 to 1,800 mm rainfall in the South. Within the region, the amount of rainfall varies from year to year, declining in the last few years. The decline led to many crop failures. The growing season ranges between 30 to 70 days in the arid and semi-arid regions to 80 to 150 days in the savannah belt.[1/] Table 1 shows the annual rainfall for selected regions in the period from 1974/75 to 1982/83.

A number of seasonal khours are found mainly in the southern part of the region, mostly running from east to west. Khours are important sources of water for cultivation and livestock, as well as for human beings. Many of these khours are directed into Havirs (low areas with earth embankment to hold water for a period of time). Some of these havirs stay the year round, while others last only for one or two months. The well-managed havirs are protected from animals and misuse. Water discharge is regulated by water pipes coming out of the havirs. In havirs, and in deep-bore water wells operated by diesel engines, water is sold for human and animal use by the local authority. In the majority of cases, four gallons of water are sold for two piasters[2/] for human use at water points. These same four gallons are resold for up to 40 piasters at destination. Animals drink at water points during the dry season. Small animals are charged two piasters per drink, while large animals are charged up to 10 piasters per drink. In Northern Kordofan Region, in the semi-arid zone, animals can live on a succulent plant called El Guzo up to two months with no need for water. A special type of watermelon also provides water for human use (cooking and drinking) in the qoz area of Northern Kordofan. The water extracted from these watermelons is estimated to be eight million cubic meters per year. Water remains as a major constraint for socioeconomic development

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1/ See FAO, Regional Study on Rainfed Agriculture and Agro-Climatic Inventory on Eleven Countries in the Near East Region, FAO, Rome, 1982.

2/ One Sudanese Pound = 100 piasters.

Table 1

ANNUAL RAINFALL IN MAJOR TOWNS OF THE PROJECT AREA

(in mm/annum)

Season	El Obeid	Um Rawaba	El Nuhud	Dilling	Kadugli
1974/75	352	340	289		
1975/76	209	344	284		
1976/77	340	206	328		
1977/78	374	202	291		
1978/79	476	521	360		
1979/80	388	371	350		
1980/81	358	235	622		
1981/82	311	335	522	603	645
1982/83	267	246	348	504	491

Source: Regional Ministry of Agriculture and National Resources (RMANR), Agricultural Service Section, Department of Economics Statistics, El Obeid, Kordofan Region.

of the region. The limited number of water points often resulted in overgrazing and environment degradation in the region. Appreciable time of the family members is spent in carrying water by donkeys, camels, carts, and even trucks to villages lacking water resources. This greatly affects the participation of family labor in the farm business and consequently yield and production of these farms.

2.4 Farming Systems and Crops Grown

Three major rainfed sub-systems of farming can be identified in the Kordofan Region:

- Sedentary traditional farming sub-system
- Mechanized farming sub-sector
- Nomads

2.4.1 The Sedentary Traditional Farming Sub-System

This dominates the qoz area in the northern part of the region, the gardud area in the middle and the sandy clays and cracking clays at the southern part of the region. Production in this sub-system depends mainly on the type of soil, the amount of rainfall, and rainfall distribution within the season. Crops grown in these areas are groundnuts, sesame, gum arabic, watermelon, and karkadi (Roselle) as cash crops, and sorghum, millet, and watermelon as subsistence crops. Area and yield fluctuate from year to year as can be seen from Table 2. Grain crop yields in Sudan are about one-third those in similar regions of the world, i.e., India and South America. Seeds, hand tools, and manual labor are the only input used among this group of farmers. Shifting cultivation is practiced in this region. It consists of clearing a plot of land and growing one crop or a number of crops, often in a mixed form, for three to four years, then allowing the land to rest for a period of time to restore its fertility. In recent years, and because of the increasing tendency of nomads to settle, land may be cropped more and allowed less time to recover. Also, agriculture is extending to low rainfall areas below 400 mm of rain. This leads to low yields, overgrazing of water

Table 2

AREA, PRODUCTION, AND AVERAGE YIELD OF THE MAJOR CROPS IN KORDOFAN REGION
For the Period 1977/78 - 1981/82

	Dura			Cotton			Sesame		
Season	Area in Feddan	Production Tons	Average Yield kg/fd	Area in Feddan	Production Tons	Average Yield kg/fd	Area in Feddan	Production Tons	Average Yield kg/fd
77/78	1,249,000	359,000	287	103,000	13,000	126	1,005,000	876,000	75
78/79	1,216,000	381,000	313	86,000	14,000	162	1,014,000	84,000	82
79/80	931,000	170,000	182	41,000	3,000	73	799,000	78,000	97
80/81	1,078,000	269,000	249	63,000	9,000	142	825,000	72,000	87
81/82	1,081,000	330,000	305	51,000	8,000	156	902,500	84,290	93

	Groundnut			Millet		
Season	Area in Feddan	Production Tons	Average Yield kg/fd	Area in Fedden	Production Tons	Average Yield kg/fd
77/78	975,000	249,000	255	1,240,000	168,000	135
78/79	842,000	236,000	280	1,290,000	219,000	169
79/80	807,000	182,000	225	958,000	132,154	137
80/81	800,000	240,000	300	940,000	169,000	179
81/82	830,000	325,000	391	945,000	209,000	221

Sources: (1) Ministry of Agriculture, Food and Natural Resource, "Year Book of Agricultural Statistics, Department of Statistics (MAFNR), Khartoum, various issues.

(2) Regional Ministry of Agriculture and Natural Resources, Agricultural Economics and Statistics Division, El Obeid, Kordofan Region.

points, and encroachment of the desert in many places. In summary, the low yield is mainly due to the continuous cropping of land, little or no use of improved inputs, poor infrastructure and services, and the subsistence mode of production. Farmers in this sub-sector often cultivate two to three separate pieces of land in addition to their gum arabic plantations. The average gross area for a characteristic farmer in this sub-sector of agriculture is about 20 mukhamas. Approximately half of that is put under crops and the other half is left for gum arabic trees or other tree species to regenerate.

2.4.2 Mechanized Farming Sub-System (MFC)

Sorghum is the main crop produced in this sub-sector in large units ranging between 1,000 to 1,500 feddans using modern tractors and implements for land preparation, sowing, and harvesting. Habila (30 miles east of Dilling) is the center of production of mechanized sorghum in the Kordofan Region. A gross area of about 700,000 feddans is put under sorghum in this area. About 500,000 feddans are licensed farms distributed to farmers while the other 200,000 feddans are grown by farmers without licensing, often in smaller units than the licensed farms.

The Government allots land to the MFC for cleaning and allocation to licensed farmers and sets the conditions for selection of farmers. These include previous agricultural experience, ability to provide funds (including working capital), fitness, character, and creditworthiness. The land is leased for 25 years to cultivators. Land rent was LS 0.10 per feddan per year, but was increased to LS 1.0 in the 1982/83 season. The MFC provides some extension services, and workshops to maintain farmers tractors at cost. Through a loan from the World Bank, the MFC provided tractors to some farmers on a medium-term loan, as well as long-term loans for land clearance. The Agricultural Bank of Sudan (ABS) grants medium-term loans to licensed farmers to purchase agricultural implements as well as seasonal loans to cultivate and harvest their crops.

In the unplanned sector, individuals cultivate the land without license. No institutional finance is available for this sector. Many of the services (roads and drinking water) are lacking among this group. Interests of cultivators and animal owners often conflict and lead to disputes.

The recommended rotation for the mechanized production scheme is to allocate half the scheme to sorghum and to leave the other half fallow or planted to cotton and/or sesame. No restriction on cropping pattern has resulted in continuous cropping of land. With no use of fertilizer, soil is depleted. Low fertility is often cited - even by farmers themselves - as the major reason for decreasing productivity. The Farmers Union in Habila cited the following main factors that lowered their productivity and profitability in recent years:

- Decreasing trend in the amount and distribution of rainfall in recent years.
- Recommended crop rotation not followed for the last 20 years.
- Unavailability of agricultural services (crop protection, extension, etc.)
- Heavy weed infestation (especially striga and Sudan grass).
- Formation of a hard crust top soil due to continuous cultivation of one crop. This requires deep plowing that needs heavy machinery.
- Inadequacy of maintenance workshop.
- Unavailability of spare parts and their high prices in the black market.
- Shortage of gas at peak demand periods.
- Down payment (30 percent) on tractors and seed drills is excessive.
- ABS seasonal loans only meet 25 percent of the requirements.
- Unavailability of adequate storage capacity.
- Excessive land rent and local taxes.
- Change in medium-term loan procedure at short notice last season barred some farmers from taking advantage of ABS loans.

2.4.3 Nomads

Both Arab and non-Arab tribes are living in Kordofan Region. The Nuba Mountain area is mainly inhabited by the Nuba. They are a Negroid community speaking several different languages and many different dialects. Arab origin tribes, like Hawazma, Kawahala, Mesiriya, Habbania, and Awlad Hamid, are also living in the region and are leading a nomadic life, raising mainly cattle and small animals, like sheep and goats. The Kababish tribe dominate the northern part of the region in the desert and semi-desert zones and mainly raise camels and desert sheep.

The nomads are cattle owners who move behind their animals in search of water and grazing and to protect their animals from pests and diseases. The transhumants are part of the nomad group who follow specific patterns or routes in the North-South movements and have permanent homes, such as the Hawazma tribe. True nomads do not have permanent homes and do not move in specific patterns. The South-North migration of transhumants is governed by the availability of pastures and water. The migration from South to North starts with the start of rainfall (May - June) as the cattle owners move away from the mud and parasites (tsetse flies) that increase in number during the rainy season. They move as far as South El Obeid where good markets exist for their animals in El Dilling, El Obeid, El Rahad, etc. As the rain passes its peak in the South and the availability of grazing and water decreases in the North (around December), the transhumants move south to their permanent homes. Part of the family - the old, the young, newly married, children going to school, and those who cultivate the family subsistence crops - may stay at these homes. Small numbers of animals may be left with the resident part of the transhumant family for dairy needs. Often, animals belonging to transhumants cause a lot of trouble for the sedentary farmers. Certain agreements, enforced by the local authorities, were made to prevent the transhumants from returning to their permanent homes before the sedentary farmers in the region collect their crops.

Nomads need cash to pay taxes (LS 012 to LS .25/head/year), to buy animal drugs and vaccine (LS 300 to LS 500 for an average herd of 120 cattle), to pay for herders (LS 50/month), household food, clothes, children's education, medical care, and for social events.

No institutional credit is available for animal owners in this sub-system of agriculture. They rarely look for non-institutional sources and meet all their cash demand from selling animals and animal products.

A characteristic herd is estimated to contain 120 cattle (a range of 50 to 350) with a take-off rate of 9 percent. Only the older and the barren females are sold at markets in the north when prices are favorable (LS 200 to 300/head). The price elasticity of supply is considered to be very low but very little work has been done in this area. Cattle not only provide meat, milk, and transport for their owners, but are also considered the real basis of wealth, prestige, and security. Herd owners are often reluctant to sell their animals (their capital) beyond their immediate cash needs. Any excess cash will be reinvested in productive animals and almost none in cash or other liquid assets. What is needed for this sector are services in infrastructure, animal health, soil conservation, and water availability to increase animal production.

2.5 Agricultural Marketing in Kordofan Region

The marketing of agricultural products begins at the farm when the farmer plants his production to meet specific demand or market prospects. It also includes purchases of inputs by the farmers.

Most of the agricultural products when harvested cannot go directly to the consumer. Transport is needed to bring the product to the right place while storage is needed to adjust seasonal supply to more or less regular demand. Also, most of the agricultural products need to be cleaned, graded, and processed in various forms to be suitable and convenient for consumption. Price is determined at the different levels of the marketing channels and some financial arrangements must be made to

cover all the stages until the retailer sells the product to the consumer. The existence of an informal information system facilitates the smooth running of the marketing machinery described.

The major field crops grown in Kordofan Region can conveniently be classified in two groups:

(1) Subsistence crops that include sorghum (dura), millet, and watermelon.

(2) Cash crops that include groundnuts, sesame, gum arabic, watermelon seeds, and karkadi.

2.5.1 Marketing of the Subsistence Crops

In the traditional rainfed sub-sector of the Kordofan Region, dura is grown mainly for household consumption. The excess is marketed at the farmgate, household, or in the village market through a variety of arrangements. At the village shops, the farmer may trade his dura crop for consumer goods. The farmer may sell the dura crop in advance through the sheil system. Quantities sold are often small and related directly to the cash needs of the farmer's household. The farmer may even sell the food of his family and buy it later at higher prices - often twice his sales price. Very little storage is done by the traditional farmer due to urgent need of cash, unavailability of storage facilities, and fear of loss from fire.

Millet is also an important staple food crop in Kordofan Region and in the west of the Sudan in general. It is grown mainly under rainfed conditions. Current production stands at a little more than half million tons, but very little is marketed. The surplus is marketed in a similar way to dura. The price of millet (LS 45/sack) is almost twice the price of sorghum. For this reason, poor traditional farmers sell millet and buy dura for their household consumption.

The bulk of the dura trade comes from the mechanized production schemes in Habila area where dura is grown mainly for the market. Dura is transported directly after harvest from production to consumption centers for immediate sale or storage. Usually storage takes place either through stacking dura sacks in the open or in traditional stores or bulk storage in pits (Matmoura) under the ground. In some cases, modern warehouses built from steel, corrugated iron, and concrete are used. Dura produced in Habila scheme last year is estimated at 280,000 tons. Three types of arrangements can be recognized in marketing of the dura crop:

(1) Through private bargaining with a merchant; a line of credit may exist between the farmer and the merchant. In this case, the farmer is obliged to sell to the merchant who can resell in the wholesale market.

(2) Through direct sale in central markets; farmers in this case are better off, own, control, or have access to enough financing to meet all expenses to move their crops to central markets. Prices received by this group are better since they can store until prices increase.

(3) Through a bank, when a crop mortgage loan is taken and the crop is deposited in the bank storage. At storage, 75 percent of the market value of the crop is lent to the producer who has the option either to claim the crop after a certain period of time or to let the bank (ABS or a commercial bank) sell it on his behalf.

Prices fluctuate sharply between markets, between seasons, within the seasons, and between years (see Table 3). Fluctuations in price are caused by the inadequacy and high costs of storage, high cost of transportation (due to poor roads, high capital, and running costs of trucks) and poor information and communications systems. Speculation is also one of the major reasons for large price fluctuations and excessive marketing costs.

Watermelon is grown on the qoz soils of Kordofan Region for water and food for human beings, for feed for animals. Watermelon are retained and sold as a cash crop. The price of one watermelon ranges between LS 0.10 and LS 0.25 at the marketplace. In recent years, the value of melon seed exports has been around LS 4 million. The usual practice is for watermelons to be intercropped with other crops.

Table 3

MOVEMENT OF PRICES BETWEEN MONTHS AND YEARS IN EL OBEID AUCTION MARKET FOR THE MAIN CROPS

(in LS/Kantar)

Crops		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Sesame	'82	18.2						20.3	23.3	24.0	25.4	32.7	34.9
	'83	35.0	36.7	39.3	38.8	40.2	41.7	40.2	33.5				
Groundnuts	'82	9.0						10.4	10.5	12.0	12.6	15.2	16.4
	'83	18.1	19.5	16.4	20.2	20.0	27.6	27.3	23.5				
Watermelon Seeds	'82	7.6						6.7	8.0	8.0	7.8	9.2	9.9
	'83	11.2	12.5	14.3	15.3	15.3	15.8	16.7	18.5				
Karkadi	'82	31.2									20.0	35.3	35.9
	'83	41.9	45.3	43.1	46.3	52.9	30.0						
Gum Arabic	'82	19.8						18.0	19.0	18.9		28.9	27.6
	'83	27.6	28.8	28.2	27.6	27.6	27.6	27.3	23.5				

Source: Regional Ministry of Agricultural Resources, Economics and Statistics Section, El Obeid - Kordofan Region.

2.5.2 Marketing of Cash Crops

Oil seeds (groundnut and sesame) are the main cash crops grown in Kordofan Region besides collection of gum arabic. Watermelon seeds and karkadi are also cash crops. Less important than oil seeds or gum arabic, they are sold both internally and in the world market for cash.

Groundnuts

Sudan is producing about 5.6 percent of the world production of groundnuts and ranks number five among the major producing countries on a global basis. A relatively high percentage of the production is exported. In 1981, Sudan contributed 11 percent to total world exports of groundnuts and 5 percent of groundnut oil. In 1979/80, the total value of groundnuts exported was US$ 40 million.

In 1979/80, the total area under groundnuts in the Sudan is estimated to be about 2,352 thousand feddan. Out of this area, 1,944 thousand feddan were produced in the rainfed area while the balance were produced under irrigation. The area grown in Kordofan Region is about 800 thousand feddan. The Kordofan Region produced 182 thousand metric tons of groundnuts during the 1981/82 season, comprising 23 percent of the total crop. The main areas of production are the sandy qoz soils of Northern Kordofan. More than 90 percent of the groundnuts is produced around El Nuhud area by traditional farmers cultivating an average of 10 mukhamas each.

Crops harvested find their way to the central auction markets in El Nuhud and El Obeid through village merchants, agent assemblers, lorry drivers, small merchants, as well as by large producers. Only 20 percent of the sellers at auction markets are found to be producers of the crops. Even when producers sell in the auction markets, they sell through their agents.

At El Obeid and El Nuhud auction markets, three groups of buyers or their agents can be identified: owners of processing plants, exporters, and speculators. Agents for owners of processing plants and speculators

are the first to enter the auction markets. Processors buy in small quantities due to their limited capital. They only work an average of six months a year and their processing capacity remains idle the rest of the year. They only need one month for maintenance and repair. Capital and storage remain the major constraints to increasing purchases for year-round work.

Speculators and processors usually obtain the bulk of their purchases directly from producers, village merchants, or agents without going through the auction market. Little competition is noticed between these two groups. At El Nuhud auction market, at the last week of October 1983, the price spread of groundnuts at auction was not more than LS 0.50 per kantar.

Agents of exporters enter the auction market late in the season between January and March when they are sure of the international prices. In this situation, the sellers often get the residual F.O.B. price after calculation of marketing costs and profit by the exporter.

Until 1969, the export trade of groundnuts was in the hands of private exporters without Government intervention. In 1970 when the Government nationalized the banking system and other Sudanese enterprises, the export trade was also nationalized and a trading monopoly given to four companies who were later merged into the Sudan Oil Seed Company. In 1980, this monopoly was abolished, but the Company continued to deal in the export trade in competition with other exporters.

With the creation of Sudan Oil Seed Company, the Government introduced a minimum price policy at auction markets as an incentive to increase production. If market prices fell below the minimum price specified, the Company was directed to buy all quantities that appeared in the market. But this policy proved to have no effect since the minimum price is set too low and the market price is always above it.

Sesame

Sesame is produced mainly under rainfed conditions in the central clay plains of the Sudan. In Kordofan and Darfur Regions, sesame is interplanted with groundnuts, millet, watermelon, or karkadi. Sesame is also produced in Gedarif area of the Eastern Region and in small areas for local consumption in Upper Nile and Equatoria Regions. Of the total value of Sudan's exports in 1978, sesame contributed LS 19.18 million (9.5 percent of total value of exports).

In 1981/82, more than 900 thousand feddans were planted to sesame in Kordofan Region constituting 46 percent of the total area in the Sudan and producing about one-third of total production. Only 40 percent of the sesame produced in the Sudan is exported. The balance is used locally for oil extraction, as direct food, for confectionary, and for seed. Producer prices are mainly affected by domestic market prices and the degree of competition between domestic processors. The structure of the marketing system of sesame is identical to that of groundnuts. Buyers in auction markets deal with the two crops at the same time.

Table 3 shows the movement of prices between months for 1982/83 season in El Obeid auction market for the cash crops produced in Kordofan Region.

Gum Arabic

About 90 percent of the world's gum arabic is produced in the Sudan and 90 percent is exported. In 1981, gum arabic contributed 10 percent to the country's foreign exchange. Kordofan Region contributes half of that. Gum arabic is used for confections, beverages, flavoring, food products, pastes, glues, and for cosmetics.

Gum arabic comes from the *acacia* tree. The acacia tree (mainly *acacia senegal*) grows well both in light sandy soils as well as in heavy cracking clay soils between latitudes 10 and 15 North in the Sudan.

For the winter crop, the acacia tree is tapped during October, while for the summer crop tapping takes place during February. Fifteen days after tapping, the tree starts to produce gum which can be picked twice a month. Depending on age and size, the tree gives between 2 to 5 pounds per pick (El Dami). Larger trees may give up to 12 pounds per pick. Because of the hard work needed, most of the gum arabic in Kordofan Region is produced on a share-basis; usually on a 50-50 basis between gum arabic plantation owners and a local laborer. The produce is collected in small quantities and transferred to villages. It is sold in a similar manner to sesame and groundnuts at local and auction markets. The Gum Arabic Company monopolizes the export of the crop. A few large traders buy gum arabic and sell it to the company at Port Sudan. The price they offer is constrained by the price they get from the company. Of the F.O.B. price, the producer receives 33 percent; 13 percent goes for local taxes and marketing margins, including transport, while 54 percent goes to the company and the Government.

Lack of price incentives, production and distribution of acacia senegal seedlings, availability of credit, provision of drinking water at production sites, and pest control are considered the main constraints to gum arabic production in the Sudan.

2.5.3 Input Purchases

The main inputs purchased by the traditional farmer are seeds, hand tools, sacks, and seed dressing chemicals. Seeds are either retained by the farmer from the previous crop or bought from a local merchant or a shopkeeper. The traditional farmer has little access to improved seeds from other sources.

Hand tools are locally made by the blacksmith. They include Jaria for sowing, hashaslia for weeding, mungal or knives for cutting the crops, and axes for tapping the gum arabic trees. The farmer can either buy these tools directly from a blacksmith, for the local market, or from a village shopkeeper. The price of each is not more than LS 1 per piece.

Jute sacks are used to carry the farmer's produce to the village or local marketplace. The sack may be used more than four times and its price ranges between one to two Sudanese pounds. In many cases, buyers provide their own sacks.

The only modern input used by the traditional farmer are the seed dressing chemicals which can either be provided by the ABS, extension service, crop protection agents, or in many cases, by shopkeepers, but at very high prices.

2.6 Agricultural Services

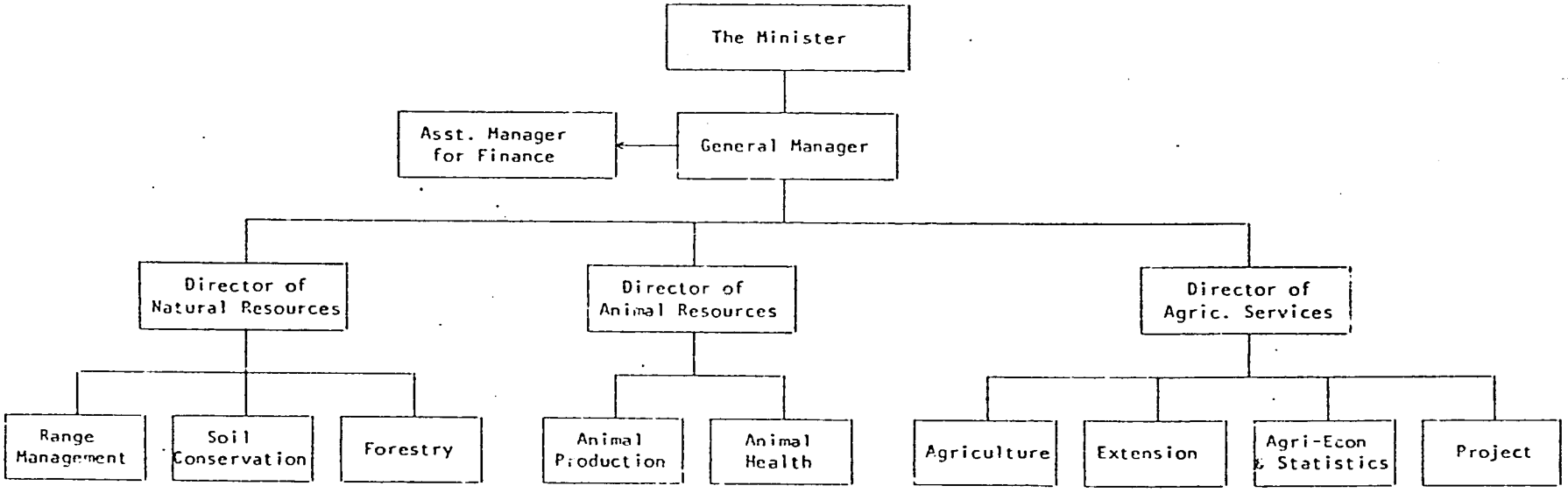
Agricultural services considered important for the rural community in Kordofan Region include forestry, crop protection, extension, cooperatives, animal health, soil conservation, and range management. The Regional Ministry of Agriculture and Natural Resources has the structure to provide many of these services, as shown in Figure 2. However, it has not had the manpower and resources to make them function. Lack of vehicles, gasoline, trained individuals, materials, and budget allocations are the main constraints to providing these services.

Crop protection services, production services, and cooperative services are administered centrally from Khartoum. These are no more effective than regional services. A lot of work needs to be done in identifying pests and diseases and providing chemicals for their control, in research in suitable seed varieties, their multiplication and distribution, and in developing a strong cooperative movement to support service delivery.

The Western Sudan Agricultural Research Project (WSARP) is mandated by the donors (USAID), World Bank, and Government of the Sudan to undertake research to improve production of the traditional farmers of the Western Sudan. The purpose and goals of the WSARP program are for the improvement of the productivity and the standard of living of farmers and pastoralists in Western Sudan through planning, development, and

Figure 2

STRUCTURE OF THE REGIONAL MINISTRY OF AGRICULTURE AND NATURAL RESOURCES



institutionalization of an agricultural research station network as part of the Agricultural Research Corporation. The Kadugli Research Station is now completed and is working full capacity. The other three sites in El Obeid, El Fashir, and Gazala Gawazat are under construction. Both adaptive and applied research are practiced at Kadugli Station to identify constraints and recommend suitable interventions.

2.7 Agricultural Finance and Credit

Three main sources of finance can be identified in Kordofan Region:

- The Agricultural Bank of the Sudan (ABS)
- The Nuba Mountain Agricultural Corporation (NMAC)
- Private Money Lenders (PML)

2.7.1 The Agricultural Bank of the Sudan (ABS)

The ABS runs three branches at Um Rawaba, El Obeid, and El Dilling, and a sub-branch (called an office) at Talodi. The Dilling Branch (established in 1970) is the largest of all ABS branches with a turnover of more than LS 4 million a year. Its activities concentrate mainly on the rainfed mechanized agricultural production schemes in Habila area (see section 2.4.2).

The characteristic farmer in this sub-system of agriculture is an ex-government official who is resident in one of the big cities and employs a Wakeel (representative) to supervise all the field work. He may visit the scheme for short periods during crop establishment and during harvesting. He typically obtains his farm machinery through a medium-term loan (3 years) from the ABS Dilling Branch. The mortgage of real estate is required if the farm implement (tractor and a seed drill) is to be bought from a private dealer.[1/] The value of the collateral

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1/ In case the loan is secured by Bank importation of agricultural machinery, the Bank will accept the scheme itself as a collateral for the loan. Schemes and standing crops also act as collateral for seasonal loans.

should be 30 percent more than the value of the loan. Often, the ABS-imported tractors and seed drills are to be distributed to the Bank clients as loans in-kind at 15 to 25 percent trade profit plus service and administrative charges that amounted to 12 percent per annum. In both cases, the client has to pay 30 percent of the value of the loan in cash before receiving the loan in-kind. The recent prices paid by the farmer are LS 29.8 thousand for a Ford 275 tractor and LS 16.3 thousand for a seed drill.

If the procurement of the tractor and the seed drill is from a local dealer, the client will present a pro-forma invoice and a certificate of ownership of real estate in one of the large towns or a city for collateral.

If the loan in-kind is to be met by Bank importation of agricultural machinery, the client has to present a certificate from the Mechanized Farming Corporation (MFC) that the scheme, of specified area, is cleared of bushes and trees and ready for cultivation. The loan is repaid in three years in three equal installments, timed with the sale of the sorghum crop. The repayment percentage is high - up to 90 percent last season.

Seasonal loans or crop cultivation loans are approved by the ABS according to area grown and expected yield. In 1982/83 season, a total of LS 7/feddan is given for sorghum cultivation in two installments; LS 4 for fuels, salaries, and food in July, followed by LS 4 for weeding in August or early September. During October-November, a harvesting loan is also approved at the value of LS 6 per sack. A committee of representatives from the ABS, the MFC, the local authorities, and the farmers tour the region to estimate the area grown and the yield/feddan. After the field tour, loans are approved and disbursed to the farmers. Repayments are also high - up to 90 percent in normal years.

After harvest, the farmer has the option to sell his sorghum or store it in the ABS storage facilities and obtain a crop mortgage loan. The total value of the loan is equivalent to 70 percent of the market value of the crop at the time of storage. The Bank will deduct the loans due and the client will receive the balance. In three-months time, the

farmer can either claim the crop after payment of the total loan or the Bank can sell the crop with surpluses going to the client or the deficit debited to his account in case the crop is sold by less than the crop mortgage loan. It is also possible for the client to extend the loan if the Bank agrees. However, this is rarely done.

The Um Rawaba Experiment

In 1977, the Dilling Branch introduced a credit program where intensive supervision replaced a collateral requirement. The program is considered the first serious attempt in the Sudan to provide institutional credit to typical small farmers. It started in Um Rawaba with financing of harvesting of sesame and groundnuts for two cooperative societies: Abu Sadd and El Semah. When these two cooperative societies applied for credit, a team from the Dilling Branch surveyed the region and estimated the area of the crops grown, expected yields, and cost of harvesting. The Bank recognized that part of the crop grown would be sold to the sheil[1/] merchant, hence only part of the cultivated area was finished. In extending loans, the Bank involved heads of villages (sheikhs) to determine the creditworthiness of the borrowers. The sheiks were informed that the loans were their money and should be repaid if the project was to continue. Cooperative services funded by ABS were also involved in the project. Although the check for the loan was written in the name of the cooperative society concerned, the actual payment was made by the Bank officials in the presence of sheikhs and cooperative officers to insure that the loan went to the intended borrower. Only 658 cooperative members were reached in 1977/78 season through this project with a total credit of LS 15,000 or LS 23 per member.

In the second season, the number of cooperative societies financed increased to five with 972 members. This time, both the cultivation operation and the harvesting operation were financed. The volume of

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1/ See 2.7.3.1.

finance jumped to LS 81 thousand, or LS 83 per member. Out of the total volume of credit, 15 percent was paid in-kind for sacks, transport, weighing, and storage. The expansion of the area financed, number of cooperatives, and total loans, as well as the repayment percentages are shown in Table 4. The area financed increased about 5,000 Mukhamas[1/] in 1977/78 season to more than 30,000 Muhamas in 1981/82 season. The number of cooperative societies increased from 2 to 27, while the total volume of loans increased from LS 15,000 to LS 680,000 for the same period. The repayment percentage is more than 90 percent for the six seasons completed, with the exception of 1980/81 season where the rainfall was very low (repayment dropped to only 77 percent).

The loans are administered in three installments intended to coincide with planting, weeding, and harvesting times. These loans are initially production loans financing cultivation costs, but continue after harvest as marketing loans. Participation in the loan program obligated the farmer to participate in the storage and marketing side of the program. When the crop is harvested, it is transported to collection centers and then to stores rented from merchants at Um Ruwaba. Representatives from the cooperatives receive the crops, weigh them, and issue receipts to producers. Crops are then held off the market until prices have reached favorable levels. After selling of the produce (which may take until March), the proceeds are deposited with the Um Rawaba branch (established in 1980) to balance the accounts. After deduction of loans received by each tenant, he receives any surplus, while deficits are debited to his personal account and transferred to the next season.

As observed by many, the program succeeded in reaching small farmers, expanded production and area grown, and ameliorated problems caused by borrowing from sheil merchants. However, improvement in the farmer's income has not been as expected for many reasons that include problems

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1/ One Mukhamas = 1-3/4 feddans.

Table 4

AREA FINANCED, VOLUME OF LOANS, AND REPAYMENT PERFORMANCE AT UM RAWABA BRANCH[1/]

During the Period 1977/78 - 1982/83

Season	Total Area Financed in 000' Mukhamas	Volume of Loans LS 000'	Number of Cooperatives	Repayment %
1977/78	5	15.0	2	100
1978/79	8	81.0	5	100
1979/80	11	130.7	6	94
1980/81	21	203.8	19	70
1981/82	30	680.0	27	90
1982/83	n.a.	400.0	42	n.a.

1/ During the first seasons, loans were provided from the Dilling Branch before the establishment of Um Rawaba Branch.

Source: ABS

of high costs of transportation and storage, buyer's rings formed by merchants due to their detailed knowledge of volume of produce and farmer obligations. The program needs to expand at a faster rate than it is in order to have more impact. The experience of lending through cooperatives encouraged the World Bank to consider financing traditional agriculture in the Sudan through the ABS with a little less than LS 7 million in a three-year program as part of an Agricultural Service Project to the ABS. The objective of the project is "to provide a standard set of cash and physical inputs to farmers through small primary cooperative societies that would enable them to increase their area of cultivation, raise yields, and obtain better prices for their produce." The target group is 10,000 farmers to be reached by the end of the three-year period.

El Obeid Branch of the ABS is working similarly to the Um Rawaba Branch. The number of cooperatives reached in 1982/83 season was 12 cooperatives. Besides cooperatives, the Bank provides loans to individuals to produce vegetables and fruits, poultry, and dairy products if they have adequate security.

2.7.2 The Nuba Mountain Agricultural Corporation

The NMAC started as the Nuba Cotton Corporation (NCC) in 1920 and continued as such up to 1966. During this period, the corporation worked as a typical commercial enterprise purchasing the cotton crop from the traditional farmers after harvest and paying them its value on the spot. The only service provided by the NCC at that time was supplying the farmer with cotton seeds free of charge. In 1967, the NMAC was established to improve the economic and social conditions of small farmers by increasing their production and bettering their living conditions. In 1970, the NMAC introduced a new project in the area to modernize the traditional farmer by providing him with improved inputs, extension, and crop protection and marketing services. The NMAC mechanically prepare the cotton land, spray the crop, provide improved cotton seeds, receive the crop at collection centers, gin and market the crop. In addition to services provided in-kind, farmers also receive LS 2/feddan as an incentive

for weeding. The farmers are only charged for land preparation (LS 6/feddan) and for cotton spraying (LS 2/feddan) although the actual cost of these operations amounted to LS 21/feddan. Farmers are paid LS 15/small kantar (100 lbs.) at a collection station. In recent years, cotton production became unattractive to farmers. Net profit from cotton is almost nil, while sesame and sorghum may secure up to LS 100 profit per Mukhama. For this reason, both areas cultivated and yield of cotton are declining year after year. The NMAC capacity is 300,000 feddans. It can gin up to one million small Kantars of cotton. In 1982/83 season, only 65,000 feddans were grown with an expected cotton yield of not more than 200,000 small Kantars.

Like other Public Agricultural Corporations, the Central Bank of the Sudan supplies NMAC with seasonal loans and working capital. The loan section in the Bank estimated the total cotton area under the NMAC to be 45,000 feddans, with a loan requirement of LS 5.7 million and a gross return of LS 1.5 million for 1982/83 season. The seasonal indebtedness of LS 4.2 will add to the accumulated debts of the corporation and make it another problematic area for the Bank of the Sudan.

2.7.3 Private Money Lenders

The majority of traditional farmers in Kordofan Region are meeting their credit needs from non-institutional sources. They have no access to ABS loans since they do not possess registered land or a cooperative guarantee. They meet their pressing financial needs from their own resources, from selling standing or expected crops in the sheil system, mortgaging their animals and valuables, or from selling their labor and the labor of their families to large farmers.

Farmers growing grains, oil seeds, or other crops need cash to purchase seeds and simple hand implements for planting, to hire labor for weeding and harvesting, to sack and transport the produce to markets, and to feed their families during the growing season. A dependable, easily-accessible source of finance is needed to provide credit throughout the

year in the form of commodity loans and during the cropping season in the form of cash and commodity loans. The sheil system is the dominant type of finance prevailing in Kordofan Region as well as in other parts of the Sudan.

2.7.3.1 The "Sheil" System

The "sheil" system is a unique type of credit disguised in the marketing system. It is a social adjustment to avoid the direct interest rate prohibited by Islam. Until the 1930's, the sheil system was the main source of finance in rural Sudan. Several types of sheil are still practiced. The oldest type is an advance of grain or seeds valued at a price substantially above the estimated price at harvest. The borrower must settle the loan by returning, at harvest time, enough grain to make up the money equivalent of the loan. The most dominant type of sheil is an advance by a local merchant or a money lender (in cash or kind) to a grower who pledges to deliver to him a specific amount of produce at harvest time. Whatever revenue the sheil merchant may receive at the sale of the crop he takes for himself. The producer is neither entitled to any surplus nor responsible for any deficit. Such an arrangement is most dominant in the Central Region (Gezira Scheme), the Northern Region, and the Kordofan.

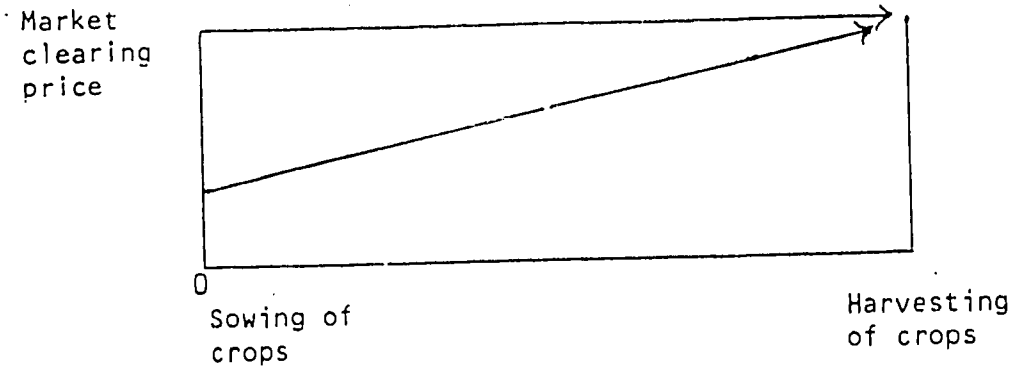
A peculiar type of sheil in the west of Sudan is practiced by pledg-ign animals as collateral. During peak demand for cash, i.e., August, a small farmer may sell his cow to a sheil merchant. It is understood between the borrower and the lender that the lender will sell the cow back to the borrower as soon as the latter gets the money, but at a higher price. The sheil merchant will leave the cow with the small farmer to be looked after. When the sheil merchant knows that the small farmer has enough money to buy the cow back, perhaps after harvest in December, he will show his desire to take the cow. Negotiations will take place between the two until the small farmer buys the cow back.

As could be seen from the above, the "sheil" system is of a different form than money lenders found in other countries where the interest rate is predetermined. For the professional money lender, the interest rate is the opportunity cost of using his money while the transaction profit is the "sheil" merchant's incentive.

2.7.3.2 Discriminating Monopoly of the "Sheil" Merchant

The stereotype that money lenders charged high interest rates universally for the high risk they are taking is not consistently supported by empirical data. Survey results of Sudan's rural areas sometimes contradict the myth which is perpetuated. The "sheil" merchant employs his extensive knowledge of the rural area as a hedge against risks incurred because of price fluctuations and defaults in his transaction with the tenant. He considers every tenant as a separate market at a certain point of time and treats him accordingly. The price varies directly with the time of the "sheil;" the earlier the "sheil," the less the offered price until harvest time when everyone buys or sells at the market clearing prices as shown in Figure 3 below:

Figure 3



The same borrower may receive different "sheil" prices at different points in time, minimizing the risk of uncertainty.

The "sheil" merchant also discriminates between borrowers, taking into account creditworthiness, indebtedness to others, and previous yield records. Small village shops act as clubs where villagers sit and chat. Disloyal or heavily indebted tenants were easily detected and excluded from transactions.

Thus, personal knowledge not only helps in the eligibility and creditworthiness of the farmer, but also helps act as security for repayment. It is socially undesirable not to repay informal loans. The borrower hedges against a bad reputation by doing his best to repay his loan.[1/] The "sheil" merchant rearranges his portfolio by lending less and less to risky farmers which renders the explanation of the high interest charged by sheil merchants on the basis of high risk borrowers invalid. The most appropriate explanation for the sheil form of money lending is that the money lender has the advantage and the power of being a perfectly discriminating monopolist. Those customers who have no alternative other than the "sheil" merchant credit, due to lower borrowing capacity, are charged a high interest (P_1), while those who have high borrowing capacity face a more elastic curve for the "sheil" credit and receive a lower rate of interest (P_2), as illustrated on the following page.

The surveys carried out by the ABS in the Um Rawaba district showed that 50 percent of the cultivators in 1978/79 season received sheil credit and realized only 50 percent of the market price. Calculated on an annual basis, the interest charged on such a transaction will be 50 percent per annum. The high interest rate charged by private money lenders shown in a number of studies was the outcome of the short period of the loan. The period ranged between 2-6 months with an average of 3 months. If only the effective period of the loan is taken into consideration, these figures will be reduced by one-quarter, and the sheil merchant will be considered more attractive and convenient than the institutional lenders. The real cost of the latter was calculated to be 19 percent for an average loan of

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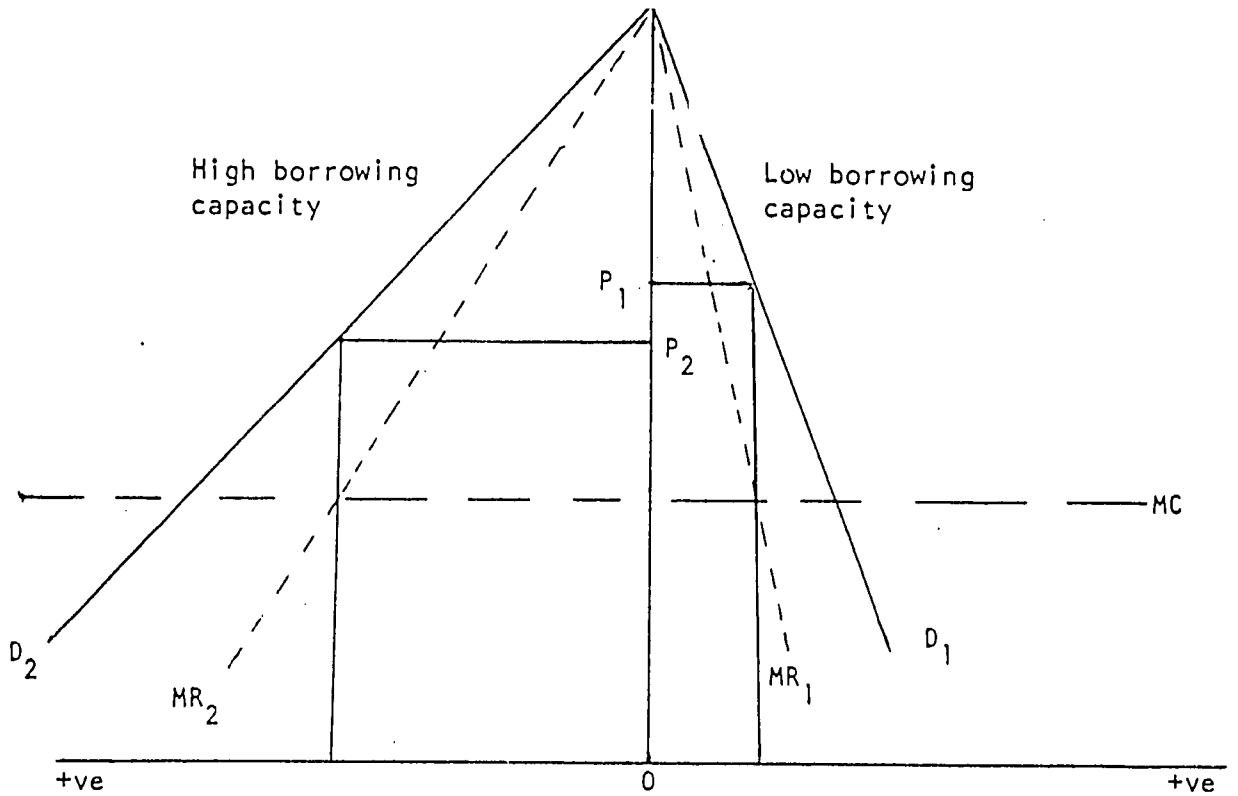
1/ This attitude is not true for institutional loans.



LS 400 (Ahmed 1980)[1/]. Even this real cost was underestimated since the institutional rate is fixed by the Government and subsidized accordingly.

The return to alternative investment, and liquidity preference, was noted as high in the rural areas of the Sudan. Capital is scarce and alternative investments may yield similar profit to the sheil merchants. Sheil merchants can buy and store tenant's crops when prices are low and sell when prices are high. They can trade in consumer goods, building materials, etc. which have a high margin of profit.

1/ Ahmed Humeid Ahmed, "Lender Behavior and the Recent Performance of Rural Financial Markets in the Sudan," unpublished Ph.D. Dissertation, the Ohio State University, Columbus, Ohio, 1980.

Awad argued against comparing the interest rate realized from sheil with institutional rates of interst of 7 to 14 percent. He favored comparison with shopkeeper's profits that ranged between 11 and 100 percent.[1/] Other research workers have argued that the margin received by sheil merchants is strictly in the nature of profit and is not interest. This is supported by farmers who prefer to deal with the sheil merchant, believing that they conform with Islamic sharia (jurisprudence) that prohibits taking interest. This is one of the reasons why some farmers do not use institutional credit no matter how extensive and cheap that credit may be. Observers reported many undesirable effects of the sheil system. Besides its effect on returns, sheil credit has a very serious effect on the area cultivated and the productivity of the borrower. During peak demand for labor, the sheil merchant, who is often a larger farmer, gives no loans before his own farm work is done, i.e., land-clearing and weeding. Because of this, the proper period for the small farmer to plant his crop may have passed, resulting in low productivity. Realizing that he has to work for the large farmer, the small farmer reduces his cultivated land to match the man-days available to him.

Sheil has been blamed for the slow rate of growth in Sudan's agriculture. Sheil is believed to reduce production incentives. The farmer feels he does not own the crop he produces. Sometimes the crop may not be enough to cover the loan advances and the balance will be carried to the next year or the next crop harvested. Debt accumulates in this manner. A stage may be reached where a few tenants spend their lives trying to pay their accounts. In such cases, the sheil merchant dictates terms of lending and exploitation may appear. The existence of merchant-small farmer ties prevents the debtor from benefiting from whatever competition there is among the product or input dealers in the region. In such a situation, no institution or agency can extend credit to these growers and expect them to repay.

1/ Mohamed H. Awad, "Problems in the Rural Areas: Controlling the Sheil" (in Arabic), Sudanese Studies, Vol. 4, 1973.

In summary, although the profit realized by the sheil merchant from an informal loan transaction may be much higher than what the formal lender charges, nevertheless these informal lenders continue dominant and flourishing in rural Sudan. Their adaptability to local conditions, continuity, and reliability of services provided, flexibility and adaptation to the local needs are main reasons for the dominance of informal lenders in rural Sudan. Farmers believe that the way they deal with sheil merchants conforms with Islam. Innovations in the above areas by the formal financial institutions will solve part of the problem.

2.8 Credit Through the Regional Ministry of Agriculture

In 1981/82 season, the Regional Ministry of Agriculture provided five tractors with their seed drills to five groups (50 farmers or more) of traditional farmers. The objective of this project is to help farmers not incorporated under the MFC to expand the area grown and to increase their production of sorghum. The tractor and the seed drill were LS 37,000 to be paid by farmers in three installments. The first installment was provided by the Ministry and will be kept as a revolving fund. The tractors are registered in the name of the Ministry until the loan is paid in full. An increasing number of applications are now submitted to obtain such loans. The consultants feel that this experiment should be considered carefully so as not to repeat the experience of the 1940's of direct government loans not repaid by farmers. Branches of the ABS in the Region are doing the same job and coordination between the ABS and the Ministry is needed.

Chapter III

OBSERVATIONS

3.1 Characteristics of Rural Communities in the Project Area

Traditional farmers group together in villages consisting on the average of 150 to 600 households. Households are made up of extended families averaging six in number. Individuals in the family may have different farms, but all share the same food. Wives in the family may farm a separate piece of land for their own household expenses. Often households have small garden plots called "jubraka" to grow quick-maturing produce for support before the main crops are harvested and sold.

Local government recognizes these divisions among the same household in distributing rationed commodities.

Heads of villages, called "Sheikh," still exist. Although not recognized officially, a sheikh's services may be called for to settle disputes, to collect taxes, or to inform his people about local government policies and activities.

Cooperatives are sometimes found around the village for special needs such as flour mills, consumer shops, transportation, water, and recently in a few areas of Um Rawaba and El Obeid, seasonal production loans from the Agricultural Bank of Sudan (ABS).

3.2 Village Population Density and Cultivated Area

Table 5 illustrates the method for arriving at the estimate for the number of mukhamas cultivated in the project area. The usual practice is to cultivate only 50 percent of area suitable for cultivation. It is good farm management to leave the other 50 percent fallow.

The ratio of cultivated land to fallow may change in the future if research develops acceptable rotational methods allowing land to be cultivated continuously.

Table 5

TOTAL RURAL POPULATION IN PROJECT AREA
AND ESTIMATED NUMBER OF MUKHAMAS UNDER CULTIVATION

	Adm. Division	No. of Districts	No. of Villages	No. of House-holds	Total Population	Estimated Total No. Cultivated Mukhamas in Project Area
1.	El Obeid	4	89	18,833	96,604	753,320
2.	Um Rawaba	7	919	39,538	356,070	1,581,520
3.	En Nuhud	9	1,566	70,762	426,166	2,830,480
4.	Dilling	7	715[1/]	41,841	217,028	1,673,640
5.	Kadugli	5	104	62,915	314,671	2,516,600
6.	Total	32	3,393	233,889	1,410,539	9,355.560
					Estimated average number Mukhamas cultivated each year in project area (50% of total):	4,677,780

1/ Estimated - recorded statistics not available. Previous studies indicated a farmer cultivates only 50% of his land. The rest is fallow. Estimated number of Mukhamas cultivated per household each year = 20

Source: Department of Statistics - El Obeid.

3.3 Present and Potential Yield Averages and Estimated Cost of Production

Table 6 provides a conservative estimate of present and potential yields by major crop and administrative division. Market prices and production costs are also given to facilitate computing producer's net income per mukhama and per farm. The average size farm is considered to be about 20 mukhamas. The estimated average future production costs per farm, taking into consideration the increased cost of modern inputs and additional costs related to increased yields are:

El Obeid	- LS 77 per mukhamas	x	20	=	LS 1,540
Um Rawaba	- LS 73 per mukhamas	x	20	=	LS 1,460
En Nahud	- LS 71 per mukhamas	x	20	=	LS 1,420
Dilling	- LS 75 per mukhamas	x	20	=	LS 1,300
Kadugli	- LS 120 per mukhamas	x	20	=	LS 2,040
			Total	=	LS 7,760

Average cost of production per farm = 7,760 ÷ 5 = LS 1,552. Deducting the value of family labor, each borrower would require a loan in the amount of 70 percent of his total cost of production. From this calculation, we can assume that the estimated average loan needed to farm 20 mukhamas would be LS 1,086.

The average increase in cost of production using modern inputs and additional cost related to increased production is about 34 percent. This increased cost is related to improved seeds, seed treatment, crop protection, extra sacks, extra transport, etc.

3.4 Improved Farming Techniques for Traditional Farmers

Just as important as modern inputs are for increasing agricultural production in the traditional sector are the use of more effective methods and techniques of farming. Adopting improved techniques often incurs more expense. The need for some farming practices are not obvious at the time they are needed and are not associated by the farmer with increased yield or production. The vital role of extension is to bring this knowledge

Table 6

COMPARISON OF ESTIMATED AVERAGE YIELD AND COSTS
OF PRODUCTION FOR MAJOR CROPS - PRESENT AND POTENTIAL

			El Obeid	Um Rawaba	En-Nahud	Dilling	Kadugli
	Sorghum						
Present:	Cost		48	50	26	57	51
" :	Yield		3	2	1	3.7	6
" :	Price/Unit		25	25	33	22	22
Potential:	Cost		55	60	65	65	70
" :	Yield		5	7	8	8	10
" :	Price/Unit		25	25	33	22	22
	Millet						
Present:	Cost		50	50	45	Very Little	Very Little
" :	Yield		2.5	1	1		
" :	Price/Unit		45	30	45		
Potential:	Cost		60	55	55		
" :	Yield		5	3	3		
" "	Price/Unit		45	30	45		
	Groundnuts						
Present:	Cost		100	100	100	Very Little	175
" :	Yield		7	7	7		15
" :	Price/Unit		23	23	23		25
Potential:	Cost		120	120	140		216
" :	Yield		10	10	12		20
" :	Price/Unit		23	23	23		25
	Sesame						
Present:	Cost		55	60	42	Very Little	44
" :	Yield		1.5	2	1.5		2
" :	Price/Unit		100	100	35		65
Potential:	Cost		100	100	80		50
" :	Yield		5	5	4		3
" :	Price/Unit		100	100	35		65
	Gum Arabic						
Present:	Cost		25	17	8.5	None	None
" :	Yield	Kt.	1	3	1		
" :	Price/Unit	Kt.	80	80	80		
Potential:	Cost		50	30	15		
" :	Yield	Kt.	2	4	2		
" :	Price/Unit	Kt.	80	80	80		
	Cotton		None	None	None	None	
Present:	Cost						48
" :	Yield	Kt.					3
" :	Price/Unit	Kt.					15
Potential:	Cost						75
" :	Yield	Kt.					6
" :	Price/Unit	Kt.					18
Increase in cost between present & potential			30.5%	31%	60%		29%

Average - 34%

Gum arabic and cotton yields and prices are based on the measure of a small kantar (100 pounds). For other crops, yield and prices are based on sacks. Costs for all crops are based on LS per mukhama

Source: Extracted from notes of farmer interviews by the study team.

from research data to the traditional farmer. Supported by a credit program, an active well-organized, adequately funded system of agricultural extension and related services can make dramatic inroads toward increasing production in the vast traditional sector of the Kordofan.

Some of the obvious areas where farmers need guidance to improve their farming methods are:

- Using better seed - either purchase selected seed, if available, or select and grade their own.
- Seed treatment - seed treatment for insects and smut is one input more available than others. However, often not used.
- Spacing - hand planting often is done in a haphazard way without regard to the optimum spacing needed to obtain the maximum yield.
- Planting in rows - such a system facilitates the weeding and inter-cropping procedures.
- Rotation of crop - this is done to some extent, but can be improved especially where it involves rotation with acacia senegal.
- Replanting - often when poor germination occurs, gaps in plant population can be replanted.
- Timely weeding - weeding is often not done soon enough or not done thoroughly.
- Time of planting - some farmers plant before the rains and some after. The best time should be researched and planting done on a scientific basis.

Table 7 summarizes the inputs and services needed by crop.

3.5 Credit System in the Project Areas which Provide Credit for Increased Yields and/or for Farmer Income

The only sources of credit available to traditional farmers are from merchants usually through the sheil system, and from cooperatives financed by the Agricultural Bank of Sudan (ABS). Of these, only the ABS loans to cooperatives provide the minimum means for farmer members

Table 7

SUMMARY OF INPUTS AND SERVICES NEEDED TO INCREASE YIELDS OF MAJOR CROPS AND THE EXTENT THESE INPUTS OR SERVICES ARE AVAILABLE TO TRADITIONAL FARMER

Crop	Inputs Needed	Availability	Services Needed	Availability
Groundnut	Quality Seeds Seed Treatment, Inoculation, Pesticides	Very limited	Extension guidance for spacing, planting systems, use of seed treatments, pest control, rotation	Practically none
Dura and Sorghums	Quality Seeds Seed Treatment, Pesticides	Very limited	Extension guidance for seed treatment, spacing, planting systems, use of seed treatment, inter-cropping, pest control, rotation	Practically none
Millet	Quality Seeds Seed Treatment, Pesticides	Very limited	Extension guidance for spacing, use of seed treatment & pesticides, inter-cropping, pest control, planting systems, rotation	Practically none
Sesame	Quality Seeds Seed Treatment	Little to none	Extension guidance for spacing, use of seed treatment & pesticides. inter-cropping, planting systems, rotation	Practically none
Acacia Senegal	Young Seedlings	Only in limited areas on a limited basis from Forestry Department	Extension guidance, planting patterns, spacing, inter-cropping, rotation	Practically none
All Above Crops	Labor for planting, weeding, and harvesting	Usually available except in Kadugli, if money available to pay	CREDIT	Inadequate amounts from merchants at high cost
All Above Crops	Animal traction	Only in Kadugli & Dilling areas on very limited basis	Animal traction, training centers, and extension	Only in Kadugli & Dilling areas in limited amount
All Crops	CREDIT	Inadequate amount & at high cost from merchants except on a limited basis in Um Rawaba and El Obeid	Cooperative organization through assistance of Cooperative Department, followed by ABS loans	Only in Um Rawaba and El Obeid on a limited basis

to obtain more production by providing funds to pay for labor at the critical times such as for planting, weeding, and for harvesting. The ABS also provides loans to cooperatives for other inputs, when they are available, such as tools, pesticides, seed, seed treatment, etc. However, this is a comparatively new venture by the ABS and only includes 43 cooperatives in the Um Ruwaba area and 27 cooperatives in the El Obeid area. To provide these loans to cooperatives, the ABS had to absorb the added cost of paying the salary of cooperative department officers, seconded from the Department of Cooperatives, to help organize cooperatives and to assist members with management of their cooperatives. There has been little or no assistance from the extension service to assist these cooperatives concerning the use of more efficient farming techniques related to increasing production per unit area.

Sheil merchants' loans are often late, in inadequate amounts, and at a cost that usually deprives borrowers of any meager net income they may have.

Commercial banks contacted showed no interest whatsoever in making loans to traditional farmers. Their interests were primarily in making inventory loans to larger merchants or traders during storage of crops or merchandise, where the bank would have the keys to the storage facility. They also made loans to individuals where they could take a mortgage on a dwelling. They were not interested in land mortgages regardless of the legal status of the borrower land title. It seems that mortgages on dwellings exert more pressure on borrowers to repay loans on time.

3.6 Constraints Associated with Providing Credit to Traditional Farmers

Providing a system of credit to traditional farmers frequently provides less than satisfactory results. Poor results from such credit ventures can usually be attributed to inadequate consideration of several constraints associated with the design and implementation of credit systems. Some of these constraints, relevant to Kordofan, are:

A. Securing loans - traditional farmers such as those found in the Kordofan area usually do not have a legal registered confirmation that their parcel of land belongs to them. Consequently, their land cannot be used as security for credit. Even if they did have a legal title, and the credit institution took such titles as security, in case of default, the legal difficulty under Sudanese law means collection may take years and by collection time, costs would be prohibitive. Mortgaging crops and livestock poses similar problems.

B. Making loans to a multitude of small farmers is tedious, time-consuming, and costly. Support services, such as agricultural agents, cooperative development assistance, and other related public assistance in Kordofan Region, are inadequate or non-existent. Such services are necessary to ensure that traditional farmers have the necessary inputs and guidance with which to increase production. Only if farmers increase production and increase their net income through the use of credit will they be able to repay their loans.

C. Interest rates - policy-makers often require the credit institution to provide credit to traditional farmers at a rate below the real cost of the money and its delivery. This usually tempts borrowers to divert loan funds to other than intended purposes. If loans are not used for productive purposes, repayment levels will decline resulting in depletion of the loan capital fund and drying up future sources of loan capital.

D. Complicated loan processing - often credit institutions require a complicated loan processing procedure. Traditional farmers will avoid applying for loans rather than go through the process.

E. Lack of public support - often policy-makers and local leaders are eager to be identified with a credit program when loans are disbursed. However, when collection time comes, these former supporters are reluctant to become involved.

3.7 A Role that Cooperatives Should Play in a System of Credit and Other Services to Traditional Farmers

The ABS pilot project in the Um Rawaba area demonstrates how cooperatives can play a vital role in a system of channeling agricultural credit and agricultural services to farmers. Making loans to cooperatives

who then distribute the funds to their members reduces the constraints, A, B, D, and E, mentioned above.

The project has been underway for about six years working at present with 43 cooperatives. This year, 15 of these cooperatives were not given additional loans because they did not make the minimum required repayments, mostly as the result of insufficient rain. These delinquent cooperatives are expected to reduce their delinquencies enough to be considered for loans for the next season.

Last season, loans were made to 42 cooperatives with a 90 percent repayment rate. On the basis of a weighted average since 1977, the recovery rate has been 85 percent.

Close supervision is provided and frequent contact made with these cooperatives. If a cooperative does not repay at least 70 percent of the annual loan, it will not be considered for further loans. Evidently, considerable peer pressure comes into play when loans are due.

Only on a small pilot project basis can the ABS continue to pay the expenses of cooperative officers. This is clearly the responsibility of the cooperative department. It is unfortunate that the cooperative department is so under-funded, under-staffed, and under-trained that it is not capable of carrying out its responsibilities. The cooperative department as well as the Department of Agriculture, including extension services, are financed by public funds, as they should be. It is evident that these organizations are at the bottom of the local government's list of funding priorities when they should be at the top, if their objective is to increase agricultural production.

3.8 Constraints Preventing Farmers from Receiving the Maximum Possible Revenue from Produce Sold

A. Lack of storage facilities is probably the greatest constraint to farmers receiving more for their produce. Storage at the village level, if available at all, is usually out in the open or in huts. In

the open, produce is vulnerable to the weather and insects, and if stored in huts, it is also vulnerable to possible fires.

Usually a farmer must sell his produce shortly after harvest to obtain money for living expenses or to pay existing debts. Of course, this is the time when prices are lowest. Sheil merchants usually buy the produce outright at the lower price and store it for themselves awaiting higher prices.

On a limited basis, where the ABS is financing production cooperatives, the ABS provides storage for the produce of the cooperative members until the cooperative management decides to sell. The Bank then deducts the amount that the cooperative owes for loans received plus storage charges. This approach to the farmer's storage problem provides the best solution. However, it is limited. In other areas where the ABS has available storage, it will store produce for individual farmers either on a loan on the inventory plus storage cost or directly for storage cost.

B. The limited availability of transport in village areas is a constraint that causes small farmers considerable problems. Sometimes there are truck owners who buy produce directly from village shopkeepers who have purchased the produce at the lowest price from a group of farmers.

The other alternative is for the farmer to transport this produce himself on animals to the nearest market. This is time-consuming especially if the distance is far and he has to make several trips. Many small farmers do not have animals that can be used for transport and have no alternative but to sell to merchants or transport agents at the time when prices are low.

3.9 Agribusiness Which Provides Needed Services for Traditional Farmers

Agribusiness most directly associated with traditional farmers needs more handtool makers. Handtool makers operate as a group of individual blacksmiths, each turning out a different type of handtool, such as axes, hoes, and other types of hand implements. Often these are made on orders from shopkeepers.

Other agribusinesses are oil mills, both mechanized and traditional, powered by animal traction, and a few merchants handling limited amounts of insecticides and seed treatment chemicals. One interviewee expressed his viewpoint that more traditional oil mills were needed. Further studies would be necessary concerning this request, taking into consideration the efficiency of traditional mills and the actual need for more oil seed processing facilities. Existing mechanized oil mills were operating at only about 60 percent capacity. They operate ordinarily about six months of the year. They could operate 11 months if they had supplies of oil seeds. Mill operators do not have the capital to purchase large quantities at one time and must buy small quantities more frequently. A few months after harvest, most of the oil seed supplies have been bought up by trader/exporters. Certainly, oil processors provide a level of competition to other buyers which has a favorable effect on oil seed prices received by farmers. If they had more storage facilities and credit available, their importance to the farmer and community could be increased considerably.

3.10 Potential Agribusiness Which May Benefit Traditional and Other Farmers in the Kordofan Region

A. Well-organized storage facilities located throughout the region which could also provide services of grading and cleaning, fumigation, drying, decortication, and market analyses and advice to customers would provide one of the most valuable services presently needed by all farmers and merchants. Such storage facilities could be either the silo of warehouse type or both. During the off season for crop storage, these storage centers could stock quantities of other inputs such as improved seeds, farm chemicals, implements, and an array of other supplies for wholesaling to village merchants. The larger volume of storage these centers could handle would ultimately be reflected in lower storage cost to their customers.

With larger capacities of secure storage available, commercial banks would be more inclined to make more inventory loans, thus bringing in more outside capital to the area.

The ABS is performing this service to a limited extent in a few areas. In fact, about 50 percent of the Bank's revenue comes from their storage business and import and sale of commodities and farm equipment. Evidently, the ABS had to resort to becoming involved in the storage/commodity business to make up for lack of revenue from its credit services. The ABS is limited to charging a maximum of 14 percent for loans, which obviously is below the real cost of the money it lends.

B. Transport facilities between outlying villages and trade centers are in great demand and of limited availability. In many areas, transport vehicles could operate year-round by providing transport for crops during harvest season and for hauling water to other areas during other times. Consideration should be given to the use of tractors pulling trailers designed for water or produce. Tractors may be slower than trucks but are more able to manage difficult roads during wet weather, thus are more flexible in their utility.

More available and dependable transport for villages would provide small farmers with more options concerning the disposal of this produce resulting in a greater share of the market price.

C. There is considerable scope for improving the design, manufacturing, and sale of hand tools and eventually animal-drawn implements. The Western Sudan Agricultural Research Project in El Obeid is presently working on designing better handtools, especially for tapping acacia senegal trees and harvesting gum arabic.

The Nuba Mountain Farming Project in Kadugli is working on animal traction implement design which can be manufactured locally. One enterprising oil mill mechanic in Nahud was working on the design of tractor-drawn planters and tilling implements.

D. Modern facilities for better and more complete processing and tanning of animal hides should provide a better market for hides. However, national government policies on granting export licenses and regulations

of government tanneries concerning methods of purchasing hides and pricing seems to involve a monopoly. This should be reviewed to identify changes necessary to provide livestock producers and slaughter businesses a more equitable share of the market prices of hides.

E. A demand exists for veterinary supplies and medicines. We were informed that livestock owners, especially the nomadic type would gladly pay the price for medicines and treatments if they were available. If animals were properly treated, they naturally would weigh more and ultimately bring increased revenue to producers. Veterinary supply shops near migration routes should prove profitable and serve an important need. How and where such shops could obtain the necessary supplies needs further study.

F. Other ideas expressed by persons interviewed concerning potential agribusiness are:

- Manufacturing of peanut butter and confectionary items using locally-produced peanuts and sesame.
- More flour mills for grinding dura and other grains.
- Nursery production of acacia senegal seedlings for sale to farmers to supplement efforts of the Forestry Division.

3.11 Importance, Characteristics, and Constraints Concerning Livestock Production

Most of the livestock, cattle and sheep in the Kordofan area are owned and managed by migrant herders. Some sedentary farmers also own cattle, sheep and goats depending on availability of water and grazing. Many small farm operators only own goats. Ownership of cattle is a sign of wealth. The availability of water and feed is a limiting factor. However, farmers invest in livestock as a means of saving since other forms of savings are either not available or bear interest and violate their religious beliefs.

Financing livestock for production for the traditional farmer is not as important as financing those things that will increase crop production. However, financing of livestock should not be excluded from lending policies.

3.12 Introduction of Animal Traction

The Nuba Mountain Farming Project for animal traction has been researching and experimenting with animal traction for traditional farmers since 1978. They have introduced several implements including a chisel, seeder, ridger, groundnut lifter, and a cart.

The project makes training available to farmers for the training of oxen and the use of implements. Farmers bring their own animals for training and the project sells the implements to them on the basis of 30 percent down and the rest in two payments. Extension guidance and advice are also provided with the package. It was found that a farmer could farm twice the area with animal traction as he could by hand.

Indications are that through the use of animal traction, yields per unit area may be increased only slightly. However, a farmer will be able to farm twice the area and at less cost per unit area than before.

Since its beginning, the project has assisted 450 farmers. The package is a valuable input and should be included in any credit program for traditional farmers. However, it should not be considered as a panacea but rather as an evolutionary input that takes time to become accepted over a larger geographical area.

3.13 A Summary Description of Agricultural Organization Support Services for Traditional Farmers in the Kordofan, Their Importance, Limitations, and Problems

The agricultural organization in the Kordofan has at least a rudimentary framework for most agricultural services with representatives in each administrative division. Those services which could play a vital role in an intensive agricultural production and marketing project are:

- Extension Service - this service usually has a representative in each area; however, they were often without adequate transport and other support. There are too few staff to reach more than a few farmers.

- Crop protection service - this service is also available; however, like extension, is usually under-staffed in need of transport and other support, and short of the various chemicals and materials needed by farmers.

- Seed research and multiplication - Western Sudan Agricultural Research Project is working on seed varieti and selection. However, little if any seed multipli tion is taking place for the Kordofan. More sophist cated farmers bring in seeds from other areas of the Sudan. There is a National Seed Administration Head quarters in Khartoum. They have nine stations in Su for multiplication of seeds but none in the Kordofan Their constraints are: shortage of suitable land, l oratory equipment and farm implements, trained staff and an inadequate number of transport vehicles. The sell improved seed at prices below cost of productio Seed produced seem to go mostly to the more informed larger farmers on a first-come, first-serve basis.

- Animal production and veterinary services - these are at present in divisional headquarters with a few sub-stations in outlying areas. They suffer the same constraints as the other services - lack of transport, veterinary supplies, and trained staff. Most of the sub-stations are staffed by workers who often use camels for transport.

- Department of Cooperatives - this service is provided to agriculture as well as to the urban population. They are drastically under-funded and under-staffed. They need transport, training materials, and more trained staff. Presently, they can only provide services to a few local cooperatives, such as for flour mills and consumer shops. They did not have the means to provide cooperative officers to assist the ABS in Um Rawaba with their credit project for traditional farmers. The only way they could help was to second two cooperative officers to the ABS which then paid all expenses including salaries.

- Range management services - this service is available to a limited degree especially in northern Kordofan. Operations suffer the usual problems of shortage of staff and lack of transport and support.

3.14 Other Organizations Adjacent to the Proposed Project Areas

A. Nuba Mountain Cotton Corporation - Organized primarily for the promotion of cotton production. It has a history of problems related to prices in relation to cost of production. Cotton becomes less competitive with other crops. The Corporation furnishes considerable services to its members. It is an appropriate vehicle for a system of credit for traditional farmers.

B. Nuba Mountain Farming Project for Animal Traction - Organized in 1978 to introduce animal-drawn equipment and to assist farmers with the training of draft animals and use of equipment. This project has merit and a credit project could benefit by associating with them for promoting animal traction to traditional farmers in other areas. The project has acquired considerable experience and has worked with 450 farmers in Southern Kordofan.

C. Mechanized Farming Corporation - Located near Dilling and involves about 400,000 feddans and about 450 tractors. Production credit is provided by ABS. It has a mixed record of repayments and is currently wrestling with minor problems concerning farmer land contracts, rotation systems, and machinery maintenance and spare parts. In spite of these problems, a similar scheme would be well-suited for production of certified sorghum, dura, and millet seed on a large scale under contract with the National Seed Administration and under their control.

D. Western Sudan Agricultural Research Project - Reseach stations contracted were located at El Obeid and Kadugli. Research related mostly to crops. Some studies also include interrelations between humans and livestock. Important findings are emerging concerning use of fertilizer, more productive varieties and cultivation methods. A weak point is that the extension service is not able to respond to research to transfer technology to farmers. Extension does not have funds or facilities to cooperate with research effectively.

E. German Agency for Technical Cooperation - Project located at Kadugli. Research centers around the use of continuous cultivation and crop rotation methods and the use of legumes and fertilizers. Heavy equipment is used for deep tillage. Results of the research is emerging and may prove valuable for traditional farmers. Again, the weak point is with extension which is not seriously working with them.

3.15 Characteristics of Other Credit and Banking Institutions

A. Sudan Rural Development Co. Ltd. (SRDC) - Consists of a group of companies which began operations in 1982 with the objective of promoting private investment in development projects in rural Sudan. It makes equity investments for not more than 50 percent and has limitations on its investments to a maximum of US $500,000, and a minimum of US $50,000. Present interest rates are 14-15 percent. It does not refinance existing projects or invest in trade and infrastructure. Repayment terms are 5-10 years.

Lending criteria of the SRDC does not make it suitable for operating a credit program for traditional farmers. However, there are possibilities that it could become involved in certain agribusiness ventures which are in need of financing of less than 50 percent of total project costs.

B. The National Development Bank (NDB) - Has headquarters in Khartoum and became operational in November 1982. Its main objectives include:

- Identify possibilities for development in the Sudan, stimulate investments in and providing financing for same.
- Provide a means for mobilizing capital through individual savings accounts and investments.
- Encourage and channel the flow of local and regional capital toward development.
- Carry on all commercial banking activities.

- Participate in the establishment of projects of development in various fields, with priorities for food production, production and distribution of pharmaceuticals, public transport, and housing.

- Establish an Islamic banking section.

The first impression that emerges when analyzing the NDB is that it presently has objectives and aspirations beyond its experience and capabilities. However, generally it seems to have less policy restrictions than the ABS or other credit institutions. It would take considerable time, resources, and training for the NDB to provide a credit system for traditional farmers in the Kordofan. It does have more immediate possibilities for financing outright, or as a partnership, certain agribusinesses.

C. Commercial Banks - Emphasis is on short-term lending ranging from 3 to 18 months. Most advances go to finance import and export trade, inventory of crops and merchandise and industry. Attitudes of commercial bank branch officials in the Kordofan concerning the financing of production schemes for traditional farmers are definitely negative. The risky and involved characteristics of agricultural production, Government policies on limits of interest rates and discount privileges and lack of specialized departments to analyze the feasibility of investments in agriculture are the underlying reasons for the negative attitudes.

D. Faisal Islamic Bank of Sudan - This is essentially a commercial bank operating under Islamic guidelines. Under this system, the charging of a predetermined amount of interest for loans or the paying of interest on savings is not permissible. Instead, the practice is for the bank to enter into a partnership with the customer and share both profit and losses. For depositors, the bank has investment accounts where the investor shares in profits the bank realizes from the use of the investor's money. There are no branches of this bank in the Kordofan. Its emphasis is on short-term investments in the trade sector. It has little expertise in lending for agriculture and especially for credit projects for traditional farmers.

3.16 Availability of Resources for Lending to Traditional Farmers

Credit institutions - the ABS is the only institution using its resources for extending credit to traditional farmers. Resources for this purpose are limited and limit the Bank's efforts to small areas on a pilot scheme basis. The low service charge rate of 14 percent imposed on the Bank are below the real cost of money, compelling the ABS to depend on income from storage facilities and merchandising from supplies and equipment to stay solvent. It is prevented from competing with commercial banks by offering accounts for savings to mobilize local capital. Restrictive limits on interest rates and savings accounts makes it impossible for the ABS to mobilize capital. This forces the ABS to depend on marginal rediscount rates with the Central Bank of Sudan or injection of capital from foreign funds for any expansion of lending activities.

Commercial banks and the Post Office Savings Bank are the only institutions in the Kordofan that offer savings accounts. However, they are not convenient for farmers living in remote areas. About 80 percent of commercial banks' deposits are in current accounts. Even the 20 percent of the deposits in savings accounts are often used in a similar, in-and-out, manner to current account; for this reason, almost all commercial bank capital goes to short-term lending.

3.17 Propensity for Traditional Farmers to Save

Traditional farmers in the past have had little reserve to save. If they did have surplus funds, they preferred to invest in livestock. Religious beliefs prevent them from using commercial bank savings accounts that draw interest, or Riba.

Chapter IV

COMMENTS AND RECOMMENDATIONS

4.1 A Review of the Total Agricultural Organization

Designing a production credit system for reaching traditional fa usually involves improving and rebuilding the infrastructure of the to agricultural organization. This is no less true for the Kordofan. Th ultimate goal is to increase total crop production and production per area. This requires a variety of inputs and services. Equally import is introducing a system of delivery designed to correct the constraint increasing production as well as convincing traditional farmers to cha their farming patterns and their concept of credit and marketing.

The Kordofan needs an effective agricultural organization, wheth or not this project comes to pass. The brief look this team was able give for this report revealed a tragically low priority given to the Ministry of Agriculture and its system of services to farmers. This h contributed to the decline in production. The Department of Cooperati organization has also been neglected to the point that it is ineffecti relative to agricultural production.

Traditional farmers have had to contend with sheil merchant cred that has kept them at a subsistence level. Government policies regula ing formal credit institutions, such as interest rates and service cha have often been contradictory to their survival and effectiveness.

Developing a project or program which involves increasing agricul tural production and establishing a complementary credit system can be accomplished quicker with less cost by building on existing foundations of experience.

The Um Rawaba credit project administered by the ABS is a case in point. ABS officials have discovered that the village system under whic traditional farmers live is an ideal medium for cooperative development

through which credit, inputs, transportation, storage, and other services can be more effectively and easily channeled. Over a period of six years or more, they have worked out many of the "kinks" that would take considerable time for another institution to work out.

The ABS has been working under several disadvantages, such as funding cooperative officers and restrictive Government policies concerning interest rates. The system has had considerable success. However, the objective for increasing production has only been partially achieved. The basic reason for this is that the Ministry of Agriculture has not fulfilled its responsibilities of providing inputs and extension guidance.

4.2 Choice of Credit Organization for Managing the Credit Component of the Project

From previous comments and analyses, the only credit institution capable and ready to handle the credit component is the ABS. It not onl has experience but its present resources, such as office space, back-up technical service and related facilities, are often under-utilized. The Branch Manager for the Um Rawaba branch, who actually implemented the present project, could be assigned to oversee the management of other proposed areas to bring his expertise to play throughout the proposed project area.

A report was prepared in 1982 at the request of the Regional Ministry of Economics and Finance, entitled "A Rural Credit Institution for Kordofan Region." It recommended that an entirely new credit institution be established to provide credit to traditional farmers.

The report includes some interesting observations about the Kordofan. However, several weaknesses appear in the rationale for the establishment of the institution. These can be summarized as follows:

A. Is is vague about what the farmer needs in order to increase production. Credit cannot increase production. It can pay for inputs and labor. However, inputs and extension must be available before credit can assist in the process.

B. It recommends an institution to be funded partly by the Government of Kordofan. There is no mention of the possibility for the institution to become self-sustaining. The Government of Kordofan is not able to support another organization such as extension services, Department of Cooperatives, Forestry Department, among others.

C. It recommends the institution be managed by a board consisting of nine representatives of organizations, corporations, and institutions. Such a number of board members usually becomes difficult to manage. It is much more effective to have policies and procedures established before a credit institution is organized. Some of the above-mentioned board could better serve the institution if it were a coordinating committee for implementation rather than a managing body.

D. The report does not discuss the issue of duplication of effort the institution would have with the ABS, cooperatives, and extension. The ABS has more facilities and experience to do what was envisioned for the new institutio

Institution budgets included financing the cooperative and extension activities. Cooperative and extension should be financed through their own organizations and as a precondition to establishment of the credit institution. If the credit institution takes over the responsibilities of the other organizations related to agriculture, these orher essential organizations will become less effective than they already are. A sound credit program depends on sound and adequately funded support organizations.

E. The report does not face the issue of interest rates relative to the real cost of money, including delivery and collection costs and allowance for inflation. If interest rates are not established to reflect the real cost of the money, the institution will become a subsidized credit program and an ever-increasing financial burden on the Government. With the present potential for farmers to double production, farmers can afford to pay for the real cost of money they borrow. What they need is the availability of inputs and services which will allow them to increase production and net revenue.

4.3 Policy and Procedure Guidelines for the Proposed Projects.

A. Project loan capital - should be placed in a separate revolving account in ABS and not intermingled with other loan fund accounts.

B. The ABS should provide project management with a monthly statement concerning loan disbursement and collection and operating expenses.

C. A procedure manual must be prepared detailing all policy and operating procedures, job descriptions, project objectives, list of personnel, training, and reporting systems, among other information. This will ensure that all project areas will operate in a standardized manner.

D. Other criteria, such as eligibility, loan purpose, repayment periods, collection procedures, would essentially be the same as ABS is using now. These should be documented in a credit manual and reviewed from time to time to keep procedure in tune with needs and changing conditions.

E. For eventual self-support of the credit aspect of the project, a detailed study should be made concerning the real cost of lending under project characteristics. Based on this study, serious consideration should be given to adjusting the interest rate or service charges to borrowers so that the cost of lending will not be negative. Present analyses indicate that the real cost of lending to be in the neighborhood of 48 percent, as described below:

1. Opportunity cost of money based on existing savings account rates in commercial banks	= + 13%
2. Administrative costs about	= + 10%
3. Allowance for default	= + 5%
4. Using the lower range of inflation	= + 20%
Total	= + 48%

4.4 Order of Priorities and Preconditions for the Implementation of the Proposed Project

PRIORITY 1. Provide adequate funding for the National Seed Administration to establish and control additional seed multiplication operations through contracts to private farmers. Suggested areas would be the mechanized farming corporation at Habiela for sorghum and millet and in the Gezira area for groundnuts. Quality seed properly treated should be provided for all farmers serviced by the project.

PRIORITY 2. Provide adequate funding to train and increase staff levels of the agricultural extension service to adequately service production cooperatives throughout the project. It is estimated that one extension agent will be needed for each 30 cooperatives organized. Agents must be mobile; therefore, adequate transport, fuel, maintenance, extension, tools and supplies must be provided.

PRIORITY 3. Provide adequate funding to train and increase staff levels of the Department of Cooperatives to adequately organize and provide management guidance for all production cooperatives under the project. Cooperative officers must be mobile; therefore, adequate transport, fuel, maintenance, and other supplies and facilities must be provided. It is estimated that at least one cooperative officer is needed for 20 cooperatives to be organized.

PRIORITY 4. Provide funding and/or loans to either the ABS or private agribusinesses to establish storage and water catchment facilities in each project area. The value of storage should be relative to that needed based on the estimated area of production serviced by the project.

PRIORITY 5. Provide adequate funding to train and increase staff levels of other agricultural services, such as the veterinary, forestry and crop protection divisions in each project area to effectively support other project activities. Such services require a great deal of mobility and transport. Sufficient number of vehicles must be provided, including sufficient fuel and maintenance. Other supplies, materials, and facilities needed must also be made available. Improving the infrastructure and capabilities of these institutions would help them coordinate to combat desertification.

PRIORITY 6. Last but not least, provide ABS with adequate funding for loan capital and for start-up expenses for each project area similar to, and based upon, the credit system presently being administered to traditional farmers through cooperatives in the Um Rawaba and El Obeid areas. Coinciding with the establishment of this credit system, policy-makers will amend their policies to permit the ABS to charge borrowers a service charge or rate of interest commensurate with the real cost of the money lent. Funding levels for the credit component are outlined in Chapter V.

PRIORITY 7. Coinciding with implementation of the above priorities and preconditions, the services of technical experts for two years to assist the Kordofan Government with the implementation of the project should include:

- One extension specialist to assist the extension service to plan and develop their capability to adequately service the project area.
- One production cooperative specialist to assist the Cooperative Department to plan and develop their capability to adequately service the project area.
- One agricultural credit specialist to assist the ABS with the organization and implementation of the expanded credit system. The primary focus of the credit specialist will be to assist the ABS with the development of a credit manual outlining all policy and procedures for the credit system to standardize activities in all project areas. Designing of appropriate forms to be used and training of personnel will also be part of the specialist's responsibilities.
- Agricultural production and marketing economist to assist all services with the design of a system of documentation and reports for monitoring the progress of the project. Other responsibilities will include analyzing local market conditions and providing cooperatives with advice and guidance on the optimum time to store or market produce.

4.5 Time Frame for Implementation

The time for the recommended credit program is a four-year period. However, the list of priorities mentioned in section 4.4 indicate that other actions must take place before credit can be extended most effectively.

The time frame for the multiplication of adequate amounts of improved seed would probably be about two years. It can also be estimated that it would take the Ministry of Agriculture and the Department of Cooperatives about the same length of time to improve their infrastructure to the point of being able to carry out their responsibilities to the project. Certain agribusiness-type loans could be initiated in advance of an intensified production credit program.

The chart on the following page provides a general picture of the time frame for implementation.

4.6 Government Policy and Control vis-a-vis the Viability of a Credit System for Traditional Farmers

A. Forgiveness of Loans. A sound credit institution has no place for policies related to forgiveness of loans. Its policy must be that all loans be repaid. If government desires to give farmers relief or subsidies, it should be done through other organizations not related to credit. If a credit organization has a history of forgiving loans, it will eventually have an undesirable effect on reimbursement rates. Borrowers will interpret conflicting policies to their own advantage.

B. Floor Prices. Present floor prices on some farm commodities are below the cost of production; therefore, ineffective. Floor prices should be established on the basis of cost of production and marketing. Floor prices should not be established if they do not have a favorable effect on production. A floor price which establishes a market price below the cost of production will have serious repercussions on a credit system which is financing the production of such commodities. Farmers will not be able to repay their loans, and/or will suffer a reduction

TIME FRAME CHART -- PROPOSED PROJECT

Action	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Organize program to produce seed stock for multiplication						
Produce first quantity of improved seed for farmers to use in Year 3 and following years						
Agriculture and Cooperatives build infrastructure and improve facilities						
Agriculture and Cooperatives work with villages to organize cooperatives and provide extension						
Agribusinesses begin construction of storage facilities to be ready for Year 3 and following years						
ABS provides production loans to cooperatives						
Water storage construction						
ABS provides medium-term loans to cooperatives						
ABS builds infrastructure to expand credit program						

in their standard of living. In this case, it is better for farmers to depend on the free market price in making decisions concerning the choice of alternate crops to produce.

C. Interest Rates. This issue has been discussed in previous chapters. In summation, farmers can afford to pay for the real cost of money they borrow if they are provided access to inputs and services enabling them to reach potential production levels. For example, providing the producer with storage facilities so that he can obtain a larger share of the market price for his produce is much more advantageous to him than subsidizing interest rates.

4.7 Public Relations

It is important and often overlooked that considerable emphasis be given to the education of policy makers and political organizations concerning the merits of the proposed project, its policies, and priorities. This is best done by a small committee of prominent people who have studied all aspects of the proposed project. It would also help if printed material was prepared as handouts to support committee efforts.

Chapter V

FUNDING LEVELS FOR THE CREDIT COMPONENT

5.1 Loan Capital

A. Net annual production loan capital - Table 9 illustrates the method used for estimating the amounts of net annual production loan capita needed by area over a period of four years, as explained below:

(A) Number of villages served - the first three years are cumulative and are estimates of what could reasonably be done each year based on the 4th year target of reaching total villages in the region. The 4th year number for Um Rawaba, El Obeid, and En Nahud was arrived at by taking 75% of the number of villages from Table 5. The 4th year number for Dilling and Kadugli was arrived at by taking 50% of the number of villages from Table 5.

For the first three areas, only 75% of the villages were used. It is anticipated that some villages may not be involved in the project for various reasons.

For the last two areas of Dilling and Kadugli, only 50% of the villages were taken into consideration. These areas involve a large number of feddans farmed under the assistance of the Mechanized Farming Corporation and the Nuba Mountain Agricultural Corporation. Such farmers would not be considered as traditional farmers.

(B) Number of cooperatives serviced - this is based on the assumption that the average sized farm is 20 mukhamas and the average number of farms per cooperative is 110, as found in the ABS project in Um Rawaba. Number of mukhamas financed:
(D) ÷ 110 x 20 = number of cooperatives served.

(C) Number of farms per cooperative is estimated to be 110, per (B) above.

(D) Number mukhamas financed - to find the total mukhamas financed in the first three years, an average number of mukhamas per village was arrived at by using the 4th year as a base. The number of 4th-year mukhamas financed was arrived at by taking 75% of the households from Table 5 x 20.

(E) Average loan size - LS 1,086 is the average size loan used in all calculations and arrived at as explained in section 3.3.

(G) Repayments - repayments are based on 90% of previous year's loans. This is deducted from the following year's loan funds needed to arrive at the net loans funds needed under (H)(Table 9).

B. Tables 8 and 10 through 19 detail capital needs.

5.2 Capital for Improving Infrastructure of Other Organizations

Capital needed to improve the infrastructure of the Ministry of Agriculture, Department of Cooperatives, Rural Water Corporations, and other organizations involved in providing services to traditional farmers to enable them to increase production must be estimated by the organizations themselves. Such estimates are beyond the scope of this report.

5.3 Capital for Improving Infrastructure of the ABS

Table 14 summarizes the capital needs of the ABS to enable it to improve its infrastructure and facilities for effective management of the proposed expanded credit program.

5.4 Alternative Approach

A detailed proposed program for the undertaking of an agricultural credit/agribusiness project for the Kordofan Region, including loan capit technical assistance, training, and associated commodities as documented in this report involves considerable cost and the rearrangement of priorities by the Kordofan Government.

This cost and involvement is indicative of what it takes to reach the long-neglected traditional farmers with a meaningful program for increasing production and net income.

However, financial and other resources may not be available to embark on such a venture. In this case, there are alternatives toward assisting traditional farmers in a less costly way, but also with less benefit to each individual and/or affecting less farmers.

Alternative No. 1

The project plan and funding for the credit component was designed so that the five areas of Um Rawaba, El Obeid, En Nahud, Dilling, and Kadugli could be planned and budgeted separately. If a lesser number of areas were selected for implementation, the costs could be proportionately reduced. In this case, it is recommended that priority for the selection be in the order that they are listed above to take advantage of the ground work already done in the Um Rawaba and El Obeid areas by the ABS.

Alternative No. 2

Choosing one or more of the services or inputs previously planned and providing the funds to make them available to traditional farmers in a limited area. The most important ones are as listed in order of their importance to the farmer by reducing his cost of production or by increasing his share of the market price of produce he sells:

1. Construction of catchment basins (havirs). These would reduce the time the family members spend on transporting water. Family members could spend more time working on the farm, replacing hired labor.

2. Construction of crop storage facilities with the availability of inventory loans. This would provide the farmer the choice of storing his produce for later sale to avoid the low prices usually occurring immediately after harvest.

3. Establish more farm-to-market and farm-to-storage transport facilities. This would reduce losses associated with village storage, facilitate marketing produce on a more timely basis, and replace the time-consuming method of animal transport.

4. Expand improved seed multiplication facilities. Better seed is usually the highest priority input that farmers request. Improved seed that is properly treated would contribute to the increase of production in varying amounts depending on the degree to which proper techniques were used in planting and tilling.

Table 8

SUMMARY OF NET ANNUAL PRODUCTION LOAN NEEDS

Taken from (H) Table 9

	Year 1 LS	Year 2 LS	Year 3 LS	Year 4 LS	Total LS
Um Rawaba	3,733,668	4,107,035	8,214,070	18,762,497	34,817,270
El Obeid	4,578,902	2,747,341	4,121,038	6,067,178	17,514,459
En Nahud	24,522,460	12,507,543	21,091,152	26,734,660	84,885,815
Dilling	3,173,021	3,490,322	6,980,645	11,296,790	24,940,778
Kadugli	13,139,514	7,883,709	8,540,685	10,511,720	40,075,628
TOTAL	49,147,565	30,735,950	48,947,590	73,372,845	202,203,950

Foreign exchange requirements are estimated to be 28% of total net annual production loan needs. Exchange rate as of 1981-82.

Source: Study of Cost of Production of Crops in Sudan, 1981-82, Ministry of Finance and Economic Planning, Page 3.

Table 9

NET ANNUAL PRODUCTION LOAN CAPITAL NEEDS

Item	Un Rawabe (75%)				El Obeid (75%)				En Nahud (75%)			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
(A) No. villages served	80	160	320	690	20	30	45	67	50	300	700	1,175
(B) No. coops served	31	63	125	270	38	57	86	128	21	123	287	482
(C) No. farms per coop	110	-	-	-	-	-	-	-	-	-	-	-
(D) No. mukhamas financed	68,760	137,520	275,420	593,070	84,326	126,489	189,734	282,495	45,165	270,990	632,310	1,061,430
(E) Average sized loan	1,086	-	-	-	-	-	-	-	-	-	-	-
(F) Loan fund needed	3,733,668	7,467,336	14,934,672	32,203,701	4,578,902	6,868,353	10,302,556	15,339,478	2,452,460	14,714,757	34,334,433	57,635,649
(G) Repayments 90%	-	3,360,301	6,720,602	13,441,204	-	4,121,012	6,181,518	9,272,300	-	2,207,214	13,243,281	30,900,989
(H) Net Total Capital Needed	3,733,668	4,107,035	8,214,070	18,762,497	4,578,902	4,121,038	6,067,178	6,067,178	2,452,460	12,507,543	21,091,152	26,734,660

Item	Dilling (50%)				Kadugli (50%)			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
(A) No. villages served	50	100	200	358	20	30	40	52
(B) No. coops served	27	53	106	190	110	165	220	286
(C) No. farms per coop	-	-	-	-	-	-	-	-
(D) No. mukhamas financed	58,435	116,870	233,740	418,410	41,980	362,970	483,970	629,150
(E) Average sized loan	1,086	-	-	-	-	-	-	-
(F) Loan fund needed	3,173,021	6,346,041	12,692,082	22,719,663	13,139,514	19,709,271	26,279,028	34,162,845
(G) Repayments 90%	-	2,855,719	5,711,437	11,422,873	-	11,825,562	17,738,343	23,651,125
(H) Net Total Capital Needed	3,173,021	3,490,322	6,980,645	11,296,790	13,139,514	7,883,709	8,540,685	10,511,720

Summary of (A), (B), and (C)

(A) Total villages served = 2,342

(B) Total cooperatives served = 922

(C) Total mukhamas financed = 2,984,555

Table 10

SUMMARY OF MEDIUM-TERM LOAN CAPITAL NEEDS

	Year 1 LS	Year 2 LS	Year 3 LS	Year 4 LS	Total LS
Um Rawaba	1,866,834	2,053,518	4,107,035	9,381,249	17,408,636
El Obeid	2,289,451	1,373,671	2,060,519	3,033,589	8,757,230
En Nahud	12,261,230	6,253,772	10,545,576	13,367,330	42,427,908
Dilling	1,586,511	1,745,161	3,490,323	5,648,395	12,470,390
Kadugli	6,569,757	3,941,855	4,270,343	5,255,860	20,037,815
TOTAL	24,573,783	15,367,977	24,473,796	36,686,423	101,101,979

Medium-term loan capital needed by cooperatives for such items as scales, livestock, and transport facilities. This estimated amount is based on 50% of the annual production loan capital needs. Foreign exchange requirements are estimated at 75% of the total, at 1983 official exchange rate of one US $ = 1.3 Ls. It is anticipated that medium-term loans will involve the purchase of many imported items.

Table 11

SUMMARY OF AGRIBUSINESS CAPITAL NEEDED FOR SEED MULTIPLICATION

(Annual Production Loans)

	Year 1 LS	Year 2 LS	Year 3 LS	Year 4 LS	Total LS
Um Rawaba	799,005	1,598,010	3,196,020	6,891,592	12,484,627
El Obeid	979,885	1,469,828	2,204,747	3,282,648	7,937,108
El Nahud	524,826	3,148,954	7,347,569	12,334,028	23,355,377
Dilling	679,026	1,358,053	2,716,106	4,862,008	9,615,193
Kadugli	2,811,856	4,217,784	5,623,712	7,310,849	19,964,201
TOTAL	5,794,598	11,792,629	21,088,154	34,681,125	73,356,506
NET CAPITAL NEEDED	5,794,598	5,998,031	9,295,525	13,592,971	34,681,125

Agribusiness capital needed for annual production loans to mechanized farmers for production of improved seeds. It is based upon 15% of a traditional farmer's cost of production. Since mechanized farmers are involved, the foreign exchange requirements are estimated to be 35% of the total at the 1981-82 exchange rates.

Source: Study of Cost of Production of Crops in Sudan, 1981-82, Ministry of Finance and Economic Planning - page 3.

This being an annual loan, it is assumed the previous year's loans will be reimbursed. This calculation shows the net capital needed.

Table 12

LONG-TERM LOAN CAPITAL NEEDS FOR CROP STORAGE FACILITIES

	Year 1 LS	Year 2 LS	Year 3 LS	Year 4 LS	Total LS
Um Rawaba	2,406,600	2,406,600	4,813,200	11,131,050	20,757,450
El Obeid	2,951,410	1,475,705	2,213,575	3,246,635	9,887,325
En Nahud	1,580,775	7,903,875	12,646,200	15,019,200	37,150,050
Dilling	2,045,225	2,045,225	4,090,450	6,463,450	14,644,350
Kadugle	8,469,300	4,234,650	4,234,650	5,081,650	22,020,250
TOTAL	17,453,310	18,066,055	27,998,075	40,941,985	104,459,425

Long-term capital loan needed by agribusiness to construct crop storage facilities. This estimate is based on two square meters of floor space per farm. Average cost is LS 350,000 per square meter.

Source: ABS

Foreign exchange requirements estimated to be 75% of the total cost. At the 1983 official exchange rate of one US$ = 1.3 LS.

Table 13

LONG-TERM CAPITAL NEEDS FOR WATER STORAGE

	Year 1 LS	Year 2 LS	Year 3 LS	Year 4 LS	Year 5 LS
Um Rawaba	480,000	480,000	960,000	2,220,000	4,140,000
El Obeid	120,000	60,000	90,000	132,000	402,000
En Nahud	300,000	1,500,000	2,400,000	2,850,000	7,050,000
Dilling	300,000	300,000	600,000	948,000	2,148,000
Kadugli	120,000	60,000	60,000	72,000	312,000
TOTAL	1,320,000	2,400,000	4,110,000	6,222,000	14,052,000

Long-term capital loans needed by agribusiness to construct water storage facilities (havirs) or rain catchments at the village level. The estimate is based on one water facility per village at a cost of LS 6,000 each.

Source: ABS

Foreign exchange requirements are estimated to be 40 percent of total costs at the 1983 exchange rate of one US $ = 1.3 LS.

Table 14

START-UP COSTS NEEDED FOR ABS SUPPORT

(In Thousand Sudanese Pounds)

Area	Um Rawaba				El Obeid				Nahud				Dilling				Kadugli				
Year / Item	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	Total
Capital Costs 1/	184	320	-	-	263	610	75	-	263	611	75	-	100	175	-	-	100	175	-	-	-
Recurring Costs 2/	27	74	87	87	25	52	52	52	65	89	147	149	25	52	52	52	25	51	51	51	-
Sub-Total	211	394	87	87	288	662	127	52	328	700	222	149	125	227	52	52	125	226	51	51	4,216
Reserve	53	98	22	22	72	166	32	13	82	175	56	37	31	57	13	13	31	56	13	13	-
TOTAL	264	492	109	109	360	828	159	65	410	875	278	186	156	284	65	65	156	282	64	64	4,571

* 25% of the total cost is added as a reserve.

* The foreign component of the cost is (55%) of the total cost (1983 exchange rate 1 US $ = 1.3 LS)

1/ Capital costs include (a) office and house building, (b) vehicles and supplies.

2/ Recurrent costs include staff, maintenance, fuel, etc.

Table 15

SUMMARY OF TOTAL LOAN CAPITAL NEEDS

Year 1

	Um Rawaba	El Obeid	En Nahud	Dilling	Kadugli	Total
Annual Production	3,733,668	4,578,902	24,522,460	3,173,021	13,139,514	49,147,565
Medium-Term	1,866,834	2,289,451	12,261,230	1,586,511	6,569,757	24,573,783
Seed Multi-plication	799,005	979,885	524,826	679,026	2,811,856	5,794,598
Crop Storage	2,406,600	2,951,410	1,580,775	2,045,225	8,469,300	17,453,310
Water Storage	480,000	120,000	300,000	300,000	120,000	1,320,000
Total	9,286,107	10,919,648	39,189,291	7,783,783	31,110,427	98,289,256

Table 16

SUMMARY OF TOTAL LOAN CAPITAL NEEDS

Year 2

	Um Rawaba	El Obeid	En Nahud	Dilling	Kadugli	Total
Annual Production	4,107,035	2,747,341	12,507,543	3,490,322	7,883,709	30,735,950
Medium-Term	2,053,518	1,373,671	6,253,772	1,745,161	3,941,855	15,367,977
Seed Multi-plication	799,005	489,943	2,624,128	679,027	1,405,928	5,998,031
Crop Storage	2,406,600	1,475,705	7,903,875	2,045,225	4,234,650	18,066,055
Water Storage	480,000	60,000	1,500,000	300,000	60,000	2,400,000
Total	9,846,158	6,146,660	30,789,318	8,259,735	17,526,142	72,568,013

Table 17

SUMMARY OF TOTAL LOAN CAPITAL NEEDS

Year 3

	Um Rawaba	El Obeid	En Nahud	Dilling	Kadugli	Total
Annual Production	8,214,070	4,121,038	21,091,152	6,980,645	8,540,685	48,947,590
Medium-Term	4,107,035	2,060,519	10,545,576	3,490,323	4,270,343	24,473,796
Seed Multi-plication	1,598,010	734,919	4,198,615	1,358,053	1,405,928	9,295,525
Crop Storage	4,813,200	2,213,575	12,646,200	4,090,450	4,234,650	27,998,075
Water Storage	960,000	90,000	2,400,000	600,000	60,000	4,110,000
Total	19,692.315	9,220,051	50,881,543	16,519,471	18,511,606	114,824,986

Table 18

SUMMARY OF TOTAL LOAN CAPITAL NEEDS

Year 4

	Um Rawaba	El Obeid	En Nahud	Dilling	Kadugli	Total
Annual Production	18,762,497	6,067,178	26,734,660	11,296,790	10,511,720	73,372,845
Medium-Term	9,381,249	3,033,589	13,367,330	5,648,395	5,255,860	36,686,423
Sedd Multi-plication	3,695,572	1,077,901	4,986,459	2,145,902	1,687,137	13,592,971
Crop Storage	11,131,050	3,246,635	15,019,200	6,463,450	5,081,650	40,941,985
Water Storage	2,220,000	132,000	2,850,000	948,000	72,000	6,222,000
TOTAL	45,190,368	13,557,303	62,957,649	26,502,537	22,608,367	170,816,224

Table 19

SUMMARY OF TOTAL LOAN CAPITAL NEED
OVER A PERIOD OF FOUR YEARS

	Um Rawaba	El Obeid	En Nahud	Dilling	Kadugli	Grand Total
1st year	9,286,107	10,919,648	39,189,291	7,783,783	31,110,427	98,289,256
2nd year	9,846,158	6,146,660	30,789,318	8,259,735	17,526,142	72,568,013
3rd year	19,692,315	9,220,051	50,881,543	16,519,471	18,511,606	114,824,986
4th year	45,190,368	13,557,303	62,957,649	26,502,537	22,608,367	170,816,224
Grand Total	84,014,948	39,843,662	183,817,801	59,065,526	89,756,542	456,498,479

Appendix A

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Appendix B

LIST OF TABLES

Appendix C

LIST OF ACRONYMS

Feddan	- 4,200 sq. meters - 1.038 acres
Mukhama	- 1.75 feddans
Small Kantar	- 100 pounds
Havirs	- Low catchment area for water storage
Qoz	- Loose undulating sandy-clay soil
LS	- Sudanese pound. Unit of currency.
Karkadi (Roselle)	- An annual plant whose flower is used to make a drink flavor, red in color
Striga (Arabic, "Puda")	- A noxious parasite weed of sorghum
Sheil	- Informal, high cost system of extending loans in cash or kind to farmers by village money lenders
El Guzo	- Succulant desert plant on which some animals can live without additional water
Islamic Sharia	- Islamic laws governing the Islamic way of life
Gum Arabic	- Solidified sap mainly from the acacia senegal tree
ABS	- Agricultural Bank of Sudan
MFC	- Mechanized Farming Corporation
MANR	- Ministry of Agriculture and Natural Resources
Riba	- Islamic term for predetermined interest rate.

Appendix D

LIST OF FIGURES

Appendix E

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46. Hamid Monem Monsour, Director of Organizations, El Nuhud.
47. Ismaeil Monem, Liaison Officer, El Nuhud.
48. Gamer, Youth Union, El Nuhud.
49. El Haris Ibrahim El Nikhali, Oil Mill Engineer, El Nuhud.
50. Guma Bushara, Political Director, El Nuhud.
51. Gafar Mohamed Khair, Veterinary Officer, El Nuhud.