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**FILE**

Senegal

AGENCY FOR INTERNATIONAL DEVELOPMENT  
**PROJECT PAPER FACESHEET**

1. TRANSACTION CODE  
 A ADD  
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2. DOCUMENT CODE  
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3. COUNTRY ENTRY  
 Senegal

4. DOCUMENT REVISION NUMBER

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 685-0209

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 Senegal Grain Storage

8. ESTIMATED FY OF PROJECT COMPLETION  
 FY  8  7

9. ESTIMATED DATE OF OBLIGATION  
 A INITIAL FY  7  7 B. QUARTER  4  
 C. FINAL FY  7  7 (Enter 1, 2, 3, or 4)

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$) -

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L. C.	D. TOTAL	E. FX	F. L. C.	G. TOTAL
AID APPROPRIATED TOTAL	2336	2569	4905	2336	2569	4905
GRANT	4905	( 2336 )	( 4905 )	( 2336 )	( 2569 )	( 4905 )
LOAN	0	( )	( )	( )	( )	( )
OTHER	0					
U.S.	0					
HOST COUNTRY	6242	183	183		6242	6242
OTHER DONOR(S)	0					
TOTALS	2336	2752	5088	2336	8811	11,147

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

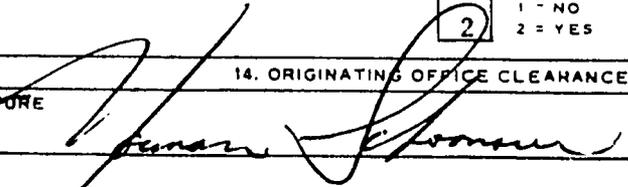
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY		H. 2ND FY		K. 3RD FY	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN	B-154	140		4905					
(2)									
(3)									
(4)									
TOTALS				4905					

A. APPROPRIATION	N. 4TH FY		Q. 5TH FY		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	D. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) FN					4905		MM YY <input type="checkbox"/> 0 <input type="checkbox"/> 2 <input type="checkbox"/> 8 <input type="checkbox"/> 2
(2)							
(3)							
(4)							
TOTALS						4905	

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 - NO  
 2 - YES (No PID Facesheet available)

14. ORIGINATING OFFICE CLEARANCE

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TITLE  
 Regional Development Officer, Dakar

DATE SIGNED  
 MM DD YY  
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15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION  
 MM DD YY  
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## TABLE OF CONTENTS

	<u>Page</u>
I. PROJECT SUMMARY AND RECOMMENDATIONS	1
A. Recommendations	1
B. Project Description	1
C. Summary of Findings	3
D. Project Issues and Questions Raised by PRP Review	3
II. PROJECT BACKGROUND AND DESCRIPTION	9
A. Background	9
B. Detailed Description	12
III. PROJECT ANALYSES	17
A. Technical Analysis	17
B. Financial Analysis	21
C. Social Analysis	27
D. Economic Analysis	30
IV. IMPLEMENTATION PLANNING	44
A. Administrative Arrangements	44
B. Implementation Plan	45
C. Evaluation Plan	48
D. Conditions, Covenants, Negotiation Status	48
V. ANNEXES	
A. PRP Approval Message (State 303122)	
B. Technical	
1. Training Program	
2. Warehouse Design and Engineering Comments	
3. Storage Management and Control	
4. Location of Warehouses	
5. Financial Backup Tables	
6. GOS Financial Situation	
C. Initial Environmental Examination	
D. Logical Framework	
E. Project Performance Tracking Network	
F. Statutory Checklist	
G. 611 (e) Certification	
H. Draft Project Description for Grant Agreement	

## PART I. PROJECT SUMMARY AND RECOMMENDATIONS

### A. Recommendations

1. Grant financing of up to \$4,905,000 is recommended, of which, \$3,703,000, will be for the construction of 30,000 metric tons of grain storage warehouse capacity.<sup>1/</sup> Of the remaining \$1,212,000, the majority, \$843,000, is for training, technical assistance and evaluation with \$359,000 earmarked for commodities.

2. Life of project funding is recommended in order to assure flexibility and the capacity to accelerate the construction schedule in the event of a significant increase in grain production early in the project. (For explanation see Part 3, D., Economic Analysis.)

3. One waiver is requested for vehicles. See Part 4, Section A, page 47. All other procurement of goods and services will be accomplished in the US and the host country, Senegal.

### B. Project Description

The Senegal Grain Storage Project constitutes the AID input to a major GOS multi-donor effort to improve the capability of the national marketing board of Senegal, the Office National de la Coopération de l'Assistance pour le Développement (ONCAD), to store and market locally produced millet and sorghum.

The total cost of the project is \$11,147,000. An addition to the above recommended AID inputs. The GOS contribution is estimated at \$6,241,614 for the procurement of an initial quantity of grain for a reserve stock, supervision of construction, operating expenses and the cost of maintaining a security stock.

Through this project USAID will finance construction of 30,000 MT of storage and carry out a training program to improve food grain storage practices. This construction input plus 30,000 MT now being constructed by the GOS will provide 60,000 MT <sup>2/</sup> of storage capacity in Senegal. In addition, AID will finance in-country and overseas training in grain storage management and cereals preservation science for 715 ONCAD management and technical personnel and provide 4 man-years of external technical assistance to organize and facilitate the training, grain storage management, cereals preservation, and storage facility construction.

1/ Originally construction and equipment were to be loan financed. See Part I, D.1., Item A, for justification for grant financing.

2/ A capacity of 120,000 MT is foreseen by the GOS as necessary in five years time. (See both technical and economic analyses).

The project will be administered by ONCAD with the assistance of two full-time technical specialists to be financed by the project. ONCAD's Technical Bureau, which includes engineering expertise, will be charged with generally monitoring the construction portion of the project, although funds are provided for independent engineering and construction supervision. Equipment to be purchased by the project for use in the storage warehouses will be under the supervision of the ONCAD Technical Bureau.

The training of ONCAD management and warehouse personnel will be the responsibility of the Personnel Bureau of ONCAD. An AID financed Grain Storage and Preservation Advisor will play a leading role in formulating and evaluating the training program.

This project is part of a larger effort to provide adequate grain storage capability which Senegal, using its own financial resources, has initiated. The AID financed construction will provide one segment of the expanded storage capacity of ONCAD and will permit the GOS through ONCAD to build a security stock of food grains for use during years of reduced local production. The project will also assist Senegal to effectively administer a program of cereal grain commercialization by balancing annual supplies between surplus and deficit areas within the country.

The training to be provided under the Project will enable ONCAD to reduce storage losses in existing and newly constructed storage facilities and will improve ONCAD's management capability in the area of grain storage and preservation.

The project supports a basic policy of the Government of Senegal, strongly encouraged by AID and other donors, to work towards self-sufficiency in basic food grains. AID supports this endeavor through its Senegal Cereals Project in the Groundnut Basin (Project No. 685-0201) with over \$3.8 obligated to date, the small irrigated perimeter Project in Bakel, and the Sahel Crop Protection Project (\$787,000 obligated to date). Other donors such as IBRD and France have major cereals production programs similar to that financed by AID, notably in the groundnut basin, but also in other regions of Senegal. In the Senegal River Basin Region over 4,000 hectares have been developed with multi-donor assistance, and AID is planning major programs in food grain production both there and in the Casamance. All of these programs and projects aimed at increasing food grain production demonstrate the need for a capacity on the part of Senegal's grain marketing organization, ONCAD, to purchase, store, manage and market such food grains. In fact, the success of the entire effort is dependent on ONCAD's capability in this respect. It is the purpose of the present project to provide the basic and fundamental infrastructure and the technical expertise and training, to enable ONCAD to manage and supervise a successful food grain program which AID and other donors have encouraged and supported Senegal to do.

### C. Summary of Findings

The analysis in this paper is in response to recommendations presented in the DAP and the IBRD Agricultural Sector Analysis of Senegal that the implementation of a national security stock program is of great importance if Senegal is to be self-sufficient in cereals in the medium to long term. The paper proposes a phased program linked to production increases with flexibility to permit a rapid expansion of capacity if required to meet the needs in a year of unusually high cereal supply.

ONCAD already has experience in building storage facilities of the type to be financed by the project. Currently 30,000 MT of pre-structured warehouses are being constructed by the GOS. Improved grain storage techniques will be adopted by both ONCAD managers and warehousemen to be trained by the project.

As a marketing institution, ONCAD has had considerable experience, first in the marketing of groundnuts and, since 1973, in the marketing of millet, sorghum, rice and corn. The implementation of the project is within ONCAD's organizational capability and the project will provide ONCAD with a more efficient and better trained grain storage management and warehouse staff.

It is the conclusion of the paper that the GOS has taken significant steps toward rationalizing their pricing policy by eliminating the subsidies to urban consumers of rice and raising the producer prices of locally grown millet and sorghum. It is also concluded that, while the current millet vs. peanut price may need some adjustment in future years, there is not sufficient data available at the present time to fault the appropriateness of present millet and sorghum farmgate price policy. Several studies are currently underway or proposed which will develop information to assist setting price policy based on farm costs.

With respect to 611 a requirements, sites, detailed drawings and cost estimates have all been reviewed by the REDSO engineer assigned to the PP team and have been found acceptable. Detailed technical project analyses are contained in Section 3 and the Annexes of this PP. All aspects of the project are technically, financially and economically feasible and are within the current technical capability of the Government of Senegal (GOS) to implement.

### D. Project Issues and Questions Raised by PRF Review

#### 1. Special Issues: Loan vs. Grant Financing (See Annex A, Paragraph 3.A.)

Item A. Should the project be grant or loan funded? : The PP recommends grant funding of the entire package. 1/

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1/ The PRP cable asked the question in terms of technical assistance and training only, as originally construction and equipment were to be loan financed.

The grain storage program is an integral part of a donor supported GOS policy of achieving self-sufficiency in food production.

The GOS made very difficult and costly internal policy decisions in order to move toward this goal of self-sufficiency. It has modified the price structure for cereals to provide farmers with an incentive price which is quite competitive in order to stimulate production. This action required increasing consumer prices (always politically unpopular) and also budgeting to provide the farm price support.

Supported by the donors (IBRD, USAID and FRG), the GOS has instituted a policy of developing a security stock in order to have in-country stocks available in years of decreased production. It has begun construction of warehouses financed from its own limited budget in order to get a head start on the program. Recognizing that a security stock is expensive to maintain, the Government has decided that it is worth the expense to become self-reliant in food grains.

As discussed in Section 3.D., Economic Analysis, the project is critical, both to help insure a supply of grain in years of low production and to maintain a reasonable cereals price in years of high production. It is clear that the absence of storage facilities can be a serious deterrent to production. Thus this project is complementary to several other AID grant projects on going (SODEVA) and proposed (Casamance project, Senegal River Basin projects) as well as to other donor production projects (IBRD, FAC, FED, Central Bank). Without a commercialization mechanism the success of these projects will be limited.

There are two basic considerations in determining the validity of loan financing a project:

1. The profitability of the activity to be developed under the project; and
2. The ability of the country to repay the loan when it becomes due. Analysis of both of these considerations indicates the appropriateness of grant financing.

Despite the fact that increased storage is critical to the food grain sector, the project does not produce income. As discussed in Section 3, C., Financial Analysis, a security stock is expensive to maintain. Its purpose is to maintain a reasonable price to farmers and to provide an adequate supply to consumers at a reasonable price even in bad years. Therefore the full costs of maintaining the storage are not passed on to consumers but rather are absorbed by the Government. The cost of maintaining the security storage is estimated at \$590,000 per year for the 30,000 tons to be constructed by AID (See Annex B.5). The benefits offsetting these costs are social, political and economic in the form of future savings but do not accrue as cash on a regular basis to permit the project to show a positive cash flow from which to draw loan repayments.

In terms of the capability of the GOS to repay the debt we must look at its overall debt load, balance of payments and foreign currency reserves.

Senegal's external public debt has been increasing at a rate of some 20 percent per annum to a level of \$300 million at the end of 1975. <sup>1/</sup> Approximately half of this debt is long term credit from foreign donors. The servicing of the debt is clearly a heavy burden to the GOS and in 1973, during the drought, France forgave some of its old debts.

Senegal has exhibited a deteriorating balance of trade position over the past nine years due primarily to the drought but also to unfavorable export prices for its major exports, phosphates and peanuts, and the inflated prices of imported energy and consumer goods. This trade deficit has only partially been offset by surpluses in the services account and by unrequited transfers. Thus the overall balance of payments remains in a serious deficit position.

At present, Senegal's net foreign exchange position fluctuates quite widely depending on the sales of export crops (peanuts for the most part). However, in recent years the net official reserves have been more often negative than positive. (See Annex B-6 for details of monetary and trade situation).

Taking the above into account, it is apparent that the GOS, trying to effect a recovery from the very serious drought, and already carrying a sizeable debt load with a weak balance of payments and foreign reserve position, should not be saddled by AID with yet another debt for a project which requires heavy budgetary support for operations. In addition, as the project is part of an overall program of food self-sufficiency that AID has been encouraging, a grant is felt to be more appropriate to our approach.

## 2. Questions Raised by ECPR Review

The questions raised at the ECPR PRP review as outlined in State 303122, December 24, 1975, are addressed in the body of the PP. A brief summary of the resolution of each point raised in the cable is discussed below.

(a) What assurances are there that warehouses will be used only for food grains and not peanuts?

Several factors discourage such a practice. First, groundnuts for export are stored in silos because it is easier to move them in and out, as opposed to warehouse storage which is not adapted to storage of groundnuts. Second, the volume of groundnuts stored at any given collection center for processing or export dwarfs the capacity of 1,000 to 2,000 MT warehouses.

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<sup>1/</sup> IBRD, Senegal - Recent Economic Developments, November 1976.

Senegal produced over a million tons of peanuts last year and has traditional methods for handling such production. Moreover, the sites and designs for the storage facilities are based on food grain considerations. Some of them are not even located in peanut producing areas. Third, in normal production years the peak period for piling groundnuts is immediately after harvest, i.e. at the start of the dry season, when little covered storage is required. A major portion of the groundnuts are processed prior to the onset of the next rainy season. When this is not accomplished, the piles are covered with tarps and this type of protection appears to be adequate. Fourth, adequate covered storage already exists for groundnut seeds. Fifth, the GOS has committed itself to a policy of creating a food grain buffer stock and has launched the warehouse construction program to store the food grains, not peanuts.

- (b) Does the GOS plan to announce buying prices before planting and hold to that price through the harvest?

In the past, ONCAD announced the cereal prices and quantity to be purchased in the fall, but starting in 1976 the price announcement was made in May. There is no reason to believe that the newly established practice of spring announcement will change in the future. The GOS has assured AID that it is well aware of the requirement to announce and maintain buying prices for an effective commercialization program. The announced prices and quantities to be purchased are the responsibility of ONCAD. If in the past, the quantity purchased has not matched purchase goals, the lack of storage facilities has been one of the major impediments to fulfilling purchase mandates.

It is expected that most millet purchases will take place during the harvest in October, November, December, and then a smaller amount in April and May. During the months of January, February and March, ONCAD will be primarily involved in groundnut purchases. Millet planting occurs from mid-June through July depending upon the arrival of the rains. Farmers attempt to schedule millet planting to coincide with the beginning of the rainy season and groundnuts are planted just after rains begin. Thus, a May price announcement, which guarantees a minimum price for the year, will provide a planning horizon for farmers to make planting decisions. Before the May announcement farmers have already considered the minimum amount of land necessary for crop rotations and basic food supplies for the family, but the price announcement could affect the allocation of the marginal amounts of land and the intensity of purchased input application.

- (c) What will be the projected grain flow into and out of storage over the crop year? What are peak storage capacity requirements and the length of time such capacity is needed?

By January 1 of 1980, the 60,000 MT of additional storage should be filled to capacity. After this time the system will be maintained so that 1/3 of the reserve is replaced each year. Thus 20,000 MT will be bought in October and November of each year, redistributed to deficit warehouses in

December and January and drawn down between January and August. The annual pattern will be to fill warehouses at the beginning of the calendar year and to draw them down by September of that year. See Part 3, D., Economic Analysis, for projections of warehouse use.

(d) Reconfirmation of construction costs: See Annex B-2 and B-5.

(e) Social Analysis and Identification of Beneficiaries: See Part 3, Social Analysis.

(f) Impact of pesticides and insecticides. See Part 3, Section A, and Annex B-3.

(g) Can the local design warehouses be modified to meet some of the drawbacks outlined in the PRP?

Yes. See Part 3, A.2., Construction.

(h) Evaluation Plan:

An evaluation plan has been prepared and included in the Project Paper in Part 4, C.

(i) What are the long run implications of high grain prices?

Prior to 1974 the Government of Senegal followed a policy of subsidizing consumption of cereals. The rationalization of the price structure, however, began in the fall of 1974 with the GOS setting farmgate prices equal to or exceeding the annual mean parallel market price. In fact, the official price now actually serves as an incentive price as it constitutes a floor price. The GOS has raised consumer prices to a reasonable level and subsidies have declined accordingly. See Part 3, D., Economic Analysis, for details.

(j) Why are 200,000 to 300,000 MT of buffer stocks needed by the GOS?

As a long range goal the GOS intends to constitute a reserve stock of 200,000 - 300,000 metric tons. These quantities represent from 21.9 percent of 32.8 percent of the 1974/75 production of the four major cereal crops in Senegal and 25.7 percent to 38.6 percent of the 1975/76 production. In terms of consumption, the proposed buffer stocks of 200-300,000 MT represent from 18.8 percent to 28.2 percent of the 1974/75 consumption and from 21.9 percent to 32.9 percent of the 1975/76 consumption. The storage stocks of food grains in the United States has never fallen below 40% of annual consumption and the normal volume of stored food grains is 100% of one year's consumption. Canada, by law, requires stored stocks representing 100% of one year's consumption. Senegal's proposed stocks are a considerably smaller proportion than would be acceptable practice in the United States.

Over the medium term, the goal is to construct adequate facilities for the storage of 120,000 MT, approximately one-half of which would be security stocks. Experience gained over the medium term would provide the basis for decisions on the quantities of grain the GOS could reasonably be expected to buy and store as well as permitting it to evaluate the rate of increasing cereal production and the optimum amount required for a security stock over the long term.

(k) What evidence is there that ONCAD has sufficient experience in agricultural procurement and marketing to justify this effort?

ONCAD, the organization which markets groundnuts, will also operate the cereal program. ONCAD handles over 1,000,000 tons of peanuts per year. Farmers who produce groundnuts are also millet producers, and, thus have long been familiar with already established ONCAD buying stations. It is recognized that grain buying, storage and other marketing activities will be an additional burden on ONCAD. But, compared to the million or more ton groundnut program, the 30,000 - 60,000 ton grain program is not a great marginal increase. It is certainly within ONCAD's capabilities.

In 1974, ONCAD purchased 30,000 metric tons of millet and in 1975 it purchased 18,000 metric tons. Thus, there is a demonstrated capability in such transactions. The training component of the project will also increase the capability of ONCAD in its new cereal program. (See Part 3, D., Economic Analysis for a complete discussion).

(l) Will AID's technical assistance be adequate?

This issue is addressed in the Detailed Description, Part 2, B., "Training" and Annex B-1. It is felt that the comprehensive training program described will alleviate the need for additional technical assistance beyond the one long term grain storage advisor recommended.

With respect to marketing and price analysis, one element of the project will be to provide US training in economic analysis to an ONCAD participant who would be assigned to the grain marketing activities of ONCAD upon return. Overall cereals pricing is determined by the Committee on Major Agricultural Products, an Inter-ministerial Council. As in all Sahelian countries, cereals pricing and policy is a highly sensitive issue for the top level of the Government and there is no question of providing direct technical assistance for this because it would not be acceptable. In addition, ADO/Dakar has been discussing with the GOS the possibility of providing assistance for an agricultural sector analysis and recently the Minister of Rural Development raised the question of AID providing assistance in statistics and documentation for agricultural information within the Ministry. Discussions with the Institute for Scientific Agricultural Research (ISRA) are being carried on looking to the possibility of AID providing assistance to make farm production cost studies as part of an agricultural sector analysis. At present GOS pricing policy has been rationalized since 1974 and, as discussed under Part 3, D., of this paper,

is well in line with available information and data. Improvement of pricing policy will depend on basic research and data collection such as ADO/Dakar is discussing with the GOS, but an additional advisor is not believed to be appropriate or necessary for this project specifically.

- (m) Of the 600 ONCAD personnel who will participate in this project and related activities, how many are new and can ONCAD support them?

Nearly all the personnel required for the project are presently employed by ONCAD. The program will be aimed at more efficient usage of existing personnel rather than developing new staff. Increased personnel costs amount to less than 10% of the GOS contribution. The increased operating costs associated with the project have been agreed to by the GOS.

- (n) Would this project be a disincentive to on-farm storage or future development of cooperatives?

The "C" in ONCAD means cooperatives. ONCAD works with cooperatives in its cereal marketing functions the same as it does in groundnut marketing and for distribution of fertilizer and seed. The project will further encourage cooperative development.

Farmers have not been engaged in storage of a national buffer stock but do store enough grain (estimated at 1 year's requirements in excess of present year) to serve as their own "insurance stock". This project will not touch that stock, as it would require a violent shift in the price structure to induce the farmer to sell out his own stock. The project, however, will encourage commercialization of excesses of production, and, by guaranteeing a market, may stimulate increased production.

3. Remaining Issues in Paragraph 3 of State 303122 are covered as follows:

Item B. Warehouse Construction: See Part 3, A.2., Technical Analysis, for analysis and description of the type of construction to be utilized. With respect to 611 a, see Part I,C. Concerning GOS construction of its own 30,000 MT capacity, local construction is already under way, as noted above, and the engineer member of the PP team checked the plans. With respect to adequate supervision of AID financed construction, see Part 3, A.2. Supervision engineering services are funded by the project. Periodic inspections will be made during the construction phase to assure that specifications are adhered to. The construction contractor will be approved by AID. Technical details relating to design and construction will be found in Annex B,2.

Item C. Is this project the "least cost" approach to resolve the need for grain price stabilization?

See Economic Section discussion of Benefit/Cost of Project and Alternatives.

## Part 2 - Project Background and Description

A. Background - In recent years there have been increasing staple food deficits in the Sahelian countries. These deficits have been the result of several factors including successive years of poor rainfall and, more important, level or decreasing productivity in the face of substantial population growth. Consequently the countries have been forced to request large amounts of food inputs from the donor countries or, as in the case of Senegal, depend upon considerable commercial food imports to feed its population.

In the late 1960's the African States became increasingly concerned about this situation and requested a review and analysis. Major studies financed by AID which addressed the problem relative to the Senegal situation were: "Production and Marketing of Cereals in West Africa", Checchi & Company, March 1970, and "Regional Grain Stabilization in West Africa", Kansas State University, December, 1970.

The conclusions of these studies are essentially the same and can be summarized as follows:

1. There are substantial possibilities for increasing cereal grain production within the limits imposed by weather conditions, through the adoption of improved cultural practices and improved varieties; and
2. A necessary condition for increasing food production is the regularization of commercialization through accumulation of adequate buffer stocks, efficient distribution of grain where and when needed, stabilization of wide fluctuations in farmer and consumer prices and increasing the dependability of farmer income, thereby providing incentives to increased food production.

Since the publication of these reports, and spurred on by the intervening years of drought which made evident that more attention to the agricultural sector was absolutely essential, the Government of Senegal has given increased priority to agricultural development. This is reflected in the 4th Four Year Plan which has just been completed and is apparent in the preliminary outlines of the 5th Four Year Plan (1978-1982).

To reduce its dependence on imports <sup>1/</sup>, Senegal is attempting to increase production of grains such as millet, the main foodcrop, sorghum, corn and rice.

Millet and sorghum are the basic food grains produced in Senegal. In 1974-1975 production of these grains totalled 588,822 metric tons. In Senegal, millet and sorghum production are usually reported as composite figures with millet normally representing three-fourths or more of the composite figure.

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<sup>1/</sup> Senegal's annual food grain imports are approximately 150,000/200,000 tons of rice, 80,000/110,000 tons of wheat and some 50,000 of other cereals, including sorghum and millet.

As a part of the overall GOS policy with regard to cereals, concerned efforts have been underway for four years to stimulate production within the country. These special efforts have been carried out by SO.DE.VA. (Société de Développement et de Vulgarisation Agricole) initially in the Siné-Saloum region with assistance from the CCCE (Caisse Centrale) from 1972 to 1975. A similar project was initiated by AID in March, 1975, with SO.DE.VA. in the Thiès and Diourbel regions, whereby a package of technical practices are introduced on farms through extension activities to intensify local production. Emphasis is given to animal traction, improved implements, fertilizers, and good quality seed, which are factors known to increase yields of millet and sorghum grown in the area. The IBRD recently completed a study of the SO.DE.VA./CCCE project in Siné-Saloum and as a result extended credit totaling \$15 million to continue and expand the effort.

The IBRD Agricultural Sector Study for Senegal<sup>1/</sup> states that in addition to the technical packages being developed, success in increasing domestic grain production especially of millet will depend on producer and consumer price policies, continued progress in millet processing and improvements in grain marketing and storage facilities.

In the area of pricing, the Government of Senegal has taken several important and politically difficult steps toward improving agricultural pricing and marketing policy, such as the elimination of subsidies on imported food items which were principally of benefit to the urban consumer.

Import subsidies were eliminated on rice, wheat and sugar and as a corollary, to encourage domestic production, the farm gate price of millet, maize, paddy rice and groundnuts was sharply increased. The result of this policy has been to discourage the over-consumption of imported food products, particularly rice, while at the same time stimulating domestic production. Concomitantly, subsidies formerly paid from the Government's agricultural stabilization fund were made available to support higher prices to the producers and for long-term investments in the agricultural field.

Actions proposed to increase the supply of foodcrops through production schemes and through the mechanism of pricing policy cannot achieve significant results if, in the meantime, no action is taken on the demand side. Millet preparation is a serious constraint on its popularity. It takes much longer than does rice and its home processing is not well suited to an urban environment. Fortunately a program of research into millet food technology being undertaken by the Food Technology Institute (ITA), gives promise of successful commercial development of a dry, stabilized millet flour and millet couscous.

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<sup>1/</sup> Agricultural Sector Study Survey, November 3, 1975. Report No. 910-SE, Vol. I.

Whatever the long-term solution, there is presently a substantial demand for millet in both rural and urban markets which should be exploited. The reduction in the subsidy on the price of rice to the urban consumer has, in part, increased the demand for the cheaper and more readily available grains, such as millet. The inefficiencies in marketing practices and storage facilities, however, has been a major deterrent to supplying the urban demand for both processed and unprocessed millet.

The IBRD Agricultural Sector Survey discusses the risks involved in agriculture in Senegal and states that "the risks in millet marketing could be further reduced by improving marketing procedures and facilities involving perhaps the establishment of over-the-year storage facilities so as to even yearly fluctuations". In addition, the AID DAP for the Central and West Africa Region states on page 25 that "investments must change the basic character of the economy so that it will no longer be at the margin of survival and subject so completely to the adverse effects of nature". It goes on to state on page 32 that "A grain program which addressed the problem of contingency storage and safe storage (since losses are high) might be able to increase marketable surpluses".

Accordingly, this project is aimed directly at the constraint identified in both the IBRD sector survey and in the AID DAP, the provision of adequate facilities for the storage of grain, both as an annual buffer stock and as a long-term security or contingency stock, as an important complement to any production program.

As described in the economic analysis section of this paper, ONCAD has demonstrated the capability to manage major commercialization schemes by handling commercialization of one million tons of peanuts per year. ONCAD has a mandate from the Government of Senegal to intervene in the cereals marketing activity and has demonstrated over the past few years that it is interested in and capable of intervening in the cereals market. However, in order to be effective in the market and to constitute a security stock it must have an effective storage program.

Therefore, in 1975 USAID/Dakar requested that Kansas State University supply a team to act as technical advisors to review the grain storage and marketing system in Senegal with specific emphasis on the need for grain storage facilities to maintain a reserve stock of grains and a program to train Senegalese in grain storage and preservation. The KSU report, entitled "Recommendations for Grain Storage and Preservation in Senegal" was completed early in 1976 and formed the basis for the PRP and the present PP. It recommended AID financing for 30,000 metric tons of grain storage in Senegal and technical assistance and training for ONCAD.

## B. Detailed Description

### 1. Sector Goal

The overall national goal to which this project contributes is that of self-sufficiency in cereal production. Senegal has embarked on a vigorous program to become self-sufficient in food grain production. Their internal development budget reflects this, priority and the investments of the major donors have been primarily to the agricultural sector. Government policies, primarily pricing policies, have begun to come into line with this objective.

The achievement of self-sufficiency is dependent upon two distinct but interrelated activities. First, production campaigns to increase productivity to a level sufficient to feed all the people and secondly a commercialization campaign capable of transferring the cereals from areas of excess supply to areas of excess demand. In a "normal" year these two interventions should be sufficient to assure self-sufficiency. However, given the great variability of rainfall and thus annual variations in supply, it is necessary to incorporate a form of security stock to handle over-production in high rainfall years and to meet the demand in low rainfall years.

Therefore, the sector goal to which this project contributes is the establishment of a stock of grain in Senegal which will serve both as a buffer stock to be used by ONCAD in its price stabilization efforts and as a security stock to be constituted in years of high production and released in years of abnormally low production. The indicators of progress toward achievement of this goal will be gleaned from cereal production, marketing, storage and import data which will indicate whether the storage is being effectively utilized for its primary purpose of storing stocks in years of high production and depleting stocks in years of low production to assure a continuous supply of grain to the consumers. The GOS estimates a requirement of 120,000 tons of storage in 1985. Further outside assistance will be sought to complete the medium term objective.

The principal assumption relating to the achievement of the project goal is that the production activities under way with financing by AID, IBRD, FAC, FED and the Caisse Centrale will be effective in increasing both productivity and production.

### 2. Purpose

The purpose of this project is to increase the capability of ONCAD to store and market millet and sorghum. The project will provide ONCAD with increased storage capacity, will enable it to utilize more efficiently the available storage and will ultimately result in a significant reduction in loss of grain stored by ONCAD.

The short-term goal of Senegal for added storage capacity of 60,000 mt is to be provided in two steps. The first 30,000 mt is being constructed with GOS financing from its own resources. This storage capacity will be ready to store millet, sorghum and corn purchased from 1976 production. The AID project will add an average of 10,000 mt capacity each for the 1977 and 1978 and 1979 seasons, based on an evaluation of requirements each year.

The GOS policy announced in November 1976 is to buy all millet, sorghum and corn offered for sale by the farmers at 35 CFA/kg. Redistribution and resale of these cereals, as well as imported grain (especially rice) will continue and will utilize former storage facilities under ONCAD control as well as newly-constructed facilities. However, a modest start on a contingency reserve stock of millet can be made once the new facilities are in use.

Achievement of the project purpose will be demonstrated by evidence of the following conditions expected at the end of the project:

- a. The existence of 60,000 mt of storage capacity constructed by AID and the GOS.
- b. In years of above-average rainfall, at least 10,000 mt of grain will go into the warehouses for carry-over to the next year, and
- c. ONCAD will be adequately staffed with trained personnel to effectively administer the additional storage capacity.

The major assumption is that rainfall will high enough to allow sufficient production to allow carry-over to the following years. It is possible that if rainfall levels are very low, imported grains will have to be stocked in the warehouses.

A second assumption is that ONCAD will provide the essential fumigants for the grain on a timely basis. Training and sensitization to the criticality of this item through the TA provided in this project will aid in assuring effective insect control activities.

### 3. Outputs

The outputs of the project fall into two general areas, physical plant and institutional development. In terms of physical plant, the output will be the construction of 23 1,000 and 2,000 ton capacity units (amounting to 30,000 MT ) distributed according to the ONCAD plan in Annex B-4 and financed through the AID project. ONCAD itself is currently completing construction of 30,000 mt of storage capacity and is searching for other donor financing for additional storage.

The institutional development program is based almost entirely upon training, with the outputs being increased numbers of trained staff. To quantify the outputs the project should produce:

- a. A trained warehouse manager at each warehouse - 47 persons;
- b. Trained regional fumigators for each region - 54 persons;
- c. Trained warehouse manager for each central warehouse  
6 persons;
- d. Trained buying agents for the cereal program - 500-600 persons;
- e. A trained professional economist and two storage experts to fill positions at the central level.

The assumption leading to the achievement of these outputs is that the persons trained by the project will continue to work for ONCAD.

#### 4. Inputs

AID will provide grant funding for the following elements of the project:

a. Storage facilities: Seven units of 2,000 tons each and 16 units of 1,000 tons will be constructed. Technical description and cost estimates of the construction are contained in Part 3, Sections A and B respectively. (Also see Annex B-5).

b. Equipment: AID funds will finance certain grain condition surveillance equipment necessary to operate each warehouse. The equipment includes moisture testers, triers, thermometers, hygrometers and scales. The estimated cost of this equipment is \$1,615.00 per unit.

Secco storage facilities which are alternately used for storage of groundnuts and millet will be used as buying stations for grain. To aid in better storage practices of grain at the seccos, each secco will be equipped with a moisture tester, a trier and a sieve, at a cost of \$460 per secco.

Three Land Rovers will be procured two for the mobile training team and one for the long-term advisor. In addition audio-visual and storage related demonstration equipment will be provided for the training program. (See Annex B-4).

c. Training: Pre-project training, foreseen as important during the PRP stage of this project, was accomplished in June-August 1976. Seven ONCAD staff members, selected from those already engaged in national or regional level grain storage and protection work, were sent to the Short Course conducted each year at KSU. Therefore, a cadre of Senegalese have already received some training in the methods of grain storage and protection which the project will promote.

From this cadre ONCAD will form a training unit or cell for the purpose of carrying out continuous ONCAD staff training and upgrading quality control personnel. The first task of this unit will be to develop training methods, demonstration techniques and develop skills in using audio-visual and other training aids. This will include the development of course outlines, manuals, etc., in cooperation with ITA, ISRA, and KSU for use in ensuing in-country training sessions during the course of the project. Courses will be prepared and conducted for:

- 54 - ONCAD Regional Fumigators,
- 47 - ONCAD Reserve Warehouse Managers,
- 6 - ONCAD Central Warehouse Managers, and
- 500-600 - ONCAD Secco Warehouse Managers.

Two training teams will be developed, including individuals qualified to instruct in the following general subjects:

- Insect and Rodent Biology and Damage,
- Proper Storage Management and Methods,
- Pest Control Techniques and Equipment,
- Equipment Maintenance and supplies.

The in-country training program of this project will maintain close liaison with the Sahel Crop Protection activities in Senegal through the USAID advisory staff of the projects. Where it is deemed necessary and possible, the expertise of one project might be utilized the supplement that of the other to carry out certain activities. Although ONCAD has heretofore utilized the staff and facilities of ITA for training its staff members, should the expended training activities of this project become more than the ITA facilities can accommodate, the facilities of the Crop Protection training center near Dakar might also be used.

The training team will conduct four one-month training sessions for ONCAD Regional Fumigators and ONCAD Reserve and Central Warehouse Managers, two two-week refresher courses of Fumigators, and twelve one-week seminars for Secco Managers throughout the two-year term of this project.

To provide this training, a mobile training unit consisting of two vehicles, audio-visual equipment, and demonstration equipment will be furnished.

To fill technical staff positions with ONCAD, the project will finance the university-level training in the U.S. of three Senegalese, one in economics to fill a position as Staff Economist and Grain Marketing Specialist, and two others to return as Grain Storage Preservation Specialists.

It is anticipated that training as recommended will provide the quality managers and technical cadre of the national and regional offices of ONCAD with the basic knowledge and techniques to improve the grain storage and preservation situation in Senegal. Warehouse managers would also be made aware of the problems involved in maintaining the quality of grains in storage over extended periods of time.

d. Technical Assistance: A U.S. Grain Storage and Preservation Advisor, working closely with ONCAD, will coordinate the in-country training team and will utilize, where needed, ITA and ISRA personnel to supplement the regular members of the team. The possibility of this cooperation was discussed with representatives of these organizations by the project paper team. The Advisor will establish contact with these other organizations soon after his arrival.

The project will also finance supervisory engineering services either through a contract with a U.S. or local firm suitable to AID.

A vehicle will be procured for the U.S. Advisor which will be shared as necessary to facilitate engineering supervision.

## PART 3 - PROJECT ANALYSES

### A. Technical Analysis

#### 1. Site Selection

Senegal is completing the construction of five warehouses of 1000 MT and 13 warehouses of 2000 MT capacities. These constitute 18 of the 47 warehouses listed for the first tranche of 60,000 MT of an eventual 120,000 MT the GOS has determined will be needed in five years for the ONCAD program to establish an adequate buffer cereal stock and to effectively commercialize cereal marketing in Senegal.

The selection of sites for all ONCAD warehouses was determined by the following considerations:

- The staple crop yield and marketing potential in the region. This is the case in the Sine-Saloum, Diourbel and Thies regions.
- The isolation of the region and the distances between the sites (Senegal Oriental and the Senegal River Valley).
- The potential consumption needs, which is an even more important consideration than potential yield and marketing (Senegal River and Cap Vert regions must be supplied with cereals from Thies).

See Annex B-4 for a map showing all prospective sites and identification of AID-financed sites. A list of sites is found in Annex B-2.

#### 2. Construction

The project proposes the construction of 30,000 MT of grain storage in 1000 and 2000 MT unit facilities. The warehouses to be financed by the AID grant will be U.S. manufactured, pre-engineered structures with locally supplied roofing systems. The construction of the concrete bases and cinder block walls will be locally contracted.

Pre-engineered U.S. manufactured warehouses of the type to be financed under this project are similar to the pre-engineered French - and German-manufactured warehouses being financed by ONCAD through their own resources. Local contractors will continue to be used to erect the structures and to complete the roofing systems and walls.

The PP team had an opportunity to visit nine construction sites for the new ONCAD warehouses. Conclusions of the team are: 1) this type of construction is within the knowledge and competence of Senegalese contractors, 2) use of local firms for construction of base and wall systems is a familiar technique in Senegal, 3) for ease of installation locally-produced roofing systems are preferable, and 4) the few deficiencies in construction, where they have occurred have largely been a result of lack of construction supervision.

The PP proposes to address the need for supervision through the funding of supervisory engineering services with a firm satisfactory to AID, either US or local, which would supervise construction activities through periodic inspections.

Several design alternatives were considered and subsequently rejected by ONCAD and by the PP design team (see Annex B-2).

Officials of SODAGRI (Société de Développement Agricole et Industriel du Sénégal) have presented a proposal to ONCAD to provide bulk storage units consisting of clusters of cylindrical, corrugated steel tanks which can also be equipped with aeration, drying and mechanical handling equipment. The present cost of the complete system, with an electric generating plant, at a U.S. port, less all transport from U.S. to job site, customs, concrete and erection, is dols. 120 per ton of capacity, while the ONCAD warehouses currently under construction are costing approximately dols. 100 per ton.

To the knowledge of the PP team, storage units of the type proposed by SODAGRI have not been tested in Senegal. One potential storage problem in steel tanks would be the effect of heating and cooling of the grain next to the side-wall and possible moisture migration/condensation. An insulated, double-wall tank would be required for satisfactory storage.

The sophistication of the system proposed by SODAGRI would present problems at this time in Senegal with maintenance and management. Spot-checking of grain moisture content by the PP team in the more humid locations in Senegal, and of imported grain, indicated that moisture contents are above the permissible level for safe, long-term bulk storage of grain at the temperatures prevailing in Senegal. Thus, drying and/or cooling is required to permit long-term bulk storage. (Grain moisture content should not be over 12% for storage of one year or more; as moisture content increases, the risk of insect and mold damage increases.)

For the purpose of evaluating the warehouses constructed by AID for the Entente Grain Stabilization Project, two officials of ONCAD travelled to Upper Volta to view the complete pre-fab system imported from the U.S. and erected there.

The GOS has already gained some experience with metal pre-fabricated warehouses and has determined that at the present time, under conditions prevalent in Senegal, the pre-fab does not offer the most optimum solution. Cereals and peanut seed stored in this type of warehouse get fried in the hot season, reducing germination and spoiling the grain. Also, there has been some dissatisfaction with the roofing systems which are difficult to repair or replace. There is a clear indication that specifications of U.S. manufactured roofing sheets will not coincide with locally produced sheets which would be used for replacement. For this reason, this solution has been rejected.

### 3. Equipment

The AID funds will finance certain grain condition surveillance equipment necessary to operate each warehouse. A tentative list of equipment for the project has been determined which will be reviewed by the Project Advisor upon his arrival at post. This includes a moisture tester, triers, thermometer, hygrometer and scale.

600 peanut storage seccos are scattered throughout the country in proportion with average groundnut production in each region. Since groundnut and millet production follow a similar geographic pattern, the peanut seccos are well situated to serve as buying stations for grain. Each buying station will be equipped with a moisture tester, trier and sieve at a cost of dols. 460 per secco.

### 4. Storage Management and Quality Control

It is apparent from the visits made by the PP design team to storage facilities currently in use by ONCAD that there are serious deficiencies in grain storage practices which highlight the requirement for adequate storage facilities, equipment and training of supervisory and warehouse personnel. (See Annex B-1, PRP and KSU report.)

Samples were taken from grain being stored at warehouses in Ziguinchor, Kaolack and Thies. Inspection of damaged grain showed that an average of 50% had been damaged by insects; thus, this inspection indicates major losses even if only half the damaged grains were considered lost in winnowing, sifting, etc. If the loss is considered in terms of rejection of grain for food uses as practiced in the U.S., it is much higher than is normally accepted in most developing countries.

Even accepting more lenient standards, the loss observed in the samples taken amounts to 31.6%. This figure excludes the one observation at Ziguinchor in which no sample was taken because there was no insect infestation. That grain was just being moved into storage from an imported (international) shipment and did not constitute a valid test of storage conditions at the warehouse visited.

Losses due to weather action (wetting) were not measured but observation indicates that such losses are of importance. For example, at Kaolack a pile of bagged grain, abandoned as unusable (total loss) was observed between warehouses; it was about 20 sacks high x 20 m x 40 m in size. The present state of the grain made it impossible to judge what had caused the loss but most likely wetting had been a factor.

Review of inspection and fumigation records at Kaolack showed no inspection of fumigation between January 1976 and the date of the visit, August 9, 1976. At other facilities with sorted grain no records were available.

In spite of statements to the effect that policy requires inspection every 15 days, it appears this is not being implemented. Whether this is due to lack of training, lack of personnel or indifference could not be ascertained but the impression is that all three elements are present. It is the opinion of the PP team that the training program proposed herein will help mitigate all three deterrents to an effective program for storage management and quality control and therefore is an essential part of this proposal.

The conclusion must be that a very great improvement in storage and quality control is needed. Better and more facilities will aid in this, but a training program to prepare individuals for competent action is a necessity.

#### 5. Training

Although trained personnel are not available to ONCAD in adequate numbers, neither the techniques of training nor the training matter are unfamiliar to that organization. Periodic training in grain storage practices is a continuing requirement for certain ONCAD personnel, primarily for the regionally-based inspectors. Training at the level of warehousemen has been less than satisfactory. In general, training programs for ONCAD personnel have been given only on an intermittent basis.

There are a minimum number of technically-qualified grain storage specialists in Senegal, generally at Bambey and at ITA. ONCAD has under its Technical Office a Quality Section with subsections for Seed, Storage Protection and Laboratory. Heads of the Seed and Storage Protection subsections have been trained at l'Institut de Technologie Alimentaire (ITA). Each of the ONCAD Regional Offices has a technical group with a Quality Section. Within this Quality Section are a leader and two fumigators per departmental subdivision of the Region. The men receive some annual training at ITA. Fumigators and regional personnel have some knowledge of grain storage preservation; however, certain inconsistencies and the status of grain storage operations indicate the need for improved training.

In 1974, AID sponsored a seminar in Food Storage and Handling Practices, primarily for grain at ports and in warehouses. Training involved lecture sessions and practical demonstration of techniques. 15 African countries were represented. 10 Senegalese, primarily representatives of ONCAD, took part in the training session.

The training program to be financed by the project responds to the apparent deficiencies in the present system. It will combine U.S. university level and special training (at Kansas State University) in grain storage

preservation, with establishment of a system including curricula, for the local training of fumigators, warehouse managers and secco managers.

The training program to be financed hereunder is described in detail in Part 2. B. Detailed Description and in Annex B. 1. This program will prepare Senegalese to perform their functions effectively at all levels of ONCAD to assure the proper functioning of the storage program.

The PP team feels that the project as described in Section 2. B. will be sufficient to give ONCAD the capability of properly managing a grain storage program.

## B. Financial Analysis

### 1. Financial Plan

The attached budget tables provide a summary of project costs. Table 1 shows AID and GOS dollar and local currency costs on an annual basis and Table 2 shows costs broken out by inputs and outputs. Further detailed costing is contained in Annex B-5.

### 2. Recurrent Cost Analysis

Recurrent costs of this project are high, with the GOS bearing a cost of some \$868,000 per year. Some of these costs are costs that would be incurred without the project and only \$68,000 of additional staff costs and \$539,000 for the cost of maintaining the security stock are incremental due to the grain storage program. The Government has made a policy decision that it will constitute and maintain a security stock of grain with the full knowledge that it would be relatively costly. The GOS is prepared to budget the required funds. (For derivation of above figures, see Table 3, p. 26).

ONCAD has traditionally had a liquidity problem. Its accounts indicate a small paper profit while its financial position is precarious. This is to a large extent due to the fact that payments from the Peanut Stabilization Fund and from Government grants to meet subsidies, for example on fertilizers, are consistently in arrears. On the other hand, any surpluses generated from peanut sales must be paid promptly to the stabilization fund. Consequently, ONCAD consistently has a cash flow problem and exists on an ever increasing overdraft from the national development bank.

This problem, in the past, has been exacerbated by the fact that ONCAD as an Etablissement Publique fell under the act Contrôle des Opérations Financières which required prior approval of nearly all expenditures by the Ministry of Finance. This situation has recently been improved by the approval of an amendment to the act giving Etablissements Publiques greater financial authority.

The GOS is fully aware of the financial problems of ONCAD and is making efforts at the interministerial level to address these problems. ONCAD management is presently planning for an expanded system of buying stations purchasing smaller amounts of cereals with the buying campaign beginning slightly earlier. Consideration of this plan will emphasize the need for adequate funding for the cereal campaign and should facilitate the obtaining of assurances from the Ministry of Finance that funds will be available. RDO/Dakar will continue its dialogue with ONCAD and at Ministry level on this subject and progress in this regard will be evaluated in annual evaluations prior to making the decision on the scale of construction for that year. Nevertheless, it is felt that a covenant is needed to the effect that adequate reserves will be provided each year to allow timely grain purchases of sufficient magnitude given storage capacity and production surpluses when existent. See Part 4. D.

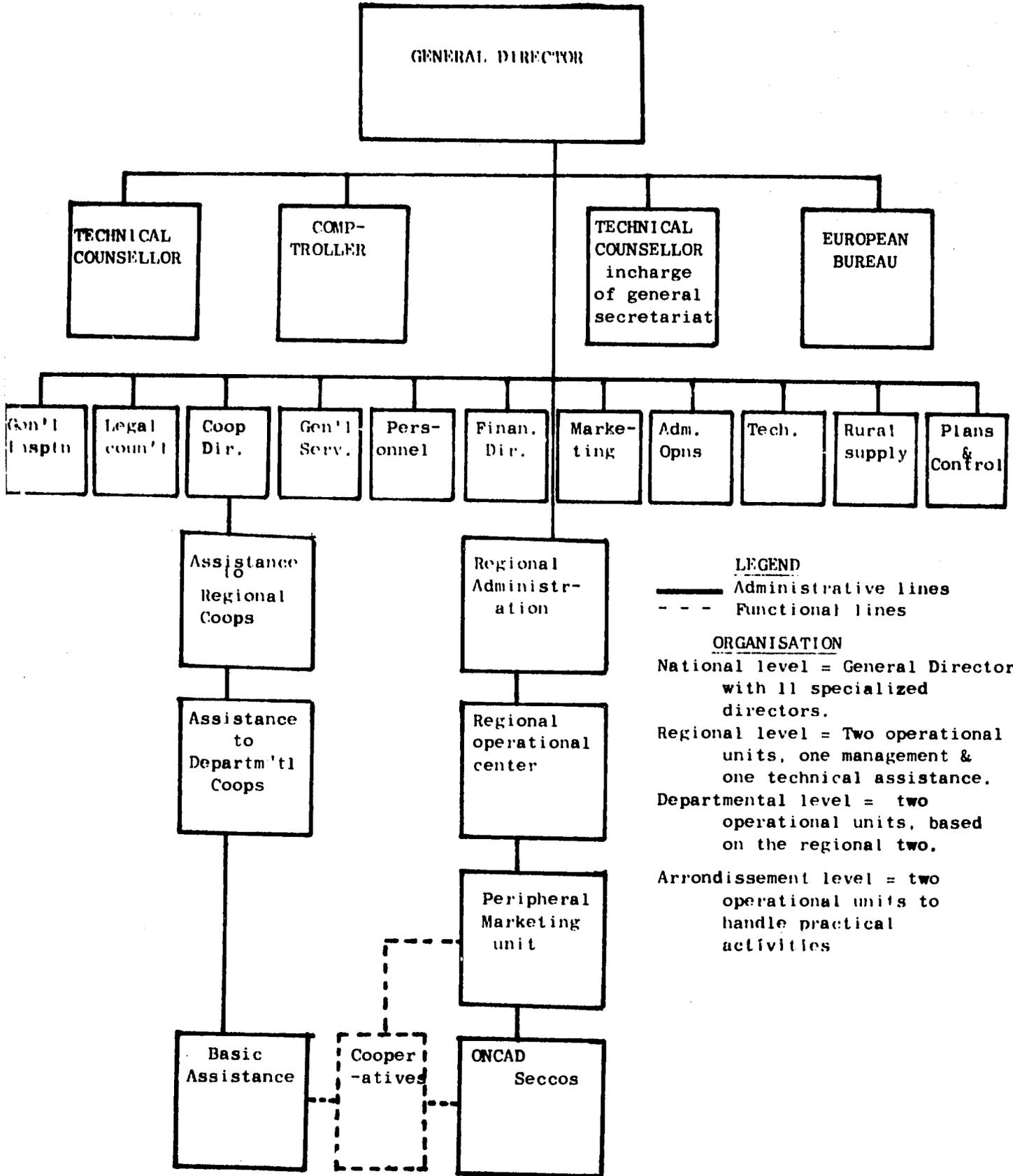


TABLE 1

GRAIN STORAGE

Budget and Financial Plan  
(\$000)

I T E M S	FY 77			FY 78			FY 79			FY 80			FY 81			T O T A L S				
	A I D		GOS	A I D		GOS	A I D		GOS	A I D		GOS	A I D		GOS	A I D		TOTAL AID	TOTAL GOS	GRAND TOTAL AID & GOS
	\$	L.C.		\$	L.C.		\$	L.C.		\$	L.C.		\$	L.C.		\$	L.C.			
Training Expenses	45	-	-	100	100	-	45	54	-	-	-	-	-	-	-	80	154	344	-	344
Training Materials	5	15	-	10	15	-	-	-	-	-	-	-	-	-	-	15	20	35	-	35
Technical Assistance	12	8	-	48	32	-	40	32	-	45	34	-	55	34	-	200	140	340	-	340
Evaluation	-	-	-	25	-	-	25	-	-	25	-	-	25	-	-	100	-	100	-	100
Supervisory Eng.	-	-	-	-	37	15	-	40	16	-	45	18	-	-	-	-	122	122	49	171
Contingencies	5	5	-	5	5	-	25	25	-	10	10	-	5	5	-	50	50	100	-	100
Sub total (no add)	(67)	(18)	-	(188)	(183)	(15)	(119)	(135)	(16)	(47)	(53)	(18)	(42)	(13)	-	(463)	(418)	(81)	(89)	(930)
Warehouse construction 16 at \$100,000 7 at \$180,000	-	-	-	419	629	-	462	692	-	507	762	-	-	-	-	1,388	2,083	3,471	-	3,471
Equipment	14	-	-	348	-	-	15	-	-	16	-	-	-	-	-	393	-	393	-	393
Salaries - exist. staff	-	-	112	-	-	192	-	-	211	-	-	233	-	-	256	-	-	-	1,004	1,004
Additional staff	-	-	71	-	-	74	-	-	55	-	-	61	-	-	68	-	-	329	329	
Operations	-	-	-	-	-	5	-	-	-	-	-	5	-	-	5	-	-	20	20	
Value of land	-	-	-	-	-	85	-	-	-	-	-	-	-	-	-	-	-	85	85	
Grain Purchases	-	-	-	-	-	1226	-	-	1226	-	-	1226	-	-	-	-	-	-	3,678	3,678
20% cost to maintain storage program	-	-	-	-	-	-	-	-	179	-	-	359	-	-	539	-	-	-	1,077	1,077
<b>TOTAL</b>	<b>81</b>	<b>18</b>	<b>183</b>	<b>955</b>	<b>818</b>	<b>1597</b>	<b>612</b>	<b>843</b>	<b>1692</b>	<b>602</b>	<b>851</b>	<b>1902</b>	<b>85</b>	<b>39</b>	<b>868</b>	<b>2,336</b>	<b>2,569</b>	<b>4,905</b>	<b>6,2412</b>	<b>11,147</b>
<b>TOTAL AID</b>	<b>99</b>			<b>1773</b>			<b>1455</b>			<b>1,454</b>			<b>124</b>			<b>4,905</b>				

TABLE 2COSTING PROJECT

## Input - Output

Inputs	Outputs			
	<u>30,000 T Storage</u>	<u>Management</u>	<u>Insect Control</u>	<u>Training Units</u>
U. S. Appropriated				
1. Training	-	200	100	79
2. T.A.	-	188	76	76
3. Evaluation	10	50	20	20
4. Superv. Eng.	122	-	-	-
5. Construction	3.471	-	-	-
6. Equipment	<u>100</u>	<u>10</u>	<u>351</u>	<u>32</u>
Total AID	3.703	448	547	207
<u>G O S</u>				
1. Existing staff	-	800	204	-
2. Additional Staff	-	100	100	129
3. Operations	-	-	-	20
4. Land	85	-	-	-
5. Grain purchase	3.678	-	-	-
6. Maint. stores	1.077	-	-	-
7. Superv. Eng.	<u>49</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total GOS	4.889	900	304	149
Grand Total	<u>8.592</u> =====	<u>1,348</u> =====	<u>851</u> ====	<u>495</u> ====

TABLE 3

COST TO GOS (1) (in \$)	TOTAL	FY -77	FY 78	FY 79	FY 80	FY 81
1. Grain purchases (Total 26,272 mt) at 35/kg	3,678,081	-	1,226,027	1,226,027	1,226,027	-
2. Supervision of Construction (GOS)	48,547	-	14,667	16,133	17,747	
3. Value of Land	85,000	-	85,000			
4. Salary, 3 men, 2 years in U.S. Add'l	45,000	22,500	22,500			
5. Salary, 1 man, short course in U.S. "	3,000	3,000				
6. Salary, Regional quality manager (6)	167,076		36,000	39,600	43,560	47,916
7. 9 Salary Regional Fumigators	150,368		32,400	35,640	39,204	43,124
8. 8 Salary reserve Warehouse Mgr. add'l	244,204	40,000	44,000	48,400	53,240	58,564
9. Salary 500 Secco Mgr (1 month each)	458,000	75,000	82,500	90,750	99,825	109,807
10. Salary 500 Secco Assistants (1 mo. each)	228,941	37,500	41,250	45,375	49,912	54,904
11. Salary Regional Warehouse Manager add'l	36,631	6,000	6,600	7,260	7,986	8,785
12. Oper. Exp. Tractor and Thresher	20,000		5,000	5,000	5,000	5,000
13. GOS con't to operating storage prog. See Table III	1,076,884			179,480	358,960	538,444
<b>TOTAL</b>	<b>6,241,614</b>	<b>184,000</b>	<b>1,595,944</b>	<b>1,693,665</b>	<b>1,901,461</b>	<b>866,544</b>

(1) 250 CFA = \$ 1.00

Totals do not equal table 1 totals due to rounding.

C. Social Soundness:

1. Direct Beneficiaries

The direct beneficiaries of the project are small millet farmers and consumers of millet in rural areas. (Millet is the main staple crop for most of Senegal's rural population). The project will benefit this group in two principal ways.

First, as demonstrated in the economic analysis to follow, a floor price for grain will be established at a critical time for farmers, i.e., between the millet harvest and just prior to the peanut campaign. It is at this time that grain speculators pay the lowest amount for millet from the producer, in the area of 15-18 CFA/kg. Speculators in turn resell it for 20-30 CFA/kg after the farmer has dried, threshed and delivered it to the buyer. It is at this point, however, that ONCAD can and will enforce its grain buying monopoly, with help from this project in the form of increased storage and purchasing capacity, and step in and buy grain at the government officially established price, 35 CFA/kg this year, thus supplying cash and a decent return to the farmer during his period of greatest need. Once the market price rises above the official price, ONCAD no longer enforces its monopoly. To the extent that this project will increase ONCAD's capacity to purchase grain during this peak period after the millet harvest, thousands of small producers should be directly benefited.

Secondly, both poor farmers and consumers will be benefited during times of inadequate local production of millet, as is often the case in years of low rainfall or drought. In such periods the price of local millet shoots up considerably and makes it more difficult particularly for the small farm family to meet basic food needs without going heavily into debt.

The situation is aggravated by the fact that the farmer's income is at the same time likely to have also fallen because of parallel declines in peanut production; the main source of cash income for most Senegalese farm families.

If this project is successful, in situations similar to the one described above, a reserve will be ready to distribute to deficit areas when needed which will drive down high localized prices and make the burden on the rural consumer (whether farmer or not) less onerous. In times of extreme drought, it could mean the difference between life and death. Also, having reserves located in the interior and throughout the country leads to more rapid distribution and reduction of related costs eventually borne by the consumer.

## 2. The Spread Effect:

In a macro sense, the project is predicated on relieving constraints to commercialization of cereal crops, mostly millet, and providing a security buffer stock of grain for consumption in drought years when production is low. Given increasing urban demand for millet, the extent that rationalization and stabilization of both the price structure for and the marketing of millet is made possible by this project, production incentives will be improved as a result of the reduction of the cost differential between producer and consumer in general. In addition, as Senegal becomes more self-sufficient in basic grains, a goal to which this project contributes, the elimination of large portions of imported rice and other grains will directly benefit large segments of the population through the increased supply of more reasonably priced and domestically produced commodities.

## 3. The Farmer's view of ONCAD

As a result of ONCAD's traditional priority for the buying and marketing of peanuts, farmers in general are suspicious of ONCAD when it comes to grain.

In addition farmers often see ONCAD as a villain because of alleged corruption, inefficiency and its role as debt collector. Regardless of the justification for these perceptions, ONCAD has demonstrated its capacity to market large quantities of peanuts and has the potential capacity to effectively manage the proposed expanded grain reserve program. Traditional attitudes should change as ONCAD gradually becomes more involved on a higher volume basis in the buying and marketing of millet. The training program, making for a more professional operation throughout the network of buying stations and warehouses, should also improve ONCAD's image considerably with the farmer.

#### 4. Impact on Women:

In the final analysis, women may benefit more than any other group as a result of the commercialization of millet. The task of threshing and preparing millet is arduous and time-consuming. Women spend two to six hours per day simply preparing millet for the afternoon meal. Two innovations associated with the commercialization of millet promise to drastically change this picture. First, a program or research into millet food technology undertaken by the Food Technology Institute (ITA) gives some promise of successful commercial development of a dry, stabilized millet flour. This flour can be made available in the form of several products, including an instant cous-cous which can be prepared as easily as rice and uses only millet flour in manufacture. If a large portion of the millet crop becomes commercially available, this project may become feasible.

A second innovation has been developed by SISCOMA at Pout, this being a portable, mechanized millet thresher which can be pulled behind a tractor from village to village or from storage site to storage site. Initial studies on this machine at Bambey (ISRA) indicate that threshing done by it costs less per unit than threshing done by traditional hand methods. In any case, women are refusing to thresh millet which goes into commercialization. They are perhaps the least under-employed group in Senegal and do not really need this added, arduous task.

Senegal has not been adverse to employing women who are adequately trained in positions of responsibility. Furthermore, women are as free as men to pursue training to qualify themselves for such positions. Therefore, women are found in such positions as Director of ITA, lab technicians in the quality testing and germination lab of ONCAD, a regional ONCAD supervisor, just to mention a few. The Governor at Kaolack said in a recent speech that he would encourage and support the use of more qualified women in ONCAD positions at all levels.

#### D. Economic Analysis

##### 1. Grain Marketing Systems

Since August 7, 1975 ONCAD has had a de jure monopoly in purchasing grains (primarily millet and sorghum in the areas where the new warehouses are to be built). ONCAD will purchase any "amount" the farmer wishes to sell for 35 CFA/kg or to wholesalers for 38 CFA/kg. For an analysis of costs to be paid out of this margin see the financial analysis section. The farm-gate price of 35 CFA is up from 30 CFA in 1975/76 and is generally announced prior to marketing the new crop. The schedule below gives the dates of announced prices for the past four years:

<u>Purchase Year</u>	<u>Announced Price</u>
1974	Oct. 22, 1973
1975	Nov. 4, 1974
1976	Nov. 4, 1975
1977	May 15, 1976

Prior to August 7, 1975 the farmer could sell either to ONCAD or to private traders operating in the rural markets. There is evidence that parallel marketing activity still exists when the market price of grain exceeds the official price. The extent of the parallel market is impossible to determine. In the past the parallel market price followed a typical pattern of 10-17 CFA/kg from harvest (early October) to December. January to the summer months prices would increase to 25-35 CFA/kg. In drought years, or just after the drought years prices may be double that of a typical year. Most analysts and experts agree that the price of 35 CFA in today's market is about 5 CFA/kg higher than the average annual farmgate price if market forces were allowed to operate. If market forces were allowed to function freely the variation of price within a typical year would be significant and place small producers in a disadvantageous position.

Despite this relatively high price ONCAD has been unable to purchase a significant or consistent share of the locally-produced grain. The schedule below gives the amount and percentage of locally-produced millet and sorghum purchased by ONCAD (in 000 MT).

	<u>1973/74</u>	<u>1974/75</u>	<u>1975/76</u>	<u>1976/77</u>
Total Produced	510	588 (Est.)	550	553.8 x (Est.)
Amount Purchased	30	35	12	4.8 (Est.)
% of Production	5.8	5.9	1.9	.9 (Est.)

There are several interesting points regarding this schedule. For example, ONCAD's purchases are positively related to production for the past three years.

In fact, since recovering from the brought ONCAD for purchased on increasing share of production above 528,000 MT, which appear to be a prior level of production for the creation of surplus and prior conditions essential for ONCAD to be able to purchase grain in appreciable volume.

The data for 1973/74 must be considered unusual and unique due to exogenous factors. 1973/74 was the first good year after the disastrous drought of the late 1960s and early 1970s. During this year food grains for drought relief were still flowing into rural areas of Senegal. Although exact figures for the end of CY 1973 are difficult to obtain, we do know that 21,081 MT of sorghum and 26,613 MT of maize were distributed free to Senegal in CY 1974. This significant amount plus an increase over the previous year's period combined with a pent up need for cash on the farmers part all combined to generate a larger than expected supply of millet sold to ONCAD. It is impossible to quantify the impact of these forces on the millet market but to ignore or discount them in an analysis of this sort would be inaccurate.

Schedule 1 and Graph 1 below illustrate the apparent production/purchase relationship believed to be in operation from data collected thus far.

ONCAD Purchases Related to Total Production

Schedule 1

$$y = 3.17 \times 10^{-62} x^{22.76}$$

y = Amt. Purchase

1  
10  
20  
30  
40

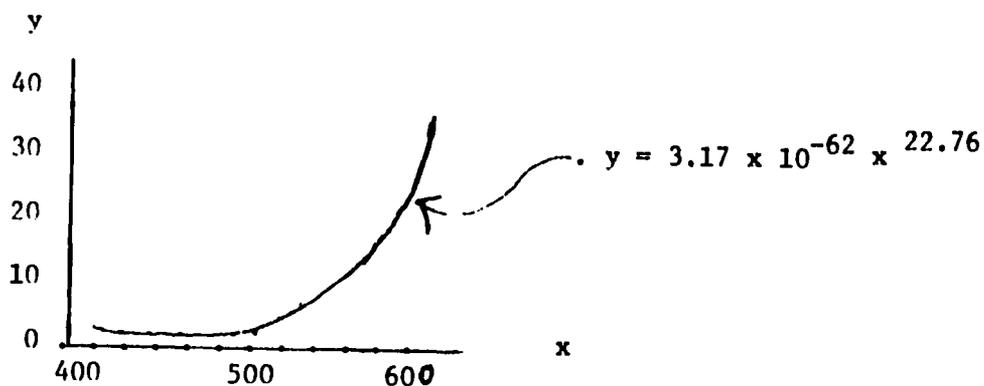
x = Amt. Produced

503.6  
557.24  
574.5  
584.8  
592.24

$$\text{Log } y = a + b \text{ log } x + e$$

Graph IONCAD Purchases Related to Total Production

$$\text{Log } y = - 61.50 + 22.76 \text{ log } x$$



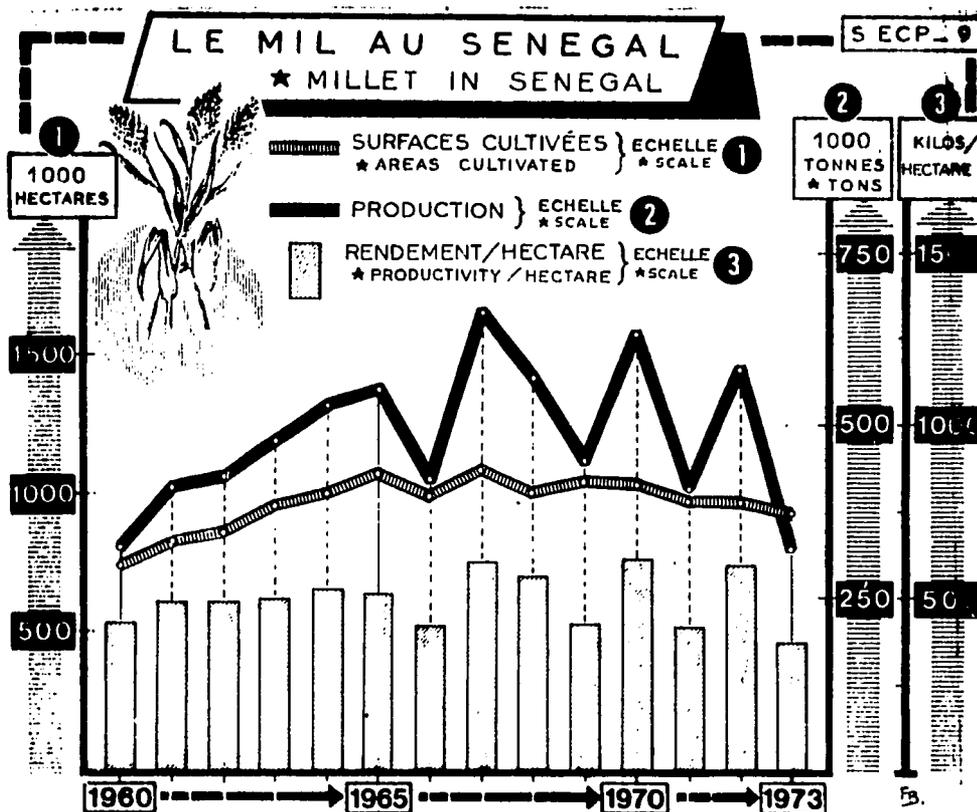
Obviously, no data projections or statistical analysis are completely valid for such a limited number but the above illustrations do indicate an important fact of the rationality of millet marketing in Senegal over the last three years.

Although the above macro analysis of ONCAD millet purchases indicate the market performs as one would expect, it is still somewhat surprising that ONCAD has been unable to capture a larger share of the millet market, especially in light of its recent price increases.

The reason for this apparent inconsistency are interrelated and somewhat complex. Although sufficient data to fully support the following analysis are not available there are no contradicting evidences to refute either the analysis or its conclusions. The conclusions are supported by the real world situation.

From the point of view of the small producer who supplies the market with food grains, millet and sorghum are primarily food crops (it is estimated that in a normal year 70-80% of millet and sorghum is auto-consumed on the farm). The farmer generally stores from one to two years supply on farm for his own family's consumption. Peanuts grown in rotation with millet and sorghum generally meet his needs for cash. In this world view the farmer will generally sell millet and sorghum only if he has an unusual need for cash or if his own stocks are overfull. Since the relative prices of peanuts and millet are such that he can make higher returns per unit of labor or per unit of land growing peanuts the rational farmer follows a "maxi-min" strategy of land use. That is, he attempts to maximize income subject to the minimum risk of hunger or starvation for his family. Simply, put, he tries to make sure he plants enough millet to feed his family and the balance of his resources goes into peanut production. Unfortunately, the farmer has little or no control over yields, which are a function of rainfall. He thus plants 40-50% of arable land to millet and 50-60% for peanuts. For Senegal as a whole the amount of land devoted to millet is relatively constant while production fluctuates wildly, primarily as a function of rainfall. (See Graph II, (On following page).

The interrelation between millet and peanuts has a significant effect upon ONCAD's ability to market locally produced grain. Millet is planted right after the first rains, between mid-June and early July. This ensures that the food crop is planted in time to benefit from the moisture. As soon as possible after millet is planted, peanuts are planted. The millet is harvested in mid to late October, as soon as the rains stop. The millet is then placed upon pallets in the fields to dry and by November the moisture content is down from 20-25% to 10-15%. ONCAD will buy millet (threshed) at around 10% moisture content. At this time the farmer will be willing to sell to ONCAD as his cash supply is low, his peanuts are not yet ready for market and he has a good idea regarding the available stock for the next year. He sells mainly his new crop. The task of threshing the millet is very time-consuming and a task for women. It is roughly estimated that two women can thresh approximately one 50/kg sack of millet in a day.

Graph 11<sup>x</sup>

(x) "Marchés Tropicaux et Méditerranéen NS", June 1974 - No.1493, p.36.

As the new millet is being dried and stored on farms, the demand to purchase millet drops at the same time as the farmer offers his crop for sale. Thus, the market price would be below ONCAD's official price. Hence, at this time, ONCAD is offered all the millet the farmer wishes to sell which is generally as much as the women can thresh.

At this point the farmer has gone as much as possible to minimize his risk. The peanut harvest starts in November and the farmer devotes more and more of the family's resources toward harvesting and marketing the cash crop. The activity of threshing and marketing of millet rapidly diminishes and virtually ends once cash starts to flow in from peanuts (December-January).

For a while after the peanut campaign the farmer's need for cash has been satisfied and he has little need to market millet. This reduction in market supply of millet is reflected in rapidly increasing prices. By the time the farmer begins to require additional cash the parallel market price of millet, in a typical year, exceeds the official price and ONCAD is offered little or no millet for purchase. Instead it appears to have entered the parallel market and has been handled by private traders. During years of extremely high production or when farmers' stocks are quite large, the official price might be competitive with the market price for a period after the peanut crop is sold, but because the farmer was unable to supply sufficient quantities of millet to ONCAD, ONCAD is unable to maintain the official price by selling its stock. Thus ONCAD is soon priced out of the millet market even in good years. In general, there is only a relatively short period between millet harvest and peanut marketing when millet is marketed by the farmer to ONCAD and then only if the production was in excess of the amount sufficient to satisfy the family's needs.

ONCAD's primary function is the supplying of inputs for and marketing of the peanut crop which is the main economic activity in Senegal. ONCAD handles approximately one million metric tons of peanuts a year, which is no small feat. When compared with the peanut operation, the grain marketing and storage activities are a small marginal increase in their activities. As is to be expected, ONCAD's priorities are directed primarily toward the peanut operation.

Although ONCAD is sometimes criticized for inefficiency and mismanagement, it should be acknowledged that given the environment of a developing country and the complexity of a high-volume operation, ONCAD's performance is really creditable. ONCAD is solely Senegalese-operated and has over 10 years of relatively successful experience in marketing Senegal's main economic crop. This is not to imply that ONCAD could not be improved (see Part IV. A. Administrative Arrangements), but obviously ONCAD has had considerable experience in rural agricultural markets dealing with coops and farmers.

During the time the farmer is willing to market his millet at the official price to ONCAD (late October through November), ONCAD is preparing for the next peanut campaign to start in late December or early January. The millet is brought to the same seccos where the peanuts will be sold in the next month. ONCAD personnel operating the secco are involved in preparations for the upcoming peanut campaign and perhaps view the purchase of millet as a minor move of a distraction than an obligation as it takes them away from the major task. This does not mean ONCAD doesn't buy from the farmer but only that the secco manager and ONCAD may not encourage the farmer to bring in as much grain as possible. Since the liquidity problem developed in 1975 (discussed in the Financial Analysis) ONCAD has not had sufficient funds after the peanut campaign to purchase millet in large amounts. Thus, while ONCAD does nothing to discourage farmers from bringing in his millet, neither does it do anything to encourage millet marketing. ONCAD's

monopoly power is not enforced by the GOS and<sup>1</sup> thus it is possible for farmers to sell millet in the parallel market. Currently, (March, 1977) the parallel market farmgate price of millet in the countryside is reported to be considerably higher than the official price so ONCAD is unlikely to be offered a significant amount of millet if a marketing campaign were launched.

## 2. Impact of Market System on Need for Storage

The qualitative analysis above points out certain institutional, technical and structural constraints currently existing in the rural grain market of Senegal. They obviously all impact upon this grain storage project and more specifically on ONCAD's need for expanded storage capacity. These constraints are restated below for purposes of clarification:

- a. The farmer's time constraint between harvesting, drying, threshing and marketing the new millet crop and beginning the harvesting and marketing of the peanut crop
- b. The cyclical market price relative to the official price of 35 CFA/kg
- c. The dichotomy between the farmer's view of millet as a food crop and peanuts as a cash crop
- d. ONCAD's high priority on peanuts vis-a-vis grain marketing
- e. ONCAD's current liquidity problem
- f. The inability to predict the millet production due to variability in rainfall.

These constraints are to be viewed in the context of GOS policies of establishing a security stock of food grains for emergency drought relief and encouraging the commercialization of grain production, thereby establishing an alternative source of income for farmers. As discussed in the Project Background section, both of these policies are included in the recommendations of the DAP and other studies of agriculture in Senegal. If successfully accomplished the policies would obviously especially benefit the small producers in rural Senegal.

In order for these policies to be achieved ONCAD must be in a position to take advantage of those exceptionally good years of production (see Graph II). In good years constraints a., b., c., and f. are not binding upon ONCAD's ability to purchase millet as the supply will be great enough to maintain the official price above the market price after the peanut campaign is completed and the farmer's aversion to risk is satisfied by on-farm storage adequate to meet his family's needs. This argues strongly for ONCAD to have sufficient storage capacity to meet storage demands generated by

a year of high production. Each "good year" is an opportunity to expand security stocks; if it is not taken advantage of, the opportunity is permanently gone.

Two other factors are operating in the agricultural sector which impact upon the constraints listed above and their relationship to achievement of GOS policies. One is the introduction and fairly rapid adoption of mechanical millet threshers in rural Senegal. This, of course, would act to relieve constraints a., b., and c.; with mechanical threshers farmers would be able to market more millet prior to the peanut campaign thus giving them cash when they most need it and at a time when ONCAD's official price commands the market. The rate of adoption is not quantifiable at this time but the positive relationship of the adoption of the threshing machine to ONCAD's share of the millet market is clear. This technical innovation also argues for an increasing positive response by the farmer toward commercializing his millet production by relieving a serious labor constraint at the critical time.

The second factor is the introduction of a new millet variety developed at the experiment station at Bambe which provides a 20% increase in yield over the native variety under similar conditions. 20 thousand hectares will be planted in areas around Bambe in the next season. In such situations two alternative responses should be considered. One response is that after adopting the new variety there will be a brief period during which the farmer gains confidence in the new variety after which he adjusts the area planted in millet down approximately 20% and plants a larger area in peanuts. In other words the farmer maintains his view that millet is the security crop and peanuts the cash crop and adjusts his land use according to the "maximum" strategy dictated by the new innovation. A second possibility is that he views the increase production of millet as a method of generating cash income during the time when his cash needs are greatest (just prior to marketing his peanuts) and maintains existing land use patterns or transfers less than 20% of his millet land to peanuts. No doubt his decision will be based upon the relative farm-gate prices and profitability peanuts and millet but he would probably be willing to take smaller returns for millet as his marginal utility for the cash is higher at the time of millet harvest than at the peanut harvest.

The two innovations discussed above could no doubt complement each other in relieving constraints to commercialization of millet. However, ONCAD must be in a position to take advantage of these innovations especially during the lag when the farmer is deciding on a revised land use strategy or again the opportunity might be permanently missed. It is impossible to quantify the amount of millet ONCAD will be offered as a result of these innovations as it depends both upon the rate of farmer adoption and the farmer's response to the adoption. It is clear however, that unless ONCAD can expand its storage capacity for millet during the next few years an excellent opportunity of increasing millet commercial-

ization will be missed. As in many cases of storage constraints the presence of storage capacity cannot guarantee success but the absence of the capacity greatly diminishes the probability of success.

One would expect that ONCAD would be offered a larger share of the increase in millet produced and marketed as a result of these innovations especially if a significant portion of the increase in production is commercialized by the farmer. In spite of the vast amount of uncertainty associated with a complex problem of this type, AID appears to be in a position of addressing a constraint at approximately the appropriate level before it becomes a bottleneck in an LDC.

The problems with the institutional constraints (d and e) associated with ONCAD are discussed in detail under Administrative Arrangements. They are briefly discussed below for purposes of completing the analysis of this section.

Thus far the paper has dealt with the exogenous constraints of the system that are outside the scope of this project. It has been determined that this project is being implemented at an appropriate time at what appears to be in an appropriate level. The institutional constraints can be dealt with within the scope of the project with effective implementation and administrative arrangements.

It should be recognized that an expansion of ONCAD's grain marketing operations requires technical and managerial skills slightly different from those involved with the peanut campaign. Although grain marketing activities are currently part of ONCAD's operations, evidence indicates that inefficiencies in the operation exist especially in grain preservation where ONCAD's experience is limited. Losses in grain due to insect damage and moisture alone are estimated in the area of 20-30% (see Annex B-2). The technical assistance and training are designed to deal with these and other problems.

The problem of ONCAD's priorities is simply a reflexion of the real world. ONCAD was originally established to handle the peanut marketing system. Peanuts generate 40% of foreign exchange and are clearly the major export crops from

the agriculture sector. To either assume or require a significant change in ONCAD's priorities is not only unrealistic, but from the GOS point of view, probably irrational; a case of "the tail wagging the dog" so to speak. Security stocks and food grain commercialization are important to both the GOS and ONCAD and ranks second among priorities.

In such a situation one solution is to establish within ONCAD a division solely responsible for coordinating all functions of grain marketing and storage management. It would be unrealistic and financially unfeasible to create a complete parallel organization for cereals marketing but a cereals coordinator at the central management level would provide a strong lobby for the cereals program. Such a solution would require departure from the organizational structure of ONCAD.

The problem of ONCAD's liquidity remains. There are reports that ONCAD has been unable to advance sufficient funds to coops for millet purchases. In a relatively poor year such as 1976/77 this problem is not serious but in a good year or in face of increasing yields it would be important. Ideally agreement should be reached with the Government so that earmarked funds (outside the peanut fund) will be set aside to insure that monies are available to purchase an agreed upon percentage of the millet crop each year. This might be about 5-10% of total production up to storage capacity depending upon the situation. Such a fund would cover incremental operating expenses.

It must be noted however, that, as the following analysis of the grain storage capacity indicates, ONCAD has shown a very credible performance in managing the expansion of its grain marketing program.

The schedule below presents ONCAD's current available grain storage capacity:

Premises belonging to ONCAD

- Ziguinchor	2,000 T
- Kaolack	13,000 T
- Thies	2,000 T
- Dakar	8,000 T
	<hr/>
Total	25,000 T

There is another 7,100 T of capacity possibly available, which ONCAD can rent on a temporary basis.

In addition ONCAD will complete construction of an additional 30,000 MT. For the location and size of the expanded capacity see Annex B2. On February 4, 1977 ONCAD provided the following report on the stock situation for millet.

Souna Millet:

<u>Year</u>	<u>Purchase</u>	<u>Stock</u>
1973/74	30,000 T	
1974/75	35,000 T	
1975/76	12,000 T	7,327 T
	6,000 T imported from Mali	
1976/77	4,800 T	4,800 T
	<u>87,800 T</u>	<u>12,127 T</u>

Sorghum Millet:

1975/76	53,000 T imported from Argentina	
	<u>140,800 T</u>	<u>39,098 T</u>

It is obvious that ONCAD will import more grain as this year's production is low. At the same time a portion of the present stock will be sold. These transactions will probably balance out. Thus ONCAD will have almost 16,000 MT of unused capacity.

Assuming that next years production will be a normal years production of some 550-600,000 Tons and that ONCAD's relationships in the grain market do not have any significant structural changes, one can estimate the amount of millet ONCAD will purchase based upon the earlier analysis as being about 20,000 MT. If next years production is extremely good ie, >600,000 MT, the amount purchased would be in the range of around 50,000 MT, thus utilizing all available storage and needing more.

It appears that ONCAD's excess storage capacity is approximately equal to the theoretical amount of millet they will purchase in 1977/78. This indicates a close degree of agreement between ONCAD's expansion of storage capacity and the demand for the expanded capacity generated by the market.

The size of the security stock and the potential for filling this stock can be estimated from production and sales data. Based on the year 1975/76 data we can estimate total requirements for millet and sorghum.

production	-	550,000 MT	
purchases	-	50,000 MT	
availability	-	<u>600,000 MT</u>	- Imports
carryover	-	26,000 MT	
requirements	-	<u>573,000 MT</u>	

Graph I on page 33 indicates that production is extremely variable ranging from less than 400,000 MT to over 650,000 MT but averaging near the 573,000 MT requirement. Thus the total requirement for security stock storage would be the difference between the requirement (673,000 MT) and the availability in a poor year (400,000 MT) or 173,000 MT. This analysis, of course, is not precise but does indicate the magnitude of the needs.

This amount of storage could not be filled in a single year but rather must be filled over time with small surpluses added each year. However in the event of an unusually good year pushing yields well above normal ONCAD could conceivably purchase some 30-40,000 MT of grain and would need storage space for this grain. As pointed out earlier, years of high production constitute the prime opportunities for filling security storage and in the opportunity passes because of a lack of storage space it is lost forever.

### Recommendations

To summarize it has been shown that:

a) ONCAD will have to continue expanding its warehouse storage capacity if it is to achieve the COS and AID mutually supported policies of security stocks and commercialization of the grain production.

b) Even though ONCAD has experience in both grain marketing and peanut handling it is weak in grain preservation techniques.

c) Barring abnormal rainfall ONCAD current storage capacity is appropriate for this year's crop purchases.

d) It is necessary to develop sufficient storage capacity to handle grain surpluses in years of abnormally high production.

Based on these conclusions it is recommended that the construction of the warehouses be tranchad. The project will schedule construction of 10,000 MT per year. However, after the first year, a joint AID/COS evaluation of the effectiveness of the training program in this project is necessary. The ideal time for this evaluation is in January after the peanut campaign is initiated. The evaluation should include the quality and amount of locally grown millet in ONCAD's warehouses, ONCAD's demonstrated ability to manage the grain storage and marketing operation, the size of the current years harvest and the projected amount of additional ONCAD purchases. Based upon this evaluation required changes in the training program should be implemented and an estimate of the next years storage capacity made. The estimated storage capacity required to store ONCAD's purchases from the current crop tempered with the effectiveness of the training program should verify the planned phasing of additional storage construction and allow acceleration of the construction schedule if needed.

If the current year's 1977 harvest is exceptionally good the grain can be placed in the peanut seed seccos prior to the rainy season and stored outside under temporary cover while the peanut seed is stored during the dry season. This is the same procedure followed in the 1974/75 season and the PRP carries a detailed description of the process. Thus, ONCAD has managed such a process in the past and should be able to do so in the future.

The advantages to this phased implementation are that they insure ONCAD can expand capacity when required to do so by millet production. It avoids expanding the storage capacity before ONCAD's management capacity is similarly expanded. It also serves as an incentive to ONCAD to efficiently manage the grain storage and marketing operations.

### 3. Benefits of the Project

A complete economic analysis of the storage construction would require a dynamic linear programming approach in which the functional would be set up to optimize a rate of grain commercialization while simultaneously establishing a better stock program. Storage capacity and manageability would then enter the matrix as resource constraints. Once the functional was optimized then the shadow price of a unit of storage capacity or unit of manageability would provide the economic opportunity cost of that unit

over a predetermined point in time. Given the quality and quantity of available data in Senegal such an approach is obviously not feasible at this time.

Instead three procedures will be utilized to show the economic viability of the project. First the savings in grain preservation will be examined. Next import substitution and finally drought relief alternative will be analyzed.

The grain preservation component will affect all the grain ONCAN can store and not just the 30,000 MT directly associated with this project. The training program is designed to reduce grain losses from the current estimated 35% to a more reasonable 4%. Assuming that ONCAD has full storage for all its present and planned capacity there would be 77,544 MT of grain (51,272 MT of existing capacity and 26,272 MT of planned capacity) assuming an average selling price of 40 CFA/kg we get 40,000 CFA/MT of 2.05 billion CFA total value (8.2 million \$). A 31% loss is thus equivalent to a \$2,543,091 annual loss. Put another way ONCAD would have to purchase 24,038 MT of millet just to replace the annual loss that would be saved by this project. Thus the marginal benefit from this portion of the project alone is potentially \$2.5 million per year. 1)

If we assume that ONCAD had to import grain in drought years because it did not have the storage capacity to take advantage of the good years we would find 35 CFA/kg CIF Dakar x 26,272 MT = CFA 91,952,000 to be the difference at Dakar. Compensating for the average transport price of 30 CFA per kg to get the grain to consumers in the rural area we arrive at a total savings of CFA 1,707,680,000 (\$6,830,720).

Finally we can regard the savings of the project by examining the cost of drought relief. Although it is impossible to predict what the world situation with regards to shipping costs and grain prices, we can based an analysis on the USAID costs of supplying 26,272 MT of drought relief food based on c.c.c. price plus ocean freight plus inland transport this cost is \$106 + \$42 + \$120 or \$268 per ton for a total cost of \$7,040,896.

While the total economic benefit is not the total of the three figures, this program is one which addresses the constraints. Relieving these constraints cannot guarantee success, but by not relieving constraints one can guarantee failure. If the capacity of ONCAD is not expanded we can be fully confident that at some point in the future the GOS will either have to input an addition 28,272 MT or AID (or some donor) will give an additional 26,272 MT that otherwise will be stored in areas of consumption in rural Senegal. Therefore, the benefits can be set up according to the following alternatives for a given year in the future when drought or near drought conditions exist.

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1) Figures given are for existing capacity. For expanding capacity figures are 3.1 billion CFA (\$12.4 million) X.31 = \$3.846,182.

Situation 1

The GOS finds some way to expand ONCAD's capacity by 30,000 MT and AID has no project. This is essentially the cost of no training program.

$$\text{Cost} = N (\$3,836,182)^{\underline{1/}}$$

(N) = year of drought

Situation 2

AID has training program but not a construction program:

- a) Either, ONCAD imports 26,272 MT - \$6,830,720
- b) or AID donates 26,272 MT of millet - \$7,040,896

Situation 3

AID has no project and GOS cannot finance warehouses for ONCAD

- a)  $N (2,543,091^{\underline{2/}}) + \text{ONCAD imports } \$6,830,720$
- b)  $N (2,543,091^{\underline{2/}}) + \text{AID donation } \$7,040,896$

In every one of these situations it is clear that although there is not a real cash flow to the project, the opportunity costs of not having this project when stocks are needed in a drought year are so large that on economic grounds alone the project is a good investment of resources. In addition, as demonstrated earlier, there are social benefits which are non quantifiable and institutional and policy benefits (as discussed in background section) which would lead us to recommend this project.

It should be pointed out that the project is a whole and the benefits are broken out in the above manner for presentational purpose. It is obvious that it would not be rational to have either the training portion and T.A. without the construction or vice versa.

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1/ from footnote page 42

2/ The cost of no training program.

## PART 4. IMPLEMENTATION PLANNING

### A. Administrative Arrangements

#### 1. Management Capability of ONCAD

The major responsibility for agricultural marketing in Senegal rests with ONCAD. Therefore it is the logical cooperating agency for implementing this project. ONCAD has come under criticism in World Bank studies and by independent researchers. As a consequence ONCAD has been subjected to official scrutiny and to several "reorganizations" in an attempt to improve its functional ability. Historically ONCAD has shown high operational costs, e.g. from 1971/72 through 1974/75 ONCAD's costs in peanut marketing have run between 9% and 12% of the selling price of the peanuts. Furthermore, it is recognized that ONCAD has had difficulty organizing the complex transportation needs of cooperatives in moving the peanut crop without delays into the rainy season.

The PP team has observed that, although ONCAD has 54 fumigators on its payroll, stores of grain have gone untreated for extended periods of time. The team also observed that construction sites were not always effectively monitored to control the quality of materials used in construction, as well as to see that minimum construction specifications and standards were being met.

On the positive side, ONCAD has effectively for a number of years organized and carried out a complex marketing program of about a million tons of peanuts each year. It has done this through the involvement of an extremely large number of small producers, treating them with concern equal to that given to larger producers. It has also stored and distributed peanut seed, imported and distributed fertilizers, insecticides, herbicides and other materials and equipment for agricultural production required by the many farmers of Senegal. It has carried out the major burden of providing production credit to farmers through cooperatives and generally assisted broadly the cooperative movement in Senegal. Therefore, ONCAD has the organizational structure and the manpower to effectively take on the establishment of a national buffer stock of grain as well as the commercialization required to periodically replenish it and to carry out the distribution and resale of grain production surplus from one area to deficit areas in the country.

Historical bottlenecks to an effective cereal program managed by ONCAD are recognized as: (1) transportation, (2) storage facilities, (3) properly trained managers for these activities, and (4) the lower priority given to cereals vs. peanut marketing. The GOS has taken initial steps to remedy both (2) and (4) by initial moves to implement its grain marketing program and policy. These moves include the presently engaged construction program for 18 storage facilities and an annually-reviewed pricing and purchasing policy for cereals. In May 1976 the price of millet and sorghum was set at 35 CFA per kg. As discussed in the Economic Analysis section, this in effect constitutes a floor price for millet and sorghum. The private sector will continue to be organized and used for transportation, but the dispersion plan for the 29 other warehouses of 1000 and 2000 MT sizes to be built in the first tranche of its long-range plans for storage will tend to alleviate transport problems for cereals.

The proposed project helps Senegal to attack problem (3) through the concentrated training program, and to further its own attack on problem (2) by the construction of storage facilities for another 30,000 MT of grain. Therefore, in conclusion, if ONCAD lacks some management capabilities, this project is aimed directly to help it resolve this crucial problem as well as several other problematical situations which have contributed to poor management. The GOS has taken a strong stand in favor of establishing a buffer stock of cereals and of commercializing the redistribution and sale of surplus production to deficit areas. A mandate has been given to ONCAD to mobilize and effect this policy. Its efforts to do so have been manifested in a number of actions discussed above and as additional actions continue to materialize, they will lend to the success of this project.

## B. Implementation Plan

### 1. General

This project is to be implemented via a combination of fixed inputs and phased inputs based on evaluations to be conducted annually. The technical assistance and training components are preprogrammed for implementation and will be put in place as illustrated in the PPT Annex. The construction component after year one will be phased based on an annual joint ONCAD/AID evaluation to be undertaken in January of each year. This evaluation will investigate progress in the technical assistance and training components,

ONCAD's success in improving warehouse management, results of the current year buying campaign and requirements for additional storage. Based on this evaluation, ONCAD and ADO/Dakar will make a decision on how many additional storage units are to be constructed in that year. See Evaluation Plan, Section 4.B for a more complete description of the evaluation program.

## 2. Procurement

There will be several different types of procurement in the project, each with its own particular methodology.

a. Technical assistance will be procured through a direct AID contract. AID/W will be the primary action agent following submission of the PIPA by ADO/Dakar.

b. Participant training and short-course training in the U.S. will be arranged through PIO/Ps issued jointly by ADO/Dakar and OI 'AD. The Office of International Training in AID/W will arrange for the training through Kansas State University.

c. U.S. materials for warehouse construction. A PIPA for technical services will be issued for the services of AAPC to assist the GOS by preparing bid documents, handling bidding procedures, evaluating bids and assisting with procurement of warehouse materials. Procurement will be done competitively after a suitable IFB is developed by AAPC and ONCAD. Given the fact that phased construction based on evaluations does not allow precise definition of the timing of construction, it is suggested that in the interests of minimizing time lost in the procurement process an IFB be prepared and a contract negotiated for the entire 30,000 MT of warehouse capacity with an escalation clause based on estimated steel price increases in the U.S. The IFB, including plans, specifications, and the contracts negotiated, will be approved by ADO assisted by REDSO/WA and the procurement process will be monitored by the ADO.

d. Procurement of local construction services will be done by ONCAD according to local competitive procurement procedures. Contracts for this activity will be reviewed and approved by ADO assisted by REDSO/WA. Procurement procedure will be monitored by ADO.

e. Since supervisory engineering is primarily in AID's interest it will be an AID direct contract, competitively procured through advertising both in the U.S. and Senegal. ADO/Dakar will be assisted by the Regional Contract Officer from REDSO/WA in procuring and negotiating the contract.

f. Equipment - An IFB will be prepared under the AAPC contract described in c. above to allow host country contracting for all equipment. AAPC will cooperate with ONCAD and the technical assistants working on the project in developing specifications, and the contract advisors will be approved by the ADO assisted by REDSO/WA.

### 3. Waivers

Only one waiver will be required, Code 935 procurement of vehicles. All other procurement will be handled competitively through AAPC in the U.S. or through ONCAD in Senegal.

With respect to vehicles, there are no companies in the country that can or are willing to provide reliable service, maintenance, or spare part support for U.S. manufactured vehicles. In many parts of Senegal, there are no facilities capable of repairing U.S. vehicles, and those to be procured will be utilized throughout the entire country. The AID Office in Dakar has received a waiver allowing the purchase of non-U.S. vehicles for its own use due to the repair and spare parts problem. A waiver, therefore, is requested to allow for code 935 purchase of three Landrovers to be utilized in conjunction with the technical assistance and training programs.

### 4. Financial Arrangements

a. U.S. dollar costs for goods and services procured in the U.S. will be paid through normal Letter of Commitment, Letter of Credit procedures through the supplier's bank.

b. At the time of signature of the Grant Agreement ONCAD will establish an account, in a bank acceptable to AID, to receive advances of project funds for local costs to be specified in the Grant Agreement and Implementation Letters. Periodically ONCAD will submit vouchers of expenditures made against project accounts to date as requests for reimbursement. Vouchers, justification material, and covering statements will be examined by ADO/Dakar and approved for reimbursement as appropriate. This procedure will continue until advances plus disbursements are equal to the total of local currency accounts.

At that time there will be "no pay" vouchers issued to liquidate advances and complete the project. Besides local costs for locally-procured construction materials and erection costs, local costs for training will also be specified in the Grant Agreement and handled through a project account with necessary monitoring by ADO and project staff to assure that AID interests are satisfied and that AID requirements are being met.

### C. Evaluation Plan:

Continuing evaluation is critical to the project. As discussed in Part 3. D. Economic Analysis, it is possible through annual evaluations to determine with reasonable accuracy the storage needs of the coming season, thus facilitating rational planning and allocation of project and GOS resources in accordance with a sound analytical basis.

The annual joint AID/ONCAD evaluation will analyze storage needs based on the year's production and the amount already purchased by ONCAD. It will also evaluate the effectiveness of the training program in improving warehouse management and will define ONCAD's cash flow position for that year.

In order to undertake this evaluation it is recommended that a two-man team be utilized as the AID component. The skills required are one agricultural economist and one grain storage expert. They will work with one or more ONCAD assigned counterparts.

The evaluation team will present their findings and recommendations for warehouse construction and modifications in the training program to ADO/Dakar which, in collaboration with ONCAD, will determine the scope of the construction activity based on recommendations of the evaluation team.

Final evaluation in 1981 will include a REDSO/WA engineer in addition to the skills defined above. The final evaluation team will concentrate on analysis of the management of the storage system and its success in meeting the stated purpose of the project.

Evaluation is funded in the budgets of the project at \$25,000 per year to allow two man-months of contracted time each year.

### D. Conditions, Covenants, Negotiating Status

#### 1. Negotiating Status

The project has been developed in close collaboration with the Government of Senegal and has been discussed at all levels up to the Ministerial. The GOS has recently restated its policies to ADO/Dakar regarding cereal self-sufficiency, food grain incentive pricing and the importance of a national security storage to complement on-farm storage. The Minister of Rural Development emphasized the importance of these policies to the Government program and indicated his full support for this project.

#### 2. Conditions

It was the conclusion of the PP team that, because of the phased construction plan with annual evaluations and decision making with

respect to implementation, conditions precedent to disbursement other than standard items should not be required. It will be emphasized in the Grant Agreement, however, that AID and ONCAD must agree on each year's construction and training plan, based on the preceding annual evaluation. For the first year of the project, enough data has been gathered and evaluated in the process of PP development to justify the decision to commence with 10,000 MT of storage construction in 1978.

3. Covenants: A single comprehensive covenants is recommended to cover:

The need to assure ONCAD liquidity for the annual purchase of agreed upon amounts of food grain at the official announced price, plus incremental operating costs associated with the expanded grain storage operation.

F. ADO Project Management

The position of project manager is established and manned in ADO Dakar. No problem is foreseen with respect to this function.

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INFO RUTAIJ/AMEMBASSY ABIDJAN 7312  
BT

UNCLAS STATE 3031??

AIDAC

E.O. 11652: N/A

TAGS:

SUBJECT: SENEGAL GRAIN STORAGE LOAN, PRP REVIEW

AA/AFR HAS CONCURRED IN EOPR RECOMMENDATIONS RE SUBJECT PRP.

FOLLOWING ARE QUESTIONS/RECOMMENDATIONS RAISED AT REVIEW WHICH SHOULD BE ADDRESSED IN PP.

A. WHAT ASSURANCES ARE THERE THAT THE WAREHOUSES WILL BE USED ONLY FOR FOOD GRAINS VERSUS PEANUTS? IT IS NOT RECOMMENDED THAT THIS BE DEVELOPED INTO A CONDITION OR COVENANT FOR THE LOAN BUT THAT MENTION SHOULD BE MADE IN THE PROJECT PAPER OF MONITORING/REPORTING REQUIREMENTS TO ASSURE INTENDED USE.

B. DOES THE GOS PLAN TO ANNOUNCE BUYING PRICES BEFORE PLANTING AND HOLD TO THAT PRICE THROUGH THE HARVEST? IT IS RECOMMENDED THAT A COVENANT BE PLACED IN THE PROJECT PAPER REQUIRING THE GOS TO IMPLEMENT A POLICY OF ANNOUNCING GRAIN SUPPORT PRICES PRIOR TO COMMENCEMENT OF PLANTING SEASON.

C. AN ANALYSIS OF THE PROJECTED GRAIN FLOW INTO AND OUT OF STORAGE FACILITIES OVER THE ENTIRE CROP YEAR IS NEEDED, INCLUDING AN ESTIMATE OF PEAK STORAGE CAPACITY REQUIREMENTS NECESSARY AND THE LENGTH OF TIME SUCH CAPACITY IS NEEDED.

D. CONSTRUCTION COSTS NEED TO BE RE-CONFIRMED. IN ADDITION AN ENGINEERING ANALYSIS IS NEEDED TO MAKE THE NECESSARY SECTION 611 DETERMINATIONS. KANSAS STATE UNIVERSITY WILL BE MAKING A FURTHER STUDY AND ADVISING A.I.D. ON THIS MATTER.

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TELEGRAM

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E. A SOCIAL ANALYSIS AND IDENTIFICATION OF BENEFICIARIES IS REQUIRED. EVIDENCE IS NEEDED TO ASSURE THAT PRINCIPAL BENEFICIARIES WILL BE SMALL FARMERS. WHILE THE PRP STATES THAT THE GOS WILL BUY FROM ANYONE, IT IS NOT CLEAR THAT SMALL FARMERS WILL AVAIL THEMSELVES OF THIS OPPORTUNITY. THE PERCENT OF SMALL FARMERS TO LARGER PROPERTY HOLDERS WILL NEED TO BE KNOWN IN ADDITION TO SOME INDICATION OF WHAT IF ANY INCENTIVES OR OUTREACH EFFORTS WILL BE REQUIRED FOR SMALL FARMER PARTICIPATION.

F. WHILE THE ECOLOGY ASSESSMENT SEEMS ADEQUATE FOR A PRP, IT WOULD BE WELL TO EXPAND THIS SECTION IN THE PP TO INCLUDE DISCUSSION ON THE IMPACT OF THE PESTICIDES AND INSECTICIDES TO BE USED IN THE PROJECT.

G. CAN THE LOCAL PEANUT WAREHOUSES BE MODIFIED TO MEET SOME OF THE DRAWBACKS OUTLINED IN THE PRP (E.G. VENTILATION, OVERHEAD SPACE)?

H. THE PP MUST ADDRESS AND OUTLINE AN EVALUATION PLAN. AS PART OF EVALUATION IT IS SUGGESTED THAT 2-3 WAREHOUSES/DEPOTS BE SELECTED AT RANDOM TO CHECK NUMBERS AND SIZE OF FARMERS, KILOS OF GILLNET SOLE VERSUS PRODUCTION AND LIKEWISE FOR PEANUT.

I. WHAT ARE THE LONG TERM IMPLICATIONS OF HIGH PRICES TO BE PAID BY THE GOS FOR GRAINS AND CAN/SHOULD THIS BE MAINTAINED OVER A LONG PERIOD OF TIME. THE STABILITY AND SUPPORTABILITY OF SUCH PRICING POLICIES REQUIRES CAREFUL EXAMINATION AND SUPPORTIVE EVIDENCE.

J. GOS AND RPO SHOULD PROVIDE SUFFICIENT EXPLANATION OF THE NEED FOR 200,000-300,000 MT BUFFER STOCKS AND THEIR PURPOSE. WE NOTE THAT THIS SEEMS TO BE FAIRLY HIGH PROPORTION OF ANNUAL PRODUCTION HELD AS BUFFER.

K. DOES EVIDENCE EXIST THAT ONCAD HAS SUFFICIENT EXPERIENCE IN GRAIN PROCUREMENT/MARKETING TO JUSTIFY THIS EFFORT?

L. WILL A.I.D.'S TECHNICAL ASSISTANCE BE ADEQUATE?

(1) WHY ONLY ONE GRAIN STORAGE AND PRESERVATION SPECIALIST FOR LONG TERM TRAINING? IS THIS REALLY SUFFICIENT TO MEET SENEGAL'S SPRING TERM NEEDS?

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WKWL SHOULD A.I.D FINANCE EXPERTS IN MARKETING AND PRICE ANALYSIS, OR WILL THIS CRITICAL ELEMENT BE COVERED UNDER SOME OTHER PROGRAM?

M. THE FACE SHEET SHOWS GOS CONTRIBUTION INCORRECTLY AS DOLS 2.3, SHOULD BE DOLS 7.0.

N. OF THE PREDICTED 600 ~~ONCAD PERSONNEL~~ WHO WILL PARTICIPATE IN PROJECT AND RELATED ACTIVITIES, HOW MANY ARE NEW AND CAN ONCAD SUPPORT THEM BUDGETARILY?

O. WOULD THIS PROJECT BE A DISINCENTIVE TO ON-FARM STORAGE; OR FUTURE DEVELOPMENT OF COOPERATIVELY-OWNED AND MANAGED MARKETING SYSTEM?

3. FOLLOWING ARE ISSUES RAISED:

A. SHOULD THE TECHNICAL ASSISTANCE AND TRAINING PROPOSED BE GRANT OR LOAN FUNDED? MOPR RECOMMENDS THAT DOLS 100,000 AIP REMAIN TO INITIATE PROJECT TRAINING BUT THAT ALL OTHER TA AND TRAINING BE LOAN FUNDED. IF GOS HAS GREAT DIFFICULTY WITH THIS PLEASE ADVISE ARGUMENTS.

B. WHAT TYPE CONSTRUCTION SHOULD BE USED: U.S. PRE-FAB OR LOCAL CONSTRUCTION? MOPR RECOMMENDS LOCAL CONSTRUCTION AS IT LEADS ITSELF NICELY TO FAR METHOD, LESS COSTLY IN LONG RUN, LABOR INTENSIVE, AND CAN BE MAINTAINED LOCALLY. NOTE THAT UTILIZATION OF THE FAR METHOD DOES NOT ELIMINATE THE NEED FOR COMPLIANCE WITH A.I.D. RULES RELATING TO PROCUREMENT AND CAPITAL CONSTRUCTION SUCH AS SECS 611 (A), (B), (C) AND SEC 604 (A) OF THE FAR AND SEC 105 OF THE F.A.R. E.A. THE RLA SHOULD BE CONSULTED DURING DESIGN OF PP TO INSURE THAT REQUIREMENTS OF THESE SECTIONS ARE MET. ALSO REEBO ENGINEER MUST LOOK OVER LOCALLY CONSTRUCTED WAREHOUSES BEFORE FINAL DESIGN TEAM BEGINS WORK. A.I.D. MUST APPROVE CONTRACTOR. PERIODIC INSPECTION SHOULD BE PERFORMED THROUGHOUT CONSTRUCTION PROCESS TO INSURE SPECS ARE MET (SOLID CRITERIA MUST BE AGREED UPON PRIOR TO BEGINNING). MOPR FELT A COVENANT SHOULD BE ADDED TO LEAN PPTER THAT GOS MUST BEGIN A CERTAIN PERCENTAGE OF THEIR WAREHOUSES BEFORE A.I.D. BEGINS ITS CONSTRUCTION.

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C. PROJECT PURPOSE. WHAT IN GOS VIEW AS TO WHY MORE STORAGE SPACE IS NEEDED (TO PROVIDE BUFFER FOR FUTURE DROUGHTS, TO STABILIZE GRAIN SUPPLIES YEAR ROUND, TO INCREASE COMMERCIALIZATION OF FOOD GRAINS)? THE PP SHOULD DEMONSTRATE WHY EXPANSION OF STORAGE REPRESENTS "LEAST COST" RESPONSE TO NEED FOR STABILIZING GRAIN SUPPLIES, AS OPPOSED, FOR INSTANCE, TO IMPROVING TIMELINESS AND AMOUNT OF FARM PRODUCTION. HOPEFULLY, RDO WILL BE ASSISTED IN ANSWERING THESE QUESTIONS BY (1) IBRD STUDY GRAIN STORAGE SITUATION, AND (2) AGRICULTURAL SECTOR ANALYSIS FOR SENEGAL THAT IS NOW IN PLANNING PROCESS.

RE AGRICULTURAL SECTOR ANALYSIS, ENCOURAGE RDO BEGIN OVERTURE TO GOS AS IT MOST IMPORTANT FOR FUTURE DEVELOPMENT OF PROJECTS IN SAID SECTOR. WOULD EXPECT THAT THE SCOPE OF WORK AND TIMELINE OF ANALYSIS WOULD BE READY BY TIME UP FOR SUBJECT PROJECT IS FINALIZED. IF AID/W NOT ASSURED THAT ISSUES PRESENTED IN ABOVE PARA WILL BE ADDRESSED IN ANALYSIS, THIS PROJECT MUST BE RE-CONSIDERED SO AS TO ADDRESS LARGER QUESTIONS.

4. IBRD STUDY AID/W HAS REQUESTED BANK LIAISON WITH RDO TO FACILITATE RESPONSES TO PARAS (I) (J) (K) AND (L). FINAL DESIGN SHOULD AWAIT COMPLETION OF IBRD STUDY.

5. REQUEST RDO PROVIDE TENTATIVE SCHEDULE AND INDICATE SKILLS REQUIRED FOR PP TEAM IN ORDER TO FACILITATE PROCESS. ONLY IBRD STUDY IS COMPLETED AND RDO/REDSO HAVE ADDRESSED QUESTIONS CITED PARA 3. MISSINGER

*11/1/76*  
*Lee Dy*  
*on NEA desk*  
*about IBRD study*

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## ANNEX B-1

### RECOMMENDED PROGRAM FOR TRAINING SENEGALESE IN GRAIN STORAGE AND PRESERVATION

#### 1. Background

In an IGA Inspection Report of October 10, 1975 covering AID drought relief programs in West Africa, the IGA insisted that AID incorporate proper pest control features in the design of any future grain storage and warehouse construction projects it may consider financing.

The training section of this project is proposed as a means of effectively educating key personnel within ONCAD and ITA to provide a nucleus of technically qualified managers and technicians to maintain GOS grain reserve stocks.

The program is designed to inform personnel at all levels within ONCAD (from National Management to secco managers) in the storage techniques and management practices necessary for effective, long-term grain preservation.

#### 2. Training Program Elements

To implement the grain storage and preservation training program, technical assistance will be required by the GOS in the form of (1) an AID Grain Storage and Preservation Advisor, (2) training of two Senegalese grain storage and preservation specialists in the U.S., (3) grain storage and marketing short-course training for ONCAD national and regional storage quality personnel, and (4) grain storage and marketing short course training for the ITA storage section leader. As pre-project training, seven regional storage quality personnel of ONCAD attended the 1976 session of the short course.

##### a. AID Grain Storage and Preservation Advisor

It is recommended that a Grain Storage and Preservation Advisor be supplied to work with ONCAD in training its personnel and implementing a sound storage and preservation

program. He should arrive at post by January 1978 and should be responsible for the following activities:

1. Serve as advisor to ONCAD on problems relating to cereal grain storage and quality preservation.
2. Develop and implement a two-month incountry training program in cooperation with ITA, ISRA and KSU for training a four-man incountry training team.
3. Coordinate training of ONCAD reserve, central and secco warehouse managers.
4. Assist ONCAD in the development and implementation of improved storage techniques and facilities.
5. Assist ONCAD in the development and implementation of effective grain management practices to reduce losses due to insects, rodents and other factors.
6. Assist ONCAD in cooperation with ITA in the development and implementation of a simple set of grain standards.
7. Assist ONCAD in the development and conduct of a grain storage loss survey.

c. Assistance in Developing Program for Incountry Training Team

It is recommended that Kansas State University, under Contract AID/ta-C-1162, be involved in the development of a program for the incountry training team, preparation of training materials and conducting a two-month period of instruction for the training team.

d. Overseas Training

1. Grain Storage and Preservation Trainee (Senegalese)

It is recommended that two Senegalese candidates be selected to receive training in the U.S. to prepare them for ONCAD positions as Grain Storage and Preservation Specialist and deputy or assistant. It is assumed that after training in the U.S. these specialists will assume the duties performed by the AID Grain Storage and Preservation Advisor and become permanent members of the ONCAD Quality staff.

The two trainees should possess certain qualifications:

a. Have the equivalent of a Bachelors Degree in Agricultural Engineering, Entomology or Agronomy, and acceptable records to allow enrollment in U.S. universities or equivalent work experience to permit them to study at the university level

b. Be fluent in English. If not, language training should be provided to pass AID requirements for U.S. training.

c. Have qualities of leadership, initiative and an intense interest in the field of grain storage and preservation.

It is suggested that these trainees attend the KSU short course during the time they are in the U.S.

## 2. Staff Agricultural Economist

This trainee will need to meet certain qualifications:

a. Have the equivalent of a Bachelors Degree in Agricultural Engineering, Agricultural Economics or Math.

b. Be fluent in English. If not, language training should be provided to pass AID requirements for U.S. training.

c. Have qualities of leadership, initiative and an intense interest in Agricultural Economics.

## 3. Grain Storage and Marketing Short Course Training in the U.S.

It is recommended that the ONCAD National Quality Section Leaders and an ITA staff member attend the 1977 Storage and Marketing Short Course conducted at KSU under Contract AID/ta-C-1162. Seven regional ONCAD Quality Control staff attended the 1976 KSU short course. It is proposed that if convenient the U.S. Grain Storage and Preservation Advisor also attend this 1977 short course.

The short course is offered each year from mid-June until mid-August. Lectures, discussions, laboratory work, workshops and field trips are included. Course materials are prepared in English, French and Spanish, with training

in English and simultaneous French and Spanish.

A core curriculum is presented on the basics of grain storage and marketing with special emphasis either on the marketing or technical aspects of grain storage, depending on participant preference. Participants in this case would pursue the technical emphasis. In total, short course training is recommended for the following personnel:

- One Grain Storage and Preservation Advisor
- One ITA Storage Section Leader
- One ONCAD Storage and Preservation Trainee

Three ONCAD Regional Quality personnel would attend the 1977 short course.

e. In-Country Training Team

It is proposed that an in-country training team consisting of four persons be assembled and receive two months instruction in grain storage and preservation, training methods, use of audio-visual training aids and demonstration techniques. In cooperation with ITA, ISRA and KSU, the team will develop course outlines, manuals and training aids for a series of in-country training sessions to be conducted for:

- 54 ONCAD Regional Fumigators
- 47 " Reserve Warehouse Managers
- 6 " Central Warehouse Managers
- 500 - 600 " Secco Warehouse Managers

The Grain Storage and Preservation Advisor, working closely with ITA, should coordinate the training team and utilize ITA, ONCAD and/or ISRA personnel on the team. ITA has an entomologist in charge of the grain storage section and technicians that could be employed in the training. ONCAD has quality section leaders and/or fumigators that could possibly be used in training and ISRA has researchers who could be called on to assist in the training.

Training teams should include at least one person and an alternate qualified to instruct in the following general subjects:

- Insect and rodent biology and damage
- Proper storage management and methods
- Pest control techniques and equipment
- Equipment maintenance and supplies

### In-Country Training of ONCAD Personnel

It is proposed that the training team conduct four one-month sessions for ONCAD Regional Fumigators and ONCAD Reserve and Central Warehouse Managers, two two-week refresher courses for Fumigators, and 12 one-week seminars for Secco Managers.

A mobile training unit consisting of a vehicle, audio-visual equipment and demonstration equipment will be provided with project financing.

### Proposed Training Schedule

Although the schedule provides for seven ONCAD staff to attend the KSU Grain Storage and Marketing Short Course during the project, this training was actually accomplished in June-August 1976. The two Grain Storage and Preservation trainees would go to KSU to complete 24 months training and earn a Master's Degree in Grain Science. During this time they would also attend the KSU short course in September 1977 if possible.

The ONCAD Director of Quality would visit grain storage and marketing functions in the United States during his training and prior to returning to Senegal on completion of training.

The ITA Storage Section Leader should <sup>also</sup> attend the 1977 short course; following this he would be involved in preparations for the two-month program to train the In-Country Training Team.

The In-Country Training Team should be assembled <sup>as early as possible</sup> in FY 1977 and undergo two months of training and preparation for conducting in-country seminars for ONCAD Regional Warehouse Managers, ONCAD Secco Managers and ONCAD Fumigators. Training of the Regional Warehouse Managers from Sine Saloum (seven), Diourbel (five) and Fleuve (three) will take place at a central location, probably ITA or ISRA. The same will be true of training for the Fumigators. Seminars for Secco Managers will be held in the various regions and/or departments where the seccos are located.

### 3. Cost of Proposed Training Program

a. Grain Storage and Preservation Advisor. It is estimated that it will cost approximately \$40,000 to support the

24-month training of two Senegalese who will eventually assume the duties of the Grain Storage and Preservation Advisor in ONCAD.

b. Short Course Training. Estimated cost per participant for short course training is approximately \$6000.

c. In-Country Training. This includes costs for assembling and preparing the four-man training team, providing and equipping a mobile training unit, and maintaining the team for approximately 24 months. Estimated cost is approximately \$455,000.

d. Total Cost. Total estimated cost of the training program could be expected to be \$500,000.

## ANNEX B-2

### WAREHOUSE DESIGN AND ENGINEERING COMMENTS

#### A. Warehouse Design

##### 1. Site Requirements

Each site should be on an all-weather road. If practical, the site should have potable water and electric power available. The site must be well drained, with no foreseeable natural hazards or features which would make the cost of leveling, excavation or soil compaction uneconomical. A typical pre-fab warehouse may require 3,000 psf soil bearing strength. The sites should be at least a kilometer from residential or commercial areas and allow room for expansion and fencing at least 20 meters out from the buildings to allow a closely mowed and maintained area to discourage rodents.

The rationale used by the GOS in the geographical location of sites considered the following:

- a. The crop yield and marketing potential of the area.
- b. The isolation of the region and the distance between sites.
- c. The potential consumptive needs of the area.
- d. The existence of a storage infrastructure.

##### 2. Type and Size of Warehouse Units

The proposed warehouses are of 1,000 and 2,000 MT capacity.

The current needs are for storing bagged grains which should not contact the walls, therefore the walls do not sustain pressure from the stored product. A side-wall height of 6 meters will allow normal stacking heights with ample clearance for inspection and fumigation operations.

Construction should minimize the heat gain into the building as much as practical and allow for ventilation, yet provide protection against driving rains and circulation of outside air when over 70% relative humidity.

The size of warehouses have been kept small and dispersed so that the small farmer with an animal-draw cart has more likely access to a local ONCAD market.

##### 3. Comparison of the ONCAD Warehouse and the Prefabricated, Imported Warehouse.

This comparison is of the warehouses ONCAD is currently building and the steel prefab warehouse of the design erected in Upper-Volta.

The prefab units have the following advantages:

- a. Less labor involved in erection,
- b. Erection time should be less,
- c. Fewer quality control problems,
- d. Floor is almost truck bed height,

- e. Fewer cracks where insects may take refuge,
- f. Better weather protection from overhanging roof,
- g. Ventilation openings can be closed to exclude rain and high humidity air,
- h. Less repair and maintenance,
- i. Greater capacity due to higher side walls,
- j. By sealing the doors and closing all ventilators, the entire contents could be fumigated.

The prefab units have the following disadvantages:

- a. Higher cost,
- b. Greater lead time required for delivery,
- c. Require imported supervision,
- d. Local construction crews are not experienced with this type of construction,
- e. The higher foundation is more difficult to form and pour,
- f. Have no side doors,
- g. Will require some management to control ventilation properly,
- h. Logistics problems in shipment and supervision.

The ONCAD warehouse has the following advantage:

- a. Lower cost,
- b. Familiar construction for local crews,
- c. Require little in foreign exchange,
- d. Less lead time required,
- e. There are 2 and 4 side doors on the 1,000 and 2,000 ton sizes respectively,
- f. No need for non-metric wrenches and power nut-runners,
- g. Walls are fairly resistant to bumping by handling equipment.

The ONCAD warehouse has the following disadvantages:

- a. Less capacity due to lower height,
- b. Low floor increases difficulty of loading and unloading,
- c. The foundation design is not adequately specified to insure proper depth of the grade beam foundation,
- d. Strict quality control requires an inordinate amount of inspection due to the labor intensive construction and on-site production processes,
- e. Open ventilators can allow rain to blow in,
- f. Walls are prone to crack, making insect control more difficult.

#### 4. Conclusion

On balance, a decision has been made to utilize pre-engineering (but not pre-fabricated) U.S. manufactured warehouses similar to those being financed directly by ONCAD (of German and French design). The construction of concrete basis and cinder block walls will be locally contracted as will local roofing. Also see the following engineering comments prepared by REDSO.

Summary:

16 X 102,000 = \$ 1,632,000 or  
16 X 90,000 = 1,440,000.

It should be noted that only a 5% inflation factor to cover a six months period was covered in the above figures and an additional 5% should be added for each 6 month increment of delay that is expected.

In summary, the concrete block walls are recommended. They are cheaper, provide better insulation and represent a greater local procurement and employment.

OPTIONAL FORM NO. 10  
MAY 1962 EDITION  
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

*Memorandum* UNCLASSIFIED

~~Handwritten scribbles and initials~~

TO : Mr. Norman Schoonover, RDO  
ADO/Dakar

FROM : *Ralph E. Barnett*  
Ralph E. Barnett, REDSO Eng. Advisor

SUBJECT: 611-a for ONCAD Warehouse Project No.685-0209.

DATE: April 29, 1977

Having visited the sites and reviewed the detailed drawings and cost estimates as submitted by Al-Sand International Corporation, and finding all to be acceptable, I recommend that you issue the required 611 -a-e certification.

UNCLASSIFIED



5010-109

*Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan*

**B. Engineering Comments**

The 23 sites that have been visited by a REDSO Engineer in their order of priority for construction are as follows:

No.	REGION	LOCALITY	CAPACITY TONS	No.	REGION	LOCALITY	CAPACITY TONS
1	Fleuve	Podor	2,000	13	Casamance	Koukande	1,000
2	Thiès	M'Bour	2,000	14	Diourbel	D'Mousty	2,000
3	Thiès	Joal	1,000	15	Thiès	Tivaouane	1,000
4	Fleuve	Aerelad	1,000	16	Thiès	Niakhene	1,000
5	Casamance	Koussi	1,000	17	Sine-Saloum	K.Madiabel	1,000
6	S/Oriental	Kedougou	1,000	18	Diourbel	Louga	2,000
7	Diourbel	Dahra	2,000	19	Fleuve	Thille Bouba	1,000
8	S/Oriental	Bakel	1,000	20	Sine-Saloum	Kaolack	2,000
9	Casamance	Kolda	1,000	21	Thiès	Thiès	2,000
10	Fleuve	Dioum	1,000	22	Sine-Saloum	Fimela	1,000
11	Thiès	Fissel	1,000	23	Thiès	Thilmakha	1,000
12	S/Oriental	Koumpentoum	1,000				

The sites average in size to be 60 M X 100 M. There is very little grading or vegetation to be removed and there are no persons to be relocated at any of the sites. The majority of the sites are adjacent to primary routes and the others are on secondary routes that are accessible all year.

The seven 2,000 tons Stran-Steel Pre-Engineered buildings are 21.34 M X 45.7 M. in dimension with concrete foundations and floor slabs. The walls are optional using either a galvanized steel sheeting or concrete blocks with galvanized steel roofing over fiberglass. Insulation plus roof ventilators and skylights will be installed. Wall louvers and 6 galvanized double slide doors are standard. Roof extensions in each end and a 1.5 M. wide canopy along each side wall would be extra.

Basic Building	\$48,430	(with steel wall paneling)
Roof Extension	6,676	
Total	\$55,106	

To the above has to be added clearing and grubbing the reinforced concrete foundation, floor slab, erection costs, transportation and contingencies plus an inflation allowance which rounds out to \$187,000 per units. If concrete walls are used in lieu of galvanized steel paneling, the price per unit could be reduced by \$17,000. Summary:

$$7 \times 187,000 = \$1,309,000 \text{ or}$$

$$7 \times 170,000 = \$1,190,000$$

The 1,000 ton warehouses are 21.34 X 22.86 M. The basic pre-fabricated building is \$30,610 and using the above criteria they price out to approximately \$102,000 each for steel walls and \$90,000 each for masonry walls.

## ANNEX B-3

### EVALUATION OF STORAGE MANAGEMENT & QUALITY CONTROL

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Samples were taken at Ziguinchor, Kaolack, and Thies for a total of seven separate samples. The losses were measured on a volumetric basis using a sample of 108 cc (paper drinking cup). A subsample of approximately 6.5 cc was taken of this for actual measuring of amount of damaged grain. All dust from the 108 cc sample was separated by sieving before the subsample was taken. The subsample was separated into insect damaged and undamaged grain, dirt (if any), live insects, and insect cast skins and dead insects. Measurement of damaged grain, undamaged grain, and dust was done with a 1cc glass vial. The volume measurements were converted to percentage.

Inspection of damaged grain showed that, as an average, 1/2 of the individual grains had been eaten by the insects, thus the volume measured represented half of the loss if the damaged grains were considered lost, as many would be in winnowing and sifting. Translating this loss into terms of rejection of grain for food uses as practiced in the U.S. would be unrealistic and would make the loss much higher than is normally accepted in most lesser-developed countries.

Even accepting the more lenient standards the loss observed in the samples taken amounts to 31.6%. This figure excludes the one observation at Ziguinchor in which no sample was taken because there was no insect infestation. That grain was just being moved into storage from an imported (international) shipment and did not constitute a valid test of storage conditions at the warehouse visited.

Losses due to weather action (wetting) were not measured, but, observation indicates that such losses are of importance. For example, at Kaolack a pile of bagged grain, abandoned as unusable (total loss) was observed between warehouses. It was about 20 sacks high x 20 m x 40 m in size. The present state of the grain made it impossible to judge what had caused the loss, but, most likely, wetting

had been a factor.

Attempts to see inspection and fumigation records produced only one record, at Kaolack, and that showed no inspection or fumigation between January 1976 and the date of the visit, 9 August 1976. At other facilities with stored grain no records were available, or, at least, were not produced upon questioning.

The conclusion must be that a very great improvement in storage and quality control is needed. Better and more facilities will aid in this, but a training program to prepare individuals for competent action is an absolute necessity.

It is also recommended that decentralization in decision-making regarding fumigation be encouraged as a means of eliminating the delays and omissions now present in the system.

In spite of statements to the effect that policy requires inspection every 15 days it appears that this is not being implemented. Whether this is due to lack of training, lack of personnel, or indifference could not be ascertained but the impression is that all three elements are present. It is our opinion that the training program proposed herein will mitigate all three deterrents to an effective program for storage management and quality control and therefore is an essential part of this proposal.

#### Observations and Findings from Visits to Storage Facilities.

Visits to warehouses where grain was stored were made at Ziguinchor, Kaolack, and Thies, and samples were taken at those facilities. All buildings were also checked, in corners of floor, behind stacks, and any other spots which rats might frequent, with an ultra-violet light. Sacks on outside of stack near corners of building and spilled grain around stacks and walls were also checked at random locations and near doors. No evidence of rat presence by fluorescence of urine was found. No fecal pellets were observed either. Warfarin is apparently used and we were told they used a rat repellent. We saw small (20 x 30 cm) plastic sacks of a white powder said to be the repellent but no one could tell us what chemical it was.

At Ziguinchor, only one warehouse was made available for a visit (the other had had an "electrical accident" and could not be opened). In the one visited, newly arrived bagged millet and sorghum was being stacked as it was off-loaded from the ship. This grain was clean and showed no insect infestation, so no sample was taken. Nearby was a small pile of bagged millet which had been in the building for some time. One sack was torn and insect damage was very evident, with much webbing of the Indian Meal Moth larvae on the sack. A sample was taken of this, and yielded the following: insect damaged grain 52%, dust and insect feces 3.2%. All samples were 108 cm<sup>3</sup>.

At Kaolack three samples were taken: two in Warehouse No. 4 and one in Warehouse No. 3.

Sample #1 Kaolack was from spilled grain swept from the floor and bagged. It was very dirty and contained many live insects and mites. Insect damage 32%, dust and insect feces 10.18%. Indian Meal Moth adults (Plodia interpunctella (Hbn.)) were present on walls and sacks; 29 larvae of Tribolium and Trogoderma and many cereal psocids (Liposcelus divinatorius (Muller) and mites (Arcarus Siro L.) present in sample.

Storage, even temporary, of such materials as this sample in the same warehouse with uninfested grain can quickly cause cross-contamination.

Sample #2 Kaolack, bagged millet in process of being transhipped. Insect damage 32%, dust and insect feces 4%. Eleven adult and 15 larval Tribolium, six larval Trogoderma and a few cereal psocids present in sample and the odor of Trogoderma was noticeable in the grain. It might be noted here that reports in literature state that presence of cast skins of Trogoderma in food can cause serious gastric disturbance and excessive amounts of the substance causing the odor are suspected of the same action. The cast skins are known to cause respiratory and skin allergic reactions - sometimes serious.

Sample #3 Kaolack, bagged grains in warehouse No.3. Trogoderma odor was very pronounced in the warehouse and grain samples still smelled strongly one week after removal from warehouse. Layers of Trogoderma cast larval skins were

present on practically all sacks, 12-31 mm deep in many places. An attempt was made to guess the population from the amount of skins, which were about 100-150 per cc. Even considering that each larva sheds its skin 5-7 times in maturing it is evident that the bushels of skins represent an astronomical population of insects. Counting 100 skins per cm<sup>3</sup> (a very rough estimate) this amounts to 3,524,000 insects per bushel of skins. For the granary weevil (roughly the same mass as the Trogoderma) it has been calculated that 35,000 beetles consume 1 kilo of grain in completing development. At this rate, one bushel of cast skins (the bushel was used merely because it was a familiar volume) represents the loss of 100 kilos of grain! And this infestation was very active.

This was the only warehouse where inspection and fumigation records were produced and they showed no action from January 1976 to 9 August 1976 when the visit was made.

Sample results; insect damage 27.2%, dust and insect feces 2%, 3 adult and 15 larval Tribolium, 40 larval Trogoderma in sample. The high number of larvae indicates a rapidly growing, destructive population.

At Thies two samples were taken at different locations in the same warehouse. This was the most poorly maintained warehouse seen. Inside and out it was covered with cobwebs and dirt; adult Trogoderma were crawling about on all walls, interior and exterior, and they were very numerous on the outside of the sacks of grain. The odor of the beetles was very strong and offensive. In both samples large numbers of early instar Trogoderma larvae were present.

Sample #1 (sacks in exposed location at end of stack)  
Insect damage 24%; dust and insect feces 1.94%.

Sample #2 (sacks on side of stack, near wall)  
Insect damage 22%, dust and insect feces 3%.

This is possibly a rather recent infestation, but of massive proportions. Two items point to this conclusion:

a) Most insects are either adults (active laying eggs) or young larvae, b) the lower level of damage.

Tabular Summary

<u>Sample</u>	<u>Insect Damage</u>	<u>Dust &amp; Feces</u>	<u>Insects present in sample</u>
Ziguinchor	52%	3.2%	<u>Plodia</u> , <u>Trogoderma</u> , <u>Tribolium</u>
Kaolack No. 1	32%	.18%	<u>Plodia</u> , <u>Trogoderma</u> , <u>Tribolium</u> , <u>Liposcelis</u> , & <u>Acarus</u> . 29 larvae
Kaolack No. 2	32%	4%	<u>Trogoderma</u> 6 larvae <u>Tribolium</u> 11 adult -15 larvae
Kaolack No. 3	27.2%	2%	Larval skins deep on sacks <u>Tribolium</u> 3 adults -24 larvae <u>Trogoderma</u> 40 larvae
Thies No. 1	24%	1.94%	Few <u>Tribolium</u> . <u>Trogoderma</u> - so many that not all were collected, most tiny (early instars)
Thies No. 2	22%	3%	Ditto

A brief talk with a professional pest control operator/fumigator brought out an estimate that 30-40% of grain was lost last year (1975) and that it was hoped to reduce the losses this year.

An official of SODEVA commented, in response to a question, that without such measures as are actually applied now the loss would have been total, 100% !

It is very evident from the foregoing presentation that improved management, sanitation, and quality control will save large amounts of food and provide better quality.

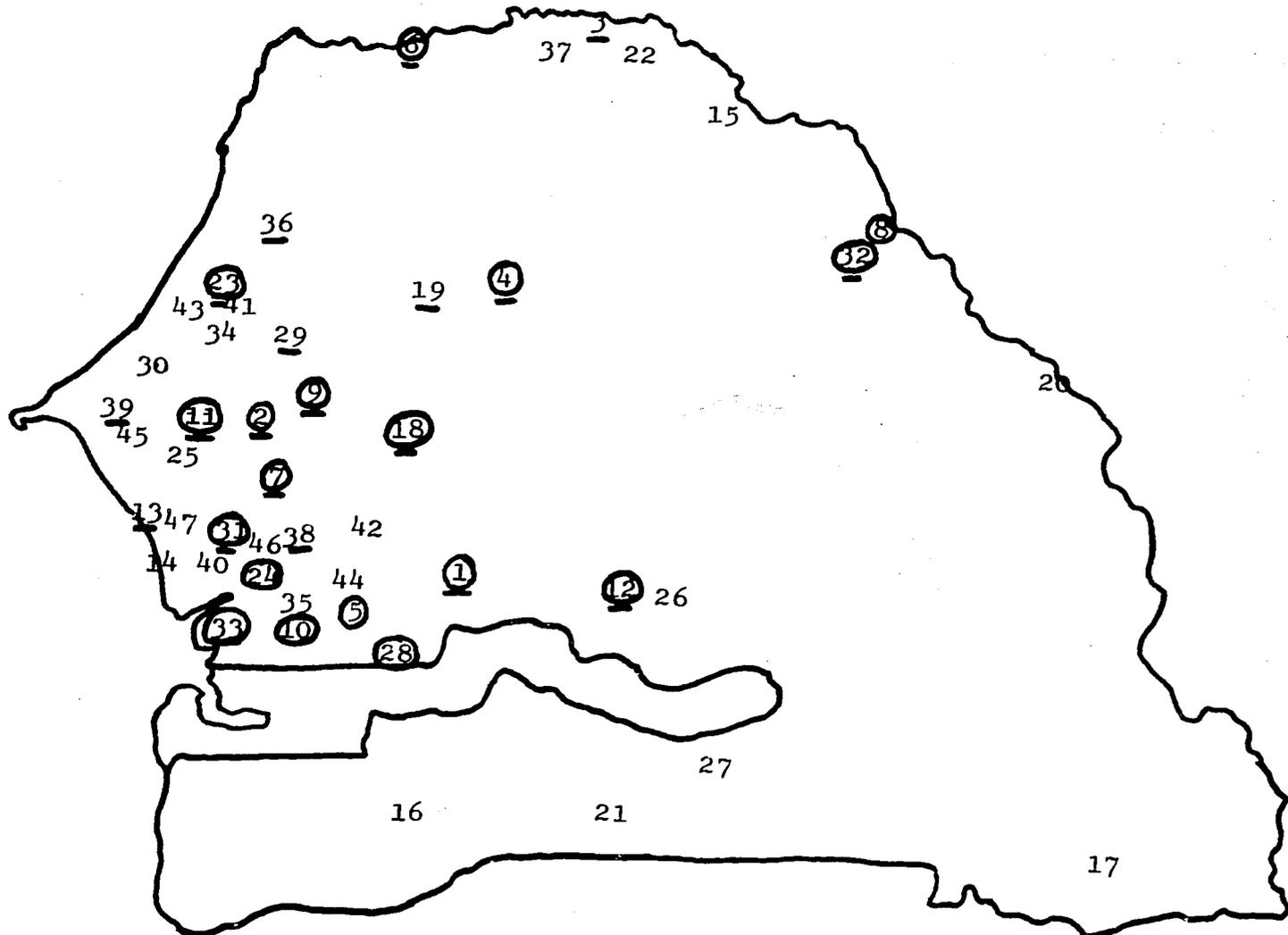
Personnel now in Senegal who have had some training (short course) at Kansas State University will be of help in alleviating the lack of knowledge in this field, but more technical and advanced personnel are needed as well as more trained at the warehouse management level.

RECOMMENDATIONS

1. Make regular inspection, and fumigation as needed.
2. Keep inspection and fumigation records in duplicate - one card on stack, one in office.
3. Decentralize decision making on when to fumigate at least to regional level, and preferably to the warehouse manager.
4. Maintain adequate stocks of chemicals in local (regional) storage for at least 6 months average use.
5. Establish a responsibility formula for grain losses due to negligence, which will encourage better management.

LOCATIONS SELECTED FOR CONSTRUCTION OF 47 ONCAD WAREHOUSES FOR CEREAL STORAGE

Total Capacity of These Will Be 66,000 MT



ANNEX B-4

Circled numbers indicate locations where ONCAD is building 18 warehouses expected to be completed in Nov. 1976. Underlined numbers are locations where warehouses of 2,000 MT size are being constructed. Warehouses at other locations are of 1,000 MT size.

Summary of Estimated Warehouse Construction Costs

	1,000 M. Ton ONCAD WAREHOUSE	1,000 M. Ton PREFAB STEEL WAREHOUSE	2,000 M. Ton ONCAD WAREHOUSE	2,000 M. Ton PREFAB STEEL WAREHOUSE
Dimensions (outside)	20m x 25m	18.3m x 27.4m	20m x 50m	18.3m x 54.9m
Area (gross)	500 m <sup>2</sup>	502 m <sup>2</sup>	1,000 m <sup>2</sup>	1,003 m <sup>2</sup>
Sidewall Height	4 m	6.1 m	4 m	6.1 m
Estimated Cost AID Eng. Est. Est. Cost per Sq. Ft.	\$91,000  \$16.91	\$95,700 (100,000)  \$17.72	\$164,000  \$15.24	\$164,600 ( 180,000)  \$15.24
Est. Net Capacity M. Ton (3.5m stacks vs. 4m stacks)	784	858	1640	1792
Est. Cost/M. Ton Cap.	\$116.07	\$111.54	\$100.00	\$91.85

FINANCIAL BACK UP TABLES

Annual Warehouse Costs

The following fixed cost for a 2,000 ton warehouse is based on a building cost of \$200,000.

Building Depreciation, 20 years	\$10,000
Interest @ 6% on 1/2 of bldg. cost	6,000
Insurance @ 1% of bldg. cost	2,000
Maintenance @ 1% of bldg. cost	2,000
Total Annual Cost	\$20,000
Annual Building Cost Per Ton	
Based on 2,000 Ton Capacity	\$10 per M. Ton

ESTIMATED COST OF GRAIN GRADING EQUIPMENT

Equipment for 23 warehouses:

Moisture Testers, 23 at \$1500	\$34,500
Triers, 1/2 "X 30", 23 at 40	920
Thermometer, 23 at 35	805
Hygrometer, 23 at 40	920

Subtotal: \$37,145

Equipment for 600 Buying Stations:

Moisture Testers, 600 at \$250	\$150,000
Triers, 1/2 " X 30", 600 at 40	24,000
Sieves, 600 sets at 80	48,000
Scales, 500 gm, 600 at 90	54,000

Subtotal: \$276,000

Total estimated cost of equipment  
for 23 warehouses and 600 buying stations  
at 1975 prices above: \$313,145

Add 12% for inflation: \$ 37,555

ESTIMATED TOTAL COST IN 1977..... \$350,700

Round to:..... \$351,000 .

Vehicles for Mobile Unit and Technical Assistant

3 Land Rovers:	\$ 40,000
Demonstration Equipment:	1,000
Audio-Visual Equipment:	1,000
	<u>\$ 42,000</u>

Entomological equipment

200	1 litre sample sacks, plastic	10.00
200	4 dram glass vials w/screw top	10.00
2	litres of 70 % alcohol-preservative	7.00
1	sieve, 1/2 mm mesh, 20 cm diax8-10 cm deep	5.00
1	" 1 mm " " " "	5.00
1	sampling probe, Trocar type, for sacks	15.00
1	graduated cylinder, plastic, 1 litre	8.00
1	" " " 500 ct	6.00
(2	kilos dessicant-for drying samples 2 specimens)	10.00
1	balance 2 kilos capacity-for weighing in 1 gram units	80.00 100.00
	samples (one which can with stand traveling in a truck)	

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Approximative total: 150.00 - 200.00

**Annual Estimated Cost for Manpower to Operate 30,000 Tons  
of ONCAD Cereal Grain Storage (Based on Estimated 1977 Pay  
Scale.)**

	<u>Man Years</u>	<u>Yearly Salary and Benefits</u>	<u>Yearly Cost</u>
Regional Quality Mgr.	6	\$6,000	\$36,000
Regional Fumigators	9	3,600	32,400
Reserve Warehouse Managers	8	5,000	40,000
Regional Warehouse Managers	1	6,000	6,000
Secco Warehouse Managers	50	3,000	150,000
Warehouse Helpers	50	1,500	<u>75,000</u>
	<b>TOTAL</b>		<b>\$339,400</b>

<u>OPERATING COSTS PER TON</u>		12 mo. storage	8 mo.
Purchase price		35,000 F/Ton	
Interest 12 mo. at 6 1/2		2,275 F/Ton	1524
Load		200 F	
Transport to storage 30 km x 22 <sup>x</sup>		660 F	
Unload		200 F	
Store		50 F	
Sack cost 620 F/sack 1976/77		210 F/Year	
3 year life			
Fumigation at 300 F/t, 1-2 times a year		300-450 T/Yr.	300
Loss in storage 4% on average at 38895 value		1556	
Unstore		48 F <sup>xxx</sup>	
Load		200 F	
Transport 170 km x 22		3,590	
Unload		192 F	
Selling expense			
Personnel \$339,400 for 26,272 t			
\$12.92/t		3,230 <sup>xxxx</sup>	
Structures			
16 1000 t	3,878	3,700 <sup>xxxx</sup>	
7 2000 t	3,342		
Equipment		450 <sup>xxxx</sup>	
Total cost		- 51,861	
Selling price wholesale 38 F/Kg after loss		+ 36,480	
retail 42 F/Kg after loss		+ 40,320	
Minimum loss if sold at 42 CFA/Kg		- 11,541	
if sold at 38 CFA/Kg		- 15,381	

(x) Road hauling tariff 1976/77

	Primary	Secondary
	1 Km X ton	
Black top	17	12
Improved	22	17
Ordinary	28-31	
Bad	50	
Cross country	60	

(xxx) calculated on basis of volume sold.

(xxxx) assumes 100% capacity.

ANNEX B-6

Table XXIII. Senegal: Foreign Assets and Liabilities of the Central Bank, 1972-June 1976<sup>1/</sup>

(In millions of SDRs; end of period)

	1972	1973	1974	1975	June	
					1975	1976
<u>Assets</u>	<u>35.4</u>	<u>9.8</u>	<u>5.3</u>	<u>26.5</u>	<u>4.6</u>	<u>2.7</u>
Holdings of SDRs	5.7	5.2	4.8	3.2	4.1	2.1
Reserve position in the Fund	3.8	4.1	—	—	—	—
Foreign exchange	25.8	0.5	0.5	23.3	0.5	0.6
<u>Liabilities</u>	<u>0.9</u>	<u>9.4</u>	<u>9.7</u>	<u>26.0</u>	<u>54.0</u>	<u>30.8</u>
Total (net)	34.5	0.4	-4.4	0.5	-49.4	-28.1

Source: IMF, International Financial Statistics.

1/ Data are converted into SDRs at the rates of SDR 1 = CFAF 278.21 for end-1972, CFAF 283.97 for end-1973, CFAF 272.08 for end-1974, CFAF 249.75 for end-June 1975, CFAF 262.54 for end-1975; and CFAF 271.64 for end-June 1976.

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Table XVII. Senegal: External Public Debt Outstanding, 1971-75<sup>1/</sup>

(In millions of SDRs; end of period)

	Disbursed					Undisbursed	
	1971	1972	1973	1974	1975	1974	1975
<u>Loans from Governments</u>	65.3	66.5	59.9	72.6	62.6	76.0	121.7
Canada	--	--	1.5	2.7	4.1	1.7	4.2
China, Peoples Rep. of	--	--	--	--	1.9	44.0	41.1
Denmark	0.1	0.4	2.3	4.5	1.2	0.6	3.3
France	48.2	48.1	25.7	32.3	37.8	16.9	19.3
Germany, Fed. Rep. of	15.3	15.1	25.8	26.9	25.0	7.0	8.8
Iran	--	--	0.3	0.3	0.5	1.7	6.9
Italy	0.1	1.3	2.2	1.5	1.6	--	--
Spain	--	--	--	--	--	--	14.2
U.S.A.	--	--	--	--	3.6	3.4	--
U.S.S.R.	1.6	1.6	2.1	4.1	3.9	1.9	1.9
<u>Loans from International Organizations</u>	13.9	19.1	23.3	31.9	52.4	49.5	67.0
AID	--	--	--	--	0.3	1.1	1.5
African Development Fund	--	--	--	--	--	4.0	9.0
Arab Fund for Economic and Social Development	--	--	--	--	3.2	--	--
EAC	--	--	0.4	0.7	0.7	4.6	4.6
European Development Fund	2.1	1.9	1.6	1.3	1.0	--	--
EIB	--	0.6	1.4	1.4	1.4	--	--
IBRD	2.0	2.1	2.6	2.7	8.7	15.0	15.6
IDA	9.8	14.5	17.3	25.6	37.1	24.8	36.3
<u>Privately held debt</u>	38.2	41.9	83.6	90.6	110.0	10.6	11.9
Suppliers' credits	18.1	17.2	6.9	10.8	12.2	3.1	3.4
Banks	0.3	--	53.0	57.1	76.9	7.4	11.2
of which: Multiple lenders	(--)	(--)	(50.5)	(54.1)	(69.1)	(--)	(4.3)
Other financial institutions	14.5	19.7	19.1	18.3	16.8	0.1	0.3
Bonds (France)	5.3	5.0	4.6	4.4	4.1	--	--
Total	117.4	127.5	166.8	195.1	245.0	138.1	180.6
<u>Memorandum item:</u>							
Arrears	(--)	(--)	(0.2)	(0.4)	(0.8)		

Source: IBRD, External Debt Division.

<sup>1/</sup> Debt (including publicly guaranteed) repayable in foreign currency and goods, with an original or extended maturity of over one year.

Note: The IBRD debt statistics are available in terms of U.S. dollars. Conversion in SDRs was effected at the following rates per SDR 1: 1971 and 1972 at US\$1.38571; 1973 at US\$1.20635; 1974 at US\$1.22435; and 1975 at US\$1.17066.

Table XVIII. Senegal: Balance of Payments, 1973-76<sup>1/</sup>

(In millions of SDRs)

	1973	1974	1975	1976
Goods and services	-132.2	-107.5	-113.0	-117.8
Exports, f.o.b.	178.5	346.8	401.6	383.2
Imports, c.i.f.	-347.3	-511.0	-551.5	-533.0
Trade balance	-168.8	-164.2	-149.9	-149.8
Freight and insurance on merchandise	3.4	4.8	6.1	6.2
Other transport	14.7	32.2	23.8	18.9
Travel	4.1	12.1	12.7	12.3
Investment income	-34.3	-41.8	-61.4	-68.5
Other government transactions	41.8	37.3	46.5	44.6
Other private	6.8	12.1	9.2	18.5
Unrequited transfers	47.5	52.9	56.1	52.2
Private	-8.3	-6.9	-3.8	-6.5
Government	55.8	59.8	59.9	58.7
Capital other than monetary sector	42.9	38.7	36.9	54.7
Direct investment	4.1	5.9	10.0	15.2
Other private long-term	-11.3	-12.1	-13.8	-8.3
Other private short-term	-2.3	4.5	3.8	11.6
Government	52.4	40.4	36.9	36.2
Net errors and omissions	4.9	14.5	3.9	...
Overall surplus or deficit (-)	-36.9	-1.4	-16.1	-10.9
Financing	36.9	1.4	16.1	10.9
1. Central Bank (net)	35.7	4.5	-5.0	...
Liabilities	9.1	--	15.8	
of which: Use of Fund credit	(--)	(--)	(25.4)	
Assets	26.7	4.5	-20.8	
of which: SDRs	(0.4)	(0.7)	(1.3)	
Reserve position in the Fund	(-0.3)	(4.2)	(--)	
2. Deposit money banks (net) <sup>2/</sup>	1.2	-3.1	21.1	...

Sources: IMF, Balance of Payments Yearbook for 1973, official estimates for 1974 and 1975; and staff estimates for 1976.

1/ CFA francs have been converted to SDRs at the following rates: 1973, SDR 1 = CFAF 265.49; 1974, SDR 1 = CFAF 289.20; 1975, SDR 1 = 260.20; 1976, SDR 1 = CFAF 275.80.

2/ These may differ from data presented in the monetary statistics owing to differences in coverage and to the classification of some transactions in the capital account.

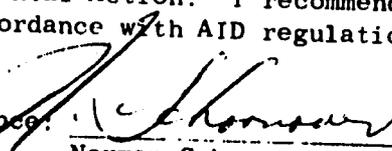
ANNEX C

Initial Environmental Examination

Project Location: Senegal  
Project Title: Senegal Grain Storage  
Funding: FY 77 - 81  
Life of Project Cost: 4,505,000  
IEE Prepared by: Gary L. Nelson,  
Project Officer - REDSO/WA  
30 March, 1977

Environmental Action: I recommend a negative threshold decision in accordance with AID regulation 16.

Concurrence:

  
Norman Schoonover  
Area Development Officer/Dakar

Date:

4/24/77

Assistant Administrator's Decision:

Approve: \_\_\_\_\_ Date: \_\_\_\_\_

Disapprove: \_\_\_\_\_ Date: \_\_\_\_\_

## I. Examination of Nature, Scope and Magnitude of Environmental Impacts

The proposed project to train staff in proper management of grain storage facilities and to construct 30,000 MT of storage warehouse capacity will have very little impact on the physical or social environment in Senegal.

### A. Description of Project

The project will give the GOS the capability to store and manage a 30,000 T security stock as part of their self sufficiency program. The project has two basic thrusts, first to train Senegalese personnel in proper management of their cereals stores. This includes proper inventory control, the use of fumigants and pesticides to reduce losses of grain and general good care of the cereal stock.

The second thrust is the construction of a total of 30,000 MT of storage capacity. This will be in the form of 1,000 and 2,000 ton warehouses to be located throughout Senegal. This project will complement an ongoing GOS project under which they have already constructed some 30,000 T of storage for long-term security storage.

### B. Identification and Evaluation of Environmental Impacts

#### 1) Summary:

This activity will benefit the environment of Senegal by (1) limiting the amount of pesticides required for grain preservation, (2) reducing the incidence of cereal grain pests, and (3) simultaneously reduce the losses to grain in storage.

Improved structural design will make housekeeping more easily accomplished and the applied pesticides more effective. The units will be built in agricultural areas, a kilometer or more from urban centers. Little land-forming or clearing will be required, and the small areas paved or roofed will not contribute significantly to runoff erosion. Since no processing will be involved, no mechanical handling of bulk material is planned. There should be no water pollution or air pollution generated (either noise or particulate). These units will be similar to existing construction in Senegal and, if yards are properly mowed and maintained, will not be unattractive.

2) Evaluation of Impacts

Impact Areas and Sub-Areas

Impact Identification  
and Evaluation

A. Land Use	
1. Changing character of land through	
a) Increasing the population	N
b) Extracting natural resources	N
c) Land clearing	N
d) Changing soil character	N
2. Altering natural defenses	N
3. Foreclosing important uses	N
4. Jeopardizing man or his works	L
B. Water Quality	
1. Physical state of water	N
2. Chemical and biological states	N
3. Ecological balance	N
C. Atmospheric	
1. Air additives	N
2. Air pollution	N
3. Noise pollution	N
D. Natural resources	
1. Diversion, altered use of water	N
2. Irreversible, inefficient commitments	N
E. Cultural	
1. Altering physical symbols	N
2. Dilution of cultural traditions	N
F. Socio Economic	
1. Changes in economic/employment patterns	N
G. Health	
1. Changing a natural environment	N
2. Eliminating an element in an ecosystem	L
3. Other factors: Intestinal Irritations	L

II. General

- |                           |   |
|---------------------------|---|
| 1. International Impacts  | N |
| 2. Controversial Impacts  | N |
| 3. Larger program impacts | N |

3) Narrative Evaluation of Impacts

a) Land Use:

The project will cause no changes in present land use although it does foresee taking advantage of changes caused by other projects, for example, shifting production into food crops.

The only possible jeopardy to man may be through the use of pesticides and fumigants to control insects in the storage units. However, with improved inspection and housekeeping procedures generated by the training program smaller amounts of residual insecticides for structural treatment will be required. With a lower incidence of pests there will be less opportunity for reinfestation and a commensurate reduction in the number of fumigations and amounts of fumigants required.

The pesticides now in use and contemplated for use are of transient nature, having residual lives in the range of 1 day to 6 weeks, therefore, constitute no serious threat of buildup in the environment. Additionally Bromophos, which is more widely used on village storage, is relatively harmless to warm blooded animals and bees and many predators show a tolerance for it. Pesticides required in the preservation of cereal grains in storage will be those recommended for use in Europe and the U.S.

b) Water Quality:

It is not expected that the project will have any effect on water quality. The chemicals used in the warehouses are used sparingly in an enclosed area and will not be likely to contaminate water sources.

c) Atmospheric:

Gaseous fumigants used in the project are used under controlled conditions with the fumigants limited to the individual stock of grain. Any leakage to the atmosphere would be of such minute concentrations to be harmless.

d) Natural Resources:

The project will not affect use of natural resources.

e) Cultural:

The project will have no cultural effects.

f) SocioEconomic:

There will be some employment generated for the construction activity but the project does not propose to hire large groups of permanent laborers.

g) Health:

The only health effect is likely to be a decrease in intestinal irritations caused by consuming the skin casts of some of the insects which will be controlled by the project. The training portion of the project is specifically directed at proper management of the warehouses and proper use of fumigants and pesticides to minimize dangers to the population.

h) General:

There are no "general" environmental impacts caused by the project.

II. Recommendation for Environmental Action

A. Recommendation for Threshold Decision

It is ascertained that the project will not have a significant adverse effect on the human environment, therefore a Negative Determination in accordance with AID Regulation 16 is recommended.

PROJECT DATA SUMMARY  
LOG CALL NUMBERGrain Storage, Fumigation/Management Training  
685-011/685-0209

NOTATION: THIS IS AN OFFICIAL  
DOCUMENT AND CAN BE USED AS AN AID  
TO OBTAIN DATA FOR THE PAR  
PROGRAM. IT IS NOT TO BE  
REPRODUCED.

Total

72

81

PAGE 14

	MEANS OF IMPLEMENTATION	
1) Increase the commercialization of Food Grains in Senegal.	1) Increase of food grains sold by farmers	1) Measuring change over 5 year period after project implementation of percent of food grains sold by farmer
2) Establish adequate and reliable buffer stocks of food grains for drought relief.	2) Increase of land farmed devoted to food grains	2) Measuring change over 5 year-period after project implementation of percent of land farmed devoted to food grains
	3) Increase in amount of food grains in storage	3) Measuring change in amount of grain stored over 5 year period after project implementation
	4) Decrease in loss of food grain in storage due to improper handling and insects.	4) Annual inspection of grain in storage.
		1) The GOS has made a sincere commitment to the commercialization of food grains
		2) Production activities by AID and other donors continue to be implemented.

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

77 81

Project Title & Number **Grain Storage, Fumigation/Management Training 685-011/685-0209**

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	NECESSARY ASSUMPTIONS
<p>Project Purpose: (B-1)</p> <p>Increase the capability of ONCAD to store and market millet.</p>	<p>Conditions that will indicate purpose has been achieved: End of Project status. (B-2)</p> <ol style="list-style-type: none"> <li>1) 30,000 tons of additional storage warehouses constructed and in use.</li> <li>2) Increase quantity and improved quality of grain stored by ONCAD. Losses reduced to 5% annual loss.</li> <li>3) Judicious and timely application of all food grain storage practices</li> <li>4) Management of stocks being undertaken in rational manner</li> <li>5) In normal rainfall years 10,000 MT of cereals going into storage.</li> </ol>	<p>(B-3)</p> <ol style="list-style-type: none"> <li>1) Observation of warehouse constructed at selected sites</li> <li>2) Periodic inspection of warehouses by ONCAD</li> <li>3) Market and storage records.</li> </ol>	<p>Assumptions for achieving purpose: (B-4)</p> <ol style="list-style-type: none"> <li>1) ONCAD will utilize the expanded storage capacity for the exclusive use of food grains</li> <li>2) Rainfall will be at/or above normal at least 3 of the 5 years in the project</li> <li>3) ONCAD will provide fumigants in timely manner.</li> </ol>

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

77-011-86  
Date Prepared: \_\_\_\_\_

Title & Number: Grain Storage, Fumigation/Management Training 685-011/685-0209

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>1) 30,000 MT of additional storage</p> <p>2) Trained warehouse managers operating ONCAD storage facilities</p> <p>3) Trained insect control personnel employed at storage units A quality control manager for each of the districts</p> <p>4) 2 training teams of 2 men each.</p>	<p>Magnitude of Outputs: (C-2)</p> <p>1) 60,000 MT of storage in units of 1,000 and 2,000 warehouses</p> <p>2) A manager with certificate of training at each of ONCAD's warehouses</p> <p>3) 6 trained teams for fumigation (one in each region) composed of 2 persons</p> <p>4) 6 graduates of training program at KSU or comparable US institution.</p>	<p>1) Observation of warehouses after construction</p> <p>2) Evaluation of ONCAD's grain storage operation.</p>	<p>Assumptions for achieving outputs: (C-4)</p> <p>1) ONCAD will implement the protection activities required to minimize storage loss of food grains</p> <p>2) The training programs proposed in this activity is adequate for the expanded needs of ONCAD.</p>

PROJECT SUMMARY  
 PROJECT CAPWORK

77-81  
 81

Project Title & Number: **Grain Storage, Fumigation/Management Training 685-011/685-0209**

BRIEF SUMMARY	OBJECTIVELY VERIFIABLE MEASURES	MEANS OF VERIFICATION	POTENTIAL ASSUMPTIONS
<p>1) Materials and labor for warehouse construction</p> <p>2) Technical assistance</p> <p>3) Overseas training</p> <p>4) In-country training.</p>	<p>Implementation Target (Type and Quantity) (D-2)</p> <p>1) Sufficient cement and steel to construct 30,000 MT of storage capacity in 1,000 and 2,000 MT units or prefabricated buildings in similar units for an equal amount of storage</p> <p>2) 3 man years of technical assistance</p> <p>3) 6 man years of overseas training</p> <p>4) 8 man years of in-country training.</p>	<p>1) Observation of warehouse construction</p> <p>2) One MS Degree person trained and 10 persons with short-term certificate of training from U.S. institution</p> <p>3) 2 two men Senegalese teams accomplishing training of 715 ONCAD personnel as follows:</p> <p>a) 600 Secco level staff with one (1) week training</p> <p>b) 115 Department level staff with four (4) weeks of training.</p>	<p>Assumptions for providing inputs: D-4</p> <p>1) Senegalese with pre-requisite background and orientation are available for training.</p>



Country: Senegal	Project No: 685-0209	Project Title: Senegal Grain Storage	Date: 30/3	/ x/ Original / / Revision #	Apprvd:
<u>CPI DESCRIPTION</u>					
<p>1. Authorization 7/77 Project Authorized - AID/W action.</p> <p>2. Grant Agreement Signed 8/77 RDO/action (Procurement of warehouse contracts begun)</p> <p>3. Equipment and material ordered 8/77. Training materials and buying station equipment for 25 stations plus warehouse equipment for 6 warehouses.</p> <p>4. In country training begins 9/77 - short term TA to be utilized to begin pilot training effort for at least 5 managers, 25 buying agents.</p> <p>5. Participants Depart 9/77 3 participants depart for US training.</p> <p>6. 1st Evaluation - 1/78 - First evaluation complete with recommendations for actions.</p> <p>7. 1st Construction Decision - 2/78 Based on evaluation ONCAD and RDO determine magnitude of first construction efforts and order materials.</p> <p>8. Technical Assistant arrives 4/78.</p>			<p>9. 2nd tranche of equipment arrives - 9/78- additional training material plus buying station equipment for 575 stations and warehouse equipment for 42 warehouses.</p> <p>10. 1st construction complete - 9/78-1st tranche of construction in amount identified in (6) and (7) above complete with grain going in.</p> <p>11. 2nd evaluation 1/79 - Evaluation of activities, success of training program, utilization of storage capacity and need for additional storage capacity.</p> <p>12. 2nd Construction Decision (2/79)-Based on evaluation ONCAD and RDO determine storage needs and order materials for second tranche.</p> <p>13. Training Plan revised - 2/79 - Based on recommendations of evaluation team, training plan revised and perfected.</p> <p>14. 3rd Tranche equipment arrives - 8/79 - Based on revised training plan and identified needs additional equipment arrives.</p> <p>15. 2nd Construction complete - 9/79 Storage identified under 11 and 12 above complete and utilized.</p>		

PPT FORM

ANNEX E-2 (cont'd)

<p>Country: Senegal</p>	<p>Project No: 685-0209</p>	<p>Project Title: Senegal Grain Storage</p>	<p>Date: 30/3</p>	<p>/x/ Original / / Revision #</p>	<p>Apprvd:</p>
<p><u>CPI DESCRIPTION</u></p> <p>16. Participants return - 11/79 - 3 participants return to ONCAD to work.</p> <p>17. 3rd Evaluation - 1/80 - Evaluation of effectiveness of training program, management of grain stores and need for additional storage.</p> <p>18. 3rd Construction Decision - 2/80 Based on evaluation ONCAD and RDC make decision on third tranche of warehouse construction.</p> <p>19. Final Training Revision - 2/80 - Based on evaluation and experience final revision of training program accomplished utilizing some outside consultants and newly returned participants.</p> <p>20. Technical Assistant departs - 4/80</p> <p>21. Final equipment purchase - 3/80 - last bits of needed equipment arrives.</p> <p>22. 3rd Construction complete - 9/80 warehouses identified in 17 and 18 above complete and being utilized.</p>			<p>23. 4th Evaluation 1/81 - Final training program evaluation and storage requirements determination.</p> <p>24. Final Construction Decision - 2/81 - If entire 30,000 T not yet constructed and evaluation indicates need ONCAD and RDC decide to complete construction.</p> <p>25. Completion Final Construction - 9/81 All 30,000 tons complete.</p> <p>26. Final Evaluation (PACC) 10/81 - Final training, engineering and economic evaluation to judge achievement of purpose.</p>		

HB 3. App 30, Part I

ANNEX F6C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

- |   |  |
|---|--|
| <p>1. <u>FAA Sec. 116</u>. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights?</p>   | <p>Yes, Project will provide buffer security stock of food grain and program will tend to stabilize farm prices.</p> |
| <p>2. <u>FAA Sec. 481</u>. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?</p> | <p>No. GOS has been very cooperative in this area.</p>   |
| <p>3. <u>FAA Sec. 620(a)</u>. Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?</p>  | <p>No. GOS does not furnish assistance to Cuba and no carriers under GOS flag are known to service Cuba.</p>         |
| <p>4. <u>FAA Sec. 620(b)</u>. If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?</p>  | <p>Yes.</p>  |
| <p>5. <u>FAA Sec. 620(c)</u>. If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?</p>  | <p>No.</p>   |
| <p>6. <u>FAA Sec. 620(e) (1)</u>. If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?</p>   | <p>No.</p>   |

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7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos? No.
8. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? No.
9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? No.
10. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? No.
11. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters,
  - a. has any deduction required by Fishermen's Protective Act been made?
  - b. has complete denial of assistance been considered by AID Administrator?
12. FAA Sec. 620(q); App. Sec. 504. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default? No.
13. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).) GOS provides 7,8% of its budget for military purposes and about \$39,6 million equivalent in foreign exchange. GOS has not purchased any sophisticated weapons systems.

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- 14. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No.
- 15. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? GOS has a good record of paying U.N. obligations. There have been technical or de minimus arrearages but these have been inconsequential.
- 16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? No.
- 17. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? No.
- 18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.? No.
- 19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? No.

B. FUNDING CRITERIA FOR COUNTRY

- 1. Development Assistance Country Criteria
  - a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment. Yes.
  - b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:
    - (1) Making appropriate efforts to increase food production and improve means for food storage and distribution. See Project Paper.
    - (2) Creating a favorable climate for foreign and domestic private enterprise and investment. Yes. See Foreign Economic Trends (FET) 77-018 Senegal January 1977 U.S. Dept. Of Commerce.

81b

- (3) Increasing the public's role in the developmental process. Yes.
- (4) (a) Allocating available budgetary resources to development. Yes.
- (b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations. No.
- (5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise. Yes.
- (6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures. Yes.
- c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made? Yes.
- d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs? No.
2. Security Supporting Assistance Country Criteria
- a. FAA Sec. 5026. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section? No.
- b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance? Yes.
- c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? N/A

6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

.. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)  
 (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;  
 (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure plus 10%)?  
 See Submission to Congress, Africa Programs, Feb. 1977 p. 347.
  
2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?  
 Yes, see 611 certification annex E. Plans and costs have been reviewed by AID engineer.
  
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?  
 No further legislative action required.
  
4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?  
 Not water or water resource related.
  
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?  
 Yes, see annex E.

PAGE NO. 6C(2)-2	EFFECTIVE DATE November 10, 1976	TRANS. MEMO NO. 3:11	AID HANDBOOK 3, App. 6C
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A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate?
- Project is distinctly bilateral. Multi-lateral context was considered in cooperation with FRG but they decided to follow with third tranche of construction.
7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
- Not a development loan.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
- Procurement of prefab. framework for warehouses and equipment will be in U.S. US contractors will be offered opportunity to compete for supervisory contract.
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.
- GOS contribution of over \$6,000,000 is entirely local costs which are critical to the project. AID contribution of 4,505,000 is 459. US correct costs. All possible maximization of US procurement has been done.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?
- US does not own excess foreign currency.

E. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

- a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?-
- a. The project is directed precisely toward the target population as the rural poor are the major producers of sorghum and millet to be purchased and stored and non farming rural poor (landless laborers) and urban poor are the major consumers. The higher urban economic groups are primarily rice consumers. The warehouses will be spread throughout the country and thus in rural areas.
- b. The commercialization program is based on cooperatives and thus the project will encourage their growth.

81

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

- (1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers; The project is designed to provide a guaranteed market for cereals and such is critical to any production program to increase rural incomes.
- (2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor; N/A
- (3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; N/A
- (4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is: N/A
- (a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations; N/A
- (b) to help alleviate energy problem; N/A
- (c) research into, and evaluation of, economic development processes and techniques; N/A
- (d) reconstruction after natural or manmade disaster; N/A
- (e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance; N/A
- (f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development. N/A

FORM NO. 6C(2)-4	EFFECTIVE DATE November 10, 1976	TRANS. MEMO NO. 3:11	AID HANDBOOK 3, App. 6C
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81

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

N/A

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

The GOS is contributing 58% of the total cost of the project. See budget, section 3, B., of PP.

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

Grant Capital Assistance is programmed to be complete in 3 years from the 1st Capital input however, due to the nature of flexible implementation based on evaluation it could carry into 4th year.

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on: (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

1. Project is aimed at economic development moving farmers into market economy.
2. Directly aimed at attaining food self sufficiency.
3. Training is important part of program.
4. N/A
5. N/A
6. Women will be involved in commercialization program see section 3, C., of PP.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

1. The project is based on the stated GOS wish to have a rational cereals policy, we are assisting this policy determination by giving them the means to handle grain resulting from policy changes and training, see ONCAD staff to help formulate the policy.

81

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). Does the activity give reasonable promise of contributing to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

Project is a direct and critical complement to production programs already underway by AID, IBRD, FAC, etc. The project paper does provide analysis of economic and technical soundness, see section 3 of PP.

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

The primary products purchased from the US are steel products thus aiding that industry. The presence of a security stock of cereals will decrease the requirement for US emergency food aid and thus allow increased food marketings from the US.

2. Development Assistance Project Criteria (Loans only)

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

N/A

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

N/A

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

N/A

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

N/A

B2

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources? N/A

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan? N/A

3. Project Criteria Solely for Security Supporting Assistance N/A

FAA Sec. 531. How will this assistance support promote economic or political stability?

4. Additional Criteria for Alliance for Progress N/A

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(6). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America? N/A

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities? N/A

## ANNEX G

### Certification Pursuant to Section 611 of the Foreign Assistance Act of 1961, as Amended

I, Norman Schoonover, Regional Development Officer/Dakar, having taken into account among other things:

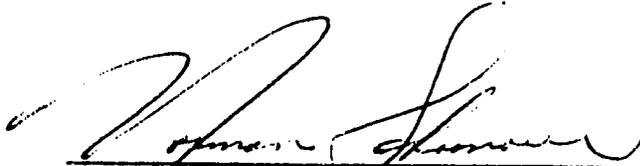
- A. The importance attached to obtaining food self-sufficiency in the Senegal national plan,
- B. That the Office National de Cooperation et d'Assistance pour le Developpement (ONCAD) has been charged by the Government of Senegal with the responsibility for implementing all cereal marketing, commercialization and national storage projects in Senegal,
- C. The belief that ONCAD can perform its designated functions in this project,
- D. The willingness of ONCAD to provide adequate staff for management and training,
- E. The fact that ONCAD has available acceptable plans approved by AID engineers for warehouse structures,
- F. The fact that the costs of the proposed construction activities have been deemed reasonable,

do hereby certify that in my judgment the Government of Senegal will have adequate financial and human resources capable of implementing and effectively operating this storage project. This judgment is based on the facts that:

1. ONCAD already has 10 years experience in marketing agricultural products throughout Senegal
2. ONCAD has experience in designing and constructing storage warehouses on a contracted basis, as evidenced by the 30,000 tons constructed with GOS financing in 1976-77
3. Technical assistance provided under the grant will assist ONCAD to implement the program
4. The training provided under the project will help prepare Senegalese to manage the project effectively
5. The phasing of the construction, based on annual evaluations, will keep the construction linked to requirements and capabilities

6. REDSO engineers have reviewed the plans and cost estimates for the construction activities and find them adequate

7. Implementation of the project will be closely monitored by a Project Manager attached to the Area Development Office in Dakar



Norman Schoonover  
Regional Development Officer

4/21/77  
Date

## ANNEX H

### DRAFT PROJECT DESCRIPTION

#### FOR GRANT AGREEMENT

The project is designed to provide ONCAD with an additional 30,000 metric tons of storage facilities and to upgrade its capability to manage its storage facilities, both AID financed warehouses and warehouses financed from the GOS budget.

In order to accomplish this, AID is providing funds under this project for the construction of seven 2000 ton warehouses and sixteen 1000 ton warehouses in pre-selected locations throughout Senegal. These warehouses will be constructed using a prefabricated framework imported from the U.S. A local contract will be executed for assembly of the frame, construction of the sidewalls and floors and for roofing the structure using locally manufactured asbestos roofing sheets.

The construction program is to be phased over a minimum of three years. Annual construction goals will be based upon an evaluation of the progress of the training program and the projected storage requirements for that year. The evaluation will be conducted in January of each year to allow sufficient time for construction prior to the end of rainy season.

The construction program will be complimented by a training program including both training in the U.S. and in Senegal. A total of 610 persons are to be trained including one agricultural economist in the U.S., 2 grain storage experts in the U.S. 6 regional warehouse managers, 54 regional fumigators, 47 local warehouse managers and 500 buying agents.

In order to accomplish this training AID will provide one long term technical **advisor** for two years and short term training teams plus training material and equipment.