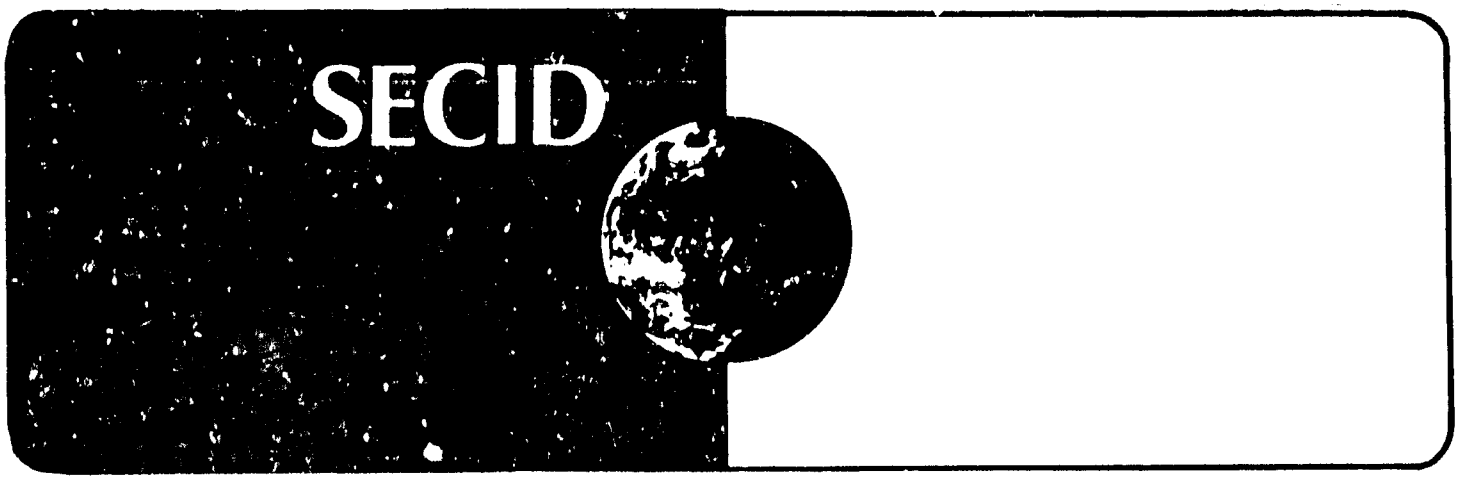

The South-East Consortium for International Development

Technical Support to Mission
AFR-0510-I-00-4007-00
Work Order No. 18
Cameroon

400 Eastowne Drive • Suite 207 • Chapel Hill • North Carolina 27514

Mid-Term Evaluation
North Cameroon Seed Multiplication Project
Phase II, No. 631-0023
Work Order #18
July, 1986

Submitted by:

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Contract No. AFR-0510-I-00-4007-00

MID-TERM EVALUATION

OF

THE NORTH CAMEROON SEED MULTIPLICATION PROJECT
PHASE II No. 631-0023

Submitted by:
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July 28, 1986
Yaounde, Cameroon.

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While the team acknowledges the support and cooperation from several individuals and agencies, none of the above mentioned should be held responsible for anything stated in this evaluation report. The evaluation team takes full responsibility for the report.

ABBREVIATIONS AND ACRONYMS USED IN THIS REPORT

Organizations

CPJA	Training Center for Young Agriculturalists
CNP	Northern Province Rural Development Project - World Bank
DAC	Development Assistance Corporation
DAI	Development Alternatives Incorporated
DHS	Deloitte, Haskins & Sells
FONADER	Fonds National pour le Development Rural
GAM	Modern Agricultural Farmer's Groups
IITA	International Institute for Tropical Agriculture
IRA	Institute for Agronomic Research
ISTA	International Seed Testing Association
MIDEVIV	Seed and Food Development Authority
MINAGRI	Ministry of Agriculture
MSU	Mississippi State University
NCSMP	North Cameroon Seed Multiplication Project
PROSEM	Projet Semencier
PVO	Private Voluntary Organization
SECID	Southeastern Consortium for International Development
SEMRY	Rice Development Society
SODEBLE	Wheat Development Society
SODECOTON	Cotton Development Society
USAID	United States Agency for International Development

FINAL DRAFT

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MAJOR RECOMMENDATIONS

1. A high priority should be given to the use of contract growers for the final stages of commercial seed multiplication.

2. Redefine project objectives to reflect the following:
   (a) Supply of breeder peanut seed from IRA should be reduced to 100 kilograms.

   (b) Projected crop yields of farmers

   (c) Number of beneficiaries to reflect the current project area.

   (d) Projected increment of farmers income to reflect the projected yield estimated in (b) and realistic price trends of cereals.

   (e) The cold storage unit be separated from the current construction package so that the prefabricated cold storage unit can be ordered and installed immediately.

3. Since the long-term training component managed by DAC is just finishing its second year, the DAC headquarters should make an analysis of the actual training cost reflecting changes in school fees, allowances, airfares, etc., both by trainees and schools.

4. MIDEVIV/PROSEM and USAID Cameroon/DAC should assume a leadership role in developing a strong spirit of cooperation with participating agencies and projects since the responsibility of seed development is entrusted to them by the Government of Cameroon.

5. Request that a short-term seed processing engineer to write building and equipment (Seed Processing Plant) specifications following the original design as stated in the Project Paper.

6. DAC immediately develop a training plan for structured in-country and third-country training.

7. DAC should ensure that a Seed Processing Specialist be recruited immediately.

8. The services of the short-term Soil Conservationist/Scientist be provided for the remainder of the technical assistance contract. One option that should be considered is to obtain these services on a full-time basis.

9. The job description of the DAC Agricultural Economist be reviewed and refined to give priorities to marketing and distribution studies, cost analysis, in-service training and short-term training including the training of trainers of extension agents.

10. The Sanguere Seed Farm be operated exclusively for the production of foundation seed.

11. Decrease hectares planted for seed production on Sanguere Seed Farm to 200 hectares.

12. Fully utilize the existing seed testing laboratory at PROSEM, Garoua.

13. Concerning distribution, marketing and pricing aspects of the project, the evaluation team recommends that:

    (a) PROSEM develop a Seed Distribution System and prepare an annual seed distribution plan using projected net production and demand.

    (b) The price of seed be steadily increased (10-20% annually, at least for the first 4-5 years); at full development, a price subsidy (to be phased out in four to five years) is recommended to match the purchasing power of farmers.

    (c) PROSEM create and develop an effective extension service to provide technical support for seeds to agencies and projects that are already reaching farmers directly.

14. USAID Cameroon and MIDEVIV recruit a senior seed management specialist immediately to assist in the implementation of the National Seed Plan.

15. The National Seed Committee should be created as soon as possible to provide policy directions towards the development of a national seed industry.

16. A coordinated agricultural marketing policy should be formulated and implemented to provide incentives for increased production and marketing of food crops, particularly cereals and groundnuts.

I. INTRODUCTION AND PROJECT BACKGROUND

A. Purpose of the Evaluation

In June 1986, the Agency for International Development contracted with SECID to carry out a mid-term evaluation of the North Cameroon Seed Multiplication Project (NCSM) on behalf of the USAID Mission in Cameroon and the Seed and Food Development Authority (MIDEVIV).

According to the contract, the objective of this first formative evaluation of the Phase II project was to:

- Conduct a formative evaluation that will identify North Cameroon Seed Multiplication Project's accomplishments, measure progress, and also identify and evaluate problem areas and constraints which may inhibit the attainment of the project's objectives.

Included in the scope of work (see Annex 1) are the following:

- Assess the validity of the design and original assumptions of the project as defined in the Project Paper and Project Agreement.
- Review whether current activities will lead towards the attainment of project objectives; when necessary, develop new assumptions and objectives that can be attained before project completion.
- Review progress to date in the delivery of project inputs both by USAID Cameroon and the Government of the Republic of Cameroon (GRC), including Technical Assistance, training, and commodities.
- Review project outputs assessing the development of institutional capacities and linkages that will enable the project to be self-sustaining once USAID Cameroon's support ends.
- Assess whether agronomic conditions are being met as to the production and multiplication of high quality seeds.
- Review whether the strategy of producing foundation seed on a mechanized farm with sophisticated equipment can be sustained.
- Evaluate the seed multiplication and processing scheme to identify problem areas and develop alternative ideas and recommendations.
- Examine the marketing aspects of project seeds in terms of production, pricing, distribution systems, demand and supply of seeds, promotional efforts, and extension capabilities.
- Review the economic aspects of the project in terms of project costs and benefits, rate of return, and long-term impacts on small farmers, including women.

It is worth mentioning that the evaluation team considers the scope of work for the mid-evaluation to be broad and most comprehensive requiring the team not only to review and assess the accomplishments and problems of the USAID Cameroon/MIDEVIV project, but also to look into other areas including the National Seed Plan, privatizaton, environmental impacts of the project, the role of women, and the impacts of the project concerning women's access to production inputs, markets, training and income.

While the team considers the stated scope of work to be very essential for an end-of-project evaluation, it is of our opinion that some of these items included in the general scope of work could not be addressed at this stage of the project. Examples include: privatization, project impact on women and their contribution, project inpact on yield and farm income, and the general impact of pricing and marketing policies on agricultural production. The first two years of the Phase II project were wisely used to make the necessary modifications and adjustments in regard to planning, organization, management and improvement of the accounting procedures. Construction of seed laboratories, cold storage, and seed processing plants have yet to be realized. Also, the success of contract seed farming is yet to be seen.

B. Evaluation Procedures and Methodology

Evaluation methodology used was as follows:

- Orientation, background information, and interviews with the USAID Cameroon staff including the Mission Director, Agricultural Development Officer, Deputy Agriculture and Rural Development Officer, ARD Project Officers, and the Agricultural Research Officer.

- A thorough review and analysis of documentation readily available and provided by the Project Officer (USAID Cameroon) and by the DAC team.

- Interviews with all members of the DAC Technical Assistance; review of their project activities.

- Interviews with the Directors of MIDEVIV and PROSEM including their assistants and technicians.

- Interviews with officials from different ministries and government agencies.

- Interviews with contract farmers, SODECOTON farmers and independent farmers.

- Intensive review of project activities at the Sanguere Seed Farm (Garoua). Site visits to Experiment Farms, and IRA at Maroua.

- Frequent review of evaluation activities with the USAID Cameroon Project Officer and the Project Development and Evaluation Officer.

The evaluation team consisted of two Cameroonians and three SECID consultants. They conducted an extensive review of the North Cameroon Seed Multiplication Project, and reviewed the evaluations done by DAI (Development Alternatives Inc.) and Mississippi State University (MSU) from which the North Cameroon Seed Multiplication Project Phase II evolved. They also conducted a series of interviews with management, seed production, harvesting, processing, storage, quality control and marketing as well as others knowledgeable in plant breeding, agronomic research, distribution and agricultural extension. The list of people contacted is presented in Annex 2.

The evaluation team consisted of two Cameroonians - Mr. Emmanuel Njopku from MIDEVIV and Mr. Paul Mbondjon Ngolong from Ministry of Plan and Territorial Development, and three SECID seed consultants consisting of Dr. Menwuyellet Moussie, Agricultural Economist and Team Leader, Dr. Paul Mezynski, Seed Technologist, and Dr. Max Boling, Seed Production Agronomist. The three evaluators have diverse experience in Sub-Sahara Africa having a total of about 25 years of African experience in their respective disciplines.

The team arrived in Cameroon on June 22, 1986. After three days of orientation and background information provided by the Mission, the team left for Garoua on June 26, where the project site is located. After three weeks of project review as to the current project activities, accomplishments to date and problems encountered by the project, the team presented its preliminary findings on July 18 in Garoua before its departure for Yaounde for finalization of the evaluation. A final oral presentation was made to the Mission prior to the team's departure on July 31, 1986. The consulting team submitted three copies of their draft report to USAID Cameroon prior to departure.

II. PROJECT DESIGN

The design of Phase II of the North Cameroon Seed Multiplication Project was a product of the recommendations of two evaluations carried out for Phase I of the project. The first evaluation was carried out in 1978/79 by Development Alternatives Inc. (DAI), while the second was undertaken in 1980 by the Seed Technology Laboratory of Mississippi State University. The other major input that was also used in the designing of the project was a World Bank Staff Appraisal Report on Northern Province Rural Development Project (CNP).

As documented in the Project Paper, the original project design retained some major assumptions, strategies and objectives that are not feasible during the life of the project which are discussed below:

A. Multiple-Step Seed Multiplication by the Farmer*

The evaluation team from Mississippi State University recommended that the final stages of the seed multiplication be done by the farmer. The strategy

*Several stages of multiplication where the final stages of multiplying is done by the farmer.

that was supposed to be followed by the project was to supply a small quantity of foundation seeds to participating farmers, who in turn would multiply the seeds up to the total quantities of seeds required to plant an average food crop area of 1.5 hectares. The farmer would need about four crop years to arrive at the quantity he needs. For instance, using different rates of farmer acceptance, Mississippi State University estimated that 2150 tons of groundnut seed would be required to plant about 108,000 hectares -- an estimated total area planted in groundnuts according to a World Bank study done in 1980. With a multiplier of 10 for groundnuts, Mississippi State University calculated that the farmers would produce 2150 tons of seeds if they were supplied with only 215 tons of seeds from the project. For the other crops, Mississippi State University used different multipliers, ranging from 48 for maize to 100 for millet. Thus, it was using this strategy (Mississippi State University's Seed Demand Multiplication), that the project design came up with a goal of producing 238 tons of foundation seed by North Cameroon Seed Multiplication Project Phase II. From the outset, Mississippi State University's Multiple Step Seed Multiplication strategy was not accepted by PROSEM and SODECOTON* for the following reasons:

- Both organizations believed the production of a high quality seed by farmers could not be assured at this stage of seed development when there is an acute shortage of trained extension agents to help farmers in producing good quality seed. Mississippi State University's recommendation for Multiple Step Seed Multiplication is quite surprising since it was the one which recommended "the elimination of the use of contract farmers insisting that even with the implementation of the package proposed by Development Alternatives Inc. (DAI), quality control would be impossible."

- According to PROSEM, the Multiple Step Seed Multiplication Strategy where the final multiplication is carried out by farmers is a venture too risky to take.

- Mississippi State University assumed that with a 33 percent of farmer acceptance rate, 100 percent of the farmers in the Center-North area would be expected to use improved seeds in only three years. It also assumed that farmers would be able to store until the seeds are renewed with improved varieties. Moreover, there is no adequate infrastructure and network system to cover the whole cultivable area of the region (less the area of cotton) with improved seeds in a matter of three years.

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*SODECOTON is the parastatal organization that is mandated by Government of Cameroon to implement the distribution and extension services of the project.

- The project designers overestimated SODECOTON's extension force and technical ability to distribute food crop seeds to some 163,000 farmers. Even if farmers could store some seeds, the probability of storing seeds keeping the same quality and quantity is very low. Thus, Mississippi State University's assumption that "the source of seed produced by any of the multiplication steps through the seed multiplied by the small farmer is traceable to breeder seed" was an assumption that could not be validated by implementation mainly due to lack of adequate follow-up in the production and storage process of improved seed.

In a developing country like Cameroon where the average annual farm income does not exceed $200.00, it is difficult for the farmer to accept a technology which he has never tried, especially in semi-tropical regions of Africa where erratic climatic conditions occur frequently.

The immediate impact of Mississippi State University's Seed Multiplication Strategy on the project was that the production targets and areas under cultivation at the seed multiplication center of Sanguere Seed Farm and Guetale were estimated using this strategy.

B. Discontinuing Contract Farming

The other major recommendation that Mississippi State University's evaluation team made was the elimination of seed multiplication by contract farmers. The project design retained this recommendation having concluded that the major problem of North Cameroon Seed Multiplication Project Phase I was the production of inferior quality of seed produced by contract farmers. Both the evaluation team and USAID Cameroon overreacted to the effect without examining the major causes of failure. Without analyzing its advantages and disadvantages, Mississippi State University simply recommended discontinuing contract farming just because it did not work in Phase I of the project.

There were many causes why contract farming failed. Among these were lack of adequate infrastructure and logistics, lack of experienced personnel (both technical assistance and national), lack of trained personnel (including technicians and extension agents), lack of adequate equipment, and management problems that lacked coordination to adequately control the seed multiplication steps. Mississippi State University itself addressed the same reasons why inferior quality of seeds were produced. The decision to delete contract farming from seed production strategy restricted PROSEM's ability to meet production goals.

With close supervision and follow-up, high quality seed production by contract farmers has proven to be successful in several countries in terms of cost and risk sharing.

However, contract farmers are willing to participate in cost and risk sharing only if they are assured a reasonable rate of return with some kind of minimum support price for the seeds they produce. This minimum (floor) price

should be at least 40-50 percent higher than the market grain price to cover the additional costs that they incur, plus the risk of producing the new seed. To reduce the costs and risks that the contract farmers may be burdened with, development/extension agencies should improve the distribution and marketing practices through effective credit and pricing system for inputs, provide technical information through extension services, minimum support price, timely delivery and collection of seeds, provision of storage and transportation facilities, and selection of good farmers. This evaluation team believes that USAID Cameroon and Mississippi State University's reservation towards contract farming would be a matter of the past if farmers were carefully selected and encouraged by providing them with the necessary inputs depending on the resource capacity of the project. With the help of the development agencies that are working closely with farmers, PROSEM would be able to identify experienced growers of good food crops. PROSEM should complement the work of those development agencies by providing special technical information for the production of seed crops.

Considering the benefits and risks to be taken, PROSEM and SODECOTON decided to try contract farming this year (1986/1987) by selecting 34 farmers to plant 22 hectares of seed mainly to groundnuts. In spite of Mississippi State University' s recommendation and the Project Design for discontinuation of contract farming, this evaluation team considers PROSEM's decision to link contract farming with SODECOTON as a breakthrough. Credit should be given to PROSEM and the DAC team, particularly to the current Chief of Party who put forth a great effort to give contract farming another try coupled with proper technical guidance and monitoring.

C. Target Zone and Number of Beneficiaries

The North Cameroon Seed Multiplication Project Phase II was designed following a study made by the World Bank on the Northern Province Rural Development Project (CNP) which is financed by the World Bank. The project area officially called the Center-North consists of the Departments of Mayo-Sava, Mayo-Tsanaga, Diamere, Kaele, Mayo-Danay, and Mayo-Loiuti.

The total number of farm holdings in the Center-North project is estimated to be about 207,000 (1980 estimate). With an adoption rate estimated by the World Bank, some 163,000 farm holdings were to benefit from the project at its full development. It is worth noting that this figure is about 70 percent of the total farm holdings in the project area - a proportion of farms that are assumed to adopt the new package of improved agricultural inputs including improved seeds. Project designers accepted these figures in their entirety without further analyzing the expected adoption rate for cereals and groundnuts excluding cotton. Even with the World Bank estimate, the adoption rate for maize and sorghum are very negligible. For groundnuts, the adoption rate is estimated to be between 35 and 40 percent.

Equating World Bank figures for the number of beneficiaries to those of the seed project may not be applicable for the following reasons:

- The World Bank project is an integrated rural development project encompassing a wide variety of improvement in infrastructures, extension and training scheme, and forestry and agricultural production (cash and food crops). This kind of project is zone-oriented and the impacts from some of the above projects can reach the majority of the farm population. Seed multiplication and distribution is a little different since it needs farmers' full acceptance of new seeds. Full acceptance is usually a slow process which develops stage by stage.

- The expected rate of adoption estimated by the World Bank and subsequently retained by the Project Design is very high for cereals and groundnuts. For cotton, a high rate of adoption is expected since the major mandate of SODECOTON for the last 15 years has been to develop intensive cotton production. Also reported in the World Bank assessment are the adoption rates for maize and groundnuts. With a cultivation method of cotton and maize, the adoption rate is less than 13 percent (about 15,000 farmers). For groundnuts, the rate is about 24 percent accounting for 36,000 farmers. The adoption rate for sorghum was not included since SODECOTON is not involved in intensive sorghum production, but it is expected to be much lower than that of maize.

- As mentioned above, SODECOTON has its own mandate to accomplish, i.e., the development of intensified cotton production in Northern Cameroon. Initially, SODECOTON's project was limited to the Center-North. Now, SODECOTON operates in a larger area including part of the Benoue. Even though SODECOTON has shown interest in providing extensive services for food crops, it has literally said that its services will be extended to only those who are currently involved in intensified cotton production. Hence, the majority of small farmers who are not able and/or willing to accept SODECOTON's package could not benefit from the seed project. These farmers are growers of maize, sorghum, and millet which the Government of Cameroon and USAID Cameroon are trying to help by providing improved seeds through SODECOTON, the only agency that has the capability to do so. SODECOTON is now looking to diversify its project activities towards the production of food crops.

D. Economic (Internal) Rate of Return

Given projected yields, adoption rates, expected production increment and projected costs and prices, the internal rate of return was estimated to be 19.5 percent according to the calculation of the World Bank Appraisal Report. The project designers took the Bank's economic cost and benefit analysis of the Northern Province Rural Development Project, added the estimated costs of the seed project, and deducted the expected benefits of cotton.

Even though the ultimate objective of the two projects is to increase farmers' real income, their goal attainment strategies are quite different.

Generally, the Project Design started with a wrong premise - a high rate of farmers' adoption of the improved seeds, thus, overstating the number of beneficiaries; multiplication of seeds by farmers; dependability on SODECOTON to reach all participating farmers without reviewing its conditions and ways of providing extension services; and projection of IRR using external data that is not feasible for this seed project.

E. Environmental Impact

The initial environmental examination (IEE) made in 1981 (Project Paper, Annex E) was negative. There is no evidence at the time of this evaluation to indicate that any change has occurred during project implementation.

Recommendations

1. The evaluation team recommends that the multiple step seed multiplication by farmers be discarded from the Project Design as stated in the Project Paper.

2. A high priority should be given to the use of contract growers for the final stages of commercial seed multiplication.

III. PROJECT OBJECTIVES

The Project Paper and Project Agreement both give "increasing the real income and productivity of 163,000 farm families in the Northern Cameroon", as the overall objective of the NCSM II Project.

According to the Project Paper, the purpose of the project is to create the institutional and infrastructural capability to produce adequate quantities of improved peanut, corn, sorghum, and millet seed for distribution to farmers in the North Province of Cameroon.

The project was to achieve the above objective by means of the following interrelated components:

- Technical assistance within PROSEM and IRA.

- Long and short-term training in the U.S. and third countries for 21 PROSEM/MIDEVIV employees.

- In-service training for 20 employees at the two seed farms, and training of about 7 trainers of extension agents from SODECOTON and MINAGRI which in turn would train about 700 extension agents.

- Upgrading of the Sanguere and Guetale seed multiplication farms by constructing seed processing plants, and machinery repair facilities.

- Construction of a regional seed testing laboratory and a cold storage unit.

- Initiation of coordination and cooperative support from agencies such as the Northern Province Rural Development Project/SODECOTON, IRA, and MINAGRI.

As specified clearly in the Project Paper, the achievement of the goal of increased farm income and productivity will occur when all the above project components are linked together in the seed flow chain from research to the farmer. In other words, if any one of the above inputs/components are not provided, the chance of achieving the project objective is very low.

The project was designed with the assumption that only the Center-North Project, the zone where SODECOTON operates, is the project area for North Cameroon Seed Multiplication Project Phase II. Currently, the project area has expanded only because SODECOTON (PROSEM's major client) has expanded its operations to other areas. In addition, PROSEM is providing seeds to other clients such as the Projet Nord-Est Benoue which covers areas not included in the project design.

The inclusion of sorghum and millet in the project signifies the great interest by the GRC and USAID Cameroon in increased cereals production not only in sub-humid regions (SODECOTON's area) but also in the semi-arid regions of Northern Cameroon where the mainstay of livelihood is in sorghum and millet.

Since SODECOTON's interest lies in profit making and intensive production systems, the production and distribution of sorghum and millet seeds will be subjected to retardation. For example, SODECOTON's demand for improved sorghum seed from PROSEM was insignificant compared to maize and groundnuts. Millet appears to be out of the picture. Thus, if the project is to depend totally on SODECOTON's extension services, one has to conclude that the project is excluding the majority of poor farmers that grow cereals, particularly sorghum and millet. Otherwise, Government of the Republic of Cameroon and USAID Cameroon have to find some alternative ways of reaching those farmers (see the section on recommendations).

The other major component that makes the goal of the project a reality is training of employees at all levels of seed multiplication. Although a number of technicians have gone for long-term training in the U.S., most will return to the farm only a few months before the end of the North Cameroon Seed Multiplication Project Phase II. As far as in-service training is concerned, the only documented and formalized training seen is in the agricultural machinery shop. Also, some computer training is done by the Agricultural Economist. As to the training of trainers of extension agents, nothing has happened to date. This, of course, will have an adverse impact on the progress and accomplishment of the project goals. In order to assist SODECOTON in the effective implementation of the project's extension functions, the project was to utilize technical assistance personnel to develop and conduct a training program for SODECOTON's trainers of extension agents. It is mainly through trained extension agents that farmers may realize the benefits of improved seeds. If this link is not operational and effective, then the whole purpose of seed development may not be realized.

The other major factor specified in the Project Design was the construction of a seed testing laboratory, a cold storage unit, and installation of a seed processing plant. If the achievement of the project is going to be evaluated in terms of these project outputs, there will be a substantial negative impact. The Technical Assistance team (DAC) and the Cameroonians working in the project will, however, be evaluated on their efforts given the constraints over which they have no control.

Recommendations

The evaluation team recommends that the project area be expanded to include areas outside the designated zone of SODECOTON for the remaining life of the project. Farmers who need improved seed cultivars should not be denied because of their exclusion from the SODECOTON zone of operations. Like SODECOTON, there are small organized groups who can distribute seeds to needy farmers.

The purpose of a foundation seed farm is to increase breeder seed to a larger quantity that can be subsequently multiplied further by contract seed producers to provide commercial seed for farmers' use. USAID Cameroon and MIDEVIV should not expect the Sanguere Foundation Seed Farm to be completely self sustaining or ever privatized. The above is true in the developed countries (USA) as well as developing countries. The assumption of a financially self sustaining foundation seed farm is a serious flaw in the project design. Private sector investment could be expected only with the introduction of hybrid varieties of crops, the seed of which must be renewed by the farmer each year. This would provide a financial incentive to the private sector to become involved in seed production.

IV. VERIFIABLE PROJECT INDICATORS

A. Project Goal

The project logical framework (logframe) stated "increasing farmers real income and productivity" as the overall goal toward which the project is to contribute. It also gives a series of criteria by which the project's success in achieving this goal can be objectively measured.

Ideally, the project could be objectively evaluated on the basis of the stated indicators. Unfortunately, little can be said for the achievement of the goal at this stage of the project because of shortcomings in the project's design and assumptions.

For example, the first objective verification criterion stipulates an increase from annual average income of $208 to an annual average of $300 by 1991 to 163,000 participating farmers. In the first place, the evaluation team finds 163,000 to be a high figure derived from 1) an overestimated

adoption (acceptance) rate by farmers, 2) a multiple step seed multiplication system were the final stage of multiplication was assumed to be accomplished by farmers, and 3) full participation of the Northern Province Rural Development Project and SODECOTON to implement the extension part of the project.

Should food production (groundnuts and cereals) ever increase in an appreciable way in Cameroon, it would be difficult to attribute all of the increase to this project. There would be dozens of projects from numerous donors and government agencies that would have contributed in a direct or indirect way. The evaluation team, however, has not come across production statistics that claim any significant increase in the production of cereals and groundnuts.

In the latest SODECOTON production analysis (1985/86), the production of groundnuts in SODECOTON's zone of operation does not show a promising figure. Total production of groundnuts declined from 1517 tons in 1983/84 to only 824 tons in 1985/86. In contrast, production of maize increased from 865 tons to 1005 tons during the same period mainly due to an increase in cultivated area (from 2379 ha in 1983/84 to 5544 ha in 1984/85). If we use a simple calculation, it can be shown that yield has decreased even in areas where SODECOTON is operating intensively.*

Another difficulty in assessing farmers income is the case of prices. Because of the price inelasticity** for cereals, improved productivity and increased production does not necessarily mean higher income to producers of food. In fact, if they are not supported by a minimum price subsidy (improved marketing, storage, and price policy), farmers may be victims of low prices caused by increased production. For example, the market price of cereals in 1985/86 was 50-60 percent lower than last year because of fluctuations in production. Thus, unless the introduction of new or improved seeds are complemented by a combination of agricultural, marketing and price policies, the chance of achieving the goal of increased farm income is small.

B. Project Purpose

In the Project Paper logframe the purpose of the project is "to create an institution that will produce improved sorghum, peanut, corn and millet seed for distribution to farmers." The verifiable indicators for the accomplishment of the purpose listed in the logframe of the Project Paper are given and discussed below.

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* This figure should be interpreted with caution since factors such as weather conditions, changes in area of cultivation, and rotation methods might have a big impact.

** Prices of cereals in developing countries decline significantly as production increases and vice versa.

1) Operation of The Sanguere Seed Farm and the planned Processing Plant

USAID Cameroon decided in 1983 to discontinue USAID financing for the Guetale farm for technical reasons. Therefore, the evaluation team only concentrated on the Sanguere Seed Farm which is comprised of approximately 300 hectares.The scheduled processing plant at Sanguere has not yet been constructed. Since the majority of long-term training of Cameroonian personnel has just started, the Sanguere Seed Farm will require three to four years to adequately staff the farm with trained and skilled personnel.

2) Production of Improved Seed

The verifiable indicator states that "by the end of the project there will be an annual production of improved seed in the following quantities: Peanuts 216 MT; Sorghum 10.5 MT; Corn 10.5 MT; and, Millet 1.3 MT."

The above figures were calculated assuming that the project would follow the Multiple Step Seed Multiplication strategy suggested by Mississippi State University's evaluation team. Because of the shortcomings of the strategy (inadequate quality control, storage problems, inadequate extension services and follow-up, logistics problems, high risk), the project decided to do all the stages of multiplication itself before distribution to farmers. Thus, it was necessary to produce more seeds in its own field.

As shown in Table 1, the project has been producing an average of 166 tons of corn annually for the last three years compared to the logframe's projection of 10.5 tons. With the exception of peanuts and millet, the projected annual production of improved seed will be met in 1986. PROSEM records would be the means of verification rather than IRA records as indicated. Continuous production would depend on no serious breakdown in mechanized seed production and that contract growers can be organized to produce a sufficient quantity of quality seed.

Table 1. PRODUCTION AT SANGUERE FARM

(UNPROCESSED)

1983/84 - 1986/87

CROPS	1983/84			1984/85			1985/86			*1986/87
	Area Planted (ha)	Yield kg/ha	Total Production (tons)	Area Planted (ha)	Yield kg/ha	Total Prod. (tons)	Area Planted (ha)	Yield kg/ha	Total Prod. (tons)	Area Planted (ha)
GROUNDNUTS	62	1820	113	222.5	616	137	112	1256	141	130
MAIZE	47	2987	140	57	2020	115	136	1790	243	140
SORGHUM	1.6	2190	3.5	-	-	-	5	1800	9	10
COWPEAS	3.5	1470	5.1	19	608	11.6	7	1529	10.7	15
TOTAL	114.1			298.5			260			295

*Planned for 1986/87

B. Project Outputs

1) Breeder Seed and a Cold Storage Unit

It was stated in the logframe that by end of the project, IRA has to supply PROSEM with the following quantities of breeder seed: Peanuts 250 kg; Sorghum 200 kg; Corn 300 kg; and Millet 20 kg.

In 1986, PROSEM's documents show that IRA's supply was as follows:

Peanuts	244 kg.
Corn	464 kg.
Sorghum	250 kg.
Cowpeas	100 kg.

Except for millet and peanuts, IRA is on target. A cold storage unit has yet to be constructed in order to store 6,000 kg. of breeder seeds as was stated in the Project Paper. Only a few kilos need to be available so that every 3-5 years the seed multiplication unit may draw upon or go back to the original selection.

2) Seed Processing Plant and Storage Facilities

The project design called for the same amount of processed seeds as stated in the production component without considering the losses incurred while processing. According to DAC's 1985 Annual Report, the processing loss for 1985 was as follows:

Peanuts	13%
Corn	25-50%
Sorghum	30%
Cowpeas	21%

It appears that NCSM/USAID Cameroon cannct reach its objective in the given time-frame relative to an operational seed laboratory, storage, and seed conditioning facilities.

3) Regional Seed Testing Laboratory

One of the project outputs was the construction of a Regional Seed Testing Laboratory in Maroua. Using this laboratory, the project was supposed to test 2500 different seed samples by year 5. The Seed Laboratory has not been constructed. Last year, the project tested only 50 seed samples.

C. Institutional Capacity to Train the Trainers of Extension Agents

The North Cameroon Seed Multiplication Project Phase II was not able to train seven of SODECOTON's technicians who were in turn to train some 700 extension agents. The project was too busy trying to improve the management

and internal organization of the office. SODECOTON has a highly organized extension service, mainly for the production of cotton. They are most interested in a source of improved seed of food crops for their contract growers. Presently, they take an average of 80% of PROSEM production.

A program for training 35 of the extension workers employed by SODECOTON is being organized for November, December 1986. A short-term Extension Advisor will be provided by DAC for the activity.

D. Project Inputs

The major inputs that are listed in the logframe are USAID Cameroon's contribution (both grants and loans) and GRC'S contribution in terms of its commitment to the seed project.

1) USAID-Grant

In order to facilitate the activities of the project, the DAC contract was revised once to reflect the current activities of the project. In addition, the USAID Cameroon budget was officially revised three times during implementation to reflect the needs and priorities of the project.

Of the total grant amount of about $8 million, $3.35 million was spent as of June 30, 1986, leaving $4.7 million to be spent during the remainder of North Cameroon Seed Multiplication Project Phase II, which is scheduled for completion on March 31, 1988.

2) USAID Loan

The USAID Loan of $5.6 million is still intact with only $725,000 committed to Lyon Associates for its Architectural and Engineering services. Of this, only $282,000 has been disbursed.

The remaining $4.87 million has not yet been committed waiting for a decision by USAID Cameroon and Government of the Republic of Cameroon concerning the construction of facilities. Construction activities will be discussed in another section of the evaluation report.

3) Contribution by the Government of Cameroon (GRC)

The evaluation team reviewed the yearly contribution of the Government of Cameroon from 1982/83 to 1985/86. From 1982/83-1984/85, the Government contributed on schedule as originally appropriated. However, the 1985/86 contribution was 95 million FCFA short of the budgeted amount of 510 million FCFA. For 1986/87, the Government appropriated 415 million FCFA, 150 million FCFA short of the budgeted amount.

Generally, the GRC's contribution and schedule of payments are satisfactory but slighly in arrears. In order to accommodate some disbursement inconveniences caused by the coincidence of the planting seasons

and the closing of the Cameroonian fiscal year (June 30), MIDEVIV has been trying to remedy the problem. If this is not corrected immediately, the project may suffer from a shortage of working capital which is much needed for the purchase of fertilizers, chemicals, farm materials, and payment of farr labor.

Recommendation

1. Redefine project objectives to reflect the following:

   a. Supply of breeder peanut seed from IRA should be reduced to 100 kilograms.

   b. Projected crop yields of farmers.

   c. Number of beneficiaries to reflect the current project area.

   d. Projected increment of farmers income to reflect the projected yield estimated in (b) and realistic price trends of cereals.

   e. The cold storage unit be separated from the current construction package so that the prefabricated storage cold storage unit can be ordered and installed immediately.

2. The Government of Cameroon should continue to contribute funds as originally budgeted in the Project Agreement.

3. Since the long-term training component managed by DAC is just finishing its second year, the DAC Headquarters should make an analysis of the actual training cost and prepare a projected training cost following changes in school fees, allowances, airfares, etc., both by trainees and schools.

V. NORTH CAMEROON SEED MULTIPLICATION PROJECT PHASE II RELATIONSHIP WITH OTHE PROJECTS & AGENCIES

It is clearly specified in the Project Design that close coordination, cooperation and constant communication at all levels of implementation must be insured with seed related agencies and projects. It further mentions that "the goal of increasing productivity and rural incomes is mutually shared by North Cameroon Seed Multiplication Project Phase II, the World Bank Northern Province Rural Development Project, MIDEVIV, SODECOTON, IRA-North, and FONADER." There are also other projects that are directly involved in the marketing of seeds such as Nord-Est Benoue, and other small projects run by missionaries and individuals.

During interview sessions with each of the participating organizations, the evaluation team sensed that there is inadequate commitment to cooperate since each agency has its own mandate and responsibilities that may sometimes be contradictory and inconsistent with each other. Relationship of each at the Ministerial Level is shown below:

Agency/Project	Ministry
MIDEVIV/PROSEM	Agriculture
IRA	Higher Ed. and Scientific Research
SODECOTON	Commerce & Industry
FONADER	Agriculture
Office Cerealiers	Commerce & Industry
Karewa Experiment Farm	Plan & Territorial Development
Project Nord-Est Benoue	Plan & Territorial Development

The three major implementing agencies of the project are MIDEVIV/PROSEM, IRA, and SODECOTON. The Government entrusted IRA with the introduction, breeding and selection of varieties, MIDEVIV with the multiplication and production of varieties provided by IRA, and SODECOTON with the distribution of PROSEM's seeds and extension of cultural techniques in its zone of operations.

In order to formalize the relationship and establish institutional linkages, the Project Agreement calls for "firm agreements between IRA and MIDEVIV and between SODECOTON and MIDEVIV within one year from the date of the Agreement" (July 15, 1982). To that effect, Protocol of Agreement was prepared between MIDEVIV and SODECOTON but not signed by SODECOTON. MIDEVIV also signed Protocols with IRA (October 28, 1983) and Project Nord-Est Benoue (July 12, 1984) (see Annex 3 for the Protocols).

The Project Agreement also calls for the establishment of a Regional Variety Release Board consisting of representatives from IRA, MIDEVIV, SODECOTON, SEMRY, and the Ministry of Agriculture. A meeting jointly organized by USAID Cameroon's Project Officer and the Chief of the Project was held on June 3, 1985, to discuss the criteria for the formation of a Variety Release Board. During the meeting, members of the Board were chosen to include representatives from IRA (President), PROSEM (Secretary), SODEBLE, SODECOTON, SEMRY, Nord-Est Benoue, MINAGRI Delegates of Garoua, Ngaoundere, Maroua, and a farmers' representative form each province (see Annex 4). The Board has not met since.

At the national level, a meeting was called by MIDEVIV on June 6, 1986, to formulate criteria for the formation of a National Variety Release Board. The meeting directed by Mr. Abong of MIDEVIV, recommended that MIDEVIV take the responsibility for preparing a working document to be discussed during the next meeting, the date of which was not fixed (see Annex 5).

Thus, except for those initial meetings, MIDEVIV has not taken adequate steps to make the Regional Variety Release Board operational. Since the formation of the Board, two agricultural seasons have passed. Yet, neither IRA nor PROSEM has called for a follow-up meeting. Since there are no other formal contacts and linkages between the researchers (breeders), producers, and users of seeds, the Board should be used effectively as a clearing house for seeds. MIDEVIV/PROSEM, should take the initiative to reassemble the Board to lay out the ground work for an operational Variety Release Board.

PROSEM has been active in making contacts with other agencies. For example, the DAC 1986 Plan of Work was sent to IRA for their review. Several IRA researchers responded with suggestions which were incorporated into the plan. Also, PROSEM has begun attending some of IRA's workshops, seminars and conferences. One problem, that PROSEM and DAC's Technical Assistance team seem to have is a "We can do it alone" mentality. To be autonomous in managing a project is one thing, but avoiding outside assistance and cooperation is something different. The project's mandate is to produce seeds, not to do research. In order to maximize production of quality seeds, the project should not hesitate to ask for help even though it may be too late for the problem to be solved.

Even though the relationship between SODECOTON and PROSEM has yet to be developed as envisioned, PROSEM has recently taken initiatives to make the relationship strong and long lasting. The revival of contract farming through SODECOTON, and the supplier-client relationship between them are positive signs of a relationship mutually agreeable and respected. The major reason that the linkage has not been strengthened is due to the postponement of the training program to train SODECOTON's extension trainers who are supposed to play a major role in implementing the distribution and cultural practices of PROSEM's seeds. Until the training component is accomplished, all project activities cannot be fully achieved. The farmer will accept new technologies only when he is informed of the risks, costs, and benefits of the technology he is supposed to adopt.

Recommendation

1. MIDEVIV/PROSEM and USAID Cameroon/DAC should assume a leadership role in developing a strong spirit of cooperation with participating agencies and projects since the responsibility of seed development is entrusted to them by the Government of Cameroon.

Table 2. FINANCIAL STATUS OF USAID-GRANT

AS OF JUNE 30, 1986

($ '000)

LINE ITEM	BUDGET PER ORIGINAL PROJECT PAPER	AMENDED BUDGET	COMMITTED	DISBURSED	BALANCE AS OF MARCH 31, 1986
TECHNICAL ASSISTANCE	$3,065	$5,252	$2,699	$2,399	$2,853
TRAINING	866	217	131	97	120
COMMODITIES	1,410	2,072	1,245	786	1,286
OTHER COSTS	440	300	99	64	236
CONTINGENCIES	565	172	-	-	172
INFLATION	1,694	27	-	-	27
TOTAL PROJECT-GRANT	$8,040	$8,040	$4,174	$3,346	$4,694 *

* Of this, 828 is in the pipeline, 33 earmarked, and 3,833 unearmarked.

FINANCIAL STATUS OF USAID LOAN

AS OF MARCH 31, 1986

($ '000)

LINE ITEM	BUDGET PER ORIGINAL PROJECT PAPER	AMENDED BUDGET	COMMITTED	DISBURSED	BALANCE AS OF MARCH 31, 1986
CONSTRUCTION & RENOVATION	$4,214	$4,600	$ -	$ -	$4,600
CONTINGENCY	421	270	-	-	270
INFLATION	965	-	-	-	-
ARCHITECTURAL & ENGINEERING SERVICES	-	730	725	262	468
TOTAL USAID LOAN	$5,600	$5,600	$725	$262	$5,338 *

*Of this, $4,875 is still unearmarked because of the delay of construction.

VI. COMMODITIES

A. Commodity Procurement

Procurement is a very complicated activity for both DAC and PROSEM. There is a need to train people in preparation of documents and procedures required for the purchase of equipment. A few examples of problems with orders of shipments are: super picker/sheller arrived with no picker and too late for the 1985 corn harvest; incorrect screen sizes shipped for the Clipper 27 Seed Cleaner; and wrong pulley size for the Hobbs peanut cleaner. These seemingly little things can cause big problems when you are operating a large mechanized seed farm.

The use of several soil conservation practices is a must for sustained foundation seed production on the Sanguere Seed Farm. For example, crop residue holds great promise for control of soil erosion by water and wind. Special equipment designed for planting in crop residue should be purchased. A grain drill will probably be required to plant a cover crop.

B. Utilization of Equipment

In nearly all cases, PROSEM has utilized the equipment effectively under the existing situation; not all pieces of equipment have been appropriate (disc plow) and some had to be modified and made functional such as the Nodet Gougis Planter for row crops.

C. Appropriateness of Equipment

In view of the fact that sustained seed production on fragile soils using mechanization has not been proven, a certain amount of experimentation and risk taking is necessary. The DAC team and PROSEM are to be highly complimented for their implementation of practices such as four-row peanut beds, band application of fertilizer at planting time, meteorological measurements, conservation tillage, design and fabrication of iron "paddle wheels" to form small basins or water holding depressions between rows of crops, parallel terraces, and grass waterways.

D. Maintenance and Storage

Equipment maintenance is an unquestionable plus for the PROSEM/DAC team, mainly due to the leadership provided by the agricultural machinery advisor. PROSEM staff is building an excellent system of management of agricultural machinery including training tractor drivers, adjustment of equipment, maintenance schedule repair, overhaul, spare parts inventory, record keeping, ordering spare parts and security.

Exposure to sand and rain produces rust, corrosion, warping, and rot. A new piece of equipment can be rendered "old" before it is used, and it is much

more difficult to make operational. Delicate pieces of equipment such as a seed treater and seed clearning equipment need to be properly stored. The new storage buildings currently on the seed farm will alleviate this problem.

Two Hobb 488 peanut cleaners procured have not been made operational because of technical problems. Originally the machine was designed to operate on 60 cycle current with motor speed of 1730 RPM. The electric current at Sanguere is 50 cycle. A 50 cycle motor is now available but the pulley size does not match (outside diameter is too small) which produces a shake speed of 810 RPM. Manufacturer's recommendation is 825-875 RPM. The fan speed is also too slow and the suction for aspiration is insufficient to lift out light weight pods. With proper shake and fan speed, the Hobb peanut cleaner should function as designed.

The Clipper 27 air and screen seed cleaner is an excellent seed cleaner and separator when equipped with proper screens and adjusted correctly. The machine has two screens. A top screen for removing material larger than the desired product and a botton screen for removing material smaller than the desired product. Sized seed remaining on top of the bottom screen is subjected to a controlled blast of air which lifts and removes light weight material and broken seed. The result is <u>one grade</u> of "cleaned" and sized seed.

The current four "grades" of corn reported in he 1985 DAC report are <u>misleading and unnecessary</u>. Apparently they are the result of improper set up of the machine and collecting a "grade" from each discharge spout. Two Clipper 27's running in "tandem" without correct screen sizes is a wasteful use of equipment and energy and contirbute negatively by causing more damage to dry seed.

A stainless steel Gustafson seed treater never used from Phase I or another project should be made operational, if possible after years of storage outdoors.

VII. Discussion on Proposed Seed Conditioning Facility

Actually, a very functional and simple seed conditioning line for corn, sorghum, and cowpeas, could be established by immediately procuring two elevators and constructing two holding bins. Two Clipper 27's are available, each can easily clean and size 5 MT of corn a day or a total of 10 MT a day; in 100 working days, 1,000 MT.

Processing equipment planned to be procured by NCSM is inappropriate. The Mississippi Report 1980 specified peanut cleaners, bucket elevators (2), bagger and weigher, shop tools and miscellaneous (holding bins, accessories, electrical switch gear, parts, etc.).

The Project Paper adopted the recommendation and added to it slightly. The commodity list (for two plants) included:

4 Surge bins
4 Elevators
4 Portable belt conveyors

2 Vibrating hoppers
4 Distributors and downspouting
2 Seed Cleaners, Clipper 27
2 Peanut Cleaners, Hobb 488
2 Bagging scale
4 Portable bag closer

In addition, the Project Paper provided a sketch of the processing plant showing arrangement of bulk storage bins, receiving dump pit, elevators, peanut cleaner, bagger and scale. A processing area for corn and sorghum was identified but arrangement of equipment not specified.

The Mississippi Report recommended a long term seed processing engineer to be responsible for proper installation of seed processing machinery and to provide training of operators for two processing storage/centers. The Project Paper dropped this specific position, and added the tasks of proper use, maintenance and repair of seed processing equipment to the duties of the Agricultural Machinery Advisor. The sketch (plate 19) in the Project Paper and the commodity list is straightforward, simple, appropriate and allows for expansion.

The design plans prepared by STV/Lyon Associates are incredibly inappropriate. The evaluation team feels it would be counterproductive to delve into the evolution of the proposed processing facility. However, a few of the technical deficiencies of the Lyon design are identified below:

- Unconventional "tepee" 10 unit bulk storage bins are a source of contamination, mixture, and difficult to clean, and excessive in storage capacity. Peanuts are normally stored in open bins and are handled with a front-end loader. The evaluation team cannot determine the technical reasons why these bins were designed as shown in the construction plans.

- Peanut storage and processing should be separated from other processing of crop seeds. The current Lyon plans illustrate peanuts and other crops seed stored in the same "tepees". This is a source of mixture (contamination) because of difficulty in through cleaning.

- Mechanical peanut shelling is not recommended for such a dry climate as North Cameroon because of excessive damage and the requirement for refrigeration.

- No apparent provision for dust collection or handling peanut shells.

- Bagger scale too big for the planned 5-10 kg. sacks for corn and sorghum.

- Three dump pits are unnecessary because a dump pit is another source of possible contamination and is difficult to clean.

- Inflexibility in the processing line because some pieces of processing equipment cannot be bypassed if desired. For example, it is not advisable to chemically treat all from a cost standpoint or in the case they need to be sold as food or animal feed.

- Too sophisticated to handle small lots of seed (some in bags) because cleaning will be required after processing each lot. The complexity of the design makes it highly susceptible to breakdown requiring expensive repair.

The evaluation team would like to address the concept of the current Lyon design and recommends tht MIDEVIV and USAID Cameroon re-examine the current concept and determine whether it is valid and appropriate for Cameroon. Questions to be answered by MIDEVIV and USAID Cameroon management follows:

1. Is a thousand ton processing capacity needed now or in the near future?

2. Can the expense of constructing a grandiose facility be justified in view in the amount of seed processed?

3. Is skilled manpower (engineers, electricians, mechanics, etc., who are knowledgeable in seed processing) currently available to operate such a facility?

4. Can adequate spare parts (belts, pulley, electrical relays, motors, etc.,) be made available at all times considering the logistical problems of ordering from abroad?

5. Will PROSEM management be overburdened with the production and processing aspects of managing all the seed operations?

6. Are the logistics in place for transporting seeds long distances to supply such a large facility?

Recommendations for the Seed Processing Facilities Required for the Sanguere Farm.

Bring a short-term seed processing engineer to write building and equipment specifications following the original design as stated in the Project Paper. This should include the following:

1. Write equipment specifications.
2. Specify a ready made steel building, and make a layout plan.
3. Order equipment.
4. Order and pack equipment in the U.S. and ship in one-way container.
5. Assemble and install machines and prefabricated cold storage unit.
6. Make the plant operational.
7. Train people for operation adjustment, maintenance and repair.

The team recommends that a seed processing and storage building as originally called for in the Project Paper be constructed at Sanguere Seed Farm for a simple but functional processing line.

VIII. TRAINING

The status of long and short-term participant training of Cameroonian personnel is shown in the following outline.

No. to be Trained	Subject	Length of Training	Location and No. In Training	
1	Bus. Admin.	30 months	USA	1
1	Bus. Admin.	30 months	USA	0
2	Seed Tech.	30 months	USA	2
1	Agric. Ext.	30 months	USA	1
1	Soil Conserv.	30 months	USA	1
2	Peanut Breed.	30 months	USA	2
2	Farm Machinery	30 months	USA	2
2	Crop Prod.	7 months	USA	0
5	Seed Imp.	3 months	USA	4 (One completed)
5	Seed Tech.	2 months	AFR	0
1	Blacksmith	2 months	AFR (completed)	

Participant training of Cameroonian personnel is now well underway after a slow start. All the USAID Cameroon financed participants (3) have departed while some of the DAC financed trainees have yet to be scheduled for third country training. Four long-term participants departed for training during 1984, one in 1985, and four departed in 1986. Some of the delay was due to an erroneous assumption in the

Project design at the beginning of Phase II that practical training could be arranged with private seed companies and seed testing laboratories in the U.S.A. After failure to place candidates into practical training, the decision was made to opt for academic training. A result of the delay is that participant training is one year behind schedule. Only three of the seven participants now in long-term training are due to return to Cameroon prior to the scheduled departure (March 1988) of the Technical Assistance team. Overlap time for the three will be only thirteen months with none for the other four.

The short-term (7 months) participant Seed Improvement training scheduled for the U.S.A. has been changed to three months per participant. This will allow MIDEVIV to train more of their personnel at the Mississippi State University Seed Improvement Course held annually. One participant has completed this training (1985) while the other four are currently in training. It is envisioned that MIDEVIV will send at least four more participants to the MSU course in academic year 1987 utilizing the planned short-term crop production training positions.

The DAC short-term (3 months) participant training scheduled for other African countries has been seriously delayed. One candidate has completed a blacksmith/welding course in Zimbabwe.

In-country training has consisted mostly of continuous on-the-job training with some structured training. The value of on-the-job training is recognized but is <u>difficult to verify quantitatively</u>.

More structured "hands-on" training in the form of short courses and workshops should be conducted, particularly in the areas of crop husbandry, quality control and seed processing. The evaluation team strongly encourages North Cameroon Seed Multiplication Project personnel to draw upon the expertise of Plant Breeders and Agronomists of IRA to assist in this training.

The training component of any project is vital to the development of an institutional infrastructure and should be assigned the <u>highest priority</u>. DAC must develop structured training for in-country training as well as develop a training schedule for the timely departure of all participants for third country training. The problem that caused delay in long-term U. S. training under this Project has been corrected and training should now proceed smoothly. The delay, however, has essentially erased any meaningful overlap time between the majority of long-term trainees and the Technical Assistance team. The evaluation team recognizes that the participants who were delayed had the opportunity to work with the Technical Assistance team before their departure, but we strongly believe that an overlap time of at least one growing season is essential to insure that the project will continue to function smoothly after technical assistance has ended.

Recommendations

1. The Technical Assistance component of the North Cameroon Seed Multiplication Project be extended one year beyond the scheduled expiration date of March 1988. USAID Cameroon and MIDEVIV should determine which positions should be extended.

2. DAC immediately develop a training plan for structured in-country and third-country training.

3. MIDEVIV submit a list of training needs to USAID Cameroon. Since the marketing and distribution aspects of the Project are extremely weak, the list should include agricultural economics/marketing, agricultural statistics and extension.

IX. TECHNICAL ASSISTANCE

The Technical Assistance team (DAC contract) consits of the following:

1 Agronomist/Seed Specialist, 1 Agricultural Machinery Adviso-, 1 Chief Accountant/Administrator, and 1 Agricultural Economist, who serves as Chief-of-Party. Short-term assistance is provided by 1 Soil Conservationist/Scientist (9 pm). Technical assistance in Plant Breeding is also being provided through a Host Country Personal Services Contract.

Performance of each technician will be examined separately, and then collectively as a team.

Agronomist/Seed Technologist

In collaboration with other DAC technicians and Cameroonian personnel, progress has been made in the following areas:

1. General Crop Husbandry - Crop husbandry (planting, cultivating, rotations, etc.) have improved considerably during Phase II of the NCSM Project.

2. Training - It appears that on-the-job training of Cameroonian personnel is being done in an informal manner but there is a need for better documentation.

3. Soil and Plant Tissue Testing - Soil testing is being done and materials needed for plant tissue testing have been ordered.

4. Establishment of a Meteorological Station - A central meteorological station for gathering data on rainfall, windspeed, air and soil temperatures and soil moisture has been recently set up at Sanguere Seed Farm. In addition, satellite rain gauges have been set-up at several locations on the farm. This station will provide basic data vital for planning of field operations.

Agricultural Machinery Advisor

In collaboration with Cameroonian personnel, outstanding progress has been made in the following areas:

1. Established a machinery and vehicle repair shop at Sanguere Seed Farm. This shop, well-equipped and organized, functions smoothly in performing its critical role on a mechanized farm.

2. Established an adequate spare parts supply with an inventory control system for parts and equipment.

3. Trained Cameroonian personnel using both structured and informal methods. Personnel have been trained in mechanics, machine maintenance and tractor operation.

4. Designed and constructed needed equipment when such equipment was not available otherwise.

Soil Conservationist/Scientist

This technician has provided a valuable service to development and management of the Sanguere Seed Farm. Through short-term consultancies in 1984, 1985, and in 1986, he:

1. Conducted a topographical survey of the farm.

2. Relocated farm roads and field boundaries.

3. Designed and supervised construction of parallel terraces and drop structures for water control in the fields.

4. Assisted the DAC Agronomist in the development of a crop rotation system for the farm.

5. Collaborated in the design and construction of a basin-forming tool to be used for water conservation.

6. Added turnrows to the fields.

7. Consistently monitors field operations and trains Cameroonian personnel through on-the-job training in soil conservation practices.

Agricultural Economist/Chief of Party

Although the above position was created for him as of August 1985, the Agricultural Economist has carried out major responsibilities including the following:

1. Project Documentation - Working in two different positions during the last three years (2 years as Financial Analyst and 1 year as Agricultural Economist/Chief of Party), the Agricultural Economist has systematically documented all activities related to the project.

2. Survey and Analysis - The Agricultural Economist has made a preliminary cost analysis and preliminary farm surveys which lay the foundation for market research including demand and price studies.

3. Training - The Agricultural Economist provided some computer training to a few PROSEM employees.

Chief Accountant/Administrator

Among the important changes that the project has gone through is the adoption of the DHS Management Information System. Assigning a qualified Technical Assistance Accountant to help in the implementation of the system was a wise decision. The evaluation team has examined the progress made in computerizing accounting procedures suggested by DHS and therefore has confidence that the Accountant will successfully carry out all responsibilities.

The only major responsibility that seems to be difficult to accomplish is the implementation of the cost accounting system. Recognizing its complexity, the Accountant has sequentially followed procedures with caution. With the help of the people working at the farm, the Accountant can produce an accurate cost analysis. The effort he puts in trying to implement the management information system should be appreciated and respected by both PROSEM AND the DAC team. He is an Accountant, hence, some of his demands for specifics and accuracies are necessary and should be supplied without unnecessary delays.

Peanut Breeder

The IRA/MIDEVIV Plant Breeder is provided by a Host Country Personnel Services contract. This contract is sponsored jointly by USAID and GRC. Services of the Plant Breeder are provided to reinforce IRA's peanut research program.

The contractor is in the last year of his second two-year contract and has performed his assigned duties in a professional manner. His major accomplishments to date are as follows:

1. Local and exotic peanut germplasm has been collected, maintained, tested and utilized in breeding experiments.

2. Conducted breeding and variety trials on research stations and farmers' fields in different ecological zones of the North.

3. Provided improved peanut breeder seed to PROSEM for multiplication.

4. Through approval of the Director of IRA, released a new peanut variety adapted to a shorter growing season in the North.

5. Conducted an ambitious peanut breeding program and currently has 1800 lines from 10 crosses in the F5 generation.

6. Provided guidance to PROSEM agronomists on production, harvesting, and processing of peanut seed.

7. Provided on-the-job training to his counterpart until he departed for formal training in the USA.

8. Submitted timely progress reports concerning his work.

In general, the work of the contractors under this project was found to be satisfactory. The contractors had no impact in the original design of the project; therefore, their accomplishments must be measured by the manner and circumstances in which they carried out the tasks assigned to them. They are all considered to have performed well. The evaluation team believes that the DAC team should give serious consideration to the following:

1) Communication - The evaluation team finds the DAC team to be weak in fruitful communication. Except for this year when the Chief of Party and his colleagues opened up a little, the project was isolated from research and development/extension agencies as far as professional communication is concerned. DAC should not only attend workshops, conferences, etc., but also should arrange workshops and conferences to discuss its problems and successes with researchers, development agencies, and farmers. With the help of USAID Cameroon, MIDEVIV, and DAC/Washington, the Chief of Party should initiate a semi-annual workshop (one before planting, one after harvesting) which will include all participants in the seed production-supply program. Another area of weakness is that a documented closer link needs to be established with IRA plant breeders and agronomists.

2) Training - Short-term and in-service training are weak points of DAC. Except for a few formal sessions in Accounting and Agricultural Machinery, the DAC team was less enthusiastic about in-service training. In-service training should be a priority if the DAC wants to leave appropriate technology behind for the Project. Another training responsibilty of DAC is the training of trainers of extension agents and should be given high priority. DAC has recently contacted SODECOTON and in principle SODECOTON agrees to DAC's training program.

3. Seed Quality - The evaluation team believes that there is an immediate need to improve quality of seed produced at Sanguere Seed Farm. This may be accomplished through careful monitoring of harvesting, threshing and processing of crop seeds. Installation of processing equipment and on-the-job training of PROSEM personnel in the operation of such equipment is needed. The services of a seed processing specialist will be required immediately.

Recommendations

1. DAC should ensure that a Seed Processing Specialist be recruited immediately.

2. Considerable progress has been made towards stabilizing the fragile, erodable soils at Sanguere Seed Farm through terrace construction, but there is a need to continue with the services of the Soil Conservationist/Scientist. Permanent vegetation must be established on terraces, in waterways and turn areas at the the ends of fields in order to stabilize the soil. It is recommended that these services be provided for the remainder of the Technical Assistance contract, at least on a short-term basis. One option that should be considered is to obtain these services on a full-time basis.

3. In-service training of the Cameroonian economist should be strengthened by involving him in farm surveys, market research, and statistical analyses.

4. The duties and responsibilities listed in the Agricultural Economist job description are too many to be accomplished before the end of the project. The determination of demand and price elasticity cannot be determined with only a year of study since three years of data are needed to determine the behavior, price trends, and demand shifts. The evaluation team recommends that the job description be reviewed and refined to give priorities to marketing and distribution studies, cost analysis, in-service training and short-term training including the training of trainers of extension agents.

5. The Agricultural Economist/Chief of Party must delegate to other DAC team members and Cameroonian counterparts in order to fulfill the Project reporting requirements.

6. The Technical Assistance component of the project be extended for at least one year as of the Project Assistance Completion date. USAID Cameroon and MIDEVIV should determine which specific positions should be extended.

X. AGRONOMIC AND PRODUCTION ASPECTS

A. Evaluation of Quality Control During Seed Multiplication

Quality control during multiplication of seeds at the Sanguere Seed Farm is generally good.

Planting, harvesting and processing machines are throughly cleaned after each use to avoid physical mixing of different crop seeds.

Minimum physical isolation standards have been established and are being followed where possible. Where physical isolation between different varieties of the same crop are not possible, the varieties are planted at different dates so that flowering of the different varieties does not occur at the same time, thus, creating a "time isolation". One potential problem exists where farmers are planting the same crop near the perimeter of one side of the seed farm. The crop that would be affected is corn since it is a naturally cross-pollinated crop. Pollen contamination in this case could be minimized by either (1) time isolation, or (2) an agreement by farmers to refrain from planting corn adjacent to a field of corn on the seed farm. Cowpeas, sorghum and peanuts would not be affected since these are essentially self-pollinated crops.

Seed fields are inspected at regular intervals by the DAC Agronomist and Cameroonian technical staff and "off-type" plants removed prior to flowering in order to maintain genetic purity. An evaluation of genetic purity of seeds being produced at Sanguere Seed Farm is difficult at this point since plants growing in the fields have not yet made sufficient growth to detect differences due to genetic contamination. A physical examination of seeds produced during the 1985 season was made. This examination, although not completely accurate, revealed no genetic or physical contamination of seeds. A word of caution concerning"over-roguing" or selection might be appropriate at this point. In the DAC/North Cameroon Seed Multiplication Project Report of Activities for the Year 1985, it was reported that "elite" (first multiplication of breeders seed) fields of corn were heavily selected for good ears. This procedure, commonly called mass selection, has the potential of changing the genetic make-up of a corn variety and should be confined to plant breeding operations. If a field growing "elite" seed is so mixed that such selection is required, then seed from the field should not be used for seed purposes.

Guidance from the plant breeders is absolutely essential in the multiplication of a new variety since each breeder is most familiar with his crop variety. Evaluation of the link between plant breeders and PROSEM agronomists indicates that there is a need to strengthen that link. Written detailed descriptions of varietal characteristics, e.g. plant height, seed color, resistance to disease, etc., should be made available to the DAC team agronomist. The DAC team should participate in "field days" conducted by IRA personnel. It is inperative that visits and discussions between PROSEM, the DAC team and IRA plant breeders take place frequently so that information exchange can occur.

B. Evaluation of Foundation Seed Production by Mechanization

The strategy of using mechanization as a means of producing and processing foundation seed was adopted for Phase I and Phase II of the North Cameroon Seed Multiplication Project. This strategy works well in North America and Europe where equipment is less expensive and spare parts and trained service personnel are readily available but generally has been less successful in most other areas of the world. The major advantage of mechanized production is that it allows for cultivation of larger areas, critical timely field operations and the potential for better quality control of production.

Considerable progress has been made during Phase II toward standardizing production equipment and in-country training of service personnel at the Sanguere Seed Farm. Adequate spare parts for most production equipment are available. Equipment for production is generally adequate and suitable. An exception to this is the Nodet-Gougis planter. This planter does an excellent job of planting in a well-prepared, residue-free seedbed but is less than adequate where minimum tillage is used for seedbed preparation. The highly erodable soils at Sanguere Seed Farm dictate that minimum tillage be practiced whenever possible.

North Cameroon Seed Multipliation Project field personnel have designed and built some equipment for field operations when such equipment was not available. A row-ridger has been build and another is under construction. A piece of equipment used to create shallow basins between rows in the field for the purpose of water conservation was designed, constructed and is being tested.

The question of whether the highly mechanized approach to seed production can be sustained over a long period to time has no simple answer. The answer may be yes only if the following criteria are judiciously followed.

1) Equipment will be renewed every five years. The sandy nature of soil at Sanguere is destructive to all production equipment causing it to become unserviceable more rapidly than it might be otherwise.

2) An adequate inventory of spare parts must be maintained. A common problem of mechanized production is failure to have spare parts on hand when needed.

3) Training of machine operators and service personnel must continue to have a high priority.

Mechanized agricultural production of any kind is expensive. Failure to give continuous timely financial support to field activities listed above will result in failure of the project to meet its objectives.

C. Development of Sanguere as a Foundation Seed Farm

A perusal of the history of Sanguere Seed Farm reveals the following:

1) No topographical or in-depth soil survey was conducted prior to selection of the area. Also no data on rainfall pattern or soil moisture regime were available.

2) Adequate separate facilities for storage of machinery, seeds, fertilizers, and pesticides are still not in place due to long administrative delays in awarding construction contracts.

3) Area planted for production has continued to expand in an effort to meet production goals with 260 ha planted during 1985 and 372 ha planned for the 1986 season.

Production has increased but quality of seed produced has not improved. Too much emphasis has been placed on meeting production goals set by the Project Paper and not enough on quality of seeds produced. The capacity to perform timely operations specially during harvest has been exceeded due to over-expansion of the farm in an effort to meet production goals.

Considerable progress has been made by North Cameroon Seed Multiplication Project personnel toward alleviating some of the problems mentioned above. These are:

1) Establishment of a crop rotation system.

2) Construction of parallel terraces and grassed waterways.

3) Completion of a topographical survey of the farm.

Currently the Sanguere Seed Farm is producing both foundation and second generation (commerical) seed. The Sanguere Seed Farm should be operated exclusively for the production of foundation seed (first multiplication of breeders seed) and rely on contract growers to produce subsequent generations for commercial seed. A pilot project utilizing contract growers through cooperation with SODECOTON has been implemented for 1986 growing season for the production of commerical seed. A high priority should be placed on the development of this activity to insure its success and gradual expansion to the point where regional seed needs of the farmer will be met.

D. Evaluation of Crop Varieties Being Multiplied

Varieties of corn, peanut, sorghum and cowpeas are currently being multiplied by North Cameroon Seed Multiplication Project at Sanguere Seed Farm. There appears to be no need to change the plan at this time. A problem exists concerning peanut production due to low soil moisture at harvest time. This problem could be lessened or perhaps completely solved by (1) decreasing the number of hectares planted to peanuts by one third and (2) beginning harvest earlier in the season. Item (2) will be discussed more fully in the section on crop husbandry.

E. Evaluation of Breeder Seed Quality

Breeder seed is received from IRA each year. A physical examination of breeder seed received from IRA for planting this year revealed no visible discrepancies except for the cowpea seed which was heavily infested with weevils.

F. Evaluation of Crop Husbandry

Overall, the crop husbandry practiced at Sanguere Seed Farm is quite good. Construction of parallel terraces and grassed waterways has done much to stabilize the highly erodable sandy soils. A system of crop rotation has been introduced. The planting of peanuts on four-row beds has helped to facilitate mechanical harvesting with a peanut combine harvester and to increase plant population (density) to near optimum.

Harvesting operations have presented problems for some crops, peanuts and corn in particular.

In the case of corn, harvesting has not begun until moisture content of the grain was between 12 and 15 percent. This has resulted in excessive cracking of grains during mechanical harvesting greatly reducing viability and quality of seed for planting purposes. This problem can be minimized by harvesting corn when moisture content of the grains is 20-21 percent.

In the case of peanuts, harvesting has been delayed until 80 percent of the pods have reached physiological maturity. This is ideal from the standpoint of achieving maximum production but presents a problem for

finishing digging operations before the soil becomes dry and hard at the end of the rainy season. Digging becomes a big problem about 15 days after the last rain. During the 1985 season, approximately one-third of the 112 ha planted to peanuts could be dug only after running a subsoiler through the field.

For the 1986 season, peanuts and corn have been planted are growing well despite the rains being delayed about a month later than usual. Laborers are well-supervised and appear to be sufficiently trained.

G. Regional Variety Release Committee

The role of a Variety Release Committee is to decide whether to release a new variety to farmers for commercial production and equally important - to make recommendations for removing an obsolete variety from the seed multiplication program (Mississippi State University Report, 1980). A Variety Release Board or Committee should be an advisory group of six to eight persons representing research, extension, development, and credit agencies and the private agricultural community. The committee meets and acts only after a crop variety has been adequately tested and recommended for release by the Director of Agricultural Research.

There appears to be the rudiments of a varietal release board in Cameroon but at this point, there seems to be a lack of an established procedure for operation. At present a new variety is released in the following manner:

1) After adequate testing on research stations and farmers fields, agricultural research personnel decide the merits of a new variety.

2) At an annual meeting, Research, Project Semencier and SODECOTON personnel decide to release the variety.

3) Breeder seed is increased and released to Projet Semencier for multiplication to foundation seed.

An annual planning meeting between research, extension, parastatals, farmers and other interested parties is held. The varietal release committee could meet at this time and decide the disposition of both new and old crop varieties.

It is important that such a body function in order to insure the smooth flow of seeds into and out of the commercial sector of agriculture.

Recommendations

1. The Sanguere Seed Farm be operated exclusively for the production of foundation seed.

2. MIDEVIV take the lead in implementing an operational Variety Release Board.

3. Decrease hectares planted for seed production on Sanguere Seed Farm to 200 hectares.

4. Place a high priority on development of private contract seed growers.

5. The following activities are recommended for implementation for the 1987 growing season:

   a) Retire sloped, highly erodable fields from production.
   b) Include a "green manure" crop in the rotation every third or fourth year.
   c) Construction of storage structures without delay.

6. It is recommended that peanut digging operations begin when the first field of peanuts reach a physiological maturity of 65 percent so that harvest can be completed prior to hardening of the soil. Peanut seed quality will not be adversely affected.

XI. SEED PROCESSING AND QUALITY CONTROL

A. Obtaining Varieties

Seeds of "released" crop varieties are obtained by PROSEM from IRA. Seed kind variety, and approximate amounts received from multiplication in 1985 and 1986 is as follows:

APPROXIMATE. CROP	VARIETY	YEAR	KG.	HA. PLANTED
Peanut	28-206	1985	200	2
	28-206	1986	236	0.4
	M513	1986	306	3
Corn	TZPB	1985	75	3
	Lot 1	1986	117	4
	Lot 2	1986	70	3
Corn	MEXICAN 17	1985	75	3
	MEXICAN 17	1986	277	11
Sorghum	S-34	1985	50	5
	S-34	1986	250	25
Cowpeas	TVX 3236	1985	175	7
	TVX 3236	1986	100	4

In the past, PROSEM has recleaned the seed prior to planting. It should not be the function of IRA to multiply breeders seed beyond a few kilograms. However, every effort should be made by IRA to produce and release a small quantity of genetically pure and physically clean seed.

Seeds for planting purposes are of the best quality when harvested at peak physiological maturation. At this stage, moisture content is too high for harvesting mechanically. The practice that is followed is to harvest just as soon after peak physiological maturation as practical with whatever equipment is available.

In the case of peanuts, sometimes the soil dries out very rapidly (10 to 14 days) and turns so hard that the peanut digger blades will not penetrate the soil. In 1985, 40 out of 110 ha (36%) had to be dug using a chisel-subsoiler. Every effort is being made to get the peanuts out of the field as quickly as possible, dry them down to 10-12% in the wagon dryers, then clean, bag and store.

B. Harvesting Recommendations

Corn:

1. For the picker/sheller, 20% moisture is good but start at 22% and take some loss. Shelling below 18% moisture may cause shelling damage to the seed.
2. Constantly monitor and adjust the sheller throughout the day to compensate for differences in moisture content and to minimize damage to the seed.

Sorghum:

1. Cut heads when mature, dry if necessary, and thresh with the Vicon thresher.

Cowpeas:

1. Pick pods by hand in the early morning or cut whole plant, dry in the wagon and thresh with the Vicon.

2. Thresh when cowpeas are tough to minimize damage.

C. Processing Recommendations

Peanuts:

1. Use Munroe or Hobb cleaner.

2. Use sufficient air to lift some good peanuts.

3. Produce no more than one grade of foundation seed. The current practice of having four grades of so called seed should be eliminated.

4. Discard lots that fall below 70% germination.

Corn:

1. Make only one grade of corn.

2. The correct air adjustment is to use enough air so that a few good kernels are lifted out of the seed mass.

Sorghum:

1. Have only one grade of sorghum.

2. Use a bottom screen with a slotted opening to drop cracked and broken seed.

3. Open air inlet vent and/or increase fan speed on the Clipper 27 until a few good seed are lifted out by the air blast.

Cowpeas:

1. Depending on the size of the cowpea, slotted, botton screens ranging in size from 8-11/64 X 3/4 should be available. Half sizes are also available and should be considered to minimize loss yet drop all split seed.

2. Judging from the high percentage of loss reported; the 10/64 X 3/4 screen currently being used may be too large.

Considering that no appropriate screens were available for corn, the Agricultural Machinery Advisor did an outstanding job of creating an upper screen out of expanded metal and a lower screen by redrilling 25% of a 14/64 screen to a size of 18/64 (7.1 mm).

D. Packaging

The packaging component looked good. Each bag was identified with a tag inside the bag (should be outside also for easy identification), indicating seed kind, variety, germination,date of test, purity, moisture content, and name of treatment (insecticide). Plans are to use smaller bags to reduce injury to the seed and this is good. Several people have pointed out that farmers have complained of getting less weight of peanuts than they paid for. Peanuts may dry down from 10-12% to 5% in storage. A package must be truthfully labeled. If you say it is 25 kg., it must be 25 kg.

E. Storage

The evaluation team found bags stored on pallets or boards which is correct. Insects seemed to be well controlled. In the warehouse, fertilizer was stored next to seed; this should be avoided. The construction of a building and installation equipment for the cold storage unit at IRA/Maroua was put under separate contract for all the facilities and equipment. The best plan would be to purchase prefabricated units and assemble them on the site. A simple inexpensive roof would suffice for shelter. No seed was conditioned during our visit. It is reported that thorough clean-up is done between lots.

The cold storage unit is a very simple and could be ordered like an ordinary piece of equipment. The cold storage unit has three purposes:

1. A depository for valuable germplasm. The starting point of a seed program.

2. To preserve a small quantity of breeder seed for regular renewal.

3. The maintenance of a "security stock" in case of a severe crop failure.

F. Seed Testing

Currently seed testing is done in a 12' x 15' laboratory with tiled benches and sink. The laboratory is located in the PROSEM office building. In 1985, a total of 50 tests were run on groundnuts, corn, sorghum, and cowpeas for germination, purity, and moisture.

This laboratory is equipped with:

2 Gamet Seed Dividers
2 Steinlite Electronic Moisture Meters
1 Purity Analysis board
1 Laboratory Scale
2 Germinators (in need of repair)

In a practical sense, a room like this is quite adequate to run 2500 samples a year. A few additional pieces of equipment such a triple bean balance, small oven, lights for analysis, an analysis table, and counting boards are all that are needed to run tests on peanuts, corn, sorghum, and cowpeas. A germinator is not even essential since the ambient temperature is about right for ordinary seed corps. Furthermore, the room is air-conditioned for good temperature control. Germination tests are already conducted in plastic bags.

A balance, seed divider, moisture tester, an oven and hand screens are are available at the Sanguere Seed Farm. The farm laboratory is useful for determining seed moisture content at the time of harvest and during the drying and storage period. Germination, purity, and screening tests need to be conducted throughout the seed handling, conditioning and storage process.

G. Certification

No official seed certification standards exist in Cameroon. Up to now, seed multiplication through several generations has been done on only the seed farm(s). The field and seed standards established by ISTA are used as a guide. This is a good placey to start.

Currently on the Sanguere Seed Farm, fields for seed crops are rogued and inspected by the field staff. This year, 34 farmers have been organized under SODECOTON to grow 20 ha. of peanuts and 2 ha. of cowpeas. These fields

are regularly inspected using ISTA standards. The Field Inspection Officer and the Quality Control Officer are responsible for both field and seed quality standards. These officers have had special training (third-country) in seed production. It is important that field records be kept so that genetic identity can be documented.

H. Regional Seed Testing Laboratory

The location, training of personnel, and management of a "regional" seed testing laboratory has been unnecessarily confounded between Project Paper and the writing in the Project Loan and Grant Agreement. Furthermore, the situation has changed with the deletion of Guetale seed farm as a seed production center. The original role in the Project Paper was to test project seed for purity, germination, vigor, and moisture.

In the broad view, the role of a Regional (part of a national) Seed Testing Laboratory should be

1. To test seed produced by private seed companies (for truthful labeling).
2. Test seed coming in from another country.
3. Serve as a referee laboratory to settle disputes.
4. Test project seed and seed from other agencies.
5. Serve as an independent laboratory under the auspices of a national seed committee.

All too often in the early stages in the development of a seed industry a national seed laboratory is established and has no seed to test. The original role as stated in the Project Paper is still valid: to test project seed for purity, germination and moisture. The list of basic equipment specified in the Mississippi State University Report is still relevant. Two laboratories, one located in Garoua and one for the Sanguere Seed Farm are unwarranted and wasteful use of funds.

Recommendation

Two options are suggested for serious consideration for USAID Cameroon and MIDEVIV for the role and location of the planned Seed Laboratory.

1. Fully utilize the existing seed testing laboratory at PROSEM, Garoua. It is satisfactory for testing 2500 samples a year. Improve the facility by adding good lights for analysis and a few additional pieces of equipment as indicated under the seed testing section.
2. Establish an official Regional Seed Laboratory located at Garoua or a National Seed Laboratory located in Yaounde under MIDEVIV or an independent agency. This laboratory will be probably be underutilized for many years.

The evaluation team recommends option 1 as the preferred option because the need for option 2 does not exist at present. We do not believe a new National Seed Laboratory will be effectively utilized for at least five years.

XII. DISTRIBUTION, MARKETING & PRICING ASPECTS

SODECOTON is to play a major role in the distribution of improved seeds to farmers. Through the efforts of SODECOTON's extension force, it was envisioned that 163,000 farmers would be using improved seeds by the end of the project.

Currently, the project is selling its seeds to two major clients -- SODECOTON and Nord-Est Benoue -- accounting for about 90 percent of PROSEM's sales. The relationship between PROSEM and its clients is nothing more than a buyer-seller type where the relationship discontinues once the transaction is made. As to the distribution of the seed to farmers, PROSEM does not have any idea where, when, and how it is distributed, or how the seed is accepted and planted by farmers. Handling, maintaining and planting of seeds by the farmer is a key element to the success of a seed program. Since the project does not do a follow-up and get feedback from the ultimate users of its seeds, this evaluation team considers the current seed distribution system to be incomplete or nonexistent.

A good seed distribution system should be complemented by an effective promotional and extension effort. The farmer should first be informed about the project, the costs and benefits of the new improved seeds, and the associated risks. Also the farmers should be provided with other inputs that complement the improved seeds, and assurances that those seeds will be adequately available in the years to come.

It is only in recent months that DAC's Chief of Party/Agricultural Economist has tried to get some feedback from the project's c..ents and farmers. In his recent survey, findings show that the majority of farmers (about 70 percent) are not aware of the project's existence. Out of the 248 interviewed, only two have bought seed directly from the project since its creation, while 29 of them received seeds through SODECOTON. DAC's agricultural economist is not that surprised of the outcome since 'the project does not do any seed distribution itself'. The ultimate users of the project's seeds are farmers and must be informed about the new improved seed that could positively affect their livelihood.

The project does not have any distribution plan. The major reason given for not having a distribution plan is that the project itself is not distributing seeds directly to farmers. Since seed is very fragile to handle, store and use, the project has the responsibility to mak-up a tine schedule for delivery and shipment for each crop, including a 'fiche technique' concerning handling, storing and planting practices. Each bag of seeds should be coded followed by the 'fiche technique' to be thoroughly followed by clients such as SODECOTON and Nord-Est Benoue.

The distribution and marketing aspect of the seed program is a key element upon which the success of the project depends. It is, therefore, necessary to insure that the right type of seed is delivered to the farmer at the right time, in the right quantity.

The major input for a good distribution plan is to estimate the quantities of seed to be produced and marketed months before the actual distribution starts. Without this projection, it will be difficult for the project to have an effective distribution program. If the project does not live up to its promises, its relationship with its clients may be adversely affected and therefore very detrimental to its success.

A seed distribution system will be effective if there is an adequate storage facility. Even though the Project Design calls for the construction of a seed storage facility, the project still depends upon one old warehouse to store everything including farm equipment and materials, fertilizers, herbicides and insecticides, processed and unprocessed seeds.

As much as physical storage is important, so is the timing and environmental conditions. Seed from each crop must have storage and environmental specifications in order to maintain the quality intact until planting time.

The final stage of seed distribution is to provide service to customers after sales. If clients are not satisfied with the seeds, adjustment may need to be made. All unsold seed should be collected, retested, and properly stored. It is very important that seed produced by the project have the quality to sell itself.

B. Pricing

PROSEM does not have a clearly defined seed price policy. Because of its promotional ineffectiveness and few years of experience in producing quality seeds, the project has been a victim of a powerful monopsony (SODECOTON). Its prices, quantity demanded, and distribution activities are dictated by this buyer.

Even though the project officials are in favor of differentiating seed prices from grain prices, there has not been a concerted effort to address the problem of seed pricing. SODECOTON takes a position that high seed prices would curtail farmers' demand. PROSEM's position is that seed should be treated differently from grain; hence, seed prices should be higher by a reasonable amount (150-190 percent of grain prices).

Both positions are justifiable depending on information that each has to defend its position. The problem is that there has been basic market study done to make an objective judgment. SODECOTON may have a point against high prices since PROSEM is only starting to produce quality seeds. Moreover, there was no adequate promotion and extension service to attract farmers for higher seed prices.

PROSEM, on the other hand, claims that the current price of its seeds is sometimes below the market price of grain, and that higher seed prices are justified by increased seed demand the project is currently experiencing.

The determination of price will be answered fully only after a market study is done to determine the price elasticity of demand -- a study that determines a change in quantity demanded as the price of a product is increased or decreased.

The fact that no market research was done in this subject does not necessarily preclude use of our intuition on the nature of the product and its price. At the initial stage of its development, seed is not indispensable as far as farmers are concerned. Their farms will not go unplanted since they have several other sources of seeds. Thus, at the initial stage of development, the price elasticity of seed demand is more elastic. In other words, if the price of seed is increased, farmers will cut their demand for seeds by a greater proportion.

At a later stage, however, demand gets more and more inelastic as farmers get acquainted with seed and start benefiting from use of improved seed. The quantity demanded will only decrease by a smaller proportion as the price of seed is increased. If it comes to a level where improved seed will make a difference, then any price can be quoted within the limits of the farmer's income. It is just like inventing a new product and trying to market it in a new territory.

The price of improved seed, therefore, is determined by using the following factors: quality; uniqueness; availability; adaptability; and promotion. If the project lacks in providing one or more of the above factors, then any significant increase in the price of seed may curtail its demand. It may take a few years more to have a full impact on farmer's choices and decisions.

The question that still should be answered is, "what price should the project propose?" There are two ways:

1) PROSEM should steadily increase the price of its seeds with caution and avoid as much as possible any attrition of clients because of high prices. This pricing system should be used only for the first few years until the project is assured of positive responses from its final users - farmers. This price is independent of grain market price which is always subject to fluctuation depending on the season and the region. For PROSEM, these first four to five years are years of testing and development. Hence, it is not the time to worry about current seed prices. The thing to worry about is the product - quality improved seed. Then higher prices and economic returns will follow.

2) Price Subsidy. Once the project reaches full development, it should start to raise prices in an attempt to recover the costs of production. However, as PROSEM increases its prices, effective demand tends to decrease. It is at this conjuncture that it

government should consider price subsidy. Price subsidy for limited years will benefit both PROSEM and the farmer -- the former can be able to run its operations economically while the latter can benefit from low input prices until he generates more disposable income. Price Subsidy of seeds must be phased out in four to five years.

Once farmers start to benefit from the use of improved seeds, the government should no longer be burdened with unnecessary subsidization.

C. Seed Demand and Supply

This project has been producing an average of 312 tons of seeds for the last three years: groundnuts, 130 T; maize, 168 T; sorghum 4 T; and cowpeas 9 T. Of the 312 tons produced annually, an average of 208 tons resulted in processed seeds (Grade I and II) accounting for an average processing loss of 30 percent. If only Grade I is taken, the processing loss is more than 50 percent, particularly in maize.

Annual sales accounted for an average of 180 tons, 90 percent of which was sold to SODECOTON and Project Nord-Est Benoue. The 1985/86 sales were the highest accounting for 264 tons (Grades I and II).

As stated in several PROSEM/DAC reports, the project was not able to meet seed demand which has been increasing during the last two years. For example, clients' seed orders for 1984/85 and 85/86 (mainly SODECOTON and N/E Benoue) were 481 and 710 tons, respectively. Since SODECOTON is shifting some of its resources to the production of food crops, the demand for PROSEM's seed is expected to increase in the coming years as production of quality seed increases and farmers start to adopt new improved seed. With contract farming expected to increase in the years to come, the project should be able to meet most of the seed demand. If the project does not meet demand, it will create dissatisfaction among users. Seed availability at all times is essential to the success of the project.

A System to Estimate Effective Demand

Effective demand is defined as the financial capability of farmers to buy seed when they require it. Thus, effective demand will be estimated using a farm survey. The farm survey will include all aspects of socio-economic characteristics, including farm income, access to extension services, inputs, distribution and marketing facilities, and availability and type of farm seed storage. This study has not been done by the project. Since the Agricultural Economist position was created less than a year ago, DAC did not have the technical capability to do farm survey and market research. Now, the Agricultural Economist has contacted several individuals to initiate demand and prices studies. The evaluation team believes that these studies are very essential. It also suggests that the Agricultural Economist prepare a comprehensive questionnaire than can answer some of the questions regarding prices, subsidies, credit, demand and supply, farm costs, rate of adaptability, productivity, and the role of extension.

The following factors could also help to determine estimated effective demand for improved seed:

- price of improved seed
- farmer's income (total and disposable income)
- availability of subsidy, credit, distribution and marketing facilities
- availability of extension services
- quality of seed
- availability of seed near the farmer
- availability of cooperatives, village groups, village chief
- knowledge of farmer on the value of improved seed
- replacement rate of seed
- area of cultivation

D. Promotion

DAC's Agricultural Economist has made some interesting preliminary surveys regarding farmers' awareness to PROSEM and its improved seeds. When asked if they have heard about PROSEM, 32 percent of the farmers responded affirmatively, and only two out of the 248 farmers have bought seeds directly from the project.

Practically no promotion of any kind (except one radio talk and one pamphlet) was done. The project has not made an effort to reach the ultimate users of seeds. It left the extension and promotion part to its clients (buyers of the seeds). PROSEM seems to define its mandate the wrong way. When asked about extension and promotion, PROSEM officials claim that the responsible agency for extension is SODECOTON. The evaluation team believes the PROSEM should start promoting itself and its product to the ultimate and potential users of seeds. It should start cultivating potential farmers even though current production does not meet demand. With an expected improvement of contract farming, the project could reach several thousand farmers (with and without SODECOTON).

Although the project did not have any problem selling its seeds, the evaluation team believes that the role of PROSEM and the importance of improved seeds should be promoted through communications media which reach the majority of farmers.

E. Role of Women

The Mississippi State report identified a survey indicating that seven percent of all households are headed by women, indicating the importance of women especially in the production of food crops. Under beneficiaries, the Project Paper states that "both husband and wife (wives) work on the farm. Women will benefit from the increases in food production, as they have their own plots which provide food for their family and/or extra income."

The Extension Specialist, A. Hamalian, conducted a comprehensive study on the ways to encourage farmers to produce and use improved varieties of seed. Key findings relative to women were:

1. Women play a key role in food crop production.

2. Women seem to be more appreciative of the difference in quality of improved seed.

3. Women are very interested in becoming involved in seed production.

4. Women seem to have more of an entrepreneurial spirit than men.

The report recommended that:

1. Women should be included in the planning stage of all extension activities to be undertaken by PROSEM.

2. Women as well as men should be encouraged to become producers of improved seed.

3. All extension efforts and efforts of education should be addressed to the whole family unit rather than to the head of the household.

PROSEM does not have a female extension worker on their staff. The evaluation team concurs with the recommendations as stated above and would encourage the addition of a female extension worker to the PROSEM extension staff as soon as possible.

The evaluation team was not able to ascertain positively or negatively the impact on the seed project relative to non-participation of women.

PROJECT'S PRODUCTION & SALES

1983/84 - 1985/86

(TONS)

	GROUNDNUTS			MAIZE			SORGHUM			COWPEAS		
EAR	T. Production	Processed Grade I+II	Sold	T. Prod.	Proc. Gr. I+II	Sold	T. Prod.	Proc. Gr. I+II	Sold	T. Prod.	Proc. Gr. I+II	Sold
83/84	113	71	71	141	61	61	3.5	2.8	2.8	5.1	4.9	4.9
84/85	137	78	51	115	80	69	-	-	-	12	11	9
85/86	141	131	128	248	170	125	9	5.5	2.4	10.7	8.5	8.5
TOTAL	391	280	250	504	311	255	12.5	8.3	5.2	27.8	24.4	22.4

F. Extension

The Project Paper states that the Center North Project/SODECOTON will provide effective extension services to North Cameroon Seed Multiplication Project II. To effectively utilize SODECOTON's agents, the project was supposed to train several trainers of extension agents who will demonstrate to farmers the use of inputs available to maximize yields of improved seeds. Because of inadequate trained personnel, PROSEM has not been able to provide training and supervision. There has not been any follow-up as to the distribution and utilization of seeds.

PROSEM and DAC have scheduled training to start just after the 1986 harvest. By then, the extension specialist who is being trained in the U.S. will be returning to assume his responsibilities. The evaluation team strongly suggests that the project give emphasis to extension by providing adequate personnel and logistical support. It would be a good idea to develop an extension service whose major responsibilities will be to provide technical support and training to seed clients like SODECOTON, North-East Benoue, PVOs, Village Groups, and other participating in seed distribution.

Another organized group of farmers that PROSEM can train and use is the CFJA (Training Center for Young Agriculturalists). With close supervision, these young farmers could be valuable in spreading the value of improved seeds since they are likely to be more receptive to a new package of technology.

The other potential target for extension agents are women who have a big role in the production of food crops. A recent farm survey conducted by an Extension Specialist has shown that women give more value to seed than men do. Provided seed is sold on credit, women are more willing to pay higher prices for seed. Thus, PROSEM has to cultivate potential users of seeds in order to implant its impact at the small farm level.

The researcher - producer - extension agent - farmer link will be effective and sound only when the major seed implementing agency (in this case, PROSEM) gives attention to each of the above chains of seed development. The link between the extension agent and the farmer is the most complex and difficult, since it involves many changes in agricultural practices and traditions. It requires an effective extension system to make it work all the way.

G. Project Impact on Production

As mentioned earlier, it is difficult to assess impacts of the project at this stage, mainly due to the short life of the project. In addition, there is no statistical data to determine its impact. PROSEM itself does not know the number and type of farmers that are using its seeds. That is why the use of its own marketing and extension service is essential to assess impact.

The positive impact of the project on the production of food crops is not questionable. The question is on the magnitude of the impact. The evaluation team considers the yield increment of 41 and 36 percent for peanuts and

sorghum, respectively, to be overly optimistic. Also, the expected increase in farm income for 163,000 farmers from an average of $208 to $300 is a high expectation. Even if production increases significantly, the farmer is not assured of higher income unless there is a government policy that provides the farmer with a ready market to sell his increased output and a price that can at least cover his production cost.

To have a successful seed production-supply program, there should be an agricultural and marketing policy that encourages the production of food crops and the marketing of surplus crops. Policies such as subsidies, minimum price, credit, agricultural trade, and private sector involvement are major ingredients for the success of a seed enterprise.

H. Internal Rate of Return

While calculating the IRR of this project, project designers omitted following major factors that should have been included in arriving both at costs and benefits of the project:

- the costs of basic research
- the opportunity costs of the project (shadow prices)
- social benefits of employment, indirect positive impacts and benefits generated several years after the project
- unquantifiable benefit of extension

In addition, some measureable variables such as price, yield, farmer adoption rate, number of beneficiaries, and SODECOTON's extension force were over-estimated. Using the above factors, PROSEM/DAC can determine a very realistic IRR. Most of the information needed can be collected from the farm survey and market research which the DAC Agricultural Economist is planning to do before his departure. Since the evaluation team believes that these kinds of studies and analyses take more than two years of study, it recommends that DAC's Agricultural Economist position be extended one more year beyond the Project Completion Date. This extension will also leave him some time to train counterparts in seed marketing and distribution.

Recommendation

Concerning distribution, marketing and pricing aspects of the project, the evaluation team recommends that:

1) PROSEM develop a Seed Distribution System and prepare an annual seed distribution plan using projected net production and demand. Its seed distribution system should go beyond the current buyers of seeds and look forward to satisfy the needs of farmers by getting feedback from the final users of seeds. PROSEM extension and marketing service must play a big role in transferring information both to management and seed clients/farmers.

2) The price of seed be steadily increased (10-20 percent annually, at least for the first four to five years); at full development, a price subsidy (to be phased out in four to five years) is recommended to match the purchasing power of farmers. Accrding to DAC's Agricultural Economist, PROSEM has an agreement with SODECOTON to raise seed prices up to 12 percent annually.

3) PROSEM carry out market research and farm survey to determine estimated effective demand for improved seed, price and income elasticities, rate of seed adoptation, and economic cost and benefit analysis.

4) PROSEM should make an effort to promote the role of improved seeds using communications media which already exist in the area and preferred by farmers -- radio using local language, field demonstration, participating during village meetings, use of missionaries and religious infrastructure, and pictorial farming techniques.

5) PROSEM create and develop an effective extension service to provide technical support for seeds to agencies and projects that are already reaching farmers directly and to monitor the distribution and extension activities of the seed component of development agencies. Using existing local organizations (CFJA, GAM) and women, PROSEM can have more impact. The team also recommends that high priority should be given to the training of trainers of extension agents.

6) DAC make an effort to revise production (quantity and yield) and income goals of the project, including the project impact area and the number of beneficiaries.

XIII. NATIONAL SEED PLAN

A comprehensive study concerning the National Seed Plan was prepared in 1981 by MIDEVIV, assisted by an FAO Seed Specialist. This document was distributed to concerned governmental agencies for their appraisal and implementation. To date, no substantial effort or initiative has been taken to make the National Seed Plan legally operational.

The study indicates that MINAGRI would be the implementing Ministry for the formulation and implementation of the National Seed Plan. It was supposed to initiate and create a National Seed Committee at the Ministerial level. This Committee at the higher level would assume the responsibilities of:

1) formulating national seed development policies; 2) providing leadership and policy guidelines to the Seed Variety Release Board and the implementing agencies of seed projects; 3) identifying major policy constraints and obstacles and finding alternative solutions to resolve them; and 4) institutionalizing the various links of the Seed Production-Supply program.

Unfortunately, the National Seed Committee has not been created. The evaluation team believes that the delay in forming this high level committee has contributed to the lack of cooperation, coordination, and team effort seen at the project level. The team believes that the lack of effective communication that is surfacing between IRA, MIDEVIV, MINAGRI, and SODECOTON emanates from lack of direction from the higher governmental level. MIDEVIV will always be reluctant to assume full leadership in the development of a comprehensive seed system until it gets firm policy directions from a Ministry of Agriculture/National Seed Committee.

In addition, the delay in the creation of the National Seed Committee has contributed to the delay in the formation of the Seed Variety Release Board. Even though a Regional Seed Variety Release Board was formed in the North, this board has deliberately avoided discussion of the issue of seed release. The major reason pointed out by many is MINAGRI/MIDEVIV's lack of initiative and follow-up. MIDEVIV has been reluctant to take full leadership.

The evaluation team believes that there is a void of trained and experienced seed professionals in MIDEVIV who can effectively advise and help in the formalization and implementation of a National Seed Policy. In light of this, MINAGRI/MIDEVIV's hesitation to push for a legalized National Seed Plan is not surprising.

Recommendations

1. USAID Cameroon and MIDEVIV recruit a senior seed management specialist immediately. This specialist would have the responsibility of:

   a) Assisting in the implementation of the National Seed Plan.

   b) Providing policy guidance to MINAGRI/MIDEVIV on seed issues.

   c) Providing technical support and guidelines to the Seed Variety Release Board.

   d) Review the work of the Release Board and the implementation of seed programs.

   e) Review and evaluate various activities of seed programs.

   f) Assist in institutionalizing the linkages of agencies directly or indirectly involved in seed development.

2. The National Seed Committee should be created as soon as possible to provide policy directions towards the development of a national seed industry. This committee should include the Ministries of Agriculture, Higher Education and Scientific Research, Plan and Territorial Development, Finance, and Commerce and Industry.

3. A coordinated agricultural and marketing policy should be formulated and implemented to provide incentives for increased production and marketing of food crops, particularly cereals and groundnuts.

Lessons Learned

1. Development of a successful seed improvement program in developing countries is a long-term effort consisting of at least ten years. The design should reflect this principle.

2. Initially, design a small seed improvement complex involving all components. Establish the infrastructure, train personnel, learn the problems and then expand the program to include other crops and/or other parts of the country.

3. When designing a project, a good base of background information is needed to arrive at realistic project goals and objectives.

4. A Foundation seed farm must be located on the most productive soil to be assured of a reliable seed source. Intensive soil conservation measures should not be necessary.

5. Foundation seed production is not a money making activity. It is most often a function of the public sector.

6. During the fledgling stage of a developing seed industry, emphasis needs to be placed on quality seed of genetically superior varieties rather than on quantity. Distribution of contaminated seed or seed of poor germination will result in doubt and mistrust in the eyes of the farmer and do the program more harm than good.

7. All commercial seed should be produced by contract growers under proper direction for special requirements such as field history, isolation, roguing and harvesting. Foundation seed may be produced also under contract.

8. The processing/storage facility is the most expensive and conspicuous component of a seed industry. It must be appropriate, functional and reliable.

9. Separation of the seed processing/storage and seed laboratory component from technical assistance was an unfortunate impediment to the progress of the project resulting in poor coordination, judgements based on misinformation, inappropriate design, unnecessary confusion and loss of time.

10. Extension and marketing is the weak link in most programs, and is the most difficult component of any seed production - supply system; hence, an intensive effort and dedication is needed to promote the purchase and use of improved seed by farmers.

Comments from Mr. Jean B. Abong, Director of MIDEVIV

He complimented the evaluation team on their objectivity, detailed evaluation, and courageous recommendations and commented on five points.

He generally concurs with all the recommendations of the evaluation team.

1. Pleased that the team saw the need for Senior Seed Management Specialist in MEDIVIV.

2. That training has been seriously delayed, but now on schedule and was pleased that the team recommended that MIDEVIV submit a list of all training needs to the Mission.

3. Concurs with the recommendation of decreasing the size of the Sanguere Seed Farm but raised a question of proper utilization of equipment, and technical assistance that was also addressed by Dr. DeLouche of Mississippi State University.

4. Admires American way of evaluation since Americans are willing to critique objectively the work of others including Americans.

5. MIDEVIV is empowered to create National Seed Committee and is diligently pursuing that goal.