

PROGRAM SUPPORT

CARE-SUDAN

**NORTH KORDOFAN EMERGENCY SEED
DISTRIBUTION PROJECT PN42**

DONORS: USAID/ODA/CIDA/CFGB

FINAL EVALUATION REPORT

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ABBREVIATIONS AND ACRONYMS

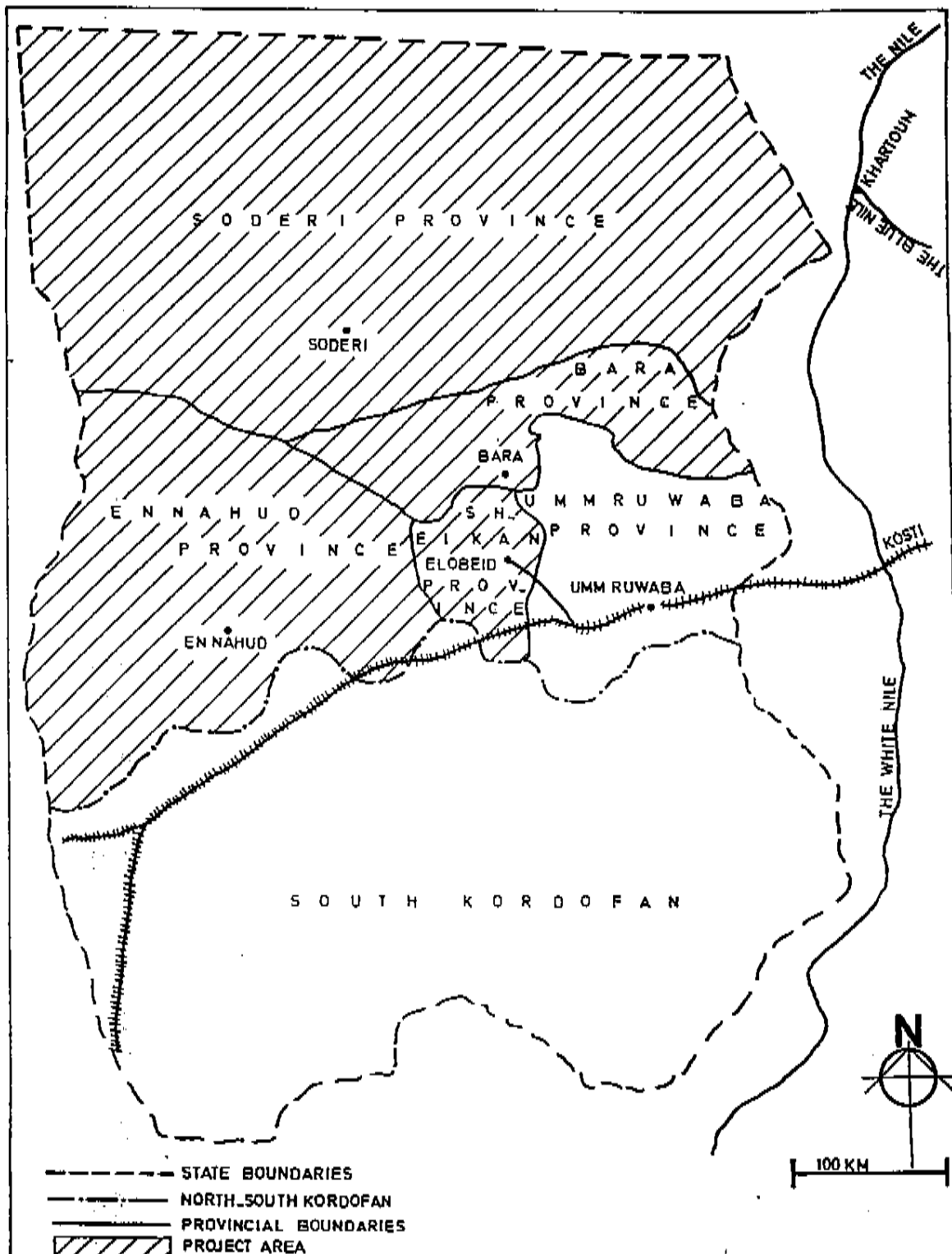
ABS	Agricultural Bank of Sudan
ADS	Area Development Schemes
CFGB	Canadian Food Grain Bank
CIDA	Canadian International Development Agency
ENCCP	En Nahud Cooperative Credit Project (IFAD)
ENSAP	En Nahud Smallholder Agricultural Project (CARE)
FAO	Food and Agricultural Organization (UN)
GOS	Government of Sudan
IFAD	International Fund for Agricultural Development (UN)
KDROG	Kordofan Drought Relief Operations Group
MOA	Ministry of Agriculture
NKESDP	North Kordofan Emergency Seed Distribution Project (CARE)
NSA	National Seed Administration
ODA	Overseas Development Administration, Britain
RC	Rural Council
RRA	Rapid Rural Appraisal
RRU	Relief Response Unit (CARE)
SWOT	Strengths/Weaknesses/Opportunities/Threats
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
VCB	Village Cash Box
VRC	Village Relief Committee
VSb	Village Seed Bank
VSS	Village Seed Stock

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WEIGHTS AND MEASURES

Type of Measure	Unit	Equivalent
Area of Land	1 makhammas	= 0.73 hectare
	1 feddan	= 0.42 hectare
	1 makhammas	= 1.75 feddan
	1 hectare	= 2.40 feddan
	1 hectare	= 1.40 makhammas
Crop Volume	1 sack of millet	= 91.4 kg
	1 sack of sorghum	= 91.5 kg
	1 sack of groundnuts (unshelled)	= 45 kg
	1 sack of groundnuts (shelled)	= 73 kg
	1 sack of sesame	= 76 kg
	1 sack of Karkade	= 14 kg
	1 sack of gum arabic	= 30 mids
	1 mid of millet/sorghum	= 3 kg

MAP 1: KORDOFAN STATE,
showing the project area



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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The modest harvest of 1989 and the total crop failure in 1990 in North Kordofan have resulted in the depletion of the farmers' seed stock. The small quantities of cereals stored by some farmers from the poor harvest of 1989 were either consumed as food or lost through repeated planting and replanting in 1990. The critical situation in North Kordofan is highlighted in various reports prepared by various governmental organizations, UN agencies and NGOs. The Kordofan Drought Relief Operation Group (KDROG) has, therefore, urged affiliated agencies (CARE, UNDP, ABS, MOA, etc.) to contact potential donors for urgent donations to secure seeds. Thus, North Kordofan Emergency Seed Distribution Project (NKESDP) represents CARE's response to that urgent request.

The general objective of NKESDP was to provide millet and sorghum seeds to assist 254,000 farm families in the rural areas that were hardest hit by the 1989/90 drought and which fall within CARE's current areas of operation, namely En Nahud, Bara and Soderi provinces of North Kordofan. Being an emergency project, NKESDP was designed on the assumption that its implementation will very much rely on the infrastructure and facilities of CARE's existing projects (CARE/UNDP Seeds and Tools Project, ENSAP, RRU) as well as on the collaboration of, and close coordination with, government technical ministries and departments at the national, regional, provincial and local levels.

The objectives of the present exercise were to evaluate the implementation of NKESDP major activities (seed procurement, logistics, seed distribution and monitoring, and institutional linkages); to assess the project socio-economic impact and effectiveness as a disaster response intervention, and to make recommendations for improving the effectiveness of such disaster

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responses, and to suggest how it may be transformed from a purely relief response to a rehabilitation oriented activity. In order to realize these objective, the evaluation team has relied on two types of data: secondary and primary. In the collection of such data some techniques of the Rapid Rural Appraisal (RRA) methodology were used, viz., review of project documents, direct observations, focus group interviews and key informant interviews.

Although serious difficulties were hardly encountered in association with the project central activities of transporting, despatching and distributing seeds to beneficiaries, the quandaries associated with the activity of seed procurement such as the unexpected government fiscal restrictions of May 1991, could be held responsible for the failure of seed suppliers either to sign or to fulfil contracts. This explains, to a significant extent, the delay in the delivery of seeds to beneficiaries.

In the case of millet seed, distributed in En Nahud, Bara and Soderi provinces, about 75 per cent were planted, 15 per cent saved for planting in 1992, and only 10 per cent were consumed as food. In the case of sorghum seed, distributed mainly in Sheikan and En Nahud provinces; about 90 per cent were planted in the former while only 40-50 per cent were sown in the latter. Thus, while the project's impacts with respect to satisfying the farmers' seed needs were positive, its impacts with regard to increasing food availability in the project area were rather modest given the general below average agricultural situation due to the long dry spells during the rainy season of 1991. However, the distribution of seeds among families was equitable and no serious biases were reported.

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The NKESDP owes much of its achievements to the success in establishing and fostering strong links with CARE's already existing projects in North Kordofan, UN agencies, as well as with government institutions at the national, state, provincial and local levels. These linkages provided the organizational, administrative, technical and logistical base upon which the project was successfully implemented.

The major findings of this evaluation admonish that the consecutive years of drought and crop failures, experienced in North Kordofan since 1983 through 1991, not only created a wide food gap but, more seriously, resulted in the complete depletion of the farmers' seed stocks. This is evident in the general shrinkage in the areas usually grown with almost all crops.

Thus, emergency seed distribution, supported by the provision of relief food, should continue in 1992, since our estimates of cereals output in the project area indicate beyond doubt that the majority of farmers will not have enough stocks of cereals to maintain them at least over the 1992 cropping season. In any future seed distribution project, whether emergency or developmental, the plan should be to contract seed suppliers and negotiate transport contracts up to drop-off points in January, centrally receive and complete all seed tests in February-March, and in April complete the despatch of seeds up to villages.

On the basis of strong nutritional, ecological and economic reasons, any future seed distribution project should consider the distribution of the so-called 'cash' crops such as groundnuts since they are part of the agricultural rotation system, partly consumed on farm, and provide some of the cash needed for the household survival in an area characterized by a chronic cereal food deficit.

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A long term seed provision programme with the view to rehabilitating the farmers' seed stocks should be initiated. This programme should be implemented in two phases. In the first phase priority should be given to the rehabilitation of the farmers' seed stocks through a) the provision of local varieties, b) the restoration of the sound local practice of seed selection, and c) the improvement of indigenous methods of seed storage. In the second phase, emphasis should be on the development of an extension seed programme whereby improved seeds and other agricultural input packages could be introduced in the programme. There is a possibility for CARE here to start small by injecting a farmers' seed stock rehabilitation component within ENSAP.

In order to avoid duplication and possible conflict of interests, we recommend a unified system of seed distribution for Kordofan State. This system requires strong linkages between, on the one hand, government administrative and technical departments and, on the other hand, NGOs and popular organizations at all levels from the village up to the state level. This should be based on a definite plan with written commitments and clear definition of obligations and responsibilities to ensure the smooth flow and feedback of information throughout the system.

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A. PROJECT BACKGROUND

1. INTRODUCTION

The modest harvest of 1989 and the virtual total crop failure in 1990 have resulted in the depletion of farmers' seed stocks in North Kordofan. The small quantities of cereals stored by some farmers from the poor harvest of 1989 were either consumed as food or lost through repeated planting and replanting in 1990. The majority of the farmers, interviewed during the surveys conducted by the Kordofan State Ministry of Agriculture (MOA) and counterpart agencies late in 1990, asserted that they had no seeds for the 1991 planting season.

The critical situation in North Kordofan is highlighted in various reports prepared by various governmental organizations, UN agencies and NGOs. The Kordofan Drought Relief Operation Group (KDROG) has, therefore, strongly encouraged affiliated agencies (CARE, UNDP/ADS, ABS, MOA, etc.) to contact potential donors for urgent donations to secure seeds. Otherwise, even if there are good rains, the majority of small farmers in North Kordofan will not be able to cultivate their lands in the 1991 agricultural season. The implication of this would be wide-scale displacement of whole families that will be very difficult to reverse, and continued large-scale relief assistance in 1991 and 1992.

2. PROJECT OBJECTIVES

The general objective of the project was to provide millet and sorghum seeds to assist 254,000 farm families in the rural areas that were hardest hit by the 1989/90 drought and crop failure

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and which fall within CARE's current areas of operation, namely, En Nahud, Bara and Soderi provinces of North Kordofan.

The specific objective of the project was to provide, by June 1991, each family in the project area with up to 5 kgs of millet or, alternatively, 2.5 kgs of millet and 5kgs of sorghum, to allow for the planting of 4 feddans (approximately 1.7 hectare) per family with cereal crops.

3. PROJECT STRATEGIES

In Soderi, Bara and Sheikan provinces, the seeds will be distributed by the Relief Response Unit (RRU) of CARE in collaboration with the Agricultural Extension Administration of the MOA-Kordofan. The RRU has 15 field monitors that can be assisted by 6 agricultural extension officers from the MOA-Kordofan.

In Ghebeish rural council of En Nahud province, En Nahud Smallholder Agricultural Project (ENSAP), which is jointly implemented by CARE, ABS and the MOA-Kordofan, will coordinate the distribution of seeds to potential beneficiaries. In The remaining 6 rural councils of En Nahud province, the IFAD/MOA En Nahud Cooperative Credit Project (ENCCP), will assume the distribution of seeds to the beneficiaries.

To the maximum extent possible, seeds will be provided on a loan basis. In En Nahud province the seed loan will be made by ENSAP and ENCCP and repayment will be made to respective project revolving loan funds.

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In Soderi, Bara and Sheikan provinces, where CARE/MOA-Kordofan are responsible for distribution, they will organize the seed loans through the Village Relief Committees (VRC), with repayment of the loans to be made to the Village Cash Box (VCB) which is the traditional institution for collecting and managing village funds.

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B. EVALUATION METHODOLOGY

1. EVALUATION OBJECTIVES

The evaluation exercise has been undertaken with the following three specific objectives in mind:

- a) To evaluate the implementation of the project and, towards this objective, to conduct a SWOT assessment of the following major project activities:
 - (i) Seed procurement
 - (ii) Logistics (transportation, storage, despatch).
 - (iii) Seed distribution to beneficiaries
 - (iv) Monitoring
 - (v) Linkages (MOA-Khartoum, NSA, MOA-Kordofan, KDROG, Rural/Village councils).
- b) To assess the project socio-economic impact and effectiveness as a disaster response intervention.
- c) To make recommendations for improving the effectiveness of such disaster responses, and to suggest how it may be transformed from a purely relief response to a rehabilitation oriented activity (community role in assessing needs and developing practical strategies to ensure continued access to seeds and increased food security in times of drought).

In order to realize these objectives, the evaluation team has relied on two types of data: secondary and primary data. In this case, the basic techniques of Rapid Rural Appraisal (RRA) were employed, namely, review of project documents, direct observations, focus group interviewing, and key informant interviewing.

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2. SECONDARY DATA

Secondary data was collected through a careful review of project design documents, field trip reports, project implementation (i.e. progress) reports, and correspondence between CARE and the concerned institutions (i.e. government ministries and technical departments at both national and Kordofan state levels, UN agencies, donors, other NGOs, seed suppliers and transport contractors). This type of data, as we shall see, has been useful in acquiring deeper insights into the project history, design and objectives; the manner in which donors have responded to the initial and amended project proposal; and the issue of institutional linkages and coordination. Moreover, the secondary sources of data provided a wealth of information regarding the constraints encountered in implementation of the major activities of the project namely, seed procurement and testing; storage, transport and despatch; and distribution to beneficiaries and monitoring.

3. PRIMARY DATA

Primary data was developed through employing three distinct techniques of data collection:

(i) direct observations, (ii) focus group interviews, and (iii) key informant interviews. The first two techniques were mainly used to obtain data at the village level, while the third technique was used in collecting information at the national, state, province and rural council level.⁵

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i) Direct Observations

The rationale behind the use of this technique was to obtain, through a set of carefully selected audio-visual indicators, some general information on the socio-economic conditions of the beneficiaries: cropping pattern, harvest, and assets owned. Thus, visual indicators such as the standing crop in the fields and the associated soil types were good indicators of the dominant cropping pattern in the area under investigation. The standing crop also provided some indications about the pattern and the distribution of rainfall, crop pests and the expected harvest. The status of vegetation and pasture gives an idea about both rainfall and the numbers of livestock in the area. Activities, such as hut renewal and reconstruction signifies good harvest, especially of the millet crop. Finally, audio-indicators, such as the sound of drums and women singing which are generally associated with wedding and circumcision ceremonies, imply not only good harvest but a general prosperity.

ii) Focus Group Interviews

These are semi-structured discussion sessions whereby the evaluation team convened a small group of farmers to explore specific topics, issues and concepts. Most of these discussions were carried out at the village level. Issues discussed included, but were not exclusive to, socio-economic conditions of the beneficiaries (average family size, average number of active farmers per family, land ownership, livestock & other assets owned, etc.), cropping patterns (crops usually grown, varieties, land planted, expected yields, costs of production, cultivation constraints, etc.), cropping situation this year (rainfall, crop pests, etc.), cereal food requirements per average family, local

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practices related to seeds (seed requirements, sources, prices, seed selection, storage methods, etc.), the distribution of project seeds distributed, farmers' opinion on distribution, and farmers' suggestions for the future.

iii) Key Informant Interviews

Key informant interviews were conducted by the evaluation team in Khartoum, El Obeid, En Nahud, Bara, Soderi, and at some of the rural councils headquarters in the last three provinces. The purpose of these interviews was to obtain detailed information on the issue of linkages and coordination and their impact upon the implementation of the project.

In Khartoum discussions were conducted with the project staff, CARE-Khartoum, NSA, RRC, and seed suppliers. Similar discussions were conducted with official in the MOA-Kordofan, KDROG, ABS, CARE- El Obeid, and transport contractors. In En Nahud, Soderi and Bara, the team members discussed various issues concerning the implementation of the NKESDP as well as the outlook for the future. These discussions were carried out with the commissioners of the three provinces, directors of agriculture, ABS managers, CARE representatives, CARE-RRU monitors, members of the Salvation Committees, representatives of Farmers' Unions, and a number of rural councils officers.

The information collected in the course of fieldwork through the use of the above techniques of data collection, represent the foundation upon which the findings, conclusions and recommendations of this report should be assessed.

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C. THE PROJECT AREA

1. PHYSICAL CONDITIONS

The project area is part of the vast central sand zone (the goz) which extends from the White Nile in a southwesterly direction to South Darfur and into the Central African Republic. The land is covered with a mantle of grasses, herbs and low scattered trees, whose size and density increases gradually from north to south in accordance with the conditions of rainfall.

By virtue of its geographical location, the project area has a continental tropical climate. This climate is characterized by four distinct seasons: a warm rainy season (kharif) from June to September; a hot dry spell (darat) from October to November; a cool dry winter (shitaa) from December to February; and a hot dry summer (seif) from March to May.

The project area is semi-arid with an increasing annual rainfall from north to south (from 100mm to 550mm per annum, respectively). Like all semi-arid areas, the climate of the project area is characterized by a high degree of spatial and temporal rainfall variability (i.e. from one place to another as well as from one year to another). Unfortunately, rainfall statistics are only available from a few stations, namely, El Obeid, En Nahud, Bara and Soderi, a fact that renders it extremely difficult to establish with some degree of certainty the geographical variability of rainfall in any one year for the whole of the project area. Thus, in analysing the available rainfall statistics for the project area one should take a special caution.

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Moreover, rainfall statistics in most cases are available as means calculated over periods of 20 years each. One problem with these averages is that they do not show the substantial year-to-year variation both below and above the mean values which is an important consideration in the explanation of the annual variations in crop yields. Another drawback is that the wet season may consist of between 10 and 30 individual storms mostly localized in spatial extent. Individual storms of more than 100 mm are not unknown.

However, given the characteristics of the semi-arid climate of the project area, an alternative and more relevant criterion to be used in assessing the significance of rainfall from crop production viewpoint is the probability of receiving a certain amount of rainfall, at a certain point in time, that is sufficient to bring a certain crop to maturity. For example, given the agronomic characteristics of millet, and the available meteorological data, one can calculate the probability of receiving at least 80mm of rainfall per month for the three wettest months (July, August, September), and distributed over six days per month. Although a moisture level of 80mm per month for three consecutive months does not correspond to the maximum rainfall required by millet (320mm) during the growth period (90 days) to attain an optimum grain yield, nevertheless it is sufficient for the crop to survive and produce an adequate harvest.

The exclusion of these facts has led very often to the consideration of the annual fluctuation in the total amount of rainfall as the most important indicator of crop yields. This idea can easily be challenged through the correlation of crop productivity figures for various parts of the project area.

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There is ample evidence to suggest that the drastic decline in productivity, in spite of the lack of a significant negative trend in the total amount of annual rainfall, can most likely be explained by the very strong trend in decreasing number of days with rainfall especially during the growth period. This is evident in the increasing number of prolonged intermittent dry spells (locally called subna),^{which} are usually referred to by farmers to explain crop failures.

Thus, in the project area, besides the total annual amount, the distribution of rainfall over the wet season is an important consideration in the explanation of the variations in crop yields.

Broadly speaking the soils of North Kordofan can be classified into two main groups; i) the sandy (or goz) soil; and ii) the fine-texture soils. The goz is the predominant soil type while the fine-texture soils are found all over North Kordofan in small pockets within the goz.

The goz soil consists of vast expanses of sand-dunes stabilized partly by a shallow and slight surface of cementation by clay and partly by vegetation. This type of soil, despite its low fertility and low water-holding capacity, is intensively cultivated. The loose structure of the soil makes it easy to cultivate with hand tools, facilitates the development of fine root system of crops and preserves for the use of crops of practically all the rains that fall. All these characteristics, which relate to the physical structure of the goz soil, compensate for its low intrinsic fertility. Major crops grown on the goz are millet, groundnuts, water melons, sesame and karkade.

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In addition to the predominant goz soil, there are scattered pockets in North Kordofan of what can be described as fine-texture soils. Within this group the farmers distinguish between the gerdud, jurraba, and Khor (Wadi, Shag) soils. The gerdud is a group of non-cracking sandy-clays and they are very hard to cultivate with hand tools. It is reddish in colour, hard in the dry weather and, during the rains, when wet, most treacherous to motor traffic, as it looks hard and safe. From a crop production point of view, it is a valuable soil but requires more than average rain to produce a good crop. It yields sorghum much better than millet.

Jurraba is distinguished from gerdud by the type of trees and grasses growing on it as well as by its general appearance. In the latter case, the red soil must be scooped by the bare hands from underneath the grey surface. Jurraba yields good crops of sorghum, okra, cowpeas and sesame.

Khor (wadi, shag) soils consist of dark clays and they are generally found along seasonal water courses. The crop commonly grown here are sorghum and okra, since both crops require much water that is secured due to the high water-holding capacity characteristic of the Khor soil.

2. POPULATION AND FAMILY SIZE

The population of North Kordofan (including Um Ruwaba province, which does not fall within CARE-NKESDP) has a population of 1.7 million persons (about 8.7% of the total population of the Sudan), with an annual growth rate of 2.1%, according to the 1983 National Population Census. This population is subdivided into urban (13%), rural settled (59.7%) and rural nomadic (27.3%).

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The examination of various estimates of the average family size revealed a range of 5 to 7 persons per family. This range is confirmed by the findings of the present evaluation exercise.

3. LANDHOLDING AND ACCESS TO LAND

Household heads, by virtue of their membership in a village community, acquire the right to 'own' a piece of land in two ways: by allocation from the village sheikh and/or through inheritance. An adult resident householder usually begins an independent agricultural career by asking the village sheikh for a piece of land. The prospective new farmer is given a plot from unallocated village land (bura) which is under the trustee of the village sheikh for distribution to villagers. Once the land is cleared and cultivated, the holder will continue to have the right of use over it at all times unless absent from the village for at least three consecutive years.

Since the turn of the century, competition over land rights has occurred. This change, which threatens the established village land tenure system, could be attributed to population increase, the increasing importance of export crop production, and the consequent affixture of economic value to landholdings. This situation has brought about a growing demand on un-allocated village land. Thus it became in the interest of the sheikh as well as of individual villagers, to claim as much land as possible. With the passage of time, this trend has resulted in village land being largely controlled by its founder's descendants and those of other early settlers.

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Today, especially in densely populated areas, most village land is already allocated and none is available for the future needs of prospective farmers from the village or subsequent settlers. In such cases, the only way for community members to obtain access to village land is through inheritance from their fathers or through renting.

One consequence of the above developments is the marked inequality in the distribution of land within the project area. Although the average size of landholding is between 40 and 60 makhammas (depending on the locality), the range is very wide and may be in the order of a few makhammas up to several hundreds makhammas.

4. ANIMAL HUSBANDRY

Animal husbandary plays an important role in the economy of the sedentary rural household in North Kordofan. The drought of 1983-85 took a heavy toll on the livestock population in the project area as livestock either died or were sold off. Prior to the drought, individuals owned small herds of cattle and sheep, but the cattle especially suffered a severe decline and have not been replenished since. A similar outcome has been the case from the 1990 drought.

Livestock are primarily regarded as a reserve of financial resources rather than a source of income. Thus, livestock are commonly sold with the view to obtaining the cash necessary to purchase seeds and to finance other agricultural operations. Furthermore, the majority of farmers in North Kordofan keep livestock because of their multiple uses including transport, milk and meat. The various types of livestock commonly maintained include goats, sheep, donkeys, cattle, and camels.

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5. OFF-FARM ECONOMIC ACTIVITIES

The incomes of the rural sedentary households in most parts of North Kordofan are based on crop cultivation, gum tapping, and animal husbandry. However, incomes from these activities are supplemented by a number of other economic pursuits. Due to the non-uniform occurrence of these activities, it is usually difficult to collect quantitative information on them. Nevertheless, their mere existence points to the fact that the household economy, although predominantly agrarian, does not depend exclusively on crop and/or livestock production.

Individuals from less prosperous rural households in North Kordofan may be self-employed as carpenters, charcoal makers, tailors, herders, collectors of firewood and construction forestry material, and/or casual and migrant labourers. The few relatively better-off individuals may invest their resources in shopkeeping, cafes, crop trading, and/or transport of crops and water. It should be noted again that these endeavours are primarily dry-season activities and by no means replace the households' main agrarian concerns.

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D. FINDINGS AND DISCUSSION

This section presents the results of the evaluation, the quantitative and qualitative information that has been collected in the evaluation exercise, along with our interpretation of these information.

1. AGRICULTURAL SITUATION 1991

i) Rainfall Patterns

Generally speaking, the total amounts of rainfall in the project area for 1991 were low and distribution over the wet months was very erratic except in some parts of Ghebeish and El Odaya rural councils. Apart from El Khuwei rural council and Bara province, the rains started almost everywhere in May. June was generally dry throughout the project area, again excluding some parts of Ghebeish and El Odaya rural councils. Dry spells (subnat, sing. subna) occurred in most parts of the project area during crop establishment (most frequent), reproduction and grain filling stages. These dry spells, however, provide the logical explanation for the total failure of the millet crop in most parts of North Kordofan.

Table (1) below provides a summary of the pattern of rainfall in the rural councils visited. It should, however, be noted that due to the nature of rainfall in the project area, Table (1) shows neither the significant variations between one village and another in the same rural council nor the difference between one field and another within the same village land, in the amount of rainfall.

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Table (1)
Rainfall in the Project Area, 1991

Rural Council	May	June	July	August	Sept.	Oct.
El Khuwei	D	D	W	W	D	D
En Nahud	W	D	W	W	T	T
Wad Banda	W	D	W	W	D	D
Suq'a El Jamal	W	D	W	D	D	D
Ghebeish	W	W	W	W	W	T
El Odaya	W	W	W	W	W	T
Abu Zabad	W	D	W	W	W	D
Soderi	W	D	W	W	D	D
Bara	D	D	W	W	T	D
El Mazroob	D	D	W	W	D	D
Jereiikh	D	D	W	W	D	D
Tayba	D	D	W	W	T	D
Um Kereidim	D	D	W	W	T	D

NB W = wet, D = dry, T = traces.

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ii) Cropping Patterns

The rural economy of the project area is a mixed system consisting of crop and livestock production. Crop production is both for food (subsistence) and for the market (cash crops). While 'food crops' refer to the basic cereals (millet, sorghum) which make up the bulk of most human diets, 'cash crops' are normally regarded as being produced for the export markets. In reality the two categories overlap.

Thus, small farmers grow both food and cash crops for home consumption and for the market. In contrast, large-scale commercial producers grow both food and cash crops, but their production is exclusively market oriented. In short, in the project area as elsewhere in the Sudan, 'food crops' are marketed as 'cash crops' and a high percentage of 'cash crops' are consumed by the household or are marketed locally.

The physical environment regulates land usage in the project area. The pattern of annual rainfall and the soil types are the prime factors which determine the general cropping in any one locality. Table (2) below provides a summary of the dominant cropping patterns in the rural councils visited. However, the Table does not take into consideration the slight deviations from these general cropping patterns within any one rural council. These deviations are usually associated with a peculiarity in the types of soil in, or the geographical location of some areas.

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Table (2)
Cropping Pattern in the Project Area 1991

Rural Council	Main crops	Minor crops
El Khuwei	Millet, Water melons	Sesame, Groundnuts, Karkade
En Nahud	Millet, Groundnuts, Water melons	Karkade, Sesame
Wad Banda	Millet, Water melons	Sorghum
Suq'a El Jamal	Millet, Water melons	-
Ghebeish	Millet, Groundnuts, Water melons	Karkade
El Odaya	Millet, Groundnuts, Water melons	Karkade, Sesame, Sorghum
ABu Zabad	Millet, Groundnuts, Water melons	Karkade, Sesame, Sorghum
Soderi	Millet, Water melons	-
Bara	Millet, Water melons	Sesame, Karkade
Um Kereidim	Millet, Water melons	Sesame, Karkade
Jereijikh	Millet, Water melons	-
Um Sayala	Millet, Water melons	-
Um Garfa	Millet, Water melons	-
Tayba	Millet, Water melons	-
El Mazroob	Millet, Water melons	-

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The 1991 cropping season provides the following observations. First, the areas that normally cultivated with groundnuts were significantly reduced, i.e. by almost more than 60% of the average area grown in the past few years. Farmers invariably explained this trend by making reference to the acute lack of seeds in 1991. Secondly, the area cultivated with millet were slightly increased in the rural councils where seeds were relatively plenty such as Ghebeish, El Odaya, Abu Zabad, and En Nahud. This increase has been more or less at the expense of groundnuts. Thirdly, it was also observed that the areas cultivated with water melons were significantly increased either to compensate for the failure of millet crop during the establishment stage or to replace millet where the latter seeds were insufficient. Fourthly, intercropping of millet and water melons was frequently observed all over the project area. Finally, mixed cropping was also observed in the jurraba and wadi clay soils. The main crops grown here included sorghum, sesame, karkade, sweet water melons, okra and cowpeas.

iii) Planting Dates

Most farmers begin to plant their different crops with the onset of rains in May. However, some farmers may resort to the practice of dry planting (remail) in April before the start of the rainy season. The rationale behind this latter strategy is two-fold. First, through dry planting farmers' intention is to avoid labour bottlenecks posed by the necessity of planting different crops at the same time. Secondly, dry planting ensures the benefit of early rains. Table (3) below provides a general idea of the sowing dates and the timing of other agricultural practices in the project area for millet and groundnuts.

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Table (3)
Farming Calendar

Operation	Millet		Groundnuts	
	Range	Common	Range	Common
First planting	April-July	May	May-Aug.	June-July
Replanting	May-July	June-July	-	-
First weeding	June-July	July-Aug.	June-Aug.	July
Second weeding	July-Sept.	Aug.-Sept.	July-Sept.	July-Aug.
Cutting/Pulling	Aug.-Jan.	Oct.-Nov.	Sept.-Nov.	Oct.
Threshing	Oct.-Jan.	Dec.-Jan.	-	-

It should be noted that the diversity in planting dates is associated with the variations in the timing of the start of the rains. Thus, in 1991, while planting of millet in most parts of En Nahud province started in May with the beginning of the first good rains, in most parts of Bara millet was first planted in July as the rains started late in the first week of July. Moreover, variations in planting dates may occur even within the same village. This usually happens where some farmers lack seeds or the cash required to purchase them. In this case, farmers without seeds may resort to the option of working in others' fields so as to obtain the cash necessary to purchase seeds.

iv) Yield Estimates

Crop yields in the project area display a high degree of variability not only from one rural council to another but even within the same village. Variations in yields could be attributed to, among other things, the diversity in the level and distribution of rainfall as well as the degree of damage caused by pests such as nafasha, samta, tree locust and birds. Thus, in

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En Nahud province, where planting started as early as May, the millet crop was severely attacked by nafasha during the intermittent dry spells (subnat), while in Bara province, where planting started late, the damage inflicted on millet was mainly due to attacks by tree locusts and birds. Moreover, water melon fields suffered from varying degrees of attack by the water melon bug (um bagga). In En Nahud province the attack was so severe that the water melon fields in some area were completely destroyed.

Table (4) below provides the average yields of millet and groundnut in some rural councils in 1991. Millet yield estimates were calculated for En Nahud province on the basis of the crop planted in May, while for Bara and Soderi by reference to the crop sown in July.

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Table (4)
Average Yields for Millet and Groundnuts, 1991

Rural Council	Millet	Groundnuts
	Sack/makhammas	Sack/makhammas
El Khuwei	0.50	-
En Nahud	0.33	2
Wad Banda	0.16	-
Suq'a El Jamal	0	-
Ghebeish	2.00	12
El Odaya	2.00	10
Abu Zabad	0.67	6
Soderi	1.50	-
Bara	0.33	-
Um Kereidim	0	-
Jereijikh	1.00	-
Um Sayala	1.00	-
Um Gerfa	1.00	-
Tayba	2.00	-
El Mazroob	1.00	-

As mentioned above, these yield estimates represent averages calculated at different villages in each rural council. The actual observations show that yield estimates for 1991 vary between zero and 3 sacks per makhammas. Again, this fact holds true not only between villages in the same rural council but even among different farmers within the same village.

In some parts of Soderi and Bara provinces water melon fields, which were free from any kind of pest damage, are expected to score high levels of productivity.

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v) Costs of Production and Net Returns

Table 5 and 6 below presents a breakdown of the total cost of production in Sudanese pounds for groundnuts and millet per makhammas for 1991. It is interesting to note that, on average, the cost of groundnut seeds represents about 44% of the total cost production compared to only 11% in the case of millet. Moreover, using an average yield of 8 sacks of groundnuts per makhammas (Table 4) and a current price of Ls.1000 per sack, the net returns from one makhammas of groundnuts will be Ls.6437. If we compare this with millet, using the highest recorded yield of 2 sacks per makhammas and a current price of Ls.1200 per sack, the net return from one makhammas of millet will be Ls.1994.

Thus, the average returns from one makhammas of groundnuts are sufficient enough to purchase a little more than 5 sacks of millet at current prices. The significance of this finding will be very clear when we discuss the issue of food availability and food security in the project area as well as our recommendation for the inclusion of 'cash crop' seeds in any future seed provision programme.

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Table (5)
Groundnut Cost of Production
per Makhammas, 1991

Operation/Item	Number of Observations (LS)					Average
	I	II	III	IV	V	(LS)
Seeds	650	700	690	645	750	687
Deshelling	20	30	25	50	30	31
Land clearance	50	100	50	30	75	61
Planting	150	100	70	150	150	124
First weeding	150	100	150	150	100	130
Second weeding	100	70	150	100	100	104
Harvesting & Transport	390	400	410	530	400	426
Total	1510	1500	1545	1655	1605	1563

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Table (6)
Millet Cost Production
per Makhammas, 1991

Operation/Item	Observations (LS)			Average (LS)
	I	II	III	
Seeds	40	50	50	47
Planting	30	50	30	36
First weeding	120	150	120	130
Socond weeding	80	100	100	93
Harvesting&Transport	100	100	100	100
Total	370	450	400	406

2. LOCAL SEED PRACTICES

i) Seed Varieties

Farmers in the project area prefer to grow local varieties. Although local millet varieties are invariably late maturing, they are preferred to other varieties since they are drought resistant and high yielders. Moreover, local millet varieties are the preferred food grain because of their colour and taste. Table (7) below gives an inventory of the local varieties of the different crops usually grown in the project area by province.

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Table (7)
Local Seed Varieties

Province	Millet	Groundnuts	Sesame	Sorghum
En Nahud	Hammir-	Barberton	Jabarouk	Zinnari Baladi
	(Kordafani)		Baladi	
	Sharoba		(Danameit)	Zinnari Herihri
	Dimby Hereihri			Najad Ahmer
Soderi	Dimby	-	-	-
Bara	Dimby	-	Hereihri	-
			Jabarouk	-

ii) Seed Requirements

Depending on the locality, the individual farmer cultivates, on average, 3 makhammas of millet, 2 makhammas of groundnuts or sesame, 2 makhammas with mixed crops (sorghum, okra, cowpeas, and karkade), and large areas with water melons. Thus, his/her seed requirements will be one mid (3 kgs) of millet at the rate of 1kg. per makhammas and 2 sacks of groundnuts at the rate of one sack per makhammas. Seeds for other crops are either required in very small amounts or available everywhere in the project area in sufficient quantities. However, if the the average number of active farmers per the average family (in terms of size) is 4, then each family would require 4 mids of millet plus one mid to cater for replanting, and 8 sacks of groundnuts. These amounts are enough to cultivate 12 makhammas with millet and 8 makhammas with groundnuts in any one agricultural season.

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Table (8)
Seed Requirements for Different Crops

Crop	Seed Requirements per Average Cultivator			Average
	Area (Makh.)	Seed Rate Per Makh.	Seed Require- ment Per Area	Family Require- ments 4Farmers
Millet	3	0.33 mid	1 mid	4 mids*
Groundnuts	2	1 sack	2 sacks	8 sacks
Sesame	2	0.5 mid	1 mid	4 mids
Sorghum	1	1 mid	1 mid	4 mids
Karkade	2	0.50 mid	1 mid	4 mids
Cowpeas	1	0.50 mid	0.50 mid	2 mids
Okra	1	0.50 mid	0.50 mid	2 mids

* one mid of millet should be added to cater for replanting.

iii) Seed Sources

Before the drought of the early 1980s, the farmers' seed stocks provided about 85% of the total seed requirements, the market 10%, and 5% in the form of gifts and reciprocal exchanges between kinsmen, neighbours and friends. However, over the drought years the above percentage distribution of seed sources started to change due to the complete depletion of farmers' seed stocks as a consequence of continuous planting and replanting and the accompanying crop failures. Thus, farmers' seed stocks in drought years meet only 5% of the total seed requirements, with the market and all seed provision programmes contributing 90% and 5%, respectively.

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iv) Seed Prices

Seeds were generally in short supply during planting time and prices were consequently very high. In the planting season of 1991, for example, the price of 1 mid of millet ranged between Ls.150 and Ls.200. (compared to Ls.30 and Ls.50 in November 1992), 1 mid of sesame about Ls.200, cowpeas Ls.100, melon seed Ls.100, sorghum Ls.100, and Ls.700 for one sack of groundnuts. These high prices could be attributed, besides the shortage in supply, to the increasing demand at planting times since the farmers are increasingly becoming dependent on the market as their major source of seeds. This latter phenomenon, as we mentioned above, could be related to the fact that farmers' harvest of cereals in recent years is not enough to satisfy the very survival requirements of the families from one harvest to another.

v) Farmers' Strategies

In order to get access to seeds, farmers' in the project area rely on different strategies. First, most farmers depend on purchasing seeds in the local markets due to their preference for the varieties locally grown. When this source fails, the second option is to purchase whatever varieties available in the nearest urban market. Secondly, since most farmers usually experience severe financial difficulties in getting access to seed at harvest time due to the lack of not only the cash required to purchase seeds, but, more seriously, they are short of the very basic needs for survival, farmers follow other strategies. One option is to sell livestock (if any) to obtain the cash required to purchase seeds. The second option is to take seed loans from traders to be repaid in the form of labour during the weeding season. Another option is to take small cash loans at the

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interest of 50% for a three month period. The final option is where poor farmers wait until the better-off ones are in need of extra labour early in the season, whereby the farmers exploit this opportunity with the view to obtaining the cash required to purchase seeds. In this case seeds are usually planted rather late in the season.

vi) Seed Selection and Storage

In normal years about 60% of the farmers practice systematic seed selection, especially in the case of cereals, whereby the large heads with good grain filling are usually cut before the main harvest and kept aside as a stock of seeds for the next planting season. This strategy is, however, less practiced nowadays due to the continuous drought years and the associated partial or total crop failures since the drought of 1983. Since then farmers relied on their cereal food stocks and finally the market when the farmers were completely depleted.

Seeds are usually stored in sacks in the guests' hut (Khalwa) elevated from the ground by a platform made from the wood of local trees to guard against attack by termites. Otherwise, farmers store their millet seeds in underground storage pits where food stocks are usually kept.

3. CEREAL FOOD REQUIREMENTS AND AVAILABILITY

The annual cereal food requirements for the average family (5-7 persons) in the project area is 12 sacks (i.e. 1080 kgs). This has been calculated on the basis of one mid (i.e. 3 kgs) per family per day. However, the production of cereals in the project area for 1991 is only slightly better than that of 1990.

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Very few farmers, and only in El Majroor and the southern parts of Ghebeish rural council, have reported that they had harvested just enough millet to maintain their families until the next harvest. In a few other cases, farmers reported that the millet harvest of this year might be enough for only 3 to 6 months. In the majority of cases, however, farmers either harvested a few mids of millet which was hardly enough to meet their cereal needs for a few weeks. This is especially true in the case of Wad Banda and Suga El Jamal rural councils as well as a large number of pockets of nearly total crop failure scattered all over the project area. This finding has been supported by our observations while we inspected families cereal lots waiting milling inside the flour mills. These observations indicated a total or partial dependence of some families on the cereals provided by CARE's RRU. Moreover, our direct observations, while travelling through Wad Banda and Suq'a El Jamal rural councils, indicate that most of the millet fields totally failed to establish and died at an early stage.

However, the above situation is exacerbated by the fact that the majority of farmers in the project area do not have a cash crop to compensate for the shortfall in millet. It should be noted that this is a well-established survival strategy given the fact that North Kordofan has always been a cereal-deficit region. Thus, for most farm families, even in 'good' years, the harvest of cereals is hardly enough to maintain the family until the next harvest. Therefore, the strategy most families adopt with the view to bridging their cereal food gap, is the cultivation of a 'cash crop' to obtain the liquidity necessary to purchase locally produced millet and/or sorghum shipped from the mechanized rainfed farms in South Kordofan. This is supported by our earlier findings where we showed how the net returns from

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the cultivation of one makhammas with groundnuts were sufficient, in a less than average year such as 1991, to purchase 50% or 75% of the average family's annual cereal food requirements of millet or sorghum, respectively. Thus, one would expect that farmers in some parts of Ghebeish and El Oday rural councils, who have a reasonable harvest of groundnuts, to be in a relatively better situation in terms of bridging the gap in their cereal requirements. This is equally true in the case of farmers who cultivated karkade in the southern rural councils of En Nahud province as well as those whose water melon crop is highly successful especially in Bara and Soderi provinces.

1. THE IMPLEMENTATION OF PROJECT ACTIVITIES

i) Seed Procurement

By the beginning of May 1991 funds were already secured from ODA and USAID for the immediate purchase and delivery of up to 700 metric tons of millet and 620 metric tons of sorghum. In view of time constraints and limited seed market, CARE decided not to float fresh tenders for NKESDP seed needs, but to take advantage of the end of April CARE/UNDP Seed and Tools Project bidding exercise due to the following reasons:

- a) The floating of fresh tenders would be associated not only with higher prices but with serious delays since it would take at least two weeks to receive and finalize bids. By that time (end of May 1991) the project would be left with only 4 weeks to preposition seeds at CARE's warehouse in El Obeid, to test the seeds, and to despatch seeds to village councils for distribution to farmers before the end of June 1991 planting and grants contract deadline.

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- b) The large quantities of seeds required by NKESDP could inflate market prices, and since there was only a small number of suppliers, fresh tendering might lead to collusion between them resulting in a further artificial increase in prices.

CARE's fears of possible prices escalation were not without reasons. The lowest prices quoted for millet and sorghum in the end of April 1991 bids for Phase II of CARE/UNDP Project were already 43.70% and 42%, respectively, higher than the prices paid in January 1991 for Phase I of the same project.

In view of all the above, it was decided to select from the end of April 1991 CARE/UNDP project bidders at least two suppliers (keeping a third on standby in case anyone failed) and contract them to supply seeds. In this way, although delays related to retendering were effectively avoided, other purchasing constraints beyond the control of CARE, and which explain both the failure of the initial suppliers either to sign or to fulfil contracts, cropped up:

- a) One principal constraint could be associated with the fact that most seed sellers operating outside Khartoum were traders and not actual seed producers.
- b) The second major constraints relates to the end of May 1991 inflation control measures of the GOS whereby cash withdrawals from the banking system were severely restricted and cash transactions became almost impossible. This is one of the reasons behind the refusal to sign contracts or the failure to deliver seeds since traders declined to accept payment by cheques, and insisted upon at least 50% cash payment.

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Thus, by mid June 1991, CARE had no firm contracts for seeds, and began to identify other suppliers and renegotiate contracts. It was too late to float tender, so individual firms were contacted and prices negotiated on a case by case basis. Finally, in the latter half of June three seed suppliers (Al Zahid, Al Rawasi and the ABS-Kordofan) were identified and contracted to supply millet and sorghum seeds. However, the failure on the part of the contractors to supply the total quantities of seed contracted during the project's second drive to purchase seeds could be related to the acute shortage of millet. Due to the lateness in the season, most millet seed had already been sold. Intense efforts were made by the project staff to locate millet at Kosti, Sennar, Damazeen and Gadaref. Reportedly, only small quantities were available, prices were very high, and sources unreliable.

Thus, even if the initial contractors had not failed, it was still quite late in the season to purchase seed in the quantities & of the quality required. However, the new contractors managed to partially fulfil their contracts. Table (9) below shows the quantities of seed contracted and the quantities actually delivered by mid July 1991.

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Table (9)
Quantities of Seed Contracted and the Quantities
Delivered by Mid July 1991

Contractor	Quantities of Millet (MTS)			Quantities of Sorghem (MTS)		
	Contr- acted	Deliver- ed	Balance	Contrac- ted	Delive- red	Balance
Al Zahid Co	125.00	125.00	0	620.00	556.29	63.71
Aziz Inter- national	160.00	147.00	13.00	-	-	-
Copt- rade Co.	283.00	179.50	103.50	340.00	17.90	322.10
ABS-Kordo- fan	59.50	59.50	0	-	-	-
Total	627.50	511.00	116.50	960.00	574.19	385.81

Source: NKESDP Files, Khartoum.

In subsequent weeks more sorghum was delivered. However, the total quantities of millet and sorghum seeds delivered by mid August 1991 showed some deviations from the quantities planned. Table (10) shows the deviation for both millet and sorghum as well as the overall deviation.

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Table (10)
Quantities of Seeds Planned and
Actual Deliveries (in metric tons)
by Mid August 1991

	Millet	Sorghum	T o t a l
Quantity planned	880.00	780.00	1660.00
Quantity delivered	511.00	832.65	1343.65
Deviation	-369.00	+52.65	-316.35

Source: NKESDP Files, Khartoum

The above table shows that while the quantity of millet delivered negatively deviated from the quantity planned by 42%, sorghum has shown a positive deviation of 6.7%. If we consider the project as a whole, the deviation was negative and amounts to 19% from the quantity planned. As we mentioned earlier, these deviations against the plan were the results of factors beyond the control of CARE.

ii) Transport, Storage and Despatch

Transportation is one of the functions that did not pose any serious problem as far as the implementation of the project is concerned. This could be explained by the existence of a huge transportation capacity in North Kordofan that is capable of moving large volumes of produce as well as relief in a very short period of time. Moreover, local transport contractors are efficient enough to mobilise individual truck owners, especially

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for the business of transporting seeds which usually coincides with, and often represents a response to, partial or total crop failure. In short, when there is an emergency seed provision project individual truck owners are generally hungry for work.

One possible constraint, however, relates to the potential shortage of fuel in North Kordofan. This actually happened twice during the implementation of the project. However, such problems were instantly overcome either through the transport contractors' own means and connections or through the joint effort of CARE and the MOA.

Another problem, cited by the transport contractors, is associated with transporting seeds after the rains had started. By that time, roads are usually flooded and most treacherous to motor traffic and, hence, might result in unnecessary delays.

Given the available capacity of CARE's warehouse in El Obeid, currently used to store relief items, one would not expect the comparatively smaller quantities of seeds to pose any serious storage problem. Moreover, since the supplier were delivering seeds in very small quantities and at very wide intervals, the problem was not one of seed storage but one of having enough seeds for despatch to the drop-off points.

At the drop-off points there were no problems associated with storage because the seeds were either immediately transported to village councils or stored for short periods of time for which private storage facilities, at reasonable prices, were available in almost all drop-off points. This has been facilitated by the fact that emergency seed distribution projects generally coincide with periods of crop failure and hence empty private stores.

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Apart from a single case where a driver diverted a truck load of 110 bags of sorghum and sold it in the market, the despatch of seeds to the carefully selected drop-off points was successfully completed. The following logistical and other factors were taken into consideration when decisions on seed despatch were made:

- a) actual availability of seeds at the warehouse;
- b) the actual rain patterns reported in the provinces;
- c) test results confirming true-to-variety and minimum level of purity and germination; and
- d) the availability of transport and fuel.

However, due to the unpredictable situation in terms of seed receipts (as noted earlier), the project started to despatch seeds first to places where the rains were imminent or had actually started, and followed this strategy throughout the period of despatch. Occasionally despatches were delayed due to either a brief transportation fuel crisis or by the time required to conduct the purity, true-to-variety, and germination tests. Table (10) follows, illustrates the actual despatch schedule.

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Table (10)
Seed Despatch Schedule by Province
(in Metric Tons)

Date	En Nahud		Soderi		Bara	
	Millet	Sorghum	Millet	Sorghum	Millet	Sorghum
3-31 July	278.00	353.24	-	-	-	-
1-7 August	-	14.40	74.60	-	20.00	-
8-15 August	-	6.48	26.10	-	55.30	18.36
16-21 August	-	-	-	-	-	61.02
Total	278.00	374.12	100.70	-	75.30	79.38

Source: NKESDP Files, Khartoum.

From the above table it is possible to arrive at the fact that 96.8% of the despatch to En Nahud province was completed by the end of July, 74.1% of the despatch to Soderi province by the first week of August, and 60.6% of the despatch to Bara province by mid August. The total quantity of seed despatched was 1334.36 metric tons (inculding 427.86 metric tons to Sheikan province) of which 504.40 metric tons were millet seeds and 830.96 metric tons were sorghum seeds.

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iii) Seed Distribution and Monitoring

Seed distribution has been carried out over two stages: (a) distribution from the drop-off points to villages; and (b) distribution to beneficiaries within the villages. In the first stage seed distribution was carried out under the supervision of CARE's RRU monitors. Apart from three odd cases in En Nahud province (i.e. Iyal Bakheet, Um Dibeiba, and El Sideirat in El Khuwei, Ghebeish and Wad Banda Rural Councils, respectively) whereby all seed despatches were distributed in the drop-off point due to the lack of clear instructions and the unavailability of the monitors when the seeds were received, seed distribution from the drop-off point to the village was more than satisfactory.

Within the villages, almost all farmers in the project area expressed their satisfaction with the manner in which seeds were distributed and all farmers interviewed reported that they have received equal shares from the project seeds.

In En Nahud province seeds were distributed by the ration card whereby each family, regardless of size, was considered as a single unit of distribution and hence, all families received equal shares. Since the amounts of seeds distributed were very small and not enough to meet even the seed requirements of an adult family member, most farmers appreciated the fairness of distribution. However, a quite significant number of farmers expressed their dissatisfaction with the idea of considering the family as a single unit of distribution since this does not take into account the variations between families in terms of land ownership, the number of cultivators, and the capacity to perform agricultural work.

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In Bara and Soderi provinces where the system of ration cards was not yet introduced, distribution was carried out on the basis of relief lists. In this case, an equal share was allocated to every single person in the village regardless of whether he/she was a child or an adult. Thus, the share of seeds received by any one family was directly proportional to its size. Again, most farmers did not voice any complaint against this system. However, a few farmers criticized the allocation of seeds to children.

In the areas where possession of a ration card was considered as the only condition for eligibility to receive project seeds, a few farmers were excluded from seed distribution. They did not hold a ration card because they were absent, for one reason or another, from the village when the applications for cards were first made. However, in a few villages the VRC took the initiative and distributed seeds regardless of the possession of a ration card or not. This, to some extent, explains both deviations from the planned allocations to families as well as the variations in the sizes of shares from one village to another.

The planned unit for seed distribution was the kilograms upon which the seed rates per unit area were calculated. However, because of time constraints and/or the lack of weighing facilities, most VRCs took the initiative and used the local unit mid (a volumetric measure equivalent to 3 kgs).

The performance of the RRU monitors, who were assigned to supervise seed distribution, was behind the efficiency and success of seed distribution as evident in the satisfaction of all parties involved including both government officials as well as farmers. The few odd cases where distribution deviated from

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the plan should not undermine this success given the added burden to the monitors, who were already working under severe pressures and tight time schedules to distribute relief.

Although farmers invariably expressed their satisfaction with the way seeds were distributed, they considered the timing of distribution as inappropriate. As we have seen, this problem could be attributed to factors beyond the control of the project. However, although some farmers reported that they received seeds in good time for planting, it was too late for the crop to mature since the rainy season was approaching its final stages. Moreover, the diversity between local and official thinking regarding the definition of the term 'appropriate timing', could be related to a gross lack of awareness on the part of the officials about the rationale behind the farmers' planting strategies. These strategies are based on the farmers' thorough knowledge about the climatic and other physical factors characteristic of North Kordofan.

iv) Institutional Linkages and Coordination

One of the strengths of NKESDP could be related to the strong links and close coordination at all levels with government institutions, NGOs and UN agencies concerned with the issue of emergency seed distributions. The rationale behind this strategy was two-fold. First, to avoid the problems associated with possible duplication of effort and, secondly, to make use of whatever facilities and infrastructure available in North Kordofan not under the direct control of CARE.

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Thus, the project has been designed and implemented in coordination with KDROG which membership includes all the technical ministries at Kordofan State level, UN agencies and NGOs collaborating with ^{the} Kordofan State Government to provide drought relief assistance. Seed allocations to rural/village councils was done by the Seed Distribution Committee, a sub-group within KDROG, the members of which included representatives from Kordofan MOA, the ABS, CARE and the UNDP. The committee took into consideration the cereal crops traditionally grown in different areas and, therefore, in some areas villages were allocated both millet and sorghum, in other areas only millet or sorghum.

CARE has contracted the National Seed Administration of the MOA-Khartoum to inspect seed lots, collect samples and perform purity, true-to-variety and germination tests. Accordingly the NSA assigned two seed testing specialists to the project. Seeds were inspected and tested at WSARP Station in El Obeid, and were despatched or rejected on the basis of these tests, and the concurrence of Kordofan State MOA.

In En Nahud province, the project worked under the umbrella of the Province Seed Distribution Committee in which CARE, the MOA/IFAD, ABS, Salvation Committee, the Farmers' Union and the Province Commissioner, were represented. Coordination in En Nahud province was facilitated by the presence of ENSAP and ENCCP, both projects being jointly implemented by the MOA and the ABS and their respective sponsoring organization (CARE and IFAD). In Soderi and Bara provinces due to the lack of such an organizational set-up and the failure of the MOA to provide the promised 6 extension officers to assist the RRU monitors, seed distribution was implemented by CARE alone with occasional assistance/intervention from the provincial authorities.

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Finally, in the process of preparing NKESDP proposal CARE approached various government departments, the private sector, and the FAO. These institutions assured CARE that all seeds are available in the Sudan and in the quantities required.

5. PROJECT IMPACTS

NKESDP should be seen as a responsible response to a felt need in the drought-affected areas of North Kordofan. CARE should be commended for being valorous enough to undertake such a venture given the various constraints under which emergency projects usually operate. Moreover, one should appreciate CARE's capability in mobilizing a diverse group of donors and securing funds for the project in a relatively short period of time.

However, due to factors beyond the control of the project such as the GOS end of May 1991 fiscal restrictions which sabotaged the activity of seed procurement, seeds were delivered rather late to the beneficiaries at a time when most of the cereal crops were already planted. Although most farmers and other concerned parties appreciated the efficiency of CARE in transporting and despatching seeds to villages as well as distributing them to beneficiaries, they invariably stressed that the distribution of seeds in July-August was rather late.

Despite the delay in the delivery of seeds to beneficiaries, the project seeds have had positive impacts with respect to satisfying the farmers' seed needs. In most parts of En Nahud province, most millet seed were used for the second planting in July since the crop sown in May totally failed due to the long dry spell in June. In July there was an acute shortage of seeds and the second planting would have not been possible without

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the projects' seeds. In most parts of Bara and Soderi where the rains started late in July, the project seeds were received just at the right time for the first planting of millet. In a few areas in the three provinces, the project seeds were not planted due to the long dry spell in July. In this case, millet seed were mostly stored with the view to planting them in 1992 cultivation season. Generally speaking, it is safe to say that about 75% of millet seed were planted; 15% were kept for planting next season; and only 10% were consumed as food.

Sorghum seed were distributed mainly in Sheikan and En Nahud provinces. In the case of Sheikan most seeds were planted since the rains started late in July just when beneficiaries received seeds. Moreover, large tracts of clay soils exist in Sheikan province, especially in the Southern parts, which are suitable for the cultivation of sorghum. In En Nahud province, where only isolated pockets of clay soils exist, most sorghum seed were consumed as food. Thus, while in Sheikan province about 90% of sorghum seed were planted only 40 or 50 per cent were sown in En Nahud province.

There is no doubt about the positive impacts of the NKESDP with respect to increasing food availability in the project area. However, this impact was rather modest given the quantity of seed distributed as well as the general below average agricultural situation. The latter could be attributed to the long dry spells in June, July and August which resulted in almost the total failure of the seeds sown in May from the farmers' own sources as well as the projects seeds sown late July or early August. Thus, even if the project seeds were distributed at the time of early planting in May they would have, in most areas, suffered the same fate of farmers' own seeds which failed due to

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the long dry spell in June. Those who planted the project's seeds reported total or partial failure due to the cessation of rains in August. In most parts of En Nahud, Soderi and Bara provinces, the farmers who planted the project's millet seeds reported very low yields in the order of 2-5 mids per makhammas. Thus making comparison between the yields of local seed varieties, planted in May, and the project's seeds, planted late July and early August, would be unfair if not illogical. Again, in both cases yields were very low due to the long intermittent dry spells in May and in August, respectively.

However, NKESDP should be applauded for being the most extensive seed distribution project in terms of coverage as well as for being free from any kind of partiality and bias with respect to the activity of distributing seeds to beneficiaries.

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E. SUMMARY AND CONCLUSION

This section presents a summary of the major findings of the evaluation exercise. This will be followed by some conclusions about the project socio-economic impact and effectiveness as a disaster response intervention.

SUMMARY:

- 1) Rainfall in the project area is characterized by a high degree of temporal and spatial variability. Most farmers, in order to benefit from every chance of rainfall, start planting with the onset of the first good showers in May. However, in the case of a long damaging dry spell in June, farmers may be forced to replant either late in June or early in July. Replanting means that farmers require more seeds per unit area than what the official estimates would have us believe.
- 2) The dominant soil type in the project area is the goz (sandy soil), where millet, groundnuts and water melons are usually cultivated. The small pockets of clay soils (jurraba and khori) are suitable for the cultivation of sorghum, okra, sesame, and cowpeas.
- 3) Millet is the dominant staple food grain grown in the project area. Water melons, like millet, are also extensively cultivated. Groundnuts are grown by most farmers in En Nahud province excluding some parts of El Khuwei, Wad Banda and Suq'a El Jamal rural councils. Most farmers in Bara province and some parts of En Nahud and Soderi provinces grow sesame. Other minor crops include karkade, sorghum, okra and cowpeas.

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- 4) Animal husbandry plays a significant role in the economy of the sedentary rural household in the project area. The drought of 1983-85 and 1990 caused a serious reduction in the livestock population in North Kordofan as most animals either died or were sold off. Re-stocking would only be possible following successive years of more than average crop harvest.
- 5) Naffasha and Samta inflicted a serious damage on the millet crop sown in May (En Nahud), while tree locust and birds caused damage in the areas where millet was planted relatively late in July (Bara and Soderi). In most parts of En Nahud province, the water melon bug was the main cause behind the total failure of the melon crop.
- 6) Most millet fields suffered great damage from the intermittent dry spells during the crop establishment stage in June (En Nahud), and the flowering and grain filling stages in July-August (Bara and Soderi).
- 7) The annual cereal food needs of the average family (5-7 persons) is 12 sacks calculated on the basis of one mid per day (i.e. one sack per month). On average, cereal production this year is hardly enough to keep the family for one or two months let alone to satisfy the total annual needs. The actual yields of millet per makhammas ranged from zero to 3 sacks. Although very few farmers succeeded in harvesting enough millet to keep them until the harvest season of next year, the majority of farmers will continue either partially or totally to depend, for their cereal needs, on the market and/or relief.

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- 8) The majority farmers who planted millet and other crops in 1991 depended mainly on local seed varieties. However, prices were very high and seeds were difficult to obtain. Thus, the acute shortage of seeds provides the logical explanation for the marked reduction in the areas cultivated with various crops especially groundnuts in En Nahud and sesame in Bara.
- 9) Farmers' seed stocks were completely depleted through repeated planting and replanting during the successive years of drought and crop failure since the early 1980s. Farmers in the project area now depend entirely on the market for obtaining their seed needs.
- 10) The minimum annual seed requirements per the average family, taking into consideration the geographical variations, are 4 mids millet, 8 sacks groundnuts, 4 mids sesame, 4 mids sorghum, 2 mids cowpeas, and 2 mids okra.
- 11) Although serious difficulties were hardly encountered in association with the project activities of transporting and despatching seeds to the drop-off points as well as the distribution of seeds to the beneficiaries, there were some problems related to seed procurement such as the unanticipated government fiscal restrictions of May 1991 and the scarcity of seeds, all of which were beyond the direct control of the project, constituted the prime factors behind the failure of seed suppliers either to sign or fulfil contracts. This explains to a significant extent the delay in the delivery of seeds to beneficiaries.

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- 12) Generally speaking, the distribution of seeds among families was equitable and no serious biases were reported. This was supported by the general satisfaction on the part of all farmers interviewed.
- 13) The project owes much of its achievements to the success in establishing and fostering strong links with CARE's already existing projects in North Kordofan, UN agencies, as well as with government institutions at the national (MOA, NSA), the state level (MOA, ABS, KDROG), the provincial and local levels. These linkages provided the organizational, administrative, technical and logistical base upon which the project was successfully implemented.

CONCLUSION

- 1) NKESDP represents a serious response to a felt need in the drought affected areas of North Kordofan. The project has been very effective in satisfying the farmers' seed needs at a time when their seed stocks were completely depleted due to the successive years of drought and crop failure during the past ten years or so. Moreover, the project seeds have had more pronounced impact in meeting the seed needs of the poorest farmers who lacked the financial ability to purchase seeds in the market at a time when seed prices were very high.

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- 2) There are no doubts about the positive impacts of the project with respect to increasing food availability in the project area. However, these impacts were rather modest given the quantity of seed distributed as well as the general below average agricultural situation in North Kordofan in 1991. The latter could be attributed to the erratic nature of rainfall in this semi-arid part of the Sudan. Thus, in North Kordofan no matter how efficient a seed distribution project may be, still its impacts with regard to increasing food availability are dependent on natural factors beyond the control of human beings. If it were not for the intermittent long dry spells during the 1991 rainy season, the impacts of the project seeds with respect to increasing food availability in North Kordofan would have been more positive.
- 3) The experience of NKESDP was instructive with respect to how an emergency seed distribution project should be planned and implemented. Moreover, it alerted government institutions, UN agencies and other NGOs working in the project area of how serious is 'the seed problem' in North Kordofan and that all concerned parties should collaborate with the view to arriving at radical solution to this problem.

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F. RECOMMENDATIONS

- 1) In order to avoid unnecessary delays and untimely delivery in any future seed distribution programme, no matter whether emergency or developmental, the plan should, as far as possible, be to contract seed suppliers and identify transporters and negotiate transport contracts up to drop-off points in January, centrally receive and complete all seed tests February-March, and in April complete the despatch of seeds up to villages.
- 2) Any future seed distribution project should seriously consider the distribution of groundnut seeds especially in the southern rural councils of En Nahud province (namely, Ghebeish, El Oday, Abu Zabad and En Nahud). This recommendation could be justified on the basis of nutritional, ecological and economic grounds. First, groundnuts constitute a rich source of protein especially for children since they are usually served to them either roasted or boiled in salted water as a snack between major meals. Secondly, groundnuts have always been an important crop in the agricultural rotation system. The alternation of groundnuts with cereals is the only technically sound and economically feasible mechanism for the regeneration of soil fertility in the sandy soils of North Kordofan. Moreover, the interchange between cereals and groundnuts assist in the control of parasitic weeds such as buda (Striga hermonthica), which thrive under the condition of continuous monocropping with cereals. Finally, groundnuts act as a cushion for the farmer since North Kordofan has always been a cereal deficit area due to total or partial millet failure. In this case groundnuts, as well

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as other 'cash' crops, are usually exchanged in the market to obtain the cash needed to purchase millet and/or sorghum with the view to bridging the farmers' chronic cereal gap. Moreover, under the current conditions of inflating vegetable oil prices, groundnuts are usually crushed into oil in order to satisfy local needs with the surplus sold in the nearby markets.

- 3) If seed quantities permit, they should be distributed according to a list of the number of cultivators (individuals who work full-time in the field during the cropping season) per family prepared by the village sheikh with the assistance of one or more members of the village Popular Committee and not according to the ration card. this would guarantee the planting of seeds and a possible improvement of food availability in the project area.
- 4) For practical reasons, any future seed distribution project should rely on local units of measurement in both the estimation of needs as well as the distribution of seeds to beneficiaries. Thus, in North Kordofan the makhammas, the local unit of area, and the mid, the smallest volumetric unit, should be used in estimating needs and in distributing seeds to the farmers.
- 5) Any future seed provision project should only consider the distribution of the varieties usually grown locally and families should receive shares equivalent to the nombre of cultivators within each family. For the single cultivator the minimum requirements should be 1 mid of millet, enough to cultivate 3 makhammas, and 2 sacks of groundnuts, sufficient to cultivate 2 makhammas. Seeds of sesame, sorghum, cowpeas, okra and water melon, since they are

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required in small quantities and available only in North Kordofan, farmers should be assisted financially to purchase them locally.

- 6) Apart from local, quick maturing sorghum varieties such as Najad ahmar, Zunari baladi and Zunari abyad, sorghum, especially varieties suitable for the central clay plains (Gedarif, South Kordofan), should not be included in any future seed provision programme.
- 7) Technical linkages should be strengthened with WSARP since it is the most appropriate institution in the Sudan to advise on the choice of varieties suitable for the conditions of North Kordofan, where to purchase seeds, the geographical distribution of the different cropping patterns within the project area, beneficiaries' seed requirements, as well as to perform purity, true-to-variety and germination tests.
- 8) In the future, the field staff of any seed provision programme, whether fresh recruits or existing CARE monitors, should undergo short-term training periods in agro-monitoring ((estimation of areas planted and yields; monitoring of crop performance (i.e. crop establishment and grain filling), rainfall pattern, the incidence of pests, etc.)). This short-term in-service training can easily be provided by WSARP.
- 9) Emergency seed distribution should continue in 1992. This should be supported by the provision of relief food (mainly sorghum) since our estimates of cereal output in the project area indicated beyond doubts that most farmers will not have enough stocks of cereals to keep them at least over the next cropping season.

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- 10) The findings of this evaluation admonish that the consecutive years of drought and crop failures experienced in North Kordofan since 1983 not only created a very wide food gap but, more seriously, resulted in the complete depletion of the farmers' seed stocks. This is evident in the general shrinkage of the areas usually grown with almost all crops. Thus, the rehabilitation of the farmers' seed stocks should be the top priority in all agricultural and rural development programmes in North Kordofan.

The rehabilitation of the farmers' seed stocks could only be achieved through a carefully-studied and well-designed seed provision programme. The success of such a programme requires, among other things, a capable administration, a well-trained technical staff, an efficient monitoring system, and a high degree of mobility. Since these features are already well-developed in the organizational set up of CARE in the Sudan, in addition to her long experience and extensive presence in North Kordofan, CARE is qualified more than any other organization to foster such a vital programme.

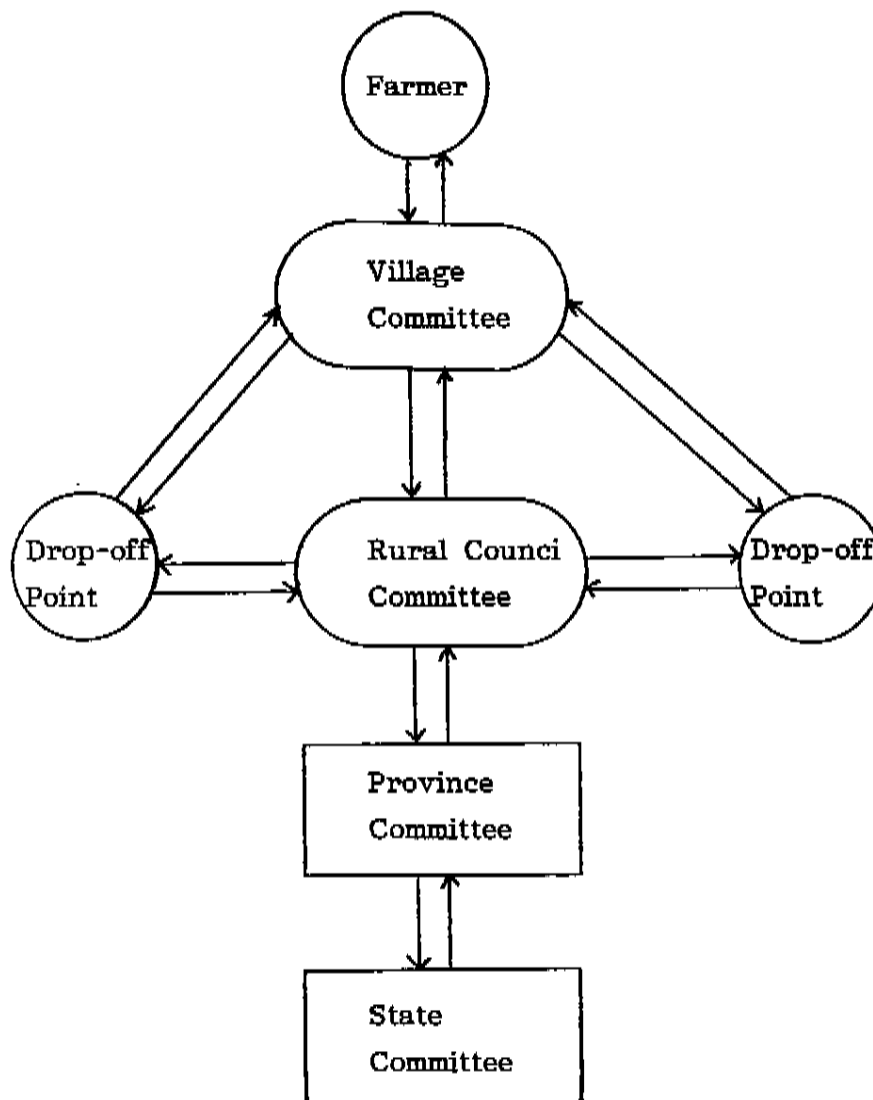
This programme should be implemented in two phases. In the first phase, priority should be given to the rehabilitation of the farmers' seed stocks through a) the provision of local varieties which are preferred by the farmer; b) the restoration of the practice of seed selection; and c) the improvement of indigenous seed storage techniques. In the second phase emphasis should be on the development of an extension seed provision programme whereby improved seeds and packages of technical inputs should be introduced in the project area.

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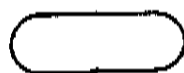
In order to avoid duplication and possible conflict of interests, we recommend a unified system for seed distribution. One prerequisite for the efficient functioning of this system is the establishment of strong linkages between, on the one hand, government administrative and technical departments and, on the other hand, NGOs, UN agencies and popular organizations at all levels from the state down to the village level. This should be based on a definite plan with written commitments and clear definition of obligations and responsibilities to ensure the smooth flow and feedback of information throughout the system. The following flow-chart provides a simple sketch of this system with the arrows denoting the directions of information flow.

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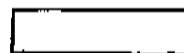
Figure (1): The Suggested System of Seed Distribution



KEY



Implementing Body



Coordinating Body

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The following is an outline of the possible membership and roles of the seed distribution committees depicted in Figure (1) above. x

A. Village Committee

1) Roles

- i) The preparation of seed distribution lists on the basis of the actual number of cultivators per family.
- ii) The transportation of seeds from the drop-off point to the village.
- iii) The distribution of seeds to beneficiaries.
- iv) Collection and storage of the seed loans at the time of repayment.
- v) Reporting to the Rural Council Committee.

2) Membership

- i) The village sheikh
- ii) Two representatives of the Salvation Committee
- iii) Two farmers not members of the Salvation Committee

B. Rural Council Committee

1) Roles

- i) The identification of drop-off-points.
- ii) The monitoring of seed distribution.
- iii) The conveyance of messages to villages.
- iv) Reporting to the Province Committee.

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2) Membership

- i) The rural council administrative officer.
- ii) Representative of the MOA.
- iii) Representative of CARE.
- iv) Representative of the Salvation Committee.

C. The Province Committee

1) Roles

- i) To set the provincial policy of seed distribution.
- ii) The conveyance of messages to the rural councils.
- iii) Reporting to the State Committee.

2) Membership

- i) The Province Commissioner.
- ii) The Nazir.
- iii) The Chairman of the Province Salvation Committee.
- iv) The Farmers' Union.
- v) MOA
- vi) ABS
- vii) CARE

D. The State Committee (a sub-group within KDROG)

1) Roles

- i) To set the general policy of seed distribution in the state.
- ii) The coordination between different donors and organizations.
- iii) Monitoring the quality and quantities of seed.

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- iv) The preparation of progress and annual reports.
- v) The initiation of information campaigns through the mass media.

2) Membership

- i) MOA
- ii) The State Salvation Committee
- iii) ABS
- iv) WSARP
- v) CARE
- vi) Representatives of UN agencies and other NGOs operating in the State.

The rehabilitation of the farmers' seed stock should start by the provision of a village seed stock (VSS) as an initial input which in the future might be developed into a village seed bank (VSB). However, the size of the initial VSS should be assessed on the basis of a detailed list of all families and the number of cultivators within them. This list should be prepared by the Village Committee. In calculating the seed needs of the families the procedure outlined in the section entitled Seed Requirements of the Findings Chapter should be followed. In this way the size of the initial VSS will be determined.

The Village Committee should be responsible for keeping storage space, seed dressing, the VSS, the distribution of seeds to beneficiaries according to the same list just before the onset of the rains, and, after harvest, the recovery of the same stock from the beneficiaries on a mid for mid basis, plus a nominal administrative charge. Members of the Village Committee should be compensated.

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Only one above-average harvest may result in the rehabilitation of the individual farmers' seed stock. Thus, in the case of consecutive years of good harvest the VSS should be annually renewed and kept as a strategic seed reserve to be redistributed in years of crop failure. However, in the case of continuous crop failure and the depletion of the VSS measures should be taken to rehabilitate it again. If the VSS proves to be a viable idea in North Kordofan, clear rules and regulations regarding eligibility criteria, disbursement and repayment of loans, and penalty for defaulters should be developed. A clear system for re-scheduling of, or exemption from, repayment also needs to be established. The experience of the ABS in extending credit (in-cash and in-kind) to the small farmers in North Kordofan could assist in this matter.

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APPENDIX I
Towns and Villages Visited

En Nahud Province		Bara Province	Soderi Province
El Khuwei	Suq'a El Jamal	El Mazroob	Soderi
Murkab	Dardoug	Tayba	El Hufra
Um Aweesha	Ghebeish	Um Kereidim	El Sinoot
Jamreika	Dirra	Bara	Um Khirwi'a
	El Liayit		
Iyal Bakheet	Wad Gasim	El Jahman	Abu Za'eema
Um Maraheek	Megeileema	El Shawal	Um Zabad
En Nahud	Um Zagaya	El Riyad	Tinna
El Jem	Sitar	Jereijikh	Um Badir
Tallib	El Odaya	Um Jazeera	Hamrat El-Sheikh
Wad El Hileiw	Um Shaloofa	Um Dayoga	
		Mazameel	
Wad Shieifoon	El Majrur		
Um Zabat	Abu Himeid		
Wad Batran	Um Chack		
Wad El Wali	Marboota		
Jabr El Dar	Dabanga		
Abu Mareiga	Abu Zabad		
Abu Doma	Um Jigro		
Koreina	Jerr Al Asai		
Shigeiro	Um Dafeis		
Wad Banda	Um Arada		
Abu A'Koda	Khammas Hajar		
El Ma'arika	Khammas El Donki		
Um A'ish			
Dabbal			

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APPENDIX II
Monthly Distribution of Rainfall; MM
in En Nahud, 1986 - 1991

Year	1986	1987	1988	1989	1990	1991
Month						
April	0	0	0	0	0	7.2
May	0	11.8	0	33.2	9.2	69.7
June	41.5	49.9	144.6	45.5	6.2	9.8
July	80.4	80.9	56.3	46.7	43.2	119.6
August	55.9	115.2	98.4	108.8	30.5	75.5
September	107.2	16.1	81.4	134.5	29.4	40.7
October	9.7	43.2	0	0.5	35.4	3.7

Source: Ministry of Agriculture, En Nahud.

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APPENDIX III
Daily Distribution of Rainfall (in mm)
in Ghebeish, April - October 1991

Day	April	May	June	July	August	September	October
1st	0	0	0	0	T	0	0
2nd	0	12	0	0	16	0	0
3rd	0	0	0	0	0	0	0
4th	0	0	0	0	0	0	0
5th	0	Traces	0	24	12	0	0
6th	0	0	0	0	0	0	0
7th	0	0	0	3	0	0	0
8th	0	0	0	0	0	0	0
9th	0	0	0	0	7	0	0
10th	Traces	Traces	0	0	6	0	0
11th	Traces	0	18	0	Traces	0	Traces
12th	0	0	0	0	Traces	0	0
13th	0	0	0	0	22	0	Traces
14th	0	0	0	11	0	0	0
15th	0	0	0	0	0	20	0
16th	0	0	0	14	0	0	0
17th	0	0	0	0	0	0	0
18th	0	0	16	3	0	0	0
19th	0	0	0	0	0	Traces	0
20th	0	0	0	4	0	Traces	0
21st	0	0	0	0	Traces	0	0
22nd	0	15	0	0	3	0	0

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Day	April	May	June	July	August	September	October
23rd	0	0	0	0	Traces	0	0
24th	0	0	0	4.30	0	0	0
25th	0	0	0	0	0	0	0
26th	0	6	0	0	Traces	0	0
27th	0	0	6	8	Traces	0	Traces
28th	0	0	0	0	Traces	0	0
29th	0	22	0	6	0	0	0
30th	Traces	0	0	0	0	0	0
31st	-	0	0	0	0	0	0
Total	Traces	55	40	79.5	66	20	Traces

Source: Ministry of Agriculture, Ghebeish

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APPENDIX IVSeed Requirements Per Average Family (7 persons)

Crop	Area (Makh.)	Total Seed Requirement	Rural Councils Recommended for Distribution
Millet	12	4 mids	All rural councils
Groundnuts	8	8 sacks	NA, GH, OD, AZ
Sesame	8	4 mids	KH, NA, OD, AZ, BA, KE
Sorghum	4	4 mids	OD, AZ
Karkade	8	4 mids	KH, NA, GH, OD, AZ, BA, KE

Rural Councils

- | | |
|------------------------|----------------------|
| 1. El Khuwei (KH) | 9. Bara (BA) |
| 2. En Nahud (NA) | 10. Um Kereidim (KE) |
| 3. Wad Banda (WB) | 11. Jereijikh (JE) |
| 4. Suq'a El Jamal (SJ) | 12. Um Sayala (SA) |
| 5. Ghebeish (GH) | 13. Um Gerfa (GE) |
| 6. El Oday (OD) | 14. Tayba (TA) |
| 7. Abu Zabad (AZ) | 15. El Mazroob (MZ) |
| 8. Soderi (SO). | |

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APPENDIX V

KEY INFORMATION

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- | | |
|--|--|
| 1. Average family size | 7 persons |
| 2. Average cereal food needs | 12 sacks/ year/ family |
| 3. Cropping pattern | See Table (2), P. 22 |
| 4. Average area cultivated | 12 <u>makhammas</u> / family (millet) |
| 5. Average seed requirement | 4 <u>mids</u> / family (millet) |
| 6. Seed sources | <ul style="list-style-type: none">- Farmer's own stock- Market- Reciprocal exchange |
| 7. Local seed varieties
(millet) | <ul style="list-style-type: none">- En Nahud: Hammir, Sharoba,
Dimby, Hereihri- Bara: Dimby- Soderi: Dimby |
| 8. Traditional seed storage
methods | <ul style="list-style-type: none">- <u>Matmura</u> (storage pit)- Sacks in hut- Heads in hut |
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