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Proj. 6770008

PD-AA6-386

ACTION MEMORANDUM TO THE ASSISTANT ADMINISTRATOR, AFRICA

THRU: AFR/DP, Mr. Robert Huesmann *E*

FROM: AFR/SFWAA, David Shear

SUBJECT: OPG Acacia Albida Expansion Project Proposal: PVO CARE

PROBLEM: To obtain your approval of the attached Project Proposal.

Project Background: In 1974-75 the Government of Chad (GOC), in an effort to protect and reclaim its deteriorating land resource base, initiated range conservation activities which among other undertakings included the planting of a token number of Acacia Albida trees. These trees were planted in selected demonstration areas. The GOC turned to CARE for assistance after their efforts to expand the project to village farmers were hampered by budgetary constraints and logistic difficulties. CARE agreed to assist and in 1975 a CARE/Chad Pilot project was started. The project involved 25 farmers and entailed the planting on 50 hectares of land, of Acacia Albida trees, Comiphora trees (used for live fencing to protect the Acacia trees) and Neem trees (used for firewood and as a wind break).

CARE, to further expand the program, has presented the attached OPG proposal to A.I.D. for funding. The purpose of the project is two-fold in that it seeks to (1) establish the Acacia tree on farmers' fields as a recognized low cost improved technology and as a means of increasing the farmers' capacity to improve his agricultural output and (2) establish the concepts of cultivating firewood as a domestic crop with concomitant protection of the environment. Project activities will focus on the planting of Acacia Albida trees on 3,000 hectares of land. Other aspects of the project are primarily designed to ensure that the Acacia trees will not be lost, either to wind erosion, browsing or for use as firewood. CARE has requested project funding in the amount of \$1,100,100. CARE and the GOC contribution (\$282,577) account for approximately 20 percent of the total project costs.

Physically, the Acacia Albida is a large tree with a crown like an oak tree. Unlike other trees that gain foliage at the onset of the planting season, the Acacia during this time is leafless and hence allows sunlight to pass through and nourish the grain planted underneath. Because of this phenomenon, the tree's growing season coincides with the dry season and assures food for livestock through pruning, leaf fall, pods and seeds. In addition the ground temperature underneath the Acacia is several degrees cooler, transpiration is decreased, and the impact of the raindrop, recognized to be the leading factor in soil erosion, is much lessened. The Acacia has been planted in the Sahel (principally in Senegal and Niger) for at least 25 years.

BEST AVAILABLE DOCUMENT

Because of the growing interest in the Acacia tree particularly by Senegal, Niger and Chad, the Technical Assistance Bureau at the request of the interested Missions and CWR, agreed to send two of its staff members to the field to determine what type of research, if any, should be included in the project proposal.

Dr. L. R. Frederick, a Soil Microbiology Specialist and Dr. E. J. Rice, a Research Agronomist, visited Dakar, Niamey, Abidjan, and Ndjamena during January and February. They toured land sites where the Acacia trees are fully established and nurseries where the seeds are initially planted. They also met with various Government and CARE officials. In summarization the team concluded that (1) trees in the Sahel are extremely valuable for stabilization of the soil and improvement of the microclimate for improved crop production; and (2) the Acacia tree is compatible with crop production in that it does not compete for light, water and nutrients during the crop planting season. The team also concluded that food production could be further increased if agronomic practices were made an element of all Acacia Albida projects. The team did not believe it practical to include a research element in the project. A.I.D. is now preparing a modest research activity to more definitively determine the full potential of the Acacia Albida. The team citing the benefits of the tree, CARE's ability to implement the project, and the GOC's initiative and support recommend that the attached proposal be approved. With regards to the inclusion of improved agronomic practices in the proposal, CARE has indicated its willingness following the project evaluation, which is to take place in the second year of the project to consider with A.I.D. means of incorporating needed agronomic expertise into the project. In the interim, CARE has agreed to take steps to educate its staff in simple improved agricultural practices and to transfer this knowledge to the farmers participating in the project. The project review committee accepts the team's recommendations and requests that this proposal be approved. The CDO/Chad strongly supports this proposal and recommends its approval.

The approval of this proposal was held in abeyance pending the outcome of the team's findings. In the interim, CARE had to start its nursery operations so that the trees could be ready for transport to the farmers by early June. CARE will be reimbursed for such expenses out of this Grant. This proposal also contains a request for the procurement of two Land Rovers. A waiver request is attached as Annex A. Your approval of this Action Memorandum will be considered approval of the waiver request.

Recommendation: It is recommended that you

1) Approve this three year project for a total amount of \$1,110,000

Approved: \_\_\_\_\_  
James S. Scott

Disapproved: \_\_\_\_\_

Date: JUN 2 1976

2) Approve funding in the amount of \$444,000 to cover the first two years of project activities.

Approved: /s/ Stanley S. Scott

Disapproved: \_\_\_\_\_

Date: JUN 2 1976

3) Approve the attached Memorandum to the Deputy Administrator which requests his approval of the attached Congressional Notification which states the Agency's intention to obligate \$444,000 in Fiscal Year 1976, to cover funding for two years of project activities for the CARE OPG Acacia Albida Expansion Project.

Attachment: a/s

AFR/SFMA:YJohn:bfc:moa:4-29-76/5-27-76

Clearances:

TA/AGR:ERice (draft) \_\_\_\_\_  
AFI/DP:DWilson (draft) \_\_\_\_\_  
AFR/SFWA:Speek (draft) \_\_\_\_\_  
AFR/DR:SCole \_\_\_\_\_  
PPC/DPRE:JWalty (draft) \_\_\_\_\_  
GC/AFR:STisa (draft) \_\_\_\_\_  
AFR/SFWA:JMcLaughlin (draft) \_\_\_\_\_  
MO/OPM:RLocke \_\_\_\_\_  
DAA/AFR:DBrown \_\_\_\_\_  
AFR/SFWA:IDCoker \_\_\_\_\_  
MO/AFR:PColes \_\_\_\_\_

REQUEST FOR PROCUREMENT SOURCE/ORIGIN WAIVER

**Problem:** Request for Procurement Source/Origin Waiver From Geographic Code 000 (U.S. only) To Geographic Code 935 (Special Free World) for OPG Acacia Albida Expansion Project

(a) Cooperating Country	Chad
(b) Nature of Funding	Operational Program Grant PVO: CARE
(c) Description of Goods	2 Land Rovers
(d) Approximate Value	\$32,600
(e) Probable Source	England

**Discussion:** Section 636 (f) of the Foreign Assistance Act of 1961, as amended, prohibits A.I.D. from the purchase or long-term lease of motor vehicles unless such vehicles are manufactured in the United States. Section 626 (f) does provide, however, that "... where special circumstances exist the President is authorized to waive the provisions of this section in order to carry out the purposes of this act." We are of the opinion that mobility requirements for the CARE field staff and local personnel engaged in the implementation of this A.I.D. funded program in Chad present special circumstances that justify the waiving of the origin requirement of Section 626 (f) and the source requirements generally set forth in Chapter 2 of A.I.D. Handbook 15.

Project activities entail the planting of Acacia, Comiphora and Neem trees on 3,500 hectares of land. Approximately 1,750 farmers from 8 villages will participate in this project. A nursery will be established for each village.

In order to implement and monitor project activities travel to and within the project area is indispensable. It has been determined that the CARE field staff requires the full time use of vehicles particularly suited to the local terrain, requirements and maintenance facilities.

The CARE field staff along with the GOC forestry division will initially be responsible for setting up nursery operations and instructing the farmers in the planting and care of the trees, thereafter this responsibility will be turned over to the farmers, with close supervision from the CARE forestry field staff. This involves frequent travel to and from the project areas many of which have no roads at all. It is to be expected, therefore, that the project vehicles will be subjected to considerable wear

REQUEST FOR PROCUREMENT SOURCE/ORIGIN WAIVER

and tear, and will have to be well maintained on a rigorously regular basis in order to assure necessary longevity. No repair facilities or any spare parts facilities for American vehicles exist in the project area. The CDO/N, after taking a survey of local car dealers and spare parts availability for U.S. vehicles, concluded that the present vehicular capacity either in-house or locally is inadequate to permit the timely maintenance and repair service for U.S. vehicles. American manufactured vehicles therefore could not be maintained in the project area and would quickly become useless. Further, representatives of the United States auto industry have confirmed to A.I.D. their inability to enter the sales and repair market in Sahelian countries. CARE has selected the Land Rover as the vehicle which can: (1) perform well under local conditions; (2) is economical to operate; (3) carry both passengers plus cargo, and (4) spare parts and services are available locally.

Primary Justification: It is essential for the effective implementation of the CARE OPG project in Chad to have foreign made vehicles which can be repaired, operated and serviced locally.

Recommendation: For the reasons stated above, that you determine that special circumstances exist at this time that warrant the procurement of non-United States manufactured vehicles and that you certify that exclusion of procurement from the sources requested herein would seriously impede attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program.

Project Title: ACACIA ALBIDA EXPANSION PROJECT Total OPG  
(A Project for the Restoration of Grain Fields) Request:  
Project Location: REPUBLIC OF TCHAD (CHAD) US\$1,080,110  
Sponsor Name and Location: CARE-Chad, B.P. 106, during the  
N'Djamena, Chad period FY76-79  
Central Headquarters: CARE, Inc., 660 First  
Avenue, New York,  
New York 10016  
Contact Person: Leo Pastore or Ralph Devone  
at Central Headquarters  
Date of Submission to A.I.D.: \_\_\_\_\_

#### Project Purpose and Description

This project is designed to benefit small farmers through concentrated plantings of Acacia Albida trees and other trees which will:

- a) Increase soil fertility and crop yields,
- b) Reduce the effects of wind erosion,
- c) Establish live fencing to protect fields against browsing by goats and cattle, and
- d) Provide a regular source of firewood (with limited cash crop value).

The targets for the project are as follows:

1. 3,500 hectares planted with Acacia Albida, 10m x 10m. With a 15% factor for loss a total nursery stock of 402,500 trees will be required.
2. 122,500 meters of live fencing using Comiphora trees, 6 to the meter, or a total of 735,000 trees. These will be planted from cuttings and replaced if they do not take.
3. 105,000 meters of wind breaks and firewood using Neem trees planted one tree every two meters. With a 15% factor for loss a total nursery stock of 60,375 trees will be required.
4. 1,750 rural farmers and 10,500 dependents will be reached as the average Chadian farm is just under 2 hectares in size.

The targets are broken down per fiscal year as follows:

FY	Acacia Albida		Comiphora Fencing		Neem for WB & FW		Beneficiaries	
	ha.	Trees	Meters	Trees	Meters	Trees	Farmers	Dependents
76	500	57,500	17,500	105,000	15,000	8,625	250	1,500
77	1,000	115,000	35,000	210,000	30,000	17,250	500	3,000
78	1,000	115,000	35,000	210,000	30,000	17,250	500	3,000
79	1,000	115,000	35,000	210,000	30,000	17,250	500	3,000
T.	3,500	402,500	122,500	735,000	105,000	60,375	1,750	10,500

The Acacia Albida is a tree which complements grain production in a manner which has no equivalent in U.S. agricultural practices. For both physical and chemical reasons, grain crops grown in its proximity produce up to twice as much grain, or more, as those planted in the open.

Physically, the Acacia Albida is a large tree with a crown like an oak. It is relatively slow growing during the first five or six years, but if properly managed and protected from browsing animals and from the hoe, it grows quickly after releasing and it can be expected to provide full benefits in less than ten years.

The characteristic which allows it to benefit the grain crops is the defoliation of its leaves at the onset of the planting season. Thus, when the rains come and all other trees gain foliage, the Acacia Albida has none and allows sunlight to pass through and the grain to grow. It therefore affords the soil and grain microclimatic amelioration. The ground temperature is several degrees cooler, trans-evaporation is decreased, and the impact of the raindrop, recognized to be the leading factor in soil erosion, is much lessened.

All other aspects of the project are primarily designed to ensure that the Acacia Albida trees will not be lost, either to wind erosion, browsing, or for use as firewood.

## II. Project Background

The Acacia Albida has been planted in the Sahel for at least 25 years, principally in Senegal and Niger. In the last two years over 1,000 hectares have been planted in Niger in a project financed by USAID (Project Number 683-170-I-A) with a survival rate averaging 85%. The Acacia Albida is not a difficult tree to propagate; however, it does not grow quickly.

Simply stated, this project focuses known resources and tested techniques on the problem of the deteriorating condition of the Sahelian grain fields, and proposes to effect a reversal of this condition. The techniques are simple and most of the equipment required in the initial years can be eliminated once farmers take the initiative to implement the various conservation measures involved.

It is well known by sahelian farmers that the grain planted under an Acacia Albida tree will produce better than that planted in the open. Exact studies of the benefits to the soil derived from the tree have been made in Senegal and Nigeria.

Chemically, the organic matter produced from these trees when planted 10m x 10m has been equated to the following by the French Tropical Research Station in Senegal (I.R.A.T.):

- Artificial fertilizer = 50 to 60 metric tons/hectar (which is equal to 300 kgs. of Nitrogen)
- Potassium Chloride = 50 k./ha. (24 kg. of Potassium)
- Phosphates = 80 kg./ha. (31 kg. of  $P_2O_5$  soluble and 25 kg. of Ca.)
- Dolomites = 125 kg./ha. (15 kg. of Mg. and 25 kg. of Ca.)
- Lime = 100 kg./ha. (43 kg. of Ca.)

The following improvements have been found in the soil properties in the immediate area of an albida: 7% increase in clay (organic material being rare in the sahelian sands), 134% increase in retention of assimilable phosphorous, 60% increase in total carbon, 43% increase in capacity of moisture retention,

100% increase in total Nitrogen, 100% increase in the rate of exchangeable calcium, and 70% increase in the rate of exchangeable magnesium.

The nitrogen-producing leaves from the *Acacia Albida* when planted 10m x 10m will produce per hectare, when grown, the equivalent in nitrogen of 17 forty kilo sacks of commercial fertilizer now selling in N'Djamena (May, 1975) at US\$13.50 per bag (21 Nitrogen, 14 Phosphoric Oxide, 11 Potash, 5 Sulphur, and 1.8 Boron).

However, for the farmer, it is enough to see the difference in the crops. A good example of the effects of the *Acacia Albida* can be seen in the Arrondissements of Matameye and Magaria in Niger where the farming land has full grown *Acacia Albida* trees. This area has yearly rains of less than 500 mm compared to the average in the N'Djamena area of 700 mm, and yet it continued to produce a surplus of grain even during the drought.

The preferred method of farming in Chad is to crop a piece of land until it no longer produces and then to leave it behind and to go and clear another field. This practice continues where the land is available. In areas where there is no abundant supply of arable land, particularly in the more northern areas, farmers are required to stay on the same pieces of land and make the best of it with the resultant diminishing returns for their labors. In times of drought the returns diminish to a disasterously low level. In short, the land that once produced a surplus produced only marginally in average years and in drought years did not produce enough to feed the family.

Thus, the time has come to popularize the use of the *Acacia Albida* tree as well as wind break plantings (used for firewood as well). The major breakthrough will come in the change of concept on the part of the farmers when they feel that they can control the quantity their fields produce as a result of these conservation factors.

The same is true for the wind break plantings which also will be used as a source of firewood. In many areas of the country, women go for miles a day to gather small twigs for firewood.

The idea of planting and managing local stands of firewood has been encouraged by the Forestry Division of the Ministry of Agriculture for at least 8 years. There was no individual farmer involvement until the Forestry Division harvested a stand and obtained a good profit. More concrete examples must be given, ones in which the farmers themselves participate.

The Acacia Albida needs to be started, i.e. planted, and then protected. The protection includes both from the browsing from animals, and from herders who often cut down mature trees to allow their animals to graze on the leaves, as well as protection from the hoe. Clearing and cultivation take a heavy toll of young seedlings as the farmer cannot see the small trees in the grass.

The Acacia Albida does well in cultivated fields and poorly in grasslands and natural tree stands. One reason may be that it is widely propagated by animals which eat the fruit and defecate the hard undigested seeds. Often these animals are bedded down in open fields. Another reason seems to be that uncultivated fields in the sahel are often hard and the root of the Acacia Albida may have a more difficult time than in the softer cultivated fields. Competition is also a factor. In uncleared fields the young trees must compete with other trees.

Mike McGahuey, CARE's Field Representative assigned to the project, has worked four years in Niger on three projects:

1. Acacia Albida Propagation
2. Village Wood Supply
3. Village Market Shade Trees

In addition, CARE-Chad has undertaken a pilot project during fiscal year 1975 involving 50 hectares, 25 farmers and their 150 dependents, 5,750 Acacia Albida trees, 1,750 meters of live fencing involving 10,500 comiphora trees, and 1,500 meters of wind breaks involving 863 Neem trees. Thus, each area of the proposed project has been tested during fiscal year 1975 to assure that the targets for the larger project are realistic.

The experience gained leads to the following conclusions:

1. Constant field participation by the project managers is required.
2. Particularly when working with farmers who have marginal energy reserves for "new" ideas, the materials must arrive on time.
3. Constant dialogue is required. Farmers generally have their own views and wish to be heard. Some of these ideas are valuable and can be incorporated into the project. In this way, the farmer feels the project belongs to him.

The Forestry Division of the Ministry of Agriculture has planted a token number of *Acacia Albida* in previous years. Through this experience the Government of Chad approached CARE for help in expanding the project to reach farmers in villages as their experience to date had been in the area of demonstrations.

Based upon the success of this project the Government of Chad will look for ways of expanding the project to new areas.

### III. Project Analysis

- A. Chad's poverty is rooted in the low productivity of the agricultural sector, partly caused by poor soil and the climate. This sector contains the bulk of the population and produces 32% of the GDP. Accordingly, Chad's development efforts should be concentrated on raising rural productivity to alleviate poverty, and more particularly, on making full use of the under-employed labor force.

The country's foremost staple crops are millet and sorghum, the basis of the cereal diet of both cultivators and nomads. Grown principally for subsistence use, these two crops in 1970 occupied an estimated 15 to 20% of all cultivated agricultural land and contributed at least 12% of the gross domestic product (GDP). Millet is grown everywhere outside the desert zone, which has been encroaching south of 16°N, and is also cultivated on the oases within the northern desert zone.

The two cereals are always lumped together in the statistics, and the terms millet and sorghum are sometimes used interchangeably for certain varieties, so that it is difficult to make a clear distinction. Fine pennisetum millet is cultivated north of 12°N wherever there are light sandy soils and an annual rainfall of between 11 and 13 inches. It is the principal crop in the Sahelian zone. In fact, it is the only crop that can be grown in areas with less than 17 inches of rainfall. It is also grown in the south, wherever soils are too light for good sorghum yields. Bottom-land sorghum, known locally as berbéré, is grown in the dry season between 11°N and 13°N on clay soils that have been flooded during the rainy season. Red and white sorghums (also known as coarse millet) are grown in the rainy season in association with cotton culture as far north as 12°N. In parts of Mayo-Kebbi they were alternated with cotton without fallow, but elsewhere they are usually planted second or third in rotation with cotton. They require at least 27 inches of rainfall.

Statistical data on millet and sorghum production are rough estimates since no attempt has been made to undertake a sample survey of acreage in the northern, central, or eastern regions. Surveys in the five southernmost prefectures reveal that earlier estimates had been on the high side. This may have been one factor in the apparent decline in millet and sorghum production since the mid-1950s. It was thought, however, that subsistence food crop production actually has declined somewhat. Among other factors, official programs for increased production of industrial crops, such as cotton and peanuts, may have cut into food crop production since the area that could be cultivated by any one family is quite limited.

Millet and sorghum are essentially subsistence crops, used for the home preparation of boule, the stiff gruel that forms the base of most meals. It is prepared with peanut oil and served two or three times a day with milk or with a sauce of vegetables and meat. Millet is also used in the brewing of several varieties of beer. One government source estimates that about one-third of the annual crop is used for beer, and

one-third is sold or exchanged. Sedentary cultivators often exchange a portion of their crop with the nomads for salt or animal products. The internal demand is usually so strong that no price-support measures are necessary.

Millet and sorghum are not only the preferred diet of most of the population but they are nutritionally superior to most alternative cereal grains, notably rice. They require a drier environment than either rice or wheat, however, and are therefore not suitable for the area where heavy investment is being made in increased production of rice, wheat and corn.

The average per capita consumption of millet and sorghum is estimated to be 260 kilograms a year, in food and beer. At this rate it is calculated that the requirement for the country as a whole should increase by about 15,000 metric tons a year.

Millet and sorghum producing in 1969/1970 was officially estimated at some 651,000 tons, most of which was consumed by producers and the rest marketed. Output is believed to have exceeded this level in good rainfall years. In the drought year 1970/71, output fell to 610,000 tons and in 1971/72 to 600,000 tons. Supplies were inadequate for domestic needs and foreign aid agencies shipped in grain. Small quantities of wheat (about 6,000 tons) are produced in the Bol polde area of Lake Chad, most of which is exported illegally across the Lake to Nigeria, in view of the low purchase price in Chad compared with the high cost of overland transportation to N'Djamena.

The market for millet is fragmented and disorganized. The small merchants who dominate the trade give credit on unfavorable terms to farmers to purchase necessities during the year. At the time of harvest, farmers receive extremely low prices, from CFA francs 50 per kilo in good crop years to CFA francs 30 in bad. On the other hand, the consumer price in N'Djamena ranges from CFAF 20 to CFAF80 per kilo. As producing zones are relatively isolated by lack of transport and communication, there are wide disparities between grain prices in different regions.

The per capita GNP was estimated at US\$80 in 1971, including non-monetary subsistence income which accounts for 35% of the total. Income is poorly distributed. It is hoped that the beneficiaries reached will be able to increase their ~~\_\_\_\_\_~~. The improvement in income levels of the beneficiaries directly involved in the project will in turn have a positive effect on the economy of the entire village. Similarly, it is hoped that the example set will encourage other small farmers to plant the Acacia Albida trees on their lands.

The current average cereal yield for a field which is not planted with the Acacia Albida is ~~\_\_\_\_\_~~. Our target is to increase production in ~~\_\_\_\_\_~~ fields by 50%, or an average of ~~\_\_\_\_\_~~. (The Centre Technique Forestier Tropical in Niger reports gains of 183% when conditions are ideal. On an average, a gain of 50% is realistic). This will increase farmer income by the same percentage.

Perhaps even more important than the economic gains to be derived from an increase ~~\_\_\_\_\_~~ in production is the ability ~~\_\_\_\_\_~~. Each hectare producing 375 kilos of additional grain will allow 2.5 people to receive a ration of 152 kilos of cereals per year, providing 70% of the average energy supply of 2,170 calories per day for the entire year. When all 3,500 hectares are planted and producing at the higher level, a total of 1,312,500 additional kilos of grain will be produced providing 8,635 people with the ration outlined above.

- B. Very simple tree-planting techniques requiring only small hand tools such as a shovel and a wheelbarrow are needed for this project. The nursery operations require a knowledge of basic gardening techniques and equipment such as plastic planting pots, watering cans, and shovels. All other requirements such as protective fencing from animals can be supplied locally. Some barbed wire will be purchased and wooden poles for fencing. These can be found locally.

CARE has assigned to the project a Field Representative with experience in a similar project in Niger. The Ministry of Agriculture's Forestry Division is staffed by Chadian personnel qualified by their experience as well as expatriate advisors. The project managers will have three essential roles:

1. Getting the supplies to the sites on time;
2. Supplying the basic technological assistance; and
3. Showing presence in the field at all times.

This latter duty is perhaps the most important. The primary limiting factor is the distance between sites and the number of sites as regards management personnel available to the project.

~~\_\_\_\_\_~~  
~~\_\_\_\_\_ of the Ministry~~  
~~\_\_\_\_\_ to participate in this project.~~

- C. With such a large share of the active population living at subsistence level and organized in traditional cultural patterns, a development strategy for Chad will have to be based on extensive knowledge of the rural population and the processes of change. This project is directed to the level of the subsistence farmer, using a tree, the *Acacia Albida*, which he has always known. As so much of the farm work is conducted by women in Chad, this project will enhance the income levels of rural farm women as well as the men.

This project strengthens the Ministry of Agriculture's efforts to reach the poorest segments of the rural population.

- D. The project will benefit a total of 1,750 small Chadian farmers and 10,500 dependents. Few projects undertaken in Chad have such a direct grass roots effect.

The Ministry of Agriculture has an extension service which is engaged in general agricultural promotion, as well as an organization of rural development (ONDAR).

The project can be duplicated easily by other farmers once they begin to realize the benefits of protecting the *Acacia Albida* tree. Once the concept is well established and the Chadian economy improves significantly, the project can be taken over entirely by the Forestry Division of the Ministry of Agriculture.

E. The project is based upon a low level of technology and a lot of common sense. At the present time few if any soil conservation measures are practiced. Generally, when a field no longer produces a good stand of grain, the farmer moves on to a new site, clears it and plants it. This site will be used until it, like the former site, no longer produces a good stand of grain.

By interplanting the Acacia Albida, a species often protected by the farmer lucky enough to have one in his field, the soil will be naturally fertilized and somewhat protected from the desiccating effects of nature, erosion from rain and scorching from the sun. Thus, the Acacia Albida is a local tree species whose value is generally known and which is ~~now protected by~~ ~~the farmer~~. It is not found everywhere because it is generally found only in cultivated fields, where its seeds propagate better but where it comes under the danger of the hoe and clearing by burning. The primary training that will be done in this project is to show farmers a method to propagate and protect this tree species and thereby increase the fertility of their fields. Intensive field work will be needed but no hard-to-grasp concepts are involved.

Similarly, the need for firewood is fundamental to rural Chadian life, with well established markets for the wood as well as the charcoal made from it.

The Ministry of Agriculture's Forestry Division knows the value of this tree and has been encouraging its planting for the past three years. Because of its lack of resources, the efforts to date have been experimental and have not been directed to the general field application.

Government counterparts are assigned to this project and budgeted for accordingly.

#### IV. Project Design and Implementation

The design and implementation components of this project have been selected considering the following factors:

1. The characteristics of the farmers to be served and the nature of their needs.

2. The resources available to these farmers.
3. The calibre of the Forestry Division's Extension Agents.
4. The resources available to these Extension Agents.
5. The nature and strength of support and direction given these agents.
6. The extent to which various infrastructures exist -- for staff development, input supplies, transportation, etc.
7. State of development of the area.

In reviewing the information gathered on the seven points listed above, it has been concluded that agricultural extension services have been most successful in Chad when the extension workers have a clear picture of their objectives, priorities and daily tasks. In short, they have been successful when associated with well-managed integrated projects where the agents have specific tasks to perform.

In the past there has been a tendency on the part of the individual extension workers and the whole extension service system in Chad to concentrate on the bigger and more progressive farmers, who can expand production most quickly. These more affluent farmers do not always require the help of an extension agent to adopt an attractive new technology, accompanied by incentives and other favorable conditions.

Therefore, it is more to the point to focus extension efforts on the less affluent but progressive small farmers who really do need the help.

This project creates a management structure in which the Chadian extension agents can function efficiently, reaching the smaller farmers in a way that provides these farmers with new tools and knowledge and which contributes directly to local development. It is a project which offers encouragement, direction, and material assistance to small progressive farmers and involves non-formal education -- "learn by doing".

Each farmer will receive a hand axe, hammer, shovel, cutter mattock and handle, and cutlass. In this way he will have the tools he needs to prepare the pickets, put the barbed wire around the stakes, clear the land and protect the young trees.

Nurserymen will be provided with wheelbarrows, shovels, plastic nursery bags and other materials as might be necessary so that they can complete the tasks expected of them.

The Forestry Division Engineers will be provided with a Contractors Transit Level and accessories, fuel and other support in order to enable them to become action oriented in the field.

Moreover, all of these people will be prodded and guided daily by CARE's project manager.

#### Implementation Schedule

FY 76: 500 ha = 50,000 Acacia Albida  
= 25,000 Neems = 50,000 m. of Wind-Break  
= 5,000 m. of Coniphora africana as live-fencing  
250 Participating Farmers  
= 10 Participating Villages  
= 15 Villages to be Contacted  
= 20 Farmer Supervisors from Villages

#### July, 75

- Contact Eaux et Forêt and National Level Officials to
  - 1) Obtain approval,
  - 2) Set up counterparts and other local participation, and
  - 3) Obtain a list of potential sites.
- Order planting pots and other nursery equipment
- Order well equipment for two wells
- Contact F.D.R. for two small-diameter wells for nurseries.

#### August, 75

- Contact local officials: Prefets, Sous-Prefets, Sultans, etc.
- Technical feasibility trips to determine if sites are acceptable to albida, and if sites need albida.

#### October, 75

- Skeleton crew and technical agents of E&F to visit village for discussions with villagers on the project. This will require an advanced trip to set up dates of trips with local officials.
- Choose sites after visiting with various villages and consulting with officials.
- After the sites are chosen, choose two nursery sites.
- Begin wells at each site.

November, 75

- Set up nursery and begin preliminary operations - all pots and materials must be on hand.

December, 75

- Nursery set-ups and preliminary operations.
- Seed collection and storage.

January, 76

- 15 January: Begin seeding Neems.
- Nursery operations; watering, weeding, pruning.

February, 76

- Nursery operations for Neems.
- Collect Acacia Albida seeds, treat and store

March, 76

- Live-fencing to begin
- Nursery operations for Neems.

April, 76

- Live-fencing
- Cut pickets
- Lay out fields
- Choose and begin training of Farmer Supervisors (for both lay out and planting)
- Nursery operations begin for Acacia Albida.

May, 76

- Lay out fields
- Training of Farm Supervisors
- Nursery operations

June, 76

- Transport of seedlings from central nurseries to villages to be maintained by farmers until time to plant out.
- Lay out fields
- Set up 'home' nurseries
- Begin transport of seedlings from village to field by donkey.
- Take inventory of nursery supplies.

July, 76

- Transport of seedlings to fields
- Planting operations

August, 76

- Replace dead stock
- Survey results

September, 76

- Survey results
- Maintenance operations

October, November

- Dead-fencing operations
- Survey results

December, 76

- Continue to make surveys
- Stipends to be paid

April, 77

- Continue to make surveys
- Stipends to be paid

Maintenance is to continue for two calendar years from date of planting.

All other planting cycles to follow the above with the following critical data:

Critical Data for FYs 77, 78, 79

1,000 ha. = 100,000 Acacia Albida  
          = 50,000 Neems  
          = 15,000 m. of Coniphora africana

500 Participating Farmers

= 20 Participating Villages  
= 30 Villages to be Contacted  
= 40 Farmer Supervisors from Villages

Technical Specifications for 1975

I. Plantings

- A. Acacia Albida at 10 meters spacing inside of field
- B. Neems as wind breaks where needed; spaced at four meters in two rows.

## II. Division of Responsibility

- A. Labor: Individual farmers will be responsible for all operations in their respective fields.
- B. Technical Survey. Forestry Division and CARE personnel will be present at all stages of preparation, planting and replacement as well as visit the sites as often as possible during the maintenance period to offer technical assistance.
- C. Logistics: For transport of all supplies and seedlings as well as for tours taken by the Forestry Division and CARE personnel, CARE will provide the vehicle and/or fuel.
- D. Accounting: CARE will be responsible to do an accounting of all expenses.

## III. Conditions of the Agreement

- A. The fields must belong to a farmer and not to an association or business or absentee.
- B. The fields must be employed for the most part for grain.

## IV. Remuneration Schedule

- A. Food-for-Work
  - 1. Grain (millet or wheat) = one bowl per man-day
  - 2. Biscuits - 1 can per man-day
  - 3. Carbohydrate Supplements -  $\frac{1}{2}$  kilo/day
- B. Cash to Participating Farmer
  - 1. 1 fr./picket cut
  - 2. 1 fr./picket set
  - 3. 5 frs./planting of tree
  - 4. 3 frs./erection of dead-fencing around each tree
  - 5. 5 frs./tree verified living in December
  - 6. 5 frs./tree verified living in April, 1976
- C. Cash to Farmer Supervisor
  - 1. 2 frs./picket set out
  - 2. 2 frs./planting of tree

LOGICAL FRAMEWORK MATRIX

SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	IMPORTANT ASSUMPTIONS
<p>A.1. GOAL</p> <ul style="list-style-type: none"> <li>- Increase food supply and protection of the soil.</li> </ul>	<p>A.2.</p> <ul style="list-style-type: none"> <li>- There will be an increase in the available food supply in those areas where the project is located.</li> </ul>	<p>A.3.</p> <ul style="list-style-type: none"> <li>- The Chadian Government policy will continue to be directed toward these goals</li> </ul>
<p>B.1. PURPOSE</p> <ul style="list-style-type: none"> <li>- Establish the Acacia Albida tree as a recognized low-cost technology which will produce increased food supply for subsistence farmers.</li> <li>- Establish the concept of cultivating firewood as a domestic crop with concomitant protection of the environment.</li> </ul>	<p>B.2.</p> <ul style="list-style-type: none"> <li>- At the end of this project there will be a lag of 5 years before all of the trees will be fully grown and production indicators can be measured.</li> <li>- Farmers have understood the concept and show willingness to duplicate it on their own.</li> <li>- Forestry Division personnel are becoming field-directed and are willing to work with the small farmers.</li> </ul>	<p>B.3.</p> <ul style="list-style-type: none"> <li>- An integrated low-cost technological package can be adapted to increase the food supply and protect the soil.</li> <li>- Farmers are able and willing to make a minimal immediate investment in anticipation of benefits 5 or 6 years in the future.</li> <li>- The Acacia Albida tree is able to produce the results described.</li> </ul>
<p>C.1. OUTPUTS</p> <ul style="list-style-type: none"> <li>- The number of seedlings produced, both Neem and Acacia Albida</li> <li>- The number of hectares field planted.</li> <li>- The number of meters of Comiphora planted.</li> <li>- The number of farmers reached.</li> </ul>	<p>C.2.</p> <ul style="list-style-type: none"> <li>- 3,500 hectares planted in Acacia Albida, 10m x 10m or 350,000 trees field planted.</li> <li>- 122,500 meters of comiphora fencing have been planted with 735,000 trees.</li> <li>- 105,000 meters of Neem trees for wind breaks and firewood involving 52,500 trees have been field planted and are producing.</li> <li>- 3,500 hectares planted will produce a total of 1,312 additional tons of food (50% gain).</li> <li>- 1,725 farmers reached.</li> </ul>	<p>C.3.</p> <ul style="list-style-type: none"> <li>- Fuel and materials will be available as required.</li> <li>- Vehicles will arrive in Chad on time.</li> <li>- Agreed upon working arrangements with Forestry Division are not altered.</li> <li>- Farmer interest at high level can be maintained until trees are established.</li> </ul>
<p>D.1. INPUTS</p> <ul style="list-style-type: none"> <li>- USAID - Materials and Equipment as well as Personnel &amp; Operations funding and PL 480 (if available)</li> <li>- CARF - Hand tools and other general support as well as</li> </ul>	<p>D.2.</p> <ul style="list-style-type: none"> <li>- See Section V.</li> </ul> <p>D.1. continued</p> <ul style="list-style-type: none"> <li>- privately donated food commodities.</li> <li>- Forestry Division - Nursery facilities, Personnel, vehicles, support.</li> </ul>	<p>D.3.</p> <ul style="list-style-type: none"> <li>- PL 480 Support can be integrated into this project.</li> </ul>

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**NO.** 18

**c. Locally Procured**

<u>Fiscal Year</u>	<u>USAID Funded</u>	<u>CARE GENERATED</u>		<u>Total</u>
		<u>North American CARE Donors</u>	<u>GOC Funded</u>	
1976	\$ 56,572	\$ 1,200	\$ 0	\$ 57,772
1977	96,116	1,320	0	97,436
1978	104,537	1,452	0	105,989
1979	112,434	1,597	0	114,031
<b>TOTALS</b>	<b>\$ 369,719</b>	<b>5,569</b>	<b>\$ 0</b>	<b>\$ 375,288</b>

**4. Other Costs: (See Annexes I, II and III for breakdowns)**

**a. Cost of office, utilities, equipment, etc. (includes Headquarters' Administration).**

<u>Fiscal Year</u>	<u>USAID Funded</u>	<u>CARE GENERATED</u>		<u>Total</u>
		<u>North American CARE Donors</u>	<u>GOC Funded</u>	
1976	\$ 12,265	\$ 4,000	\$ 4,500	\$ 20,765
1977	21,585	4,400	4,950	30,935
1978	23,743	4,840	5,445	34,028
1979	26,117	5,324	5,990	37,431
<b>TOTALS</b>	<b>\$ 83,710</b>	<b>\$ 18,564</b>	<b>\$ 20,885</b>	<b>\$ 123,159</b>

**b. Fuel**

<u>Fiscal Year</u>	<u>USAID Funded</u>	<u>CARE GENERATED</u>		<u>Total</u>
		<u>North American CARE Donors</u>	<u>GOC Funded</u>	
1976	\$ 8,320	\$ 0	\$ 1,500	\$ 9,820
1977	11,660	0	1,650	13,310
1978	12,826	0	1,815	14,641
1979	14,801	0	1,997	16,798
<b>TOTALS</b>	<b>\$47,607</b>	<b>\$ 0</b>	<b>\$ 6,962</b>	<b>\$ 54,569</b>

**c. Transportation Costs (including vehicle purchases)**

<u>Fiscal Year</u>	<u>USAID Funded</u>	<u>CARE GENERATED</u>		<u>Total</u>
		<u>North American CARE Donors</u>	<u>GOC Funded</u>	
1976	\$ 10,800	\$ 0	\$ 3,500	\$ 14,300
1977	11,880	0	3,850	15,730
1978	0	0	4,235	4,235
1979	0	0	4,659	4,659
<b>TOTALS</b>	<b>\$ 22,680</b>	<b>\$ 0</b>	<b>\$ 16,244</b>	<b>\$ 38,924</b>

**d. Other Support Costs**

Fiscal Year	USAID Funded	CARE GENERATED		Total
		North American CAPE Donors	COC Funded	
1976	\$ 13,225	\$ 2,000	\$ 3,200	\$ 18,425
1977	42,450	2,200	3,520	48,170
1978	61,200	2,420	3,872	67,492
1979	69,600	2,662	4,259	76,521
<b>TOTALS</b>	<b>\$ 186,475</b>	<b>\$ 9,282</b>	<b>\$ 14,851</b>	<b>\$ 210,608</b>

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GRAND TOTAL ,  
for Items 1 to 4    \$1,080,110    \$187,583    \$ 94,994    \$1,362,687

**5. Cost Benefit Ratios**

**a. Total cost of project from all funding sources:**

\$1,362,687

**b. Inputs and Percentages of Inputs**

USAID -- \$1,080,110 -- 79%

CARE -- 187,583 -- 14%

COC -- 94,994 -- 7%

**c. Cost per Tree**

(1) All Trees

402,500 Acacia Albida

735,000 Comiphora

60,375 Neem

1,197,375 Trees    \$1.14

2) Acacia Albida Field Planted Only

350,000 Acacia Albida Trees    \$4.77

**d. Cost Per Direct Beneficiary**

1,750 farmers

10,500 dependents

12,250    \$111.24

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**NO.** 21-37

Attachment I.

Translation of the letter from the Ministry of Waters, Forests,  
Fishing and Hunting to the Director of CARE-Chad, dated March  
19, 1975 No. 183/EF.P-C.

For the attention of Mr. Mike McGahuey

In the fight against the effects of the drought, the Forestry Service has been trying for more than a year to help the people in the affected areas but in vain, because of the simple fact that it does not have the means to do so.

For this reason and following our meetings of the 17th and 18th of this month, I have the honor to ask you to step in with sources of American financing to help us to:

- Carry out reforestation (the Taungya Method), using Acacia Albida trees, in the food-crop producing fields in order to raise the crop yield.
- Make the farmer himself participate in the tree policy.
- Set up wind-breaks to prevent the encroachment by sand onto the field and wind damage to the crops.
- Plant live fencing around the fields.
- Dig wells for the irrigation of the planted trees, etc.

This program which is, as you know of utmost importance, has already been successful in Niger through your help, and could now be undertaken in Chad where the ecosystems are similar to the above-mentioned neighbouring country.

Hoping to receive from you a prompt, favorable reply, I remain

Yours truly

El Hadj Malick Sow  
Director of Waters, Forests,  
Fishing and Hunting

E.P. 100  
REPUBLIQUE DU TCHAD

Unité - Travail - Progrès

MINISTRE DES EAUX, FORETS, PECHES  
ET CHASSES, PARCS NATIONAUX  
ET RESERVES DE FAUNE

N'Djamena, le 10 Mars 1975

DIRECTION DES EAUX,  
FORETS, PECHES ET CHASSES

Le Directeur des Eaux Forêts Pêches et Chasses

Service de \_\_\_\_\_

Monsieur le Directeur de CARL-TCHAD  
A l'attention de Monsieur MIKE MC GIBNEY  
Directeur Adjoint CARL-TCHAD BP. 106

N° 113 /E.F.P.C.

à N'DJAMENA

Dans le cadre de la lutte contre les effets de la Secheresse, le Service Forestier cherche depuis plus d'un an à venir en aide aux paysans des zones concernées mais en vain, ceci par le simple fait qu'il manque des moyens.

A cet effet et dans suite à nos entretiens les 17 et 18 courant, j'ai l'honneur de vous adresser l'information relative aux offres de financement Americaines pour vous aider à:

- Réaliser dans les champs de culture vivrières les reboisements (Moringa, Toumoré) en Acacia allié en vue d'augmenter le rendement des récoltes.
- Faire participer le paysan à la politique de l'arbre.
- Constituer des brise-vent pour empêcher l'envasement des champs par le sable et la coulure des cultures (pépinières).
- Planter les haies vives autour des champs.
- Créer des puits sur l'arrosage des zones plantées etc...

Ce programme dont l'importance ne s'est jamais vue, a été déjà réussi au Niger par vos services et pourrait avec intérêt être entrepris au Tchad dont les Acoustèmes ressemblent à ceux du pays voisin précité.

.../...

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- 2 -

En attendant de recevoir de vous une prompte suite favorable,  
je vous prie de croire M. le Directeur, à ma considération dis-  
tinguée, -

LE DIRECTEUR DES BUREAUX POSTES ET CHASSES

  
*L. H. L. LICK*  
L. H. L. LICK 30

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