

Proj. 6856201 (4)

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REPLY TO
ATTN OF: AFR/DR/SFWAP, Todd W. Crawford WC

SUBJECT: Senegal Cereals Production Project 685-0201

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to: See Distribution

Attached please find a copy of the evaluation report for the subject project, prepared by Consultant Fran LeBeau. This evaluation builds, in part, on a draft evaluation report written by a larger contract team in March-April 1977. It makes recommendations concerning the completion of Phase I and design of Phase II.

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An excellent report by Fran

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EVALUATION OF THE SENEGAL CEREALS PROJECT

S U M M A R Y

After review of the documents, prepared by the contract evaluation team in March-April 1977 and review of SODEVA and CNRA reports on project implementation and ADO project files, the following conclusions can be drawn:

1. SODEVA as the principal GOS implementing agency has done an excellent job in project management and implementation. Inputs have been judiciously and effectively utilized. Well prepared comprehensive reports providing ADO with details of project implementation have been submitted on a timely basis.
2. The development of physical facilities is essentially completed. Commodities have been procured and put to use.
3. The strength of the extension service in the project area has been more than doubled.
4. The rate of extension of use of the technology packages overall has been satisfactory. Use of inputs have shown a steady upward trend. The level of use of the higher level of technology has not reached original projections which were perhaps optimistic. There are a number of reasons why the higher levels of technology have not expanded as rapidly as projected: (1) the relatively small percentage of farming units with adequate land resources, able to make the larger investments or capable of affording the higher risks involved; (2) inadequate supplies of the heavier farm implements required; (3) conflict between heavy fall plowing and harvest for use of labor and (4) the as yet incomplete demonstration of the economic superiority of the higher levels of technology over the less intensive technology.
5. SODEVA and the Liaison Unit of the CNRA are aware of these problems and have taken steps to develop a better understanding of the factors involved. In-house analysis and evaluation of the results of 3 year's operation of the AID and the IBRD supported production intensification projects is currently underway. The results from these will be reflected in some reorientation of the extension programs.
6. The Liaison Unit of the CNRA has undertaken a series of very useful studies on the socio-economic impact of the technology packages. Given the nature of this work and the short period since the project has been under way few definitive conclusions can be reached. The role of the Liaison Unit in providing objective data on which to measure the impact of extension is essential for designing dynamic programs attuned to changing conditions and improvements in technology.

7. During the short period (essentially only two years, since report of results from the 1977-78 crop year was not yet available) it is not possible to measure the impact of the project on production or on the productivity of the farm unit. A measure of such impact, however, can be obtained from comparison of changes in use of inputs being recommended by the extension service and in the number of farms and area of adoption of production intensification practices. The number of farmers adopting some level of intensification increased by 55% and 35% respectively from 1974-75 to 1975-76 and 1975-76 to 1976-77. Corresponding increases in area under intensification were 50% and 38%, and those for use of fertilizers were 45% and 44%.

8. Extension of the project for one year is recommended. The balance of obligated funds remaining plus the unobligated balance of approved funds appear to be sufficient to continue the project at approximately the same level as that for the 1977-78 crop year.

9. Certain recommendations are made for consideration in developing a second phase project.

EVALUATION OF THE SENEGAL CEREALS PROJECT

A. BACKGROUND

The program is based on a project paper which was developed in 1974 and approved in November 1974 as a medium term AID project to counteract the effects of the serious Sahelian drought (1969-73). A Project Agreement with the GOS was signed in February 1975. Implementation began with the 1975-76 crop cycle.

The project is implemented through two entities of the GOS - SODEVA, a semi autonomous agricultural development and extensive organization which is charged by the GOS with the major role for agriculture development in the dry land areas of the Groundnut Basin and CNRA, the National Center for Agriculture Research. By far the bulk of the actions fall under the management of SODEVA. This involves principally the extension and training function. However, an element of data collection for evaluative purposes is also a significant part of the SODEVA role.

The CNRA role is one of carrying out applied research trials at the village level to prove the utility of and/or demonstrate packages of technology, to explore and develop systems for production diversification and to do farm economics studies. This is carried out by a "Liaison Unit" created for this purpose within the CNRA.

AID financing was made available for infrastructure, equipment, operational costs, and technical assistance by two expatriate specialists. A full-time AID project manager was assigned to the program. The ADO role consisted primarily of monitoring the project through reports regularly submitted by the GOS implementing agencies, visits to the project area by the project manager, review and approval of annual budgets, financial review and verification, assistance to GOS in solution of administrative problems and participation in annual evaluations prescribed in the Project Agreement.

A mid-term evaluation by an AID evaluation team was prescribed in the Project Agreement. This was undertaken by a contract team of three individuals in March-April 1977. The report on this evaluation has not been completed, however, a complete draft was available.

B. METHODOLOGY

This evaluation is based upon review and analysis of the draft documents prepared by the contract team; of quarterly and annual reports of SODEVA and CNRA Liaison Unit; ADO files; reports on the IBRD-CCCE supported SODEVA program in the Sine-Saloum area; certain other miscellaneous reports, and consultation with AID and GOS personnel.

The point of departure for the evaluation is the Project Paper and Project Agreement taken together.

The first section relates to the several instruments or actions involved in the project implementation which were projected as necessary steps for achieving project objectives. This is essentially a recording of factual accomplishments without reference to contribution to project purpose or goal.

The second section attempts to relate observable results to the achievement of project objectives as set forth in the ProAg, and to the project goal, purpose and outputs as defined in the Project Paper.

C. PROJECT INSTRUMENTS AND ACTIONS

1. Personnel

(a) SODEVA Component:

The ProAg projected the increase of field extension personnel from 112 to 253 by the end of the project. The numbers actually reported were 196, 234 and 243 for years 1975-76, 1976-77, and 1977-78 as of July 1977. At that time recruitment was in progress for 9 positions.

The total personnel, including that in the field, district headquarters, and special demonstration units, were 249, 289 and 295; of which AID financed 120, 163 and 169 respectively for 1975-76, 1976-77 and 1977-78. The figures for 1977-78 reflect the status as of July 1977.

Two expatriate advisor positions were financed during the entire period as projected in the ProAg.

Performance insofar as increasing the personnel in the project area as essentially consistent with projections.

(b) CNRA Component:

One position, that of the Chief of the Liaison Unit was projected to be financed by AID. During the first 15 months this position was occupied by an expatriate pending the return from training of the GOS nominee for the position. The Senegalese technician returned as scheduled, assumed the directorship of the Liaison Unit and is performing well.

2. Training

(a) In-Service Training

The principal focus of the training element of the project was on basic training for new recruits, in-service training for all field personnel, and farmer training/contacts.

A total of 26,560 person-days of training, of which half was to be done during the first year, were projected in the ProAg. Farmer training/contacts amounting to 83,393 farmer person-days and involving 881 meetings were also projected.

During the first year (1975-76) basic training of approximately 30 days duration were provided for 59 new recruits. This was somewhat less than anticipated due to the late arrival of the expatriate training advisor. In-service training included programs, covering 30 themes, which ranged in duration from 1/2 day to 20 days. The cumulative attendance of field personnel at all programs was 3,188 individuals. Farmer attendance in similar programs totaled 27,404.

During the second year (1976-77) 3,238 days of training were offered to field staff. The per man average was 14 days. Special short courses training for farmers were not undertaken. This was replaced by visits to training centers (ZER) and demonstrations. During 1976-77, 834 meetings with a total attendance of 8,170 farmers and 285 demonstrations involving 7,025 farmers were reported.

Other training/extension activities included the preparation and distribution to extension agents of leaflets and bulletins on 32 topics.

Numerous audio-visual materials including slides and movie films were prepared. During 1976, 146 projections reaching 1,248 villages were effected by mobile units. Estimates of attendance for Department of Thies alone were 300 persons, of which 150 were adults, for each projection.

The level of training activity for the first two years while somewhat below projections appear, nevertheless, to have been satisfactory and well managed.

The in-service training program for SODEVA personnel has been concentrated in the two lower categories of personnel - those most directly in contact with the farmers. More recently the trend has been to recruit from a higher level of educational achievement and the lowest category of agents is being gradually eliminated. One consequence of this will be the gradual replacement of the older agents who are more experienced in the practical side of farming, but less able to keep records, with younger individuals who for the most part have limited practical experience but greater potential for growth.

(b) Participant Training

Participant training was provided for two individuals. One high level SODEVA employee completed a 3-month program including a 2 months course in Agriculture Development and Planning at University of Florida, and observation travel in the U.S. An excellent report was prepared by the participant. This participant is now the SODEVA delegate for the Department of Thies, a position which effectively uses his training.

A second participant completed the course "Organization Development Skills for Agriculture Managers" in May 1976. The participant is now serving as Coordinator between "Promotion Humaine" (Human Resources Development) and SODEVA in the Department of Thies.

(c) Training Facilities

Two levels of training facilities support the training program. The "Centre d'Entraînement aux Techniques Agricoles et de Développement" (CETAD) provides up-grading training for SODEVA staff on a continuing basis. The new facilities which had been developed in part through assistance from other sources and in part from AID resources greatly facilitated the training of project personnel.

Another level of training is provided at four ZER (Zone d'Entraînement de Référence) centers. These are equipped with the tools and implements which are being extended and serve as demonstration centers for farmer training and for training the two lowest categories of agents.

AID inputs in construction and equipping the ZERs have been adequate and have been effectively used.

3. The CNRA Liaison Unit is a unique innovation of the project. This unit is designed to assure closer and more effective collaboration between research and extension. The Liaison Unit is undertaking a number of trial/demonstrations to prove effectiveness of packages of technology under typical village conditions. AID inputs in support of this Unit has been relatively limited. The salary of the Unit Chief (originally this was filled by an expatriate and subsequently by a well qualified Senegalese agriculture economist who had just completed training in Europe), offices for the Unit at Bambey (main CNRA research station) equipment and 10% of the local and operations costs have been provided by AID. An allocation of AID funding was also made for development of a center at NDiemane for research and development on Deck soils (a heavy soil type of considerable area in and outside of the project area).

4. Infrastructure and Equipment

The project construction of infrastructure has been essentially completed. Some delays in completing certain units, due to a variety of reasons, did not particularly retard the other aspects of project implementation. Total construction costs exceeded the original budget due to three principal causes: (a) inflation (b) the need to conform to Department of Urbanism building codes for certain of the structures (this had not been anticipated in the original design) and (c) the need for supplementary items of construction not initially planned - fencing, garages, etc. Cost increases were approved on a case by case basis within overall budget allocations.

The equipment and supplies programmed have been procured, delivered and put in use. Given the magnitude of the project the allocation for this equipment appears to be very modest.

5. Revolving Funds

Two revolving funds were projected: (a) one to permit SODEVA to procure and distribute production inputs where ONCAD was not satisfactorily rendering this service. These supplies would be placed on credit and recoveries credited back to the fund and (b) one to finance on the farm storage where ONCAD was not adequately purchasing the surpluses.

Neither of these funds were operational during the first two years. SODEVA had nevertheless, to some degree, taken steps to fill the gaps. By agreement with ONCAD, ONCAD reimbursed transportation inputs transported by SODEVA or others. Some construction of on-farm and village storage has been made, however, the Carrera type storage has not been entirely satisfactory. It has been noted that with increasing grain production during the 2-3 years of good rainfall prior to 1977, farmers are improving their traditional storage structures to hold grain for consumption as well as the surpluses destined for the market.

A small fund was established to finance procurement of equipment under a rent-sale program. It is too early to judge this operation as yet in view of its limited operations.

6. Reporting

The Project Agreement required SODEVA and CNRA to report quarterly on operations with an annual report for each year operations. Both organizations have done an excellent job of reporting. The SODEVA reports are especially comprehensive, reporting on the completed year's work and projecting plans for the coming year in their annual reports.

Financial reporting and submission of vouchers for reimbursement have been adequate although there seems to be particularly long time lag between making expenditures and submitting vouchers.

7. Evaluation

The Project Agreement required annual joint evaluation of project implementation and accomplishment. One such evaluation was made in early May 1976. This consisted of a meeting with the key personnel of the GOS implementing agencies and ADO. The record of this evaluation showed that a wide range of subjects, issues and problems were openly and frankly discussed. Actions were recommended to resolve issues. The file records that action was taken in most cases.

8. The management of AID inputs by the cooperating agencies has been highly satisfactory. The time lag in implementation actions and in draw down of AID funding appear to be well within the usual AID experience in launching projects of this nature. It is also apparent that the GOS has managed the funds put at its disposition very prudently with the result that considerable savings over original expenditure projections have been achieved.

D. EVALUATION OF RESULTS

1. The Production Intensification Program

The GOS program of increasing agriculture production, farmers income and to promote improvement in the rural sector is based on the expansion of use of increasingly higher levels of technology through the use of more appropriate and greater amounts of production inputs. Three levels are defined. However, there is probably no very clear line of separation between these in actual practice. A large number of practices are included which may be used in a wide range of combinations and intensities.

The lowest level of technology (TL), after the traditional, involves a series of improved cultural practices which require few inputs; better seeds, use of light - horse or donkey - implements and low levels of fertilizers. The intermediate package (TB) includes the same cultural practices, improved seed and use of fertilizers but also involve heavier implements (oxen drawn). The highest level (TBFF) involves all the TL and TB practices, use of heavier implements, more thorough soil preparation and heavier doses of fertilizers including the basic rock phosphate application (phosphatage de redressement).

The SODEVA effort is geared to extend improved technology to the largest number of farmers and to induce a progressive shift from the lower to higher levels. A number of problems have been encountered which impact negatively on this effort, especially which respect to the highest levels: (a) hesitancy on the part of the farmers to clear land and make remedial phosphate applications because of insecure use tenure, (b) the conflict for use of labor between heavy fall plowing and harvest, (c) limited availability of implements and fertilizers.

More success has been achieved with the TL levels. This is to be expected since the incremental increase in yield with the introduction of the first increment of improved practices is usually greater than that obtained with higher increments. This is particularly true with respect to fertilizers. Moreover, the higher the level of technology the more important it becomes to adhere to all the elements and the greater are the risks of negative economic impact from poor rainfall. The farmer is therefore behaving rationally by embracing the lower levels in preference to the higher levels. This, however, does not lead to maximization of production on a national scale. While the yield effects of the different levels of technology have been demonstrated in experimental trials, it is not clear at this time to what degree this is being achieved in farmers' fields. SODEVA collects numerous data on yields under different levels of intensification. The collation and analysis of this data is being done as part of an in-house (SODEVA) evaluation of both the AID supported and the IBRD supported project. The results of these evaluations will be available in late March 1978 and should be extremely interesting.

An important element in the applied research being undertaken by the Liaison Unit of CNRA is to determine under present farm conditions the relative value of the different technology packages in terms of profitability to the farmer and in terms of applicability with respect to labor utilization and land areas of the typical farm unit. Pending a clear demonstration of the superiority of the higher levels in the hands of representative farm units it would seem that the extension effort should be geared more to the lighter input technologies. It is understood that some reorientation of the SODEVA program will emerge as a result of in-house evaluations.

2. Measurement of the Effectiveness of the Extension Effort

Some appreciation of the impact of the extension program can be obtained by observing change over time in application of recommended practices. The following tables 1-4 provide data indicative of the progress made.

TABLE 1
Progression of Extension of the Levels of Intensification

Intensification Level Numbers of Farmers	1974	1975		1976	
	Realized	Projected	Realized	Projected	Realized
Highest TBFF	247	-	264	847	432
% realized	-	-	-	-	51%
% increase over prior year	-	-	7%	-	64%
Semi intensive-TB	454	-	999	2,094	1,340
% realized	-	-	-	-	-64%
% increase over prior year	-	-	120%	-	34%
Less intensive-TL	6,000	-	9,118	5,707	12,213
% realized	-	-	-	-	214%
% increase over prior year	-	-	52%	-	35%
Intensification Level Number of hectares					
Highest (TBFF) - millet	310	-	585	1,682	925
% increase from prior year	-	-	89%	-	57%
Highest (TBFF) - groundnut	630	-	827	1,070	1,026
% increase from prior year	-	-	31%	-	24%
Combined semi and least intensive TB + TL	19,010	-	30,337	-	-
% increase from prior year	-	-	60%	-	-
TB only	-	-	-	-	14,994
Total hectares	261,505	-	271,400	-	-

TABLE 2

Use of Fertilizers*

Fertilizer Tons	1974	1975		1976	
		Projected	Realized	Projected	Realized
Groundnut fertilizer MT.	2,013	3,705	3,495	-	5,432
% increase over prior year			74%		55%
Millet fertilizer MT.	4,150	5,610	5,470	-	5,404
% increase over prior year			32%		-1%
Rock phosphate MT.	210	2,869	482	-	443
% increase over prior year			129%		-8%

(*) Deliveries of fertilizers as of July 1977 for the 1977 crop was 30% less than the figures for use on the 1976 crop. The biggest reduction was in millet fertilizers. This is believed to be due to a 25% increase in fertilizer price to the farmer.

TABLE 3

Use of Other Inputs

Input	1974	1975		1976	
		Projected	Realized	Projected	Realized
Seeders	1,056	2,490	2,354	4,508	2,944
Single plow	2,118	3,953	3,885	5,714	4,145
Groundnut lifter	807	1,757	1,134	3,412	444
Basic plow	357	719	630	1,162	599
Heavy plows	15	34	33	13	4
Horse cart	870	2,889	0	3,836	566
Oxen cart	71	172	0	324	0
Oxen trained (pairs)	432	-	1,028	-	1,176
Groundnut seed MT.	15,545	-	14,176	-	15,300
Millet seed MT.	-	-	16	-	38
Niebe seed MT.	-	-	9	-	15

TABLE 4

Integration of Livestock With Crop Production

	1974	1975		1976	
		Projected	Realized	Projected	Realized
Number of farmers	650		1,194	2,015	1,151
Cattle (numbers)	1,525		3,652	3,994	1,634
Sheep (numbers)	250		1,773	4,230	6,000 ⁺
Forage crops (farmers)	80		109	178	160
Forage crops (has)	20		33	95	61

(*) Data available for only two of the three Departments in project area.

Several points appear to be significant: (a) the rate of expansion of the heaviest input package (TBFF) has been lower than expected, while the less intensive package (TL) have expanded at a much more rapid rate. The intermediate level (TB) also failed to expand as rapidly as projected; (b) the level of use of fertilizers continued to increase with respect to use for groundnuts and millet, but less so for millet. The increase in the use of fertilizer on millet was greater between the crop years 1974 and 1975 than between the 1975 and 1976 crop years. Data for 1977 (as of July 1977) showed a considerable drop in fertilizer for millet; (c) the delivery of light agriculture implements showed a general increasing trend throughout the period while that for the heavier oxen drawn equipment remained very low; (d) the delivery of improved groundnut seeds remained at a fairly constant level while that for millet and cowpea increased substantially; and (e) the data from table 4 suggest an increasing tendency towards integration of livestock production in the farming enterprise.

A number of factors, external to the project are confounded in these data. Particularly significant was the serious shortage in heavy (oxen drawn) implements. It is difficult to determine whether this reflect lack of interest by the farmer or procurement and delivery problems by ONCAD.

The limited expansion of the heaviest input package was undoubtedly due in part to shortage of equipment although the numbers of farmers and hectares using TBFF is still low, the rate of year to year increase has been reasonably good, about 50% increase in 1976-77 from 1975-76. The number of oxen in use, however, exceeds the amounts of heavy equipment available. In 1976-77 for instance, the average pair of oxen plowed only .75 ha. Oxen are being used with light equipment with less effective results.

The increased cost of fertilizers with no increase in commodity prices has undoubtedly been the most important factor conditioning the tapering off and even reduction of use. The differential in fertilizer use on groundnuts and millet, as prices increased, suggest that the cash return from groundnuts are more conducive to procurement of fertilizer. Moreover, after two reasonably good crops of millet since the drought (1975 and 1976) the incentive to the farmer to increase millet production has probably decreased because of uncertain marketing opportunities. Severe drought during the 1977-78 crop year seriously upset the upward production trend for both millet and groundnuts.

The trend towards increasing diversification is of much interest, since this offers alternatives to the millet-groundnut rotation. Greater and more rapid extension of this trend appears to be dependent upon development of and demonstration of the value of alternatives. This is an important element of both the CNRA Liaison Unit's applied research program and of the SODEVA extension effort.

It is clear that the extension effort is producing change. It appears that greater intensification is being retarded by factors external to the project - supply distribution, marketing of output, pricing of inputs and outputs, etc. -.

3. Measurement of Impact on Production and Farmer Income

Year to year production in any given area is dependent on factors besides the use of technology. Variations in rainfall in one of the biggest variables. The relative economic outlook (perceived economic outlook, which under some circumstances could place a higher value on subsistence than on cash income) of different crops can also cause important year to year shifts in production. Consequently the impact of a production promotion effort is measurable only over a long period of time and in terms of a trend line rather than actual amounts.

The impact on farmer incomes of use of different levels of technology is also subject to some of the same variables. Limited data show a trend towards higher yields as the levels of technology increases. Farm management data to show the economic value, however, was not available from the documents reviewed. Research on this is being undertaken by the CNRA Liaison Unit.

That elements of the technology are profitable is reflected in the increasing application of them by farmers. It is estimated for example that about 70% of farmers are now using some fertilizer and a like percentage some form of animal traction. Tables 1-4 provide figures to show the progression of use of inputs and intensification practices.

The development of approaches for measuring the impact of production promotion programs on the individual farmer, on the area as a whole and on a national scale is an issue which is attracting increased attention. The IBRD and SODEVA have undertaken studies to attempt to arrive at a satisfactory approach for use by the SODEVA evaluation unit for the Sine-Saloum project. Collaborative efforts in this area should be encouraged.

4. The Liaison Unit of CNRA

The Liaison Unit established within the CNRA is a unique innovation of the project. This Unit is designed to fill the gap which has traditionally separated research from extension. The Project Paper defines the role of the Liaison Unit as follows: "the preparation of documents and brochures in a form consistent with research results and useable by the extension service. The Liaison Unit will also be charged with the conduct of applied research trials throughout the project area and for socio-economic surveys to measure the effects realized by the project at the farm level.

A proposed staffing consisted of a chief of the Unit, two agronomists at the ingénieur agronome level, 5-6 technical assistants and two expatriate advisors provided by IRAT. The actual professional staffing in February 1978 was as follows: a director, a livestock technician at the engineer level, 6 data collectors (enquêteurs) and one data analyst. The Unit receives technical support from CNRA research staff as well as the SODEVA field personnel in the three sample villages.

The activities of Unit are carried out at three points in the project area (1) headquarters at Bambey, (2) three villages, one in each of the three districts - to be increased to 5 in 1978 -, selected as typical villages for collecting socio-economic data and for experimental trials and demonstrations and (3) a station at NDiemane for experimental trials on Deck soils, these are heavier than those typically found in the project area but are of interest because of the substantial area involved.

The activities include:

(1) A sample survey of three villages including demography, land areas by farm units and by use, equipment and livestock inventory, etc. From this general survey a sample of units are selected for in-depth socio-economic study at the farm unit level.

(2) Establishment of practical trials in each of the villages to study results of technology packages in actual practical application and to identify constraints to more general application.

(3) Carry out certain specialized studies such as (a) the socio-economic impact of mechanized threshing and decortication of millet. Impact on use of labor on grain marketing, on storage, on farm revenues, etc., (b) study of improved grain storage structures and (c) study and demonstration of production diversification with respect to crops as well as livestock, including production of feed for livestock.

(4) Experimental study of production on the heavy soils (Deck) at NDiemane and design of a production system applicable to these. The area of Deck soils is understood to be very sparsely populated.

To date, as is to be expected given the experimental nature of much of the Unit's activities, only limited data have been collated, analyzed and reported in a fashion useable for purposes of evaluation.

A complete analysis of data collected by the Liaison Unit is being developed as part of a broader in-house evaluation of the project involving SODEVVA as well as the Liaison Unit. It is to be noted that concurrently an evaluation is being made of the Sine-Saloum project with the IBRD. These evaluations will be completed later in the spring of 1978. It is expected that a number of important conclusions will emerge which could result in certain changes in orientation and approach of the activities of the Liaison Unit as well as of SODEVVA.

The Liaison Unit is seen as playing a significant role in providing on a continuing basis results from practical trials and socio-economic information needed to guide the larger action programs.

4. Externalities which Impinge on Project Results

Several elements external to the project as currently constituted have an important influence on the achievement of project objectives. Among these the more important ones are: (a) input supplies and related credit, (b) marketing and storage and (c) input and commodity prices.

(a) The responsibility for procuring and distributing of inputs rest with ONCAD (Office National pour la Cooperation et l'Assistance au Developpement). Estimations of requirements are made through the cooperatives in consultation with SODEVVA agents and global requirements are provided to ONCAD. ONCAD procures and distributes, administering the allocation and collection of credit by the BNDS. One of the assumptions for project implementation was the satisfactory discharge of the supply and credit functions by ONCAD. The record show that this has been deficient in terms of quantities delivered, timeliness of delivery, and adequate coverage of the area.

SODEVA has taken some initiative to reduce the adverse impact of their deficiencies: (a) negotiated with ONCAD for reimbursement of transportation costs for delivery made by others where ONCAD would not make delivery, (b) suggested placement of inputs on consignment to cooperative under control of SODEVA at the time of sale of their groundnut crop and (c) direct procurement from the source by cooperatives. It is understood the items (a) and (b) will be made operational during the 1978-79 crop year.

(b) The marketing of surplus products from the farmer is handled by ONCAD. ONCAD is the only entity legally entitled to buy and sell commodities such as groundnuts and grain. Traditionally ONCAD interest has been concentrated on buying the groundnut crop. This coupled with limited storage facilities for grain either on the farm or the village or cooperatives creates a problem at harvest time in handling marketable surpluses of grain. It is understood that ONCAD has created a section to handle procurement and marketing of locally produced grain. This action could help resolve this problem. However, ONCAD will be unable to purchase millet this year as a direct result of the poor 1977-78 harvest.

Some efforts have been directed by SODEVA/CNRA towards introduction of improved storage facilities on the farm and at the village. The problem, however, is more complex than the simple provision of facilities. The program being introduced requires that the grain be threshed before storage for subsequent sale. Threshing millet is very labor intensive. Since the harvesting and threshing is compressed in point of time the use of mechanized threshers is being demonstrated. The demonstration of mechanized thresher has apparently had a considerable impact in the rural population. The possible impact on use of labor, timely marketing, farm revenues, etc. of mechanized threshing on family economics however is not clear, but this is being studied by the Liaison Unit.

Some farmer initiative, in improving the traditional storage facilities in which the millet is stored unthreshed as chopped heads firmly packed, has been noted. It would be well to carefully weigh the advantages and disadvantages of "improved" traditional methods as compared to more modern methods of storage of threshed grain.

(c) The importance of commodity and input prices on reaction of farmers to intensification programs hardly need be mentioned. With both commodity and input prices fixed by the Government, careful attention to maintaining a balance which provide some economic incentive is essential. The impact of increasing the price of fertilizers in 1976 on demand for 1977 was noted in table 2. Since the drought there has been little pressure of supply of grain in the market, because surpluses over consumption needs have been divided between sales for immediate cash and reconstitution of

farmer held reserves. The favorable prices for millet since the drought - the GOS raised official prices by about 40% while the parallel market has offered even higher prices - has undoubtedly contributed to the expansion of production in the past few years. When significant surpluses develop, however, the guarantee of a reasonable price to the farmer can become important to his decision to produce.

E. RELATION TO PROJECT OBJECTIVES, PURPOSE AND GOAL

The Project Paper established the following as objectives of the project:

- (1) To encourage production of cereals in rotation with existing cash crops to provide farmers with their basic food needs.
- (2) Gradually increase farmers incomes by introduction of more rational production methods which will improve productivity and lead to commercialization of the increased millet crop.
- (3) Assist in expansion and strengthening of the Senegalese Agriculture Extension Service (SODEVA).
- (4) Expand the current program of applied research to village farm cooperatives and intensified farms to serve as models for more generalized agriculture development throughout the groundnut basin.
- (5) Develop the necessary rural infrastructure to assure continued overall agricultural development in the area.

The ProAg established essentially the same objectives though in somewhat greater detail, and included some quantification of some of the objectives. A set of inputs were prescribed which were to lead to specific outputs which were to contribute to achievement of a purpose and goal.

The project inputs have been realized as projected except for some time lag in implementation of projected levels (see section C). The use and management of inputs by the implementing agents has been on a high order of effectiveness.

The outputs have also been realized to a substantial degree. The output relating to numbers of farmers adopting intensification practices was approximately reached in terms of total numbers. However, the number practicing the higher levels of intensification, although increasing by 75% fell short of projections (see sections D.1 and D.2).

A dual purpose was defined in the Project Paper: (a) to assist the GOS to achieve a higher and self-sustaining level of productivity in the agricultural sector and (b) to support the effort of the Senegalese implementing agency, SODEVA, to diversify and intensify productivity in the West Central region of Senegal's groundnut basin.

The objective measurement of progress toward achievement of the (a) purpose is not feasible at this point, nor is it realistic to have anticipated that such would be available in the short time since the project was begun. This is discussed more fully in section D.3.

The project has made a substantial contribution to the (b) purpose through additions to infrastructure and equipment, additions to personnel strength, training, and the creation of the CNRA Liaison Unit. The adoption of production intensification practices and the production diversification initiatives also contribute to achievement of this purpose.

The program goal was defined: to contribute to economic development of agricultural productivity, particularly in cereals, in an important area of the country's groundnut basin.

The objective measurement of progress toward achievement of the project goal is likewise not feasible at this point see D.3.

The project objectives have been reached to the extent that measurement is feasible. Objectives 1, 3, 4 and 5 have certainly been reached.

F. CONCLUSIONS AND DIRECTIVE FOR A PHASE II PROJECT

1. No provisions were explicitly made for continuation of the project after cessation of AID support after March 31, 1978. The Project Paper suggested that any funds remaining at that date due to lag in expenditures or unused contingencies be allocated to extending AID support beyond the terminal date or for similar actions in other areas.

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The Project Paper made the assumption that the GOS would finance continuation of the SODEVA production promotion program beyond the terminal date of AID support, and suggested this would probably be at a somewhat reduced level. Moreover the possibility of obtaining additional external assistance was admitted.

The probabilities of the GOS supporting the project at present levels, even after assuming that infrastructure expenditures in the future will be limited, seems remote, given that payment of salaries alone accounted for about 50% of all AID financial supports for SODEVA. If salaries, training and demonstration and operating expenses are taken into account, AID support becomes almost 70% of the total. The additional annual cost to the GOS for continuing the project at the current level of effort is thus seen to be on the order of twice the total GOS input in the project for the year 1976-77, an amount not likely to be forthcoming, particularly in view of the 1977 drought. Assuming a 25% or even a 50% reduction in the level of effort will require increases of 82% and 22% in GOS expenditures over those for 1976-77.

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It is clear therefore that continuing even an acceptable level of effort will require external support.

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It is understood that funds still remaining in the project are approximately sufficient to fund one additional year's operation (thru March 31, 1979) at either the full level or at a somewhat reduced level.

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It would seem that the remaining funds should be used to finance continuation of the project rather than in planning for expansion to other areas. To do otherwise would place in jeopardy the extension structure which was fielded during the past 3 years.

A second phase of the project was anticipated. It seems that as far as SODEVA is concerned extension into a second phase is a foregone conclusion.

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A second phase could consider three alternatives: 1) termination of AID support in the current project areas with the 1978-79 crop year and transferring AID assistance to a new areas; 2) continuation

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support system improvements in technology are developed on a continuing basis. As technology becomes more complex, and as farmers become better attuned to accepting useful technologies, the needs of extension is more for better trained agents and less for the massive grassroot effort (encadrement lourd). This evolution of extension services should be factored in the planning of training, personnel levels and budgetary requirements.

An additional element which bears emphasizing is that individual farming units vary considerably as to circumstances and adaptability of any set of measures. The blanketing of a total population with a single set of measures must give way to providing sets of alternatives. Real development will occur when each individual will have chosen those good elements which are adapted to his own circumstances and to his perception of /

2. The draft evaluation paper by the AID contract team and the SODEVA and CNRA reports indicate a preference by the farmers for the semi-intensive levels of technology. In fact the higher levels (TBFF) of technology, as presently practiced in farmers fields appears to offer little productivity advantage over the less intensive levels. This is in part due to the less than complete application of the package by many TBFF farmers. Admittedly the data to support this conclusion is weak, nevertheless a total review of this issue should be made in design of a second phase whether in the present project area or in other areas. It would be well to compare observations in the IBRD-CCCE supported Sine-Saloum area to those emerging from the SODEVA/AID project. The data being developed by the Liaison Unit of CNRA and the two in-house evaluations, SODEVA/AID and SODEVA/IBRD which should be completed in March 1978 should help to clarify this point.

3. Throughout the AID contract team's draft report and also in the SODEVA reports reference is made of the impact of certain elements, external to the project, on achievement of project objectives. There are discussed in section D.5 of this report. The design of a second phase project should carefully consider means of reducing or eliminating the adverse impact of these factors.

4. The limitation in the availability of objective data seriously limits measurements of project accomplishments towards achievement of project purpose and program goal. This problem is common to most projects of this nature. It is understood that SODEVA/CNRA collect considerable amounts of data in the project area. This data should be collated and analyzed as far as possible to determine its adequacy, as well as to serve as a basis for designing more adequate data collection methods and content. Particular attention should be given to study and measurement of social impact. A second phase design should focus special attention on this issue. Comparative experience with other projects, especially the Sine-Saloum project should contribute to some

degree of resolution of this problem. The on-going evaluation of both the AID supported and the IBRD supported projects will probably provide the analysis required.

5. While, the role of the Liaison Unit of CNRA is well conceived, it seems that the scope of its activities exceeds the capacity of the existing staffing and perhaps also of facilities. After three years of functioning, a review of the role of this unit and the adequacy of its resources should be in order.

6. The current project was designed to increase cereals (millet principally) production in a given area in the groundnut basin. Increasing grain production was seen as a means of achieving more rational crop rotation and as a means of increasing farmers incomes through sale of surplus grain.

This objective was consistent with AID as well as GOS strategies at the time of project design, and reflected priorities after several years of serious drought. As implementation proceeded, however, it became apparent that this narrow focus was too limiting. In practice, the SODEVA program has affected not only grain but also groundnuts production. Some other production diversification elements have been introduced as well.

The design of a second phase project should embrace a broader strategy; a strategy which would seek to maximize returns to the farming unit, consistent with preservation of production potential, and optimize comparative advantage at the regional and national levels.

7. SODEVA as the GOS agent charged with agriculture program in much of the dry land areas has initiated actions which go beyond the original concept of the Senegal Cereals Project, e.g. initiatives to integrate livestock production in the farming system, initiatives to expand the crop production base, initiatives in the area of forestry, etc. Such initiatives should be encouraged and supported in so far as a sound basis for these actions can be discerned. Soil conservation and fertility improvement undertakings would seem to be especially appropriate. The application of basic rock phosphate to the phosphate impoverished soils in the groundnut basin (phosphatage de redressement) appears to merit special attention. Since the results are not immediate but accrue over a longer period of time there is a hesitation on the part of the farmer to make the investment in this practice. Although currently partly subsidized, a more substantial or even complete subsidy to achieve more general application of this practice might be considered. The support of such a practice would represent more of a direct investment in soil fertility and hence production potential than a production input of short duration.

8. The project has provided very limited participant training. Only two short term participants received training during the first three years. The requirements for higher level personnel in SODEVVA as well as in the Liaison Cell should be carefully analyzed by a second phase design group so that the longer term needs can be anticipated and provided for in replacement of expatriates in keeping with GOS policies and for general upgrading of extension staff.

9. Careful consideration should be given to 1) the need to continue the expatriate technical assistance element and 2) the most effective way to use this technical assistance. It is understood that SODEVVA plans to discontinue this assistance. It is not clear whether this reflects a careful analysis of need or relationship problems between the expatriate individuals and GOS personnel. It was not possible to undertake an analysis of this issue. The draft contract evaluation report deals with this issue in some detail. This is appended to this report under section F.1.

10. The project as originally structured essentially provided for a transfer of AID resources for project implementation. Certain elements of the resources transfer could be considered as investment in the development of the capabilities of the GOS to manage and operate agricultural development programs, e.g. physical facilities and certain capital equipment, investment in training and some portion of the investment in personnel. At the same time an important percentage of the resource transfer was essentially a subsidy to current personnel and operational budgets. Much of this type of expenditure is likely to have more limited lasting impact. Although within the context of the Sahel Development Program recognition was made of the need to support local operations costs, it would seem that the question of balance between investments in improvements of a lasting nature and current operations financing should merit serious attention.

11. To the extent feasible the design of a second phase project should be undertaken jointly by GOS (SODEVVA and CNRA) and ADO personnel with only such outside consultants as may be necessary to accomplish the task in a reasonable time frame.

F. J. LeBeau, Consultant

February 11, 1978