SAHEL DEVELOPMENT PROGRAM TEAM
EVALUATION BRIEFING DATA AND ISSUES

SENEGAL

October 1977

SDPT EVALUATION BRIEFING DATA AND ISSUES

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CLUB SECTOR GOALS

Rainfed and Irrigated Crop Production Sectors

Crop Demand Forecasts

Forecasts of rice/wheat and millet/sorghum/maize demand can be separated into forecasts of Senegal's population, average cereal demand per capita, and the fraction of cereal demand allocated to rice/wheat:

a. Population. The population in 1975 is estimated to be approximately 5,000,000 people and increasing at 2.7 percent per year. 1/

b. Cereal Demand per Capita. Consumption per capita in 1974 was 220.4 kilograms per person and has shown an average decrease from 1961 to 1974. 2/

c. Rice/Wheat Fraction of Total Cereal Demand. This fraction is 31 percent in 1974 and shows an average increase from 1961 to 1974. 3/

Based upon time trends of the above data, using econometric technique, Table S1 presents the cereal consumption forecasts.

TABLE S1

Historical Trend in Senegal Cereal Demand 1/

			Thousand Metric Tons
Year	Total Cereals	Rice/Wheat	Millet/Sorghum/Maize
1980	1,310	511	799
1990	1,955	821	1,134
2000	2,529	1,163	1,366

1. Based on (a) forecasts for cereal demand per capita of 229.3, 227.3, and 225.3 kilograms per person and rice/wheat fraction of demand of 39, 42, and 46 percent for 1980, 1990, and 2000 respectively, and (b) forecast of 2.9 percent per year increase in population.

Sources: IBRD, Republic of Senegal.

Other forecasts of cereal demand are presented in Table S2.

1. IBRD, Migration and Employment in Senegal, September, 1976, p 2.
2. Republic of Senegal, Misistere de Developpement Rural et de L'Hydraulique, Actions Planifiees de Production Cerealiere (1977-1985), December, 1976, p 7.
3. Ibid.

TABLE S2

Forecasts of Senegal Cereal Demand

Thousand Metric Tons

Year	Club du Sahel Rainfed Sector Working Group: Total Cereals	Rice/Wheat	Millet/Sorghum/Maize	Club du Sahel Irrigated Sector Working Group 1/: Total Cereals	Rice/Wheat	Millet/Sorghum/Maize
1980	1,250	505	745	933	362	571
1990	NA 2/	NA	NA	1,374	607	767
2000	2,055	970	1,085	1,805	787	1,018

1. Assuming: (a) population growth rate of 2.8 percent per year, (b) increase in cereal demand per capita from 192.4 in 1975-77 to 208.5 in 2000, and (c) increase of rice/wheat fraction of demand of 42 percent in 1975-77 to 45 percent in 2000.
2. NA denotes not available.

Sources: Club des Amis du Sahel, Equipe des Cultures Seches, La Promotion des Cultures Seches au Senegal, 7702/SEN/R, Mars, 1977, p 2; Equipe Cultures Irriguees, Rapport National Senegal, Mars, 1977, p 27.

The range of the forecasts shown in Tables S1 and S2 is presented in Figure S1.

Millet/Sorghum/Maize Production Trend

It is possible to project a future time trend using the data in annex D and econometric techniques for millet/sorghum/maize production (i.e., coarse grains). 1/ This time trend and the range of forecasts for consumption are presented in Figure S2.

Figure S2 shows the possibility for production decreasing below demand. Since coarse grains are the subsistence crops in rainfed regions and gorwn in competition with groundnuts, the more likely event is that coarse grain production will meet demand at the expense of groundnuts, assuming no increase in cereal yields.

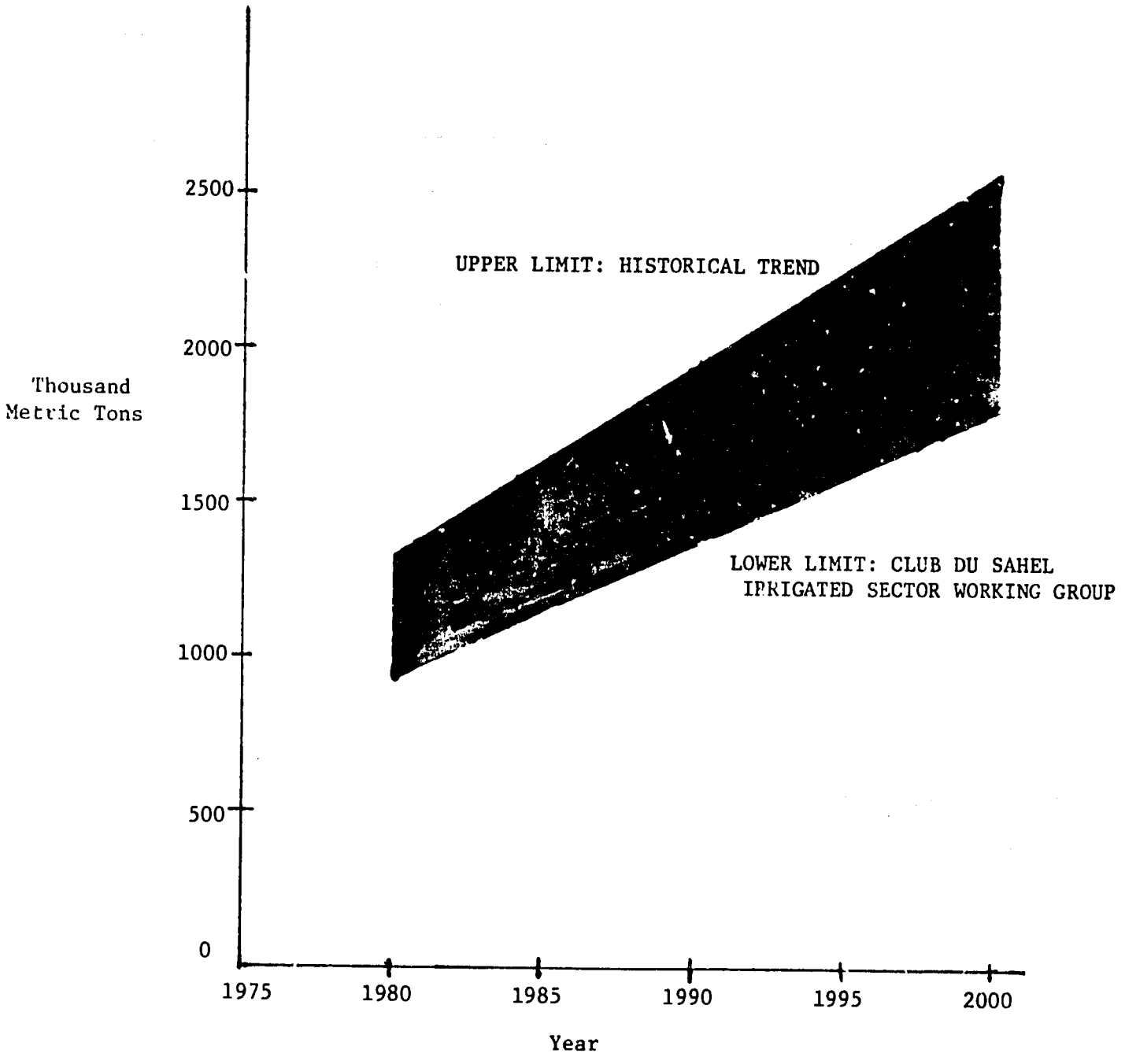
Rice/Wheat Production Trends

The comparison of the time trend for rice production and the range of forecasts for rice/wheat consumption are presented in Figure S3. 2/

1. Data for 1960-1975; University of Michigan, Center for Research on Economic Development (CRED), Marketing, Price Policy and Storage of Cereals in the Sahel, Senegal Study, Appendix, Table 1.
2. Data for 1960-1974; ibid.

FIGURE S1

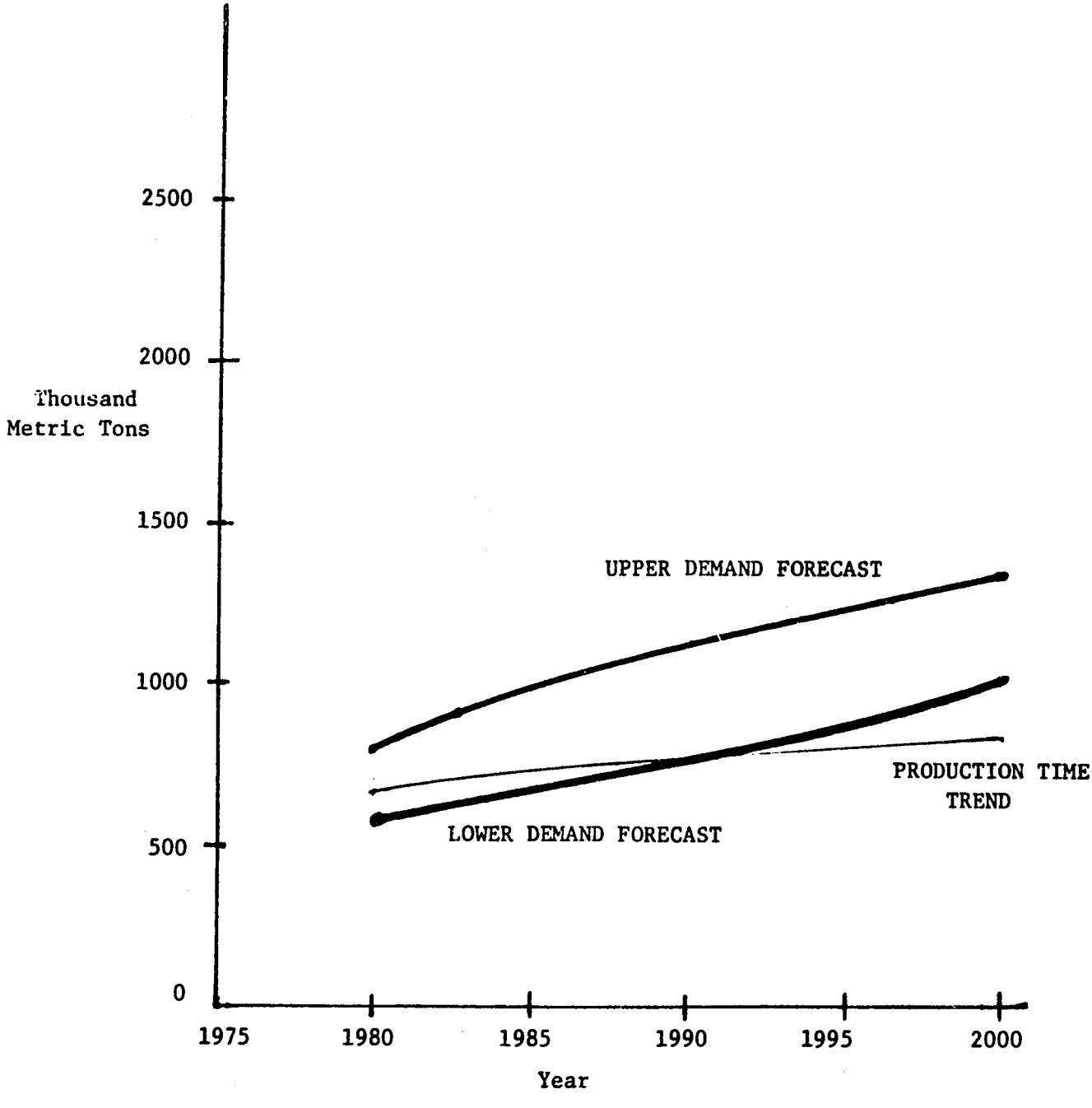
RANGE OF FORECASTS FOR TOTAL CEREAL DEMAND IN SENEGAL



SOURCE: Tables S1 and S2

FIGURE S2

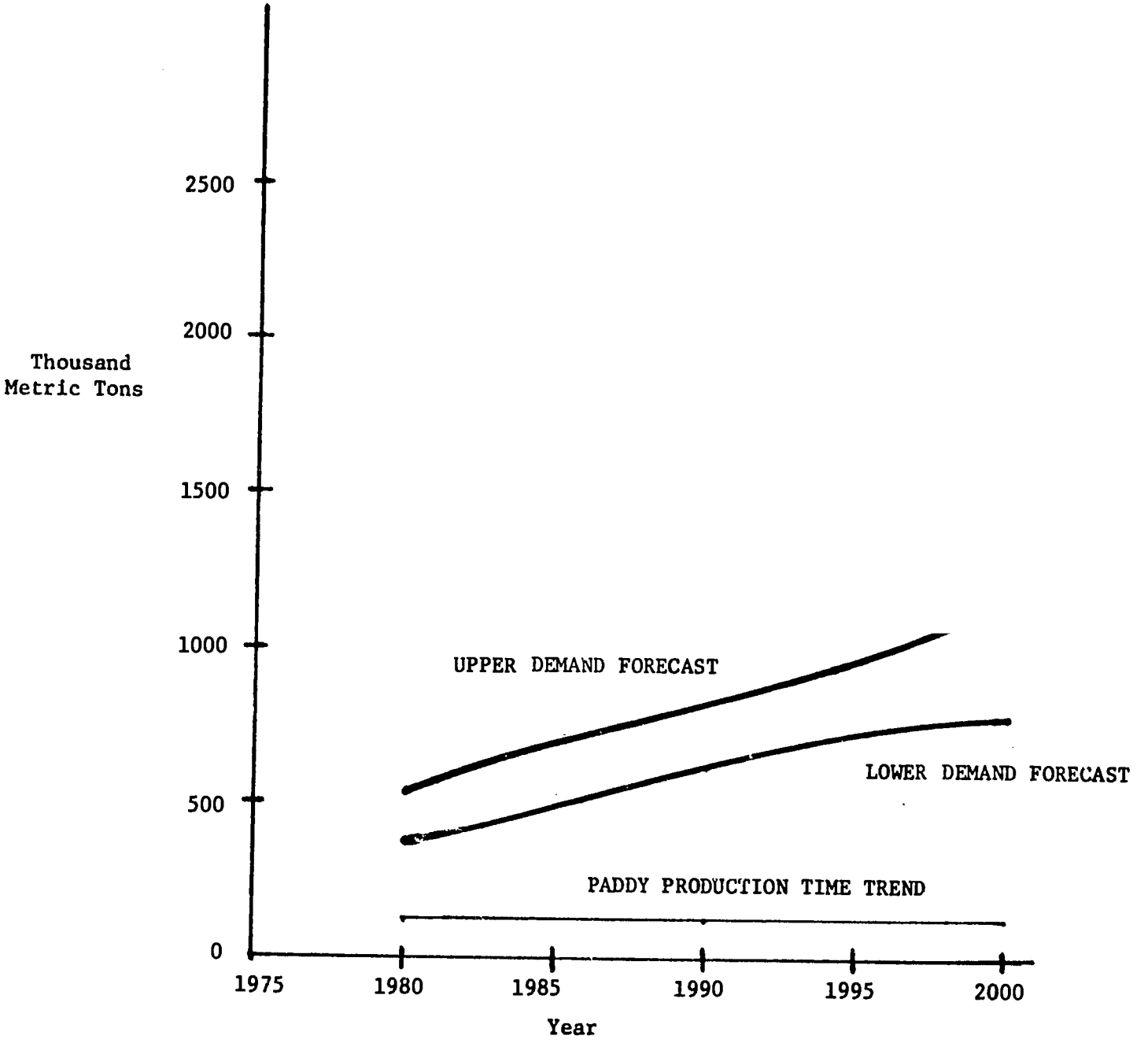
MILLET/SORGHUM/MAIZE PRODUCTION TIME TREND
RANGE OF FORECASTS FOR DEMAND



SOURCE: Tables S1 and S2 ; Production time trend from historical data in CRED, Marketing, Price Policy and Storage, Senegal Study, appendix, table 1.

FIGURE S3

RICE PRODUCTION TIME TREND AND
RANGE OF FORECASTS FOR DEMAND



SOURCE: Tables S1 and S2 ; Production time trend from historical data in CRED, Marketing, Price Policy and Storage, Senegal Study, appendix, table 1.

Comparing Total Cereal Production Trend and Cereal Demand Forecasts

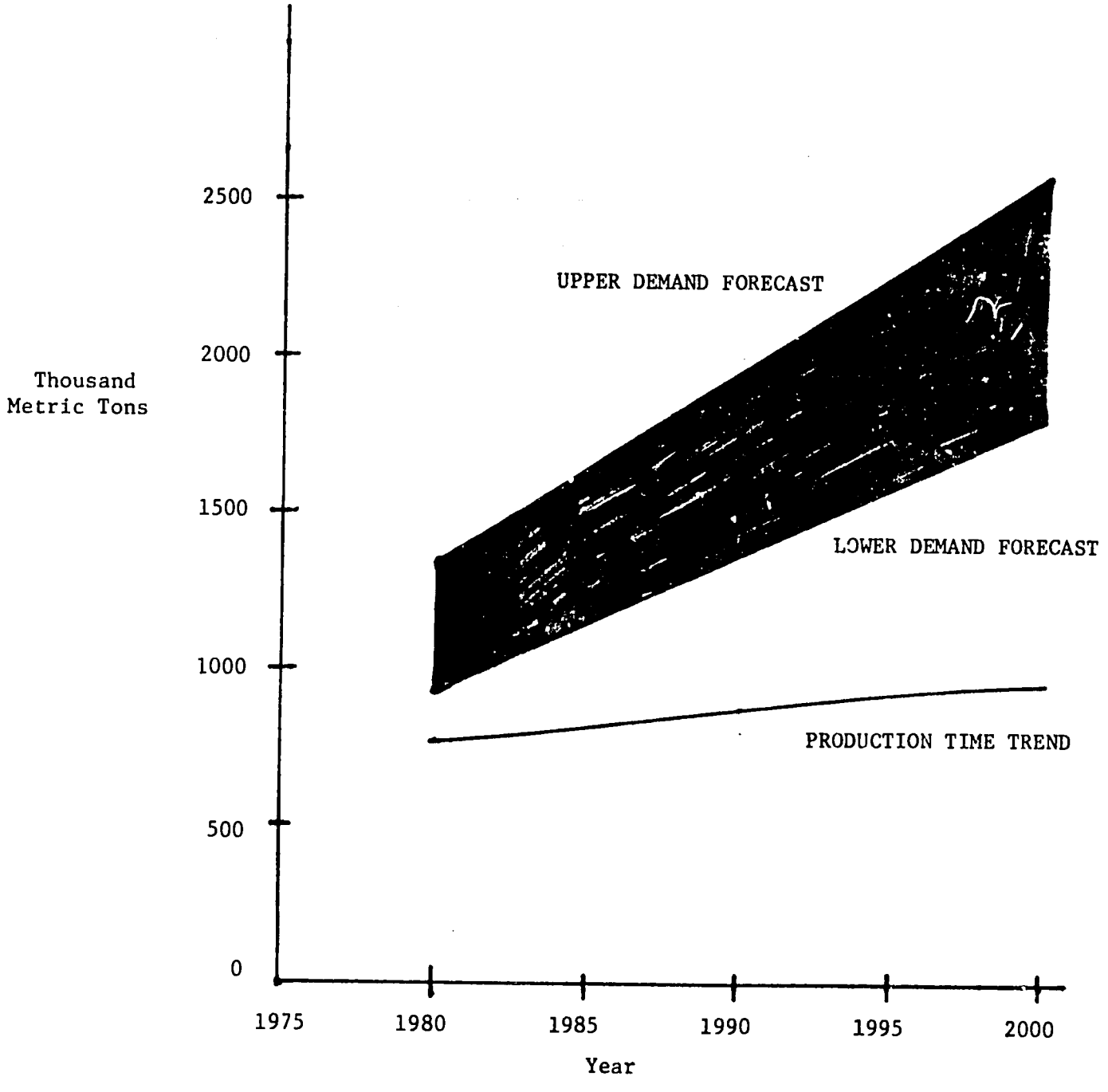
The comparison of production trend and demand forecasts for cereals are presented in Figure S4. There is a growing gap after 1980. This gap can be filled in two ways:

a. An increase in domestic production. An increase in coarse grains can be achieved by an increase in cereal yields, by an increase in acreage (i.e., either new lands or a decrease in groundnut land), or a combination of yield and land increases. Since the land and population density is not homogenous, different outcomes can be expected in different regions.

b. An increase in cereal imports. This can be achieved by an increase in foreign exchange import revenues or increases in Senegal's international debt.

FIGURE S4

RANGE OF FORECASTS FOR TOTAL CEREAL DEMAND IN SENEGAL
AND TOTAL CEREAL PRODUCTION TIME TREND



AID Project Goals for Crop Production

The FY 1979 Annual Budget Submissions (ABS) for Senegal and the OMVS list seven current and planned projects which will directly affect crop production:

a. Senegal Cereals Project Extension (Groundnut Basin)
b. Casamance Regional Development Project (Casamance)
c. Small Irrigated Perimeters Project (Fleuve)
d. Matam Irrigated Perimeter Project (Fleuve)
e. Sahel Food Crop Protection Project (Countrywide)
f. Model Village Irrigated Agricultural Development (Fleuve)

The goals of these projects are the increase of crop production. The costs, timing, and quantitative effects of the projects are presented in Table S4. The AID contribution to increasing Senegal crop production, compared to demand, is presented in Figure S5.

Other Donor Project Goals for Crop Production

The most important donors to Senegal are France, the EEC, Germany, the World Bank, and Canada. Table S5 presents the major donors from 1974 to 1976.

Table S5

MAJOR DONOR ASSISTANCE COMMITMENTS TO SENEGAL

Millions of Dollars

Donor	1974	1975	1976
France	61.42	75.51	60.75 1/
European Economic Community (EEC)	32.33	5.12	15.85
Canada	5.13	12.78	12.05
World Bank (IBRD)	-	25	10.5
Germany	20.35	8.9	1.78
United States	5.14	7.18	.03
Total All Donors	141.4	163.91	119.4 1/

1. Understated due to incomplete data on French technical assistance.

Source: Club des Amis du Sahel, Sectoral Breakdown of Official Development Assistance to the Sahel, 1974-1976.

TABLE S4

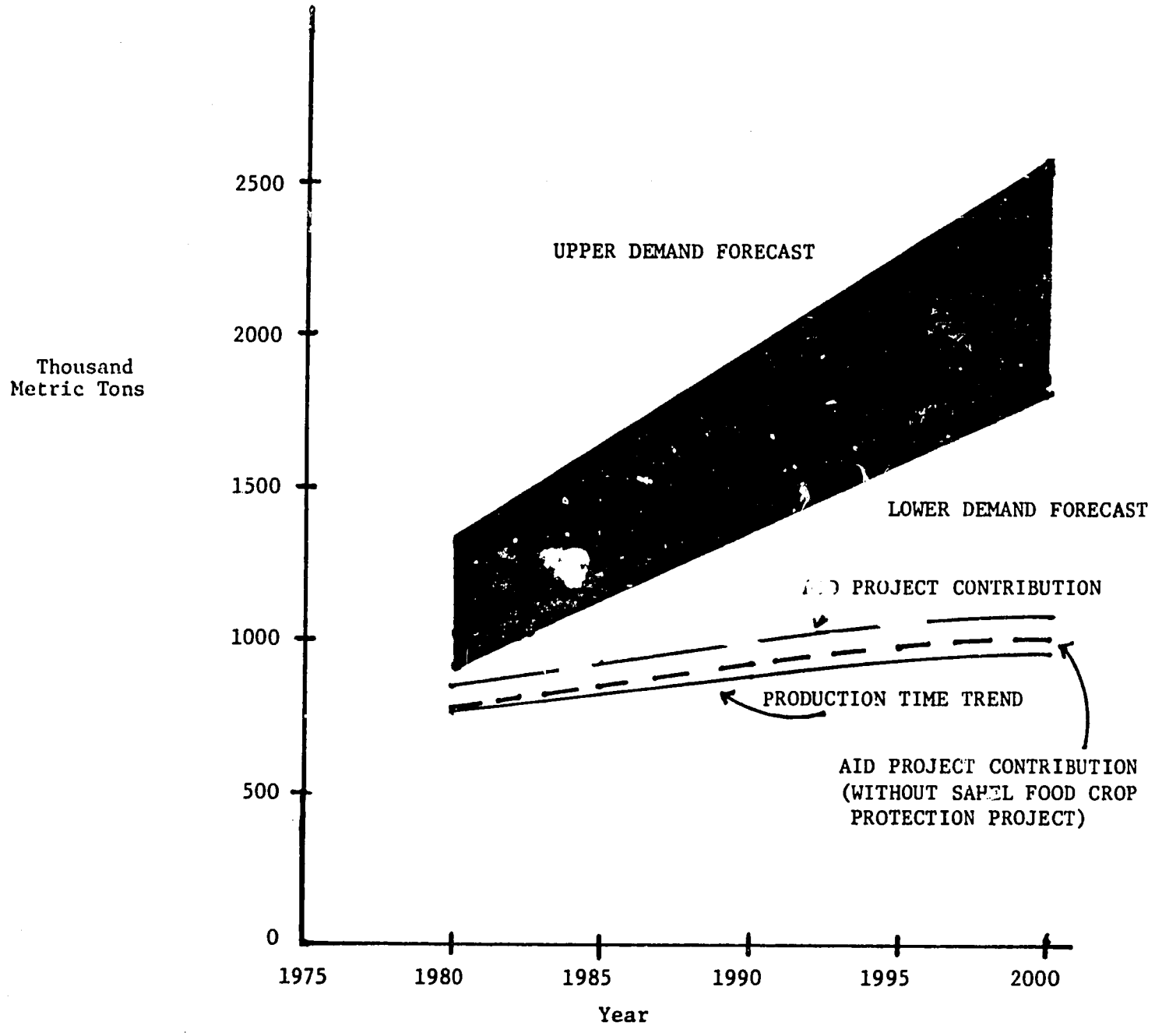
QUANTITATIVE CROP GOALS OF AID PROJECTS

NAME	PROJECT INVESTMENT	PERIOD 1/	MILLET/MAIZE/SORGHUM PRODUCTION PRESENT YEAR	PRESENT QUANTITY	GOAL YEAR	GOAL QUANTITY	RICE/WHEAT PRODUCTION PRESENT YEAR	PRESENT QUANTITY	GOAL YEAR	GOAL QUANTITY
Senegal Cereals Extension 2/	$3,500,000	1978-81	1977	462 MT 3/	1981	850 MT 3/	--	--	--	--
Casamance Regional Development 4/	$28,000,000	1978-82	1977	0	1982	400 MT	1977	11200 MT	1982	22000 MT
Small Irrigated Perimeters 5/	$5,800,000	1977-80	1977	0	1985	4171 MT	1977	0	1985	6067 MT
Matam Irrigated Perimeter 6/	$19,500,000	1978-90	1976	4032 MT 7/	1990	23888 MT	1976	1728 MT 7/	1990	22748 MT
Sahel Food Crop Protection 8/	$3,200,000	1975-78	1974	487000 MT	1979	62300 MT	1974	50000 MT	1979	60500 MT
Model Village Irrigated Agricultural Development 9/	$1,000,000	1979-81	--	--	--	--	1978	0	1981	525 MT 10/

1. U.S. Fiscal Year
2. AID, Dakar ABS FY 1979, June, 1977, p 22.
3. Assuming millet yield of 500 kilograms per hectare.
4. AID, Casamance Regional Development, Project Paper, April, 1977, p 32.
5. AID, Bakel Crop Protection, Project Paper, Volume II, May, 1977, table A-11.
6. Bechtel Overseas Corporation, Development of Irrigated Agriculture of Matam, December, 1976, p 1-21, 11-8; AID, OMVS ABS FY 1979, June, 1977, p 24.
7. Based on an estimate of 70 percent of 1976 total grain production for coarse grains.
8. AID, Sahel Food Crop Protection, Project Paper, June, 1975, p 37, 96, 167.
9. AID, Dakar ABS FY 1979, June, 1977, attachment C.
10. Assuming 2.5 metric tons per hectare yield for 210 hectares of cultivated rice.

FIGURE S5

RANGE OF FORECASTS FOR TOTAL CEREAL DEMAND IN SENEGAL,
TOTAL CEREAL PRODUCTION TIME TREND, AND
AID PROJECT CONTRIBUTION



SOURCE: Tables S1, S2, and S4.

Twelve current or planned non-AID donor projects which will directly affect crop production have been identified: 1/

a. IBRD, Sedhiou II Project (Casamance)
b. EEC, Cotton/Cereals Project (Eastern Senegal)
c. IBRD, Sine Saloum Project (Central)
d. Belgium, CER Pilot Farms Project (multi-regional)
e. IBRD, Senegal Terres Neuves II Resettlement Project
f. ADB 2/, Nyassia Irrigated Crop Project (Casamance)
g. ADB, Guidel Irrigated Crop Project (Casamance)
h. China, Bignona Irrigated Crop Project (Casamance)
i. FADES, Large Irrigated Areas Project (Fleuve)
j. IBRD, Small Irrigated Areas Project (Fleuve)
k. EDB, Small Dam Project (Eastern Senegal)
l. Germany, Bas Saloum I (Central)

The goals of those projects for which we have documentation are presented in Table S6. Their contribution to increasing Senegal crop production is presented in Figure S6.

Club des Amis du Sahel Project Goals for Crop Production

Five planned Club projects which will directly affect rainfed crop production have been identified: 3/

a. Development de la Zone Cotonniere (Portions of Sine Saloum and Casamance, all of Senegal Oriental),
b. Developpement Rural Integre de la Region de la Faleme,
c. Projet de Developpement de Thies-Sud,
d. Projet d'Intensification des Cultures en Zone Sahelienne (Thies, Tivaouane, Bambey et Diourbel), and
e. Promotion du Developpement Agricole Integre en Basse-Casamance.

In addition there are many irrigation projects planned, primarily in the Senegal River Valley and the Casamance. 4/

The goals of those projects for which goals are declared are presented in Table S7. Their contribution to increasing Senegal crop production is presented in Figure S7.

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1. Consultative Group on Food Production and Investment in Developing Countries, National Investment Strategy for Increasing Food Production, Senegal, June, 1973, Appendix 2, Table 1. UN projects are listed in Annex B.
2. ADB denotes the African Development Bank.
3. Club des Amis du Sahel, Equipe des Cultures Seches, La Promotion des Cultures Seches au Senegal, 7702/SEN/R and related documents, 7702/SEN/P-1 through p-17, March, 1977.
4. Club des Amis du Sahel, Equipe Cultures Irriguees, Rapport National Senegal, March, 1977.

TABLE S6

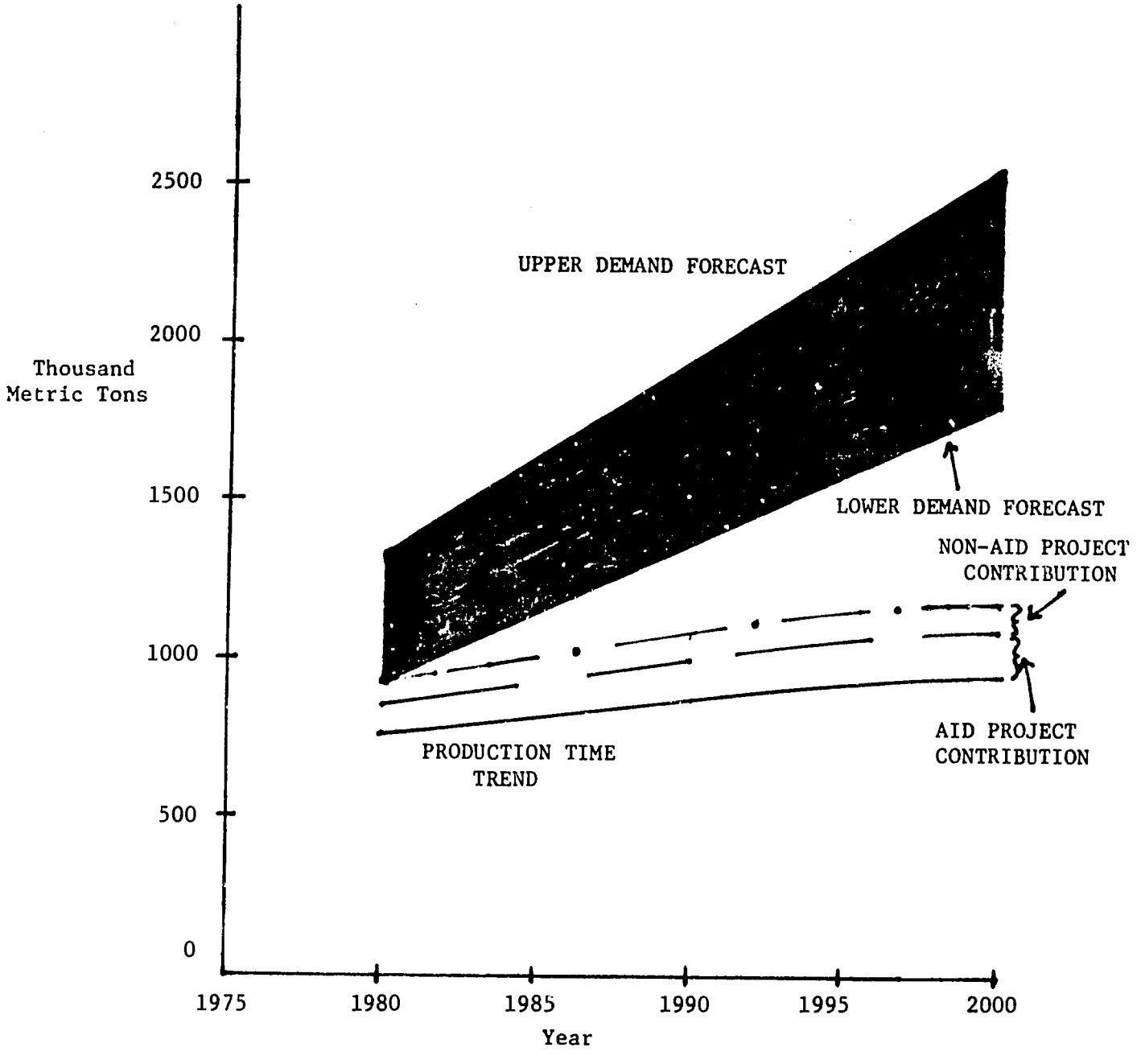
QUANTITATIVE CROP GOALS OF NON-AID PROJECTS

PROJECT			MILLET/MAIZE/SORGHUM PRODUCTION				RICE/WHEAT PRODUCTION			
			PRESENT		GOAL		PRESENT		GOAL	
NAME	INVESTMENT	PERIOD	YEAR	QUANTITY	YEAR	QUANTITY	YEAR	QUANTITY	YEAR	QUANTITY
Sine-Saloum Agricultural Development 1/	$30,900,000	1975-80	1976	23032 MT	1980	72906 MT	-	-	-	-
Second Sedhiou Project 3/	$12,900,000	1976-1980	1975	6463 MT	1980	18634	1975	12460	1980	25221
Terres Neuves II Resettlement	$3,900,000	1976-1979	1975	0	1990	3529	-	-	-	-

1. IBRD, Appraisal of Sine Saloum Agricultural Development Project Senegal, May, 1975, annex 14, table 3.
2. IBRD, Appraisal of a Second Sedhiou Project Senegal, June, 1976, annex 18, table 7.
3. IBRD, Appraisal of Terres Neuves II Resettlement and Eastern Senegal Technical Assistance Project Senegal, June, 1975, annex 9.

FIGURE S6

RANGE OF FORECASTS FOR TOTAL CEREAL DEMAND IN SENEGAL,
TOTAL CEREAL PRODUCTION TIME TREND, AND
AID AND NON-AID PROJECT CONTRIBUTIONS



SOURCE: Tables S1, S2, S4, and S6.

TABLE S7

QUANTITATIVE CROP GOALS OF PROPOSED CLUB DU SAHEL PROJECTS

PROJECT			MILLET/MAIZE/SORGHUM PRODUCTION				RICE/WHEAT PRODUCTION			
			PRESENT		GOAL		PRESENT		GOAL	
NAME	INVESTMENT 1/	PERIOD	YEAR	QUANTITY	YEAR	QUANTITY	YEAR	QUANTITY	YEAR	QUANTITY
Developpement de la Zone Cotonnier (Sine Saloum, Casamance, Senegal Oriental)	$23,000,000 2/	1977-80	1977	3193 MT	1980	48950 MT	1977	19500 MT	1980	36375 MT
Developpement Rural Integre de La Region de la Faleme	$2,000,000	4 years								
Projet de Developpement de Thies-Sud	$3,000,000	1977-81	-	-	1980	20000 MT 3/	-	-	-	-
Projet d'Intensification des Cultures en Zone Sahelienne (Thies, Tivaouane, Bambey & Diourbel) 4/	$6,000,000 5/	1977-2000	1974	98200 MT	2000	118200 MT	-	-	-	-
Promotion du Developpement Agricole Integre en Basse-Casamance	$10,000,000	1977-80	1978	750MT	1981	1875 MT	1978	13500 MT	1981	27000 MT

(Table S7 continued)

TABLE S7 (Continued)

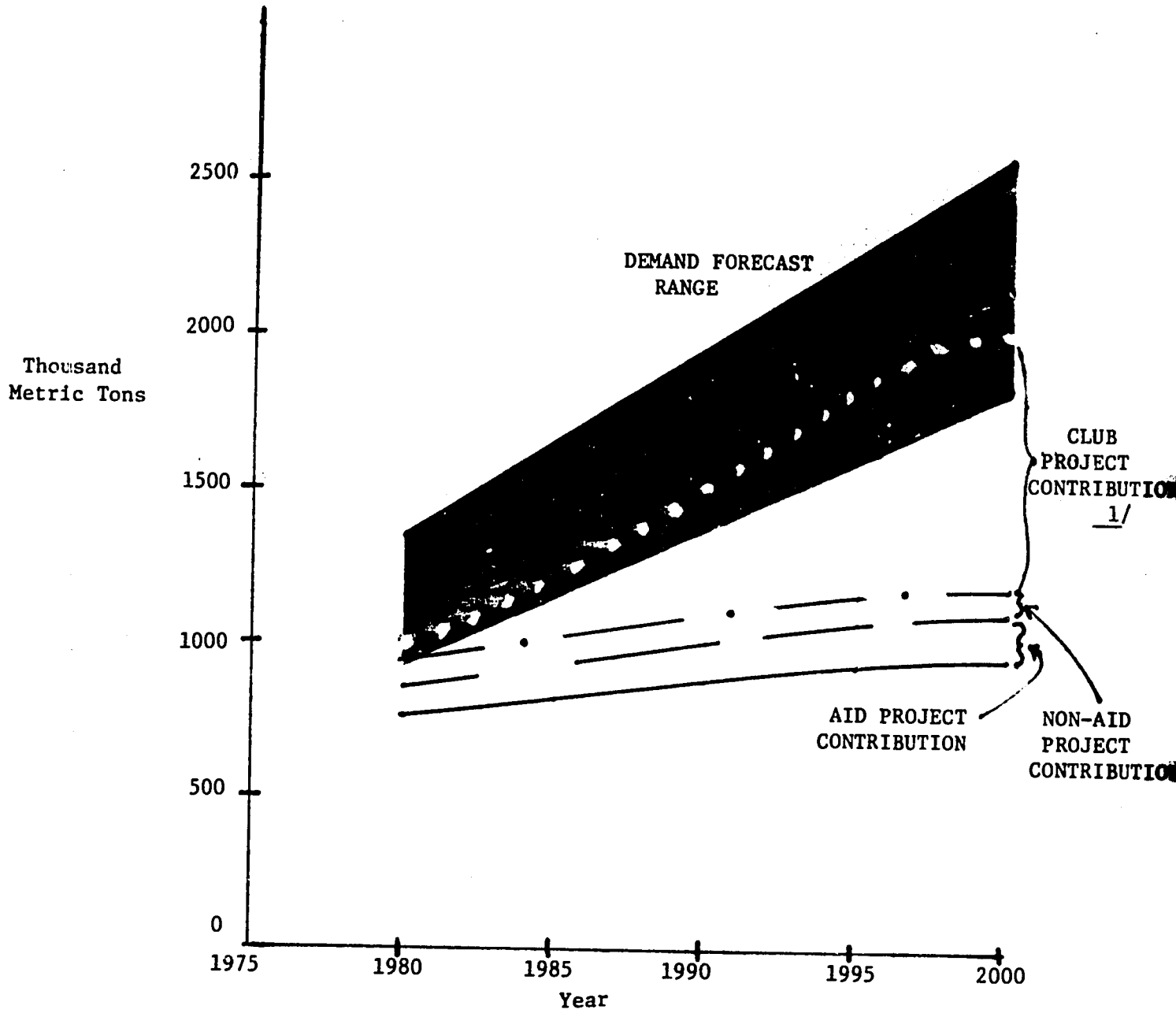
NAME	PROJECT INVESTMENT 1/	PERIOD	MILLET/MAIZE/SORGHUM PRODUCTION PRESENT YEAR	PRESENT QUANTITY	GOAL YEAR	GOAL QUANTITY	RICE/WHEAT PRODUCTION PRESENT YEAR	PRESENT QUANTITY	GOAL YEAR	GOAL QUANTITY
Irrigation Projects	$1,224,000,000									
Fleuve		1977-81	-	-	1981	24000 MT 3/	-	-	1981	74000 MT 3/
Casamance		1977-81	-	-	1981	2200 MT 3/	-	-	1981	14500 MT 3/
Fleuve		1982-89	-	-	1989	86000 MT 3/	-	-	1989	215000 MT 3/
Casamance		1982-89	-	-	-	-	-	-	1989	48000 MT 3/
Other 6/		1982-89	-	-	1989	3000 MT 3/	-	-	1989	5250 MT 3/
Fleuve		1989-2000	-	-	2000	115200 MT 3/	-	-	2000	234450 MT 3/
Casamance		1989-2000	-	-	2000	11000 MT 3/	-	-	2000	152250 MT 3/

1. Exchange rate of CFA 250 = $1 applied.
2. France (FED) financing has been acquired for approximately 30 percent of the total investment.
3. Increment to preceding production.
4. This project appears to be an extension of the AID Senegal Cereal Project.
5. Costs thru 1981 only.
6. Composed of Nayes, Cap Vert, Bas Saloum, Sylvo-Pastorale.

Source: Club des Amis du Sahel, Equipe des Cultures Seches, La Promotion des Cultures Seches au Senegal, 7702/SEN/P-1, P-2, P-3, P-4, P-14, April 1977; Equipe Cultures Irriguees, Rapport National Senegal, March 1977, Tableau No. 4-6 (Horr Texte).

FIGURE S7

RANGE OF FORECASTS FOR TOTAL CEREAL DEMAND IN SENEGAL,
TOTAL CEREAL PRODUCTION TIME TREND, AND
AID, NON-AID, AND CLUB PROJECT CONTRIBUTIONS



SOURCE: Tables S1, S2, S4, S6, and S7.

1/ Rice production goals multiplied by .65; wheat production by .8.

Livestock Production Sector

Livestock Demand and Production Forecasts

Beef demand can be projected by projecting historical beef consumption at the population growth rate of 2.7 percent per year. Domestic beef production, due to the scarcity of data, is simply projected to remain constant. Demand and production are presented in Figure S8.

AID Project Goals for Crop Production

The AID project concerned with livestock production is the Eastern Senegal Livestock Project. The original project proposal presented an increase in livestock offtake of approximately 1000 head of cattle. 1/ At 140 kilograms per head, this would imply an 140 metric ton increase in annual meat production.

Other Donor Project Goals for Livestock Production

The only identified projects are livestock projects being conducted by the FED in the Ferlo region and by the World Bank.

The IBRD project is being conducted from 1976 to 1980 at a cost of $13 million. At the end of the project incremental production would be 1,600 head of cattle, or 224 metric tons of meat. Five years after project completion, total incremental production would be 23,700 head of cattle, or 3,100 metric tons of meat. 2/

Club des Amis Project Goals for Livestock Production

The Club Livestock Working Group has proposed an integrated production system for beef production in Senegal. 3/ This system, composed of ranches, intensive feedlot, and slautherhouse is as follows:

a. Ranches. Initially two ranches are proposed in production areas: at Doli (in Diourbel Region, near the Groundnut Basin) and at Denndoudi (south of the route between Linguere and Matam, in the Ferlo). The primary modes of operation will be: (1) young bull-calves will be taken to the ranches from 12 to 18 months in age and will stay from 14 to 20 months; they will be intensively fed their last 3 to 4 months and sent to slaughter around 3 years old, or (2) cattle 4 years and above will come to the ranches for a short time before being sent to slaughter. Cattle already in good condition for sale will not be sent to ranches at all. The ranch at Doli will be 80,000 hectares with a 10,000 herd of cattle capacity. The ranch at Denndoudi will be 120,000 hectares with a 15,000 head of cattle capacity. The two ranches will produce 17,500 head for movement to the next stage.

1. AID, Eastern Senegal Livestock Project, Project Paper, December, 1974, annex I, p I-1.
2. IBRD, Appraisal of Eastern Senegal Livestock Development Project, May, 1976, p 23.
3. Republique du Senegal, Ministere du Developpement Rural et de L'Hydraulique, Avant-Projet de Production Integree de Viande Bovine au Senegal, January, 1977.

b. Intensive Feedlot. This center will be in Cap Verte. Cattle will be taken by wagon, from the ranches, to the center for intensive feeding for about 4 months. The capacity of the feedlot will be 20,000 head at a time.

c. Refrigerated Slaughterhouse. The slaughterhouse will have a capacity of 150 to 200 head per day.

After the first year of the project there will be 3,000 metric tons of carcasse meat sold. From the second to the fourth year of the project beef production will increase to 4,200, 6,000, and 9,000 metric tons respectively. The system will take 4 years to implement and infrastructure and equipment costs will amount to $6 million.

Four proposed Club projects which will directly affect livestock production have been identified:

a. Development of Livestock in the Sylvo-Pastoral Zone. Zone is bounded in north and east by Senegal River, in the south by the route between Linquere and Matern, and in the west by Loc de Guiere and the Ferlo. A second phase of a vertically integrated project including breeding, feeding, fattening, processing and marketing. The initial three year phase consists of developing water sources and enclosures for 3 groups of herders. The funding for this project will amount to $14.5 million over five years.

b. Development of Livestock Production in Casamance. Integrated livestock in the Casamance, using agricultural byproducts. The cost of the project will amount to $4.7 million over five years. The FED is financing $4.3 million with the government funding the remainder.

c. On-farm Cattle Fattening in the Delta.

d. Livestock Development in the Groundnut Basin. Fattening using agro-industrial residues and fodder. Funding is for $4 million.

These projects do not set specific goals for livestock production. The Livestock Working Group synthesis report does give a goal of 6 percent per year growth in meat production. 1/ The comparison of Club goals and trends in beef consumption are presented in Figure S9.

There are three areas of activity related to livestock production for which projects are planned:

a. Studies and Research.

--Fodder Seed Multiplication Center at Thies, $440,000.
--Cattle fattening trials at Fanaye, $320,000.

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1. Club des Amis du Sahel, Livestock Team, Explanation of Approach, Synthesis and Orientation, Livestock Production and Marketing Program, April 1977, p 11.

b. Animal Health.

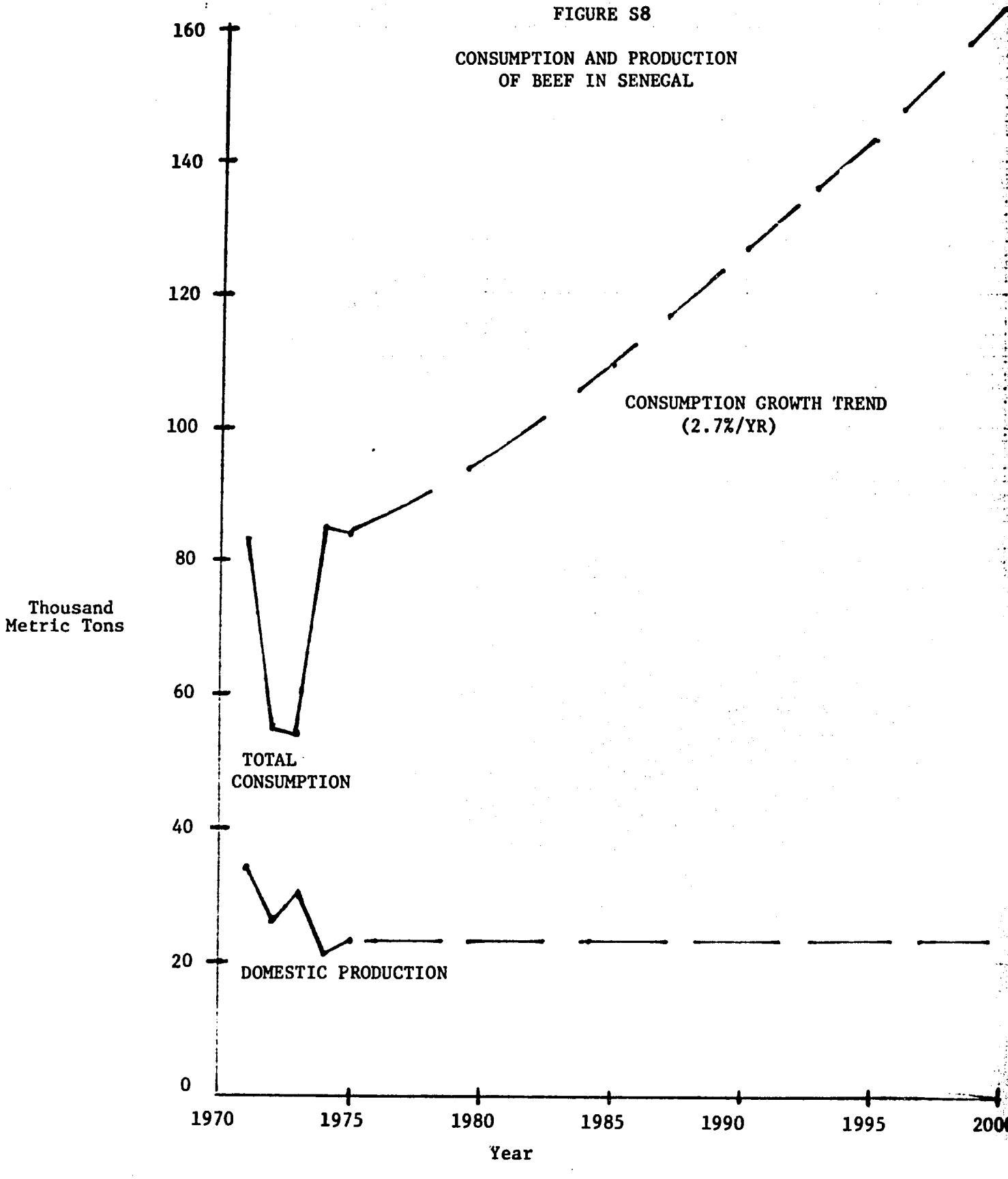
--improving the infrastructure and functioning of the animal health division, $1.2 million.
--trypansomiasis control in the Somone region, $200,000.
--infrastructure for 30 veterinary stations, $1.1 million.

c. Marketing.

--cold storage equipment to enable consumer center to sell frozen or refrigerated products, $2.7 million.
--construction of 4 regional slaughterhouses, $1.7 million.
--construction of a cattle market at Thies, $680,000.
--equipment for cattle market, $340,000.
--cattle loading and unloading platforms.

FIGURE S8

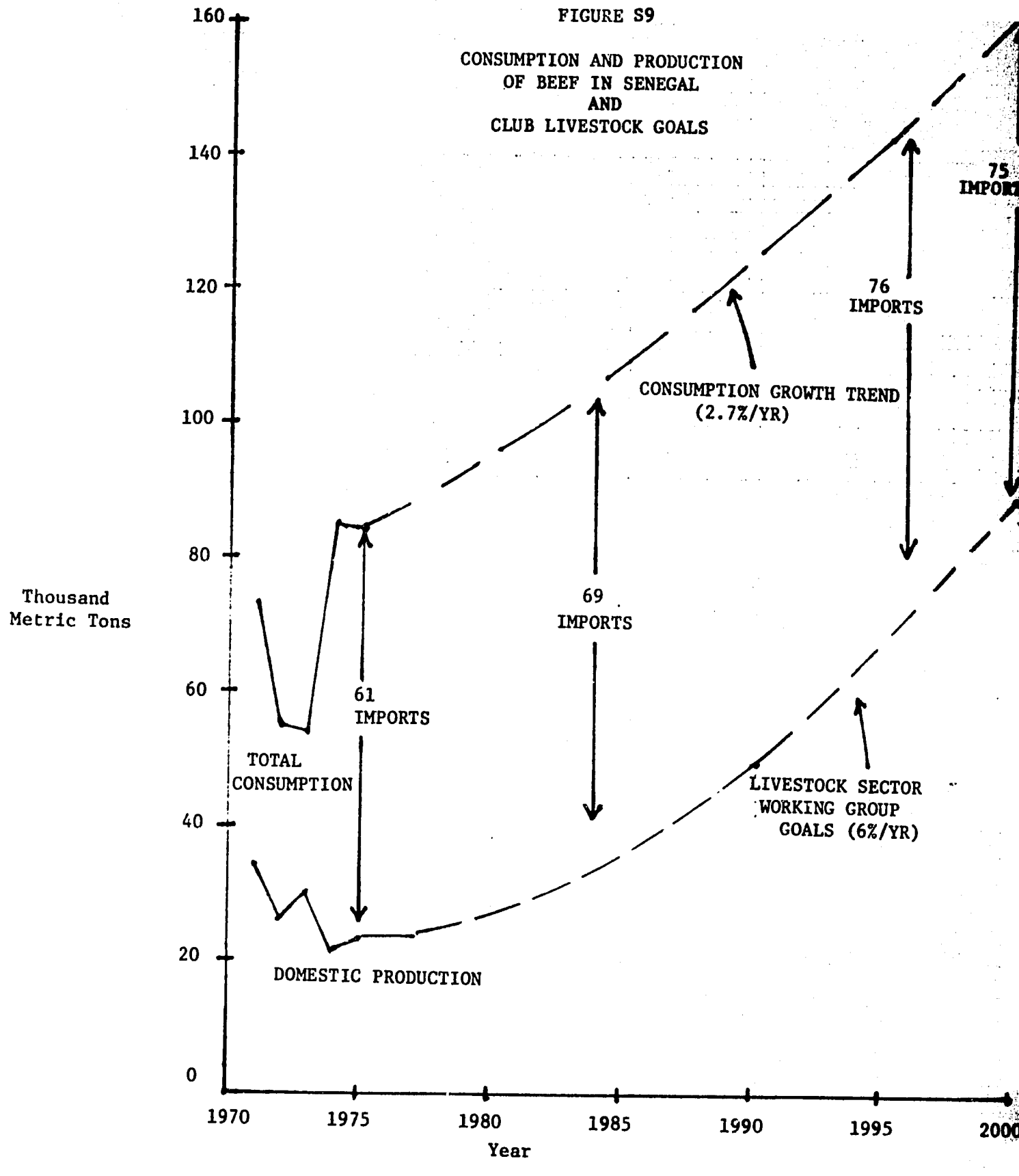
CONSUMPTION AND PRODUCTION
OF BEEF IN SENEGAL



SOURCE: FAO, Production Yearbooks, Trade Yearbooks

FIGURE S9

CONSUMPTION AND PRODUCTION
OF BEEF IN SENEGAL
AND
CLUB LIVESTOCK GOALS



SOURCE: FAO, Production Yearbooks, Trade Yearbooks

Strategies to Alleviate Constraints

Regional Development Agencies

1. The AID Strategy:

The Dakar ABS states:

> "The AID program in Senegal recognizes the important role which the regional development agencies play in agricultural development of the rural area . . . AID will be heavily involved in both direct support to these agencies and implementation of agricultural production projects through them." 1/

Such project support is as follows:

a. Senegal Cereal Production Project. The project provides support for SO.DE.VA and for the creation of a special liaison office at Bambey Research Center to make demographic and economic studies and to undertake applied research, to be disseminated by SO.DE.VA.

b. Small Irrigated Perimeter Project. The project is coordinated with SAED.

c. SAED Training Project. This project provides funding to assist SAED to develop a training program for upgrading skills of its personnel.

d. SODESP - Livestock Production Project.

2. The Club Strategy:

The Club production sector projects are conducted as follows:

a. Developpement de la Zone Cotonniere. The project will be directed in Senegal Oriental by SO.DE.FI.TEX.

b. Developpement Rural Integre de la Region Faleme. The Project will be directed in the Senegal River Valley by SAED.

c. Projet de Developpement de Thies-Sud. The project will be directed in the Groundnut Basin with SO.DE.VA.

d. Projet d'Intensification des Cultures en Zone Sahelienne. The project will be directed in the Groundnut Basin with SO.DE.VA.

e. Promotion du Developpement Agricole Integre en Basse-Casamance. The project will be directed in the Casamance with SOMIVAC.

f. Irrigation Projects. Projects will be directed in the Senegal River Valley through SAED.

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1. Dakar ABS, op. cit., p 4.

Rural Participation

1. The AID Strategy:

The Project with the most rural participant involement is the proposed Model Village Irrigated Agricultural Development Project. This involvement, specifically by village youth, is described in the Dakar ABS, attachment C.

2. The Club Strategy:

The project with the most rural participant involvement is the Human Resources Project, Extension du Reseau Existant de Maisons Familiales, to extend the number of les Maison Familiales Rurales (MFR). The MFR's were established in 1964. In 1976 there were 47 MFR's in 24 villages, and the 5th Plan calls for an extension of this number to 115. Each MFR represents an association of men and women responsible for its operation. The different MFR's are grouped into a national association of MFR's, located in Thies.

The objectives of the MFR's are to train youth, adults, and trainers:

a. The training of yough is to allow them to participate in the economic development of their region, while improving their income and quality of life. The program is two years, and provides time for reflection and theoretical training, and a time for practical activity in villages. The youghs participate in the training, close to their families.

b. The training of adults is similar in objectives to training of youths. The training is in short intervals and eventuates in literacy training in French or a national language.

c. A system is established to recruit from youth in MFR's those suitable for becoming future MFR training. They receive training within and outside the MFR.

Funding is for four years and amounts to $1,952,000. 1/

Insufficient Trained Manpower

1. The AID Strategy:

The largest AID project with training objectives is the SAED Training Project. This is a five year project with funding for $3,700,000. The specific objectives are to construct training facilities and to train the following number of people:

--308 SAED Extension workers,
--625 SAED management personnel,
--20 SAED personnel receiving short- and long-term U.S. training,
--870 billshr chiefs,
--60,000 villagers to be trained by chiefs, and
--23,500 persons receiving functional literacy training.

1. Club des Amis du Sahel, Equipe des Resources, Rapport de la Commission Operationelle et de Synthese, March, 1977.

Other AID projects have training components. For example:

a. Grain Storage Project. The project is to improve the capability of the national marketing board of Senegal, ONCAD, to store and market grain locally. The project will result in:

--a manager with certificate of training at each ONCAD warehouse,
--six trained teams for fumigation (one team in each region) composed of two persons per team, and
--six graduate of training programs in U.S.

b. Senegal Rural Health Services. The project purpose is to create within Sine-Saloum, a network of staffed village health posts. There will be 250 village health workers qualified.

c. Senegal Land Conservation and Revegatation Project. The project is intended to assist the GOS in its efforts to improve, protect and maintain the natural resource base. The project will result in:

--28 supervisor personnel trained overseas,
--600 technical personnel trained, and
--6000 farmer/herders trained.

2. The Club Strategy:

The Club Irrigation Working Group has defined personnel needs for irrigation development. Assuming an irrigation production unit to be approximately 3 hectares, then the number of personnel needed is based on: 1/

-- 1 basic monitor for every 25 production units (pu),
-- 1 director for every 125 pu's,
-- 1 agricultural technician for every 375 pu's, and,
-- 1 perimeter chief engineer for every 650 to 700 pu's.

Since from 1977 to 2000 there are 246,100 hectares of new or improved hectares planned, then there is a need for the following number of trained personnel for irrigation: 2/

-- 3,281 basic monitors,
-- 656 directors,
-- 219 agricultural technicians, and
-- 117 chief engineers.

The Club Ecology and Environment Working Group has proposed strengthening of the following schools: (a) Section for Waters and Forests of the National School of Rural Students at Bambey, and (b) National School of Technical Agents of Water and Forests. The Group's goals for the entire Sahel in 1990 are: 320 students, 1,050 technicians, and 6,800 field personnel. 3/

1. Club des Amis du Sahel, Equipe Cultures Irriguees, Rapport National Senegal, March 1977, p 49.
2. ibid., p 40.
3. Club des Amis du Sahel, Team for Ecology and Environment, Committee's "Forest Strategy in the Sahel", p 35, annex 1.

Major club training projects include: 1/

a. Formation Feminine au Moyen de Groupements de Productrices. Twenty-five organizations of women agricultralists have been established since the 1970's in Thies, Sine Saloum, Diourbel, and Louga. The government desires to establish 10 more per year over the next 10 years. The major objectives are:

--training the female population in agriculture,
--the more rational participation of women in the development of the country, and
--the participation of women in national organizations (e.g., cooperatives).

Funding is for five years and amounts to $2,847,000.

b. Ecole Nationale d'Horticulture-Reconstruction et Formation d'Enseignants. This project is for reconstruction and furnishing of Ecole Nationale d'Horticulture de Cambrene. Technicians from the school have been trained for use in market garden farms, in modern market garden operations (e.g., BUD Senegal), in fruit farms, etc. SAED has used trained technicians as extension agents for irrigated cultivation in the Senegal River Delta. There would be an increase in the permanent enrollment to 234 students:

--108 "techniciens",
--30 "techniciens superieurs", and
--96 "auditeurs".

Funding amounts to $1,775,000.

c. ONCAD - Centre de Formation Cooperative. The objectives of this project is to create a center for training cooperative members. The project will involve:

--conception and implementation of a plan for training leaders and personnel of cooperatives, and
--development of teaching methods adapted for cooperative training and preparation of appropriate training aids.

The funding is four years and for the amount of $595,000.

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1. Club des Amis du Sahel, Equipe des Resources, op cit.

Degradation of Land and Soil Base

1. The AID Strategy.

The major AID project in this area is the Land Conservation and Revegatation Project. The specific objectives of the project are:

a. The decrease of resource degradation at deep-bore water points in sylvao-pastoral (rangeland) zones,
b. the preservation of existing forests and woodresources against uncontrolled bush fires and woodcutting,
c. the prevention of further deterioration of soil and reduction of crop yield in Senegal's peanut and millet producing regions, and
d. the conservation and improvement of existing forest resources in the Cap-Vert (Thies-Dakar) region (3,000 hectares for an annual production of 48,000 cubic meters.)

These activities will take place in four regions. The regions and the principal elements undertaken in each region are:

a. Pastoral Zone.

--water development,
--cattle control,
--revegatation, and
--land conservation.

b. Sine Saloum.

--fire control, and
--extension services.

c. Groundnut Basin.

--nursery development,
--soil conservation, and
--reforestation.

d. Cape Vert.

--nursery development, and
--reforestation.

Specific AID involvement will be:

a. Resource Survey. This will involve satellite imagery, aerial photography, and ground data collection.

b. Infrastructure reinforcement. This will center around: deep-bore well sites in the rangeland zones of northern Senegal, national range and forest reserves in Sine-Saloum, soil fertility in the peanut basin, and forest resources in the Cap-Vert Region.

c. Technical Assistance. Technical specialist will be provided in natural resource conservation, range management, technical education, forestry, livestock, soils conservation, etc.

d. Strengthening of Extension. The project will contribute towards strengthening the Forestry and Livestock Services extension programs.

2. The Club Strategy:

The Club's Ecology and Environment Working Group has proposed a forestry strategy. 1/ The objectives of the strategy are:

a. supply population needs for combustible wood and construction timber,
b. forage protection and management,
c. improved agricultural production factors, and
d. protection and appropriate exploitation of wildlife.

The strategies to meet these objectives are based on the following subprograms:

a. Wood Production.

1. natural regeneration methods,
2. artificial reforestation,
3. management and protection of natural forest stands,
4. village plantations, and
5. green belts around urban areas.

b. Integrated Farm-Forest-Forage Operations.

1. preventive measures (pasture management, installation of wind breaks in agriculture areas, gaining popular acceptance on non-erosive methods of working the soil, creation of wood supplies around villages, planting fire belts around the forests, etc.)
2. taking direct measures to control erosion phenomena (control of brush fires, fixation of dunes, flood prevention, etc.)
3. actions to restore the environment, such as reforestation, restoring vegetative cover for temporary protection or by planting)

c. Conservation and Utilization of Wildlife.

1. In the Sahelian zone:
   --restore populations of wildlife and their habitats,
   --inventory and manage desert species, and
   --plan, establish and manage protected zones.
2. In the Sudan zone:
   --preparation of management plans and their execution,
   --pilot projects for production of meat from game animals,
   --improvement of tourism based on wildlife, and
   --these projects will satisfy food needs of rural communities.

d. Coordinated Education and Forestry Training.

The working group has proposed projects in each of the subprogram areas.

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1. Club des Amis du Sahel, Team for Ecology and Environment, Committee's "Forest Strategy in the Sahel".

a. Wood production. Based on working group projections, the demand for wood in Senegal, both urban and rural, in 1990 will be 4,511,000 cubic meters (cm). Production in 1975 was 4,137,000 cm leaving a deficit of 374,000 cm. The first generation projects are presented in Table S8. These projects will result in a total production of 1,184,000 cm resulting in a surplus of 810,000 cm by 1990 for Senegal.

TABLE S8

Projects Proposed in Wood Production Subprogram

Project Title	Cost	Annual Planned Production (1000 cubic meters)
Reforestation in the Senegal River Delta for Firewood Production	$2,448,000	9
Reforestation of Firewood Around Urban Areas in West	$1,733,000	17
Management of Forests of Central Senegal	$1,740,000	700
Development of Forests in Southern Senegal	$21,930,000	423

b. Integrated Farm-Forest-Forage Operations. The projects in this subprogram are primarily designed to prevent desertification. The projects are presented in Table S9.

c. Conservation and Utilization of Wildlife. The projects are presented in Table S9.

d. Coordinated Education and Forestry Training. The projects are presented in Table S9.

Source: Club des Amis du Sahel, Team for Ecology and Environment, Committee's "Forest Strategy in the Sahel", annex 1.

TABLE S9

Projects Proposed in Integrated Farm-Forest-Forage Operations, Conservation and Utilization of Wildlife, and Coordinated Education and Forestry Training Subprograms

Project Title	Cost
Integrated Operations	
Reforestation in the Forest-pasture Zone by Planting Forage Trees	$6,869,000
Fixation of Dunes and Protection of Truck Farm Basins of the Extensive Slopes North of Senegal	$4,436,000
Struggle Against Brush Fires	$7,840,000
Improvement of Agricultural Soils in the Center of Senegal by Reforestation with Acacia Albida and Erection of Windbreaks	$ 605,000
Amenagements Pastoraux	2,500
Conservation of Wildlife	
Protection and Rational Exploitation of the Wildlife	$2,320,000
Breeding of Crocodiles in Casamance	$1,090,000
Coordinated Education	
Strengthening of the Section for Waters & Forests of the National School of Rural Students at Bambey	$ 420,000
Strengthening of the National School of Technical Agents of Water & Forests	$ 420,000

Source: Club des Amis du Sahel, Team for Ecology and Environment, Committee's "Forest Strategy in the Sahel", annex 1.

Health Care Delivery System

1. The AID Strategy:

The AID Project in this area is Rural Health Services Development Project. This project will take place in Sine-Saloum Region. The objectives of the project are:

a. Creation of 250 village health workers (VHW) and a network of village health posts (VHP) for provision of basic health services (first-aid, environmental sanitation, etc.) and collection of vital statistics.
b. Upgrading and expanding secondary health posts (located in arrondissements 1/),
c. Organizing a system of surveillance and supervision of VHW's by mobile teams out of secondary health posts,
d. Provision of technical assistance to Senegal Ministry of Health in project planning, implementation and evaluation, and
e. Coordinating establishment of VHP's with UNICEF's creation of village pharmacies and rural maternities.

2. The Club Strategy:

The Club Health and Nutrition Working Group has proposed a health care delivery system, Village-Based Health System. 2/ The system is designed for the average Sahelian country on five geographical levels: village, arrondissements, cercle, regional, and national. The responsibilities for each level are:

a. Village. At the village level basic health services are provided by village health workers (VHW) who are chosen by village residents and live in the village. Basic health services include nutrition, education, simple hygiene, organizations for immunization teams, simple curative measures, etc. They also provide primary data collection sources.

b. Arrondissement. These are the bases for nurse or auxillary visits to villages. A center for data collation, immunization campaign scheduling, and training of VHW's.

c. Cercle. Center for nurse, midwife, and MD visits to arrondissments and villages. Responsibility for immunization and categorical disease control. Collation of data for transmittal to national level.

d. Region. Coordination of supervision at perpiheral levels. Hospitalization referral when possible. Regional health plan development, implementation, and evaluation.

e. National. Development of national treatment guide and formulary.

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1. Senegal has seven Regions which are divided into 27 departments (cercles) which are divided into 85 arrondissements.
2. Joseph, S. and Scheyer, S., A Strategy for Health as a Component of the Sahel Development Program, May 1977.

Research on traditional medicine. National manpower policy and planning formulation. Training of MD's, senior nurses, and midwives.

Major components of such a strategy involve:

a. Nutrition. Emphasis must be placed on improvements of nutritional status of population, especially mothers and infants.

b. Village Water. The first priority is to make available an adequate quantity of water for village consumption needs. Second, villagers must be educated as to the importance of making water supplies safe.

c. Environmental Sanitation. There must be village participation in establishment of sanitation systems to insure proper use and adequate maintenance. Simple technologies can be utilized and there is need for further research.

d. Communicable Disease Control. Health risks to the population can be significantly controlled by regional or area approaches. A CILSS/Club plan should be developed in cooperation with the World Health Organization.

There are no specific Club projects designed yet. Current donor projects are presented in annex C.

Population Growth.

The U.S. Strategy:

AID strategy is based on its Family Planning Project. The objectives of the project are to assist the government in offering family planning services through its network of hospitals, maternity services and maternal and child health centers, as well as the distribution of contraception devices as appropriate. This project will train personnel and organize clinics.

The Club Strategy:

There is no Club strategy in this area.

National Marketing and Pricing Policy

1. The U.S. Strategy:

As far as marketing, AID is providing support, through the national marketing board of Senegal (ONCAD) via the Senegal Cereals Project. This project will establish a grain storage capacity:

a. to be used by ONCAD in its price stabilization efforts, and

b. to be used as a security stock to be constituted in years of high production and released in years of abnormally low production.

The program should ultimately result in a significant reduction in loss of grain stored by ONCAD through more efficient storage facilities.

The Dakar ABS does not state a strategy for type of preferable marketing systems (i.e., state or private) or prices.

2. The Club strategy:

The Club Marketing, Price, and Storage Working Group has not yet established a storage strategy.

Consultants for the Working Group, the Center for Research on Economic Development (CRED), have recommended that the governments encourage private traditional trade rather than state marketing boards. CRED argued that although private and para-state structures have been established, they have not replaced the private sector. Rather they have hindered cereal expansion programs. All the Sahelian representatives strongly opposed this proposal. Their claim was that production has suffered from the private sector's way of operating and their nearly systematically mercantilistic behavior. The majority of the team members recommended:

a. measures be taken to enable producers to organize themselves and manage the organizations which best protect their interests, and

b. that existing parastatal marketing structures and the local development authorities and projects offices be given all possible human, financial, and material means to purchase and market grains. Insofar as possible the private sector should be governed by regulations designed to provide "the best service at the best price".

The Working Group has not yet made a recommendation on price policy. They indicated that several prior studies should be first made, for example:

a. repercussions of a policy of high grain prices on the urban and rural consumers,

b. evaluation of cost prices for various crops, at various technical levels, in order to determine the relationship between the various agricultural crops,

c. effects of a policy of higher producer prices on the economy of the various production units, in terms of their size (knowledge of the distribution of income at each level, typology of the production unit),

d. study on food consumption to assess consumption prospects for each type of product (e.g., rice, sorghum, millet, etc.), and

e. storage at village levels.

Transport

The U.S. Strategy:

The Casamance Regional Development Project has a road transport component. Travel in the Casamance is severely hampered in the dry season by the condition of roads which are little more than tracks and in the rainy season are impassable. The roads chosen for improvement have been decided upon in consultation with the government. The amount of road improvements is approximately 551 kilometers:

a. In Upper Casamance there are 212 kilometers proposed for improvement.

b. In Middle Casamance there are 179 kilometers proposed.

c. In Lower Casamance there are 160 kilometers proposed.

The Club Strategy:

The road network of Senegal is 13,250 kilometers. Because of budget constraints this road system is in danger of deterioration. Donor funding is proposed for road rehabilitation, road maintenance, and improvements to maintenance shops and equipment from 1977 to 1982.

Major condidates for rehabilitation are routes between Fatick-Kaolack and Louga-Leona-Colobane. Additional routes result in a total 405 kilometers. The funding required for this period is $67,150,000. 1/

1. Club des Amis du Sahel, Group Transports et Infrastructure, Rapport de Synthese, May, 1977.

ISSUES

A discussion of issues can be based on the issued raised at the fourth meeting of the Consultative Group on Food Production Investment (CGFPI), held in Washington, September, 1977. 1/ The SDPT and Field Post staff can discuss for each of the issues raised by the U.S. at that meeting:

a. whether the U.S. position was correct, and if not what changes should be made,

b. what are the implications of these positions for U.S. strategy and projects, and

c. what are the implications of these positions for Club strategy and projects.

The CGFPI issues are contained in annex A.

There are additional issued to be discussed:

a. AID projects generally do not have objectives beyond the early 1980's. Due to the momentum of population growth and the long delays involved in bringing about change, should AID projects be planned over a longer time horizon? How?

b. Figure S7 shows a widening gap between total cereal demand and planned production if demand is high and all proposed projects do not reach their planned objectives. This gap can be decreased by an increase in cereal land at the expense of groundnut land and foreign exchange revenues. Either total cereal supplies will fall or Senegal's foreign exchange deficit will widen. Is a disaster on its way? Can the proposed development investment be effective? Are AID projects sufficiently large enough and in the appropriate sectors to have a significant effect?

c. Figure S9 shows a widening gap for beef production. Can more development investment close the gap?

d. AID has shown support for regional and functional development agencies. Is more support needed for central planning? What would be the benefits and drawback for such support?

e. Figures S7 and S9 are based on the data presented in annex D. What is the Field's opinion of the accuracy of this data? Is it good enough for such planning purposes? If not, is the effect of current donor efforts unknown? How could better data be collected?

f. Figures S8 and S9 indicate beef production as the major livestock indicator. Are other variables more important (i.e., animal stocks, herder income, milk production, etc.)?

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1. Republic of Senegal, Ministry of Rural Development and Water Resources, National Investment Strategy for Increasing Food Production, June, 1977.

g. How much and what kind of rural participation is needed in planning a development project? Will a project only be successful if farmers participate in the planning and management of a project?

h. The Club gives an estimate of training needs for irrigated development. What is the Field estimate of need trained personnel by level, by decade, for rainfed crop, irrigated crop, and livestock development? Are AID, other donor, and proposed Club training projects adequate to fill this need? If the need is not filled, what will be the effect on the achievement of project goals, as shown in Figures S7 and S9?

i. The Club Livestock Working Group and Government of Senegal have specified an overall livestock production system. Has the AID livestock project been coordinated with this strategy? If not, how can it? Are there elements of this strategy that AID can fund?

j. The Club Ecology Working Group concentrated on wood production projects. Should this be of more concern to AID? Should the Club concentrate more on AID concerns?

k. The AID family planning strategy has been held up by the government. If the new Minister of Health indefinately postpones the project, is it desireable for AID to fund research to show the government the implications of a no family planning policy? How should AID promote a fimily planning program to the government (e.g., demographic studies as a means to open doors to family planning projects; insert family planning components into health projects; etc.)?

l. Given the CRED report on the desireability of promoting private grain traders, how can AID projects either: (1) assist private traders, or (2) not discourage private traders? How is the Grain Storage Project affecting private traders?

m. Given the Club Transport Working Group's concern over the deterioration of Senegal's road system, should AID assist? If so, how?

n. Senegal's Fifth National Development Plan, 1977/1981, calls for development resources to be distributed as follows: 1/

--Rural development and water resources, 27 percent
--Industry, trade and tourism, 24.62 percent
--Planning and human resources, 40.7 percent
--Science and culture, 7.68 percent.

Should AID's development strategy have roughly this distribution? If not, why not?

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1. UNDP, Country and Intercountry Programming and Project, Senegal, September, 1977, p 15.

o. What is Field's judgemental quantification of other donor strategy resource distribution? Is the AID strategy similiar to other donors? If not, why not?

p. Annual recurrent costs for AID projects in Senegal are high: 1/

--Senegal Grain Storage	$868,000
--Small Irrigated Perimeters	200,000
--Eastern Senegal Livestock	220,000
--Senegal Cereals Project	640,000
--Land Conservation and Revegetation	112,000
Total	2,040,000

The national budget allocation for agriculture and livestock in Senegal's IV Development Plan was CFAF 1,931 million in 1975. In U.S. terms, this is $8.6 million. Thus the sum of the estimated recurrent costs is approximately 24 percent of this national budget.

Recurrent costs are not necessarily bad, but Senegal's economy must grow to support them. How can AID projects include in their initial analysis a projection of the future government and private revenues allocated to pay recurrent costs and a projection of total AID project recurrent costs?

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1. AID Project Papers: Senegal Grain Storage, May, 1977, p 21; Bakel Crop Production, May, 1977, p 101; Senegal Range and Livestock Development, December, 1974, annex I, p 2; Senegal Cereals Production, November, 1974, p 49; Land Conservation and Revegetation, November, 1976, p 37.

ANNEX

ANNEX A

NATIONAL INVESTMENT STUDY FOR INCREASING
FOOD PRODUCTION - SENEGAL

CGFPI, Fourth Meeting, Washington, D.C., Sept. 7-9, 1977

Issue # 4. Agricultural Input Subsidies

GOS argues that subsidies are of great value to the investment strategy. In fact of the 25 major funding categories, it has the highest funding and is approximately 50 percent of the budget for support activities in the V and VI Plans.

There are two issues. If subsidies are needed, then perhaps the prices to farmers are too low, thus there is the issue of raising farmer crop prices. In addition, if the government pays subsidies to the farmer to encourage fertilizer use, then the government must be reimbursed. The second issue is whether the government is reimbursed by the consumer of the crop, other sectors of the economy, or by the donor community.

U.S. Position

The U.S. position depends on the question of government reimbursement. The U.S. would support subsidies if reimbursement was by the consumer. However the U.S. would suggest simply raising prices instead to consumers and farmers to cover the subsidy thus: (a) decreasing government's administrative expenses, (b) decreasing chances that subsidies could be paid for out of general tax revenues, and (c) increasing chances that farmer's will use optimum amounts of fertilizer. The U.S. would favor a study into the feasibility of raising crop prices to farmers.

The U.S. does not support taxing other economic sectors or donor funding for long-term input subsidy programs. Donor funding would conflict with the donor and host country's agreements to work towards self-sufficiency. The U.S. would favor a study of the feasibility of short-term (5 years) donor commitments in conjunction with an addition to the development plan that indicated how and when the cost of the subsidies would be shifted from the government/donors to the appropriate consumers. A failure to convert the subsidies from the government/donors to consumers would be an indicator of lack of success of the development projects.

Discussion

There are several economic levels of interest when discussing input subsidies. Three major levels concern the farmer, the consumer, and the government.

At the farmer level, the farmer must receive revenues to purchase inputs to increase crop yields. He may receive an adequate price for his crop that allows him to buy the optimum amount of inputs. If the price is too low, he must buy less than the optimum.

In the case of too low prices, the government can subsidize inputs (i.e., increase farmer's income through a gift of agricultural inputs). However the government must tax someone to pay for the subsidy. Since the government can obviously not tax the producer, it must either tax the consumer of the crops, tax other areas of the conomy, or ask for donor support.

If the government taxes the consumer, it would be the equivalent of raising prices. If the consumer is able and willing to pay the price and the tax, the government should simply raise the price instead, since the market place is generally more efficient than bureaucracy. In addition, there should be noted an additional argument for market prices. Subsidies presume that the government has an excellent knowledge of the yield response of inputs. Should the government knowledge be, or become, unrealistic, subsidies can be needlessly wasted. Farmers, who purchased inputs and harvested crops, would have immediate knowledge of the effects of inputs. If they don't work, they don't pay.

Should the consumer be unwilling to pay the charges, the reasons for this should be ascertained and addressed. If the consumers are unable to pay, projects to raise consumer incomes should be addressed.

It is questionable whether other areas of the economy should bear the subsidy. There is little argument for slowing economic growth in the service or industrial sector.

There may be a need for s short-term donor commitment if the argument can be made that subsidies raise productivity to the point they can be self-financing. This agrument must be convincingly made. Should donor funds be requested, they should require a plan indicating the timing and rationale for the phasing out of the funding.

Issue #5. Consumer and Producer Pricing Policies

GOS suggests that price-regulation policies will be needed to curb demand for imported wheat and rice. The issue is what form this regulation will take. An additional issue is whether the government should encourage farmers with increased crop prices to make choices consistent with national objectives.

U.S. Position

The U.S. would support government duties or quotas on the import of rice and wheat. These price increases will be especially needed if it is decided to increase the farm price of cereals. Such a rise in the domestic cereal price would otherwise cause increased rice and wheat imports if import prices are not increased. The U.S. would also suggest that such duties be reinvested in projects to increase domestic cereal production.

The U.S. also supports an increase in the cereal crop price to farmers so as to encourage an increase in cereal production as a farmer cash crop.

The U.S. would suggest four areas of study before taking such price measures. First, research be instituted to determine the price cross-elasticities of demand for each of the major cereals assuming a successful millet commercialization program. Second, the combined effect of the price changes, millet commercialization, and projected urban incomes on urban nutrition should be intensely studied. Third, research should be started on the necessity and feasibility of projects to increase urban income, especially of the urban poor. Fourth, research should be instituted on the effect on national income of various combinations of rice and wheat imports versus domestic production of cereals and groundnuts.

Discussion

The U.S. takes no position at this time as to whether cereal imports are good or bad for Senegal. However the U.S. does generally support policies that would lead to Senegal taking advantage of all its comparative advantages in relation to international trade. In this light, the U.S. supports policies that would in general lead to prices for cereals that reflected their true domestic market value.

There is a need to raise rural incomes and increase domestic agricultural production. This is especially so in the Groundnut Basin where population pressure is causing a need for more agricultural inputs to increase yields. To increase incomes, the government can increase farmer crop prices. Should it want to promote more millet production it must raise millet prices relative to groundnut prices.

If millet prices are raised to farmers, the increase must be passed along to the consumer. The effect on urban real income may be mitigated by several factors. The major cereals consumed in the cities are rice and wheat which are priced higher than millet. If millet commercialization programs are successful, consumers will be able to consume millet at lower prices. Thus a rise in millet prices to former rice price levels would have no effect relative to urban incomes.

However, it may still be necessary to place duties or quotas on imported rice to offset part of the price increase in millet. Otherwise demand may shift back to imported cereals. The government should not lower millet prices since this would lead to either subsidies that the government could not afford, or producer prices too low to encourage millet production. The U.S. would also support the government using, as was done in the Ivory Coast, the duties to provide as investment in the domestic crop production program.

The combination of all these price increases, despite millet commercialization, may have negative effects on urban nutrition. Thus it may be necessary to study ways to increase urban incomes.

Issue #6. Millet Commercialization

The issue is whether the commercialization of Millet should be encouraged through investments in product research and development, promotional campaigns, and distribution systems.

U.S. Position

The U.S. supports this research. The production of such products in important so as to stimulate demand for rural millet production and increase rural incomes.

Discussion

The rural population, especially in the Groundnut Basin, has depended upon millet as a staple. In contrast, the urban population, especially middle and upper income families, have favored imports of broken rice.

Since a major way for the government to increase rural incomes is to increase millet prices, it is obviously necessary to assume a market for the increased millet production. The result otherwise would be a large stock of government owned millet.

Issue #7

GOS does not discuss the impact of population growth on national goals of cereal production and nutrition.

U.S. Position

The goal of the plan is to increase cereal consumption per capita. The plan focuses only on means to increase cereal food production. The U.S. suggests research be started to: (a) investigate the effect of population growth on food production and (b) determine possible economic and social factors to decrease population growth. If the research determines that population gorwth does not result in compensating increases in agricultural production, then steps should be taken to utilize the determined factors to slow population growth.

Discussion

The annual population growth rate in Senegal, 2.6 percent, necessitates at least an equal rate of increase in agricultural production to maintain nutrition levels, and a greater increase to improve nutrition. In fact the rate of increase in production must be even greater due to the following reason: since all farmers keep cereal stocks, as rural population increases, so must this cereal stock.

Thus a decrease in the population growth rate is equivalent to an increase in production. For example, a drop in the population growth rate to 2 percent per year is equivalent to an increase in the cereal production growth rate to 3.2 percent. Each would increase per capita production at approximately 0.6 percent per year. On the other hand, it is entirely possible that the population growth rate will increase in the next few years, creating even greater demand for basic grains than envisioned in the GOS plan.

An argument against decreasing population growth is that an increased population would allow a proportionally greater increase in food production. Although this proposition is untrue in the short term, because of the increased dependency ratio and is questionable over the long term, this topic deserves further study.

AID has proposed a family planning project, but it has not been approved by the government.

Issue #8 National and On-farm Storage

The issue is whether improved on-farm and national cereal storage systems are important enough to receive investments.

U.S. Position

The U.S. supports projects to improve on-farm and national storage. In addition, the U.S. suggests research to determine precise loss rates at the national and farm levels.

Discussion

It is obvious that it would be good to cut storage losses where they occur. The U.S. is funding a project to establish storage for a national cereal reserve in Senegal. Since this is a measure to increase domestic cereal supplies, and since there are a variety of other means to achieve this end (e.g., training of farmers, crop protection programs, research on new seed varieties, etc.), it should first be verified that funds invested in storage systems are more cost-effective than investments in other projects.

Issue #9 GOS Grain Marketing Policy

The issue concerns the desirability and feasibility of government marketing agencies retaining a legal monopoly on grain marketing.

U.S. Position

The grain marketing problem is much more complex and difficult, as well as more important, than is indicated in this report. The existence of a legal state monopoly with dominance in reality by private traders, presents a situation of much inconvenience. It raises risks and uncertainties, and hence costs of performing trading functions. It absorbs resources of the government which might be better used on production programs. It prevents the development of a traders' community which could acquire greater skill and capital for performance of more complex marketing functions. It stifles entrepreneurial development.

It would seem predent to conduct more intensive analysis, including consideration of the appropriate role of the private sector in grain marketing, before undertaking such a massive and fundamental expansion of the state grain trade monopoly as outlined in the GOS report.

Discussion

Marketing of food grains in Senegal is a legal monopoly of government agencies, notably ONCAD. According to the GOS document, the Senegalese government will retain this marketing monopoly for millet, rice and maize, though some decentralization is recommended, from ONCAD to the "development agencies." The report implies that the only problem in government marketing policy and performance is that ONCAD is a bit too centralized, and a little inefficient. This is wrong. The real problem is the proper role of state marketing, and the danger that marketing bottlenecks could cripple the production program.

One part of the problem is the fictional character of the legal monopoly. In fact most grains are marketed by the private sector, illegally. The following table shows ONCAD marketings in recent years:

Table I. GRAIN MARKETED BY ONCAD

Years	Millet/Sorghum Marketed (tons)	% of Production	Rice-Locally Produced (tons)	Rice-Imported (tons)
1970-71	346	insignificant	600	168,000
1971-72	2,900	"	650	170,000
1972-73	21	"	0	189,000
1973-74	30,000	6%	1,000	141,000
1974-75	36,000	5%	3,600	124,000
1975-76	12,000	2%	N.A.	130,000
1976-77	10,000*	2%	N.A.	130,000

*As of February, 1977

ONCAD does not succeed in buying more local grain for several reasons:

1. It provides no real service to farmers or consumers. It is in effect an additional middleman. So farmers deal directly with other buyers who pay higher prices.

2. The government marketing machinery, like all the government machinery, is extremely cumbersome. At least until 1975, complete administrative arrangements were required before private traders were allowed by buy grain. Until an annual "enabling decree" was issued, no grain could be shipped from rural areas without written authorization of the Governor of the Exporting region. According to regulations then existing, shipment of more than 800 kg. (8 sacks) of grain required approval from the Ministry of Finance! Delays in the issuance of the traders' licensing decree were common. In addition, there have been frequent long delays in getting funds to finance purchases to buying agents.

3. Farmers appear to have a strong preference for avoiding grain sales to ONCAD, for many reasons. They fear that the grain transactions will become linked to credit repayment and tax issued related, for example, to groundnut sales. ONCAD also requires that farmers transport grain to buying stations.

Issue #9

The report suggests that more grain marketing responsibility will be shifted to the development agencies, away from ONCAD. But this risks involving those agencies in a competition with the (illegal) private traders which they are unlikely to win. They, for example, will have to pay official prices to producers and sell at official prices to consumers, regardless of market-determined prices. More important, taking on of marketing functions on the scale implied they would absorb a major share of the resources of the development agencies. The government grain marketing agencies everywhere in the Sahel operate under deficits because of these factors. The same would be true of the Senegalese development agencies, if they get involved deeply in marketing grain. Moreover, failures or shortcomings on the grain marketing side could compromise the extension efforts on which production increases depend.

Issue #10 Irrigated versus Rainfed Agricultural Development

The GOS paper states that large scale irrigation projects have investment costs of approximately $6,000 per hectare. Small scale projects costs are on the order of $1,200 per hectare. Internal rates of return exceed 10 percent. In contrast, rainfed investment costs are assumed to be $850 per hectare, with rates of return around 13 percent.

The issue is whether the current proportion of investment in production programs (i.e., 64 percent for irrigated crops and 37 percent for rainfed crops) is justified.

U.S. Position

The U.S. believes that intense research is necessary to determine the relative places of irrigated and rainfed crops within Senegal's economic and social framework. The research should recognize the effect of each strategy on nutrition levels in both average and low rainfall years. In addition, it should recognize the economic costs of each in terms of development expenses, including necessary training, and recurrent costs. The U.S. is currently supporting research in this area.

Regarding irrigation development, the U.S. supports the strategy development by the Club du Sahel as does the GOS. This strategy places emphasis in the short term (1977-1982) on rehabilitation of existing irrigation infrastructure and the development of low cost, small to medium scale perimeters, with heavy emphasis on building farmer capability to effectively use and manage controlled water supplies.

Discussion

The promise of irrigated agriculture is high yields and drought insurance. The historical success of irrigated development in the Sahel has not been great. Development of irrigated farming takes large investments in engineering studies, land preparation, and training of farmers and extension staff. The operations are usually complex and slow to reach fruition. In addition, it is often difficult for the project to pay for necessary production inputs, operating and maintenance costs, and depreciation costs. If these costs are not paid, the country can be saddled with high expectations and continued reliance on donor assistance. For an example of the effect of these costs, see the memorandum attached on an appendix to this issue.

Rainfed crop yields increases have been slow but dependable. Yields, however, are heavily dependent on rainfall. Development and operating costs are generally low.

AID and the UNDP are supporting research in the Senegal River Valley on factors of irrigated crop production. In addition, AID is developing a Socio-economic model of Senegal to study the trade-offs between irrigated and rainfed development.

September 7, 1977

MEMORANDUM FOR THE RECORD

FROM: Michael Maddox

SUBJECT: Data on Irrigation

INTRODUCTION

This memorandum analyzes data on present and proposed irrigation in the Office du Niger, Mali and the Senegal River Delta. It also shows the effect of ignoring population growth effects in the Office du Niger.

OFFICE DU NIGER

Data

Data from the West African Rice Development Association (WARDA) report on the Office du Niger are presented in table 1.[1] Line 15 gives the cash cost to the Office du Niger system. In the proposed cases it is assumed the price of rice is increased to cover all expenses, except subsidies. Line 20 gives the net foreign exchange savings. In none of the proposed optimistic cases does the project result in increased consumer savings or foreign exchange savings.

Population Growth Effects

The WARDA report does not give the projected dynamic effects with population growth as a factor. Table 2 presents the effect of a population growth of 2.7 percent per year, the West Africa average. The consumption rate is greater than 2.7 percent since farmers keep their own cereal stocks. These stocks must also be increased.[2]

With population growth considered, the project results only worsen.

SENEGAL RIVER VALLEY

Data

Data on irrigation in the Senegal River Delta are presented in table 3. In 1974 there was a negative cash flow to the government as shown in line 15. Assuming an increase in prices to consumer to cover all expenses, the government loss is eliminated.

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1. WARDA, Mali Office du Niger: Intensification of Rice Cultivation, June 1975.

2. If Y denotes amount of cereal stock by years of consumption, G denotes population growth rate, or denotes number of years projected, then the actual growth of cereal corruption over N years equals:

$$(1 + Y)\ (G)^N - Y.$$

Thus, if Y=.5, G=1.027, and N=10, then the actual consumption growth over 10 years equals 46 percent, or 3.9 percent a year.

TABLE 1

IRRIGATED RICE: PRESENT AND PROPOSED PROJECTS IN OFFICE DU NIGER

		Present (1973/74)	Projected			
			Pessimistic Case I	Case II	Optimistic Case I	Case II
1.	Cultivated Area (HA)	40,000	40,000	40,000	40,000	40,000
2.	Yield Net of Losses (MT/HA)	1.8	2.7	2.7	3.6	3.6
3.	Production (MT)	72,000	108,000	108,000	144,000	144,000
4.	Seed Use (MT)	4,800[1/]	3,200[2/]	3,200	3,200	3,200
5.	Marketed (MT)	48,000	80,500	80,500	116,500	116,500
6.	Consumed (MT)	19,200	24,300	24,300	24,300	24,300
7.	Depreciation Costs (MF/HA) [3/]	12,500	18,000[4/]	18,000	18,000	18,000
8.	Operating and Maintenance Costs (MF/HA)	26,000[5/]	37,500[6/]	37,500	37,500	37,500
9.	Farmer Production Costs (MF/HA)	32,500[7/]	67,908[8/]	73,908[9/]	67,908[8/]	73,908[9/]
10.	Price of Rice to Farmer (MF/KG)	40	40	50	40	50
11.	Value to Farmer of Production Not Consumed (Million MF)	2,112	3,348	4,185	4,788	5,985
12.	Net Cash to Farmer (Million MF)	812	632	1,229	2,072	3,029
13.	Cash Revenues to Government (Million MF) [10/]	940	1,470	1,710	1,697	1,937
14.	Fertilizer Subsidies (Million MF) [11/]	85	10,392	10,392	10,392	10,392
15.	Net Cash to Government (Million MF)	-1,347[12/]	-10,392[13/]	-10,392[13/]	-10,392[13/]	-10,392[13/]
16.	Cost of Domestic Rice in Bamako (MF/KG)	82.8[14/]	118[15/]	131[15/]	108[15/]	122[15/]
17.	Consumer Savings Over Imported Rice (MF/KG)[16/]	167	132	119	142	128
18.	Foreign Exchange Savings From Import Substitution (Million MF)[16/]	6,381	10,701	10,701	15,486	15,486
19.	Fertilizer Imports (Million MF)[17/]	136	10,952	10,952	10,952	10,952
20.	Net Foreign Exchange Savings (Million MF)	6,245	-251	-251	4,534	4,534

1/ 120 kilograms seed per hectare (WARDA, p 34).

2/ 80 kilograms seed per hectare (WARDA, p 50).

3/ Estimate of present development costs over average lifetime of 40 years.

4/ Present depreciation costs plus additional redevelopment costs over 40 years, (WARDA, pp 33 & 52).

5/ Total cost in 1,040 million Malian francs (WARDA, p 32).

6/ Total cost in 1,500 million Malian francs (WARDA, p 58).

7/ Total cost per 10 hectare farm in 325,375 Malian francs (WARDA, p 34).

8/ Total cost per 7 hectare farms in 475,357 Malian francs (WARDA, p 57).

9/ Total cost per 7 hectare farms in 517,357 Malian francs (WARDA, p 57)

10/ Composed of farmer's land use fees (i.e., 16,000 MF/HA at 40 MF/KG and 20,000 MF/HA at 50 MF/KG) and lump sum for milled rice (i.e., 10,000 MF/MT milled rice) (WARDA, p 35).

11/ Based on government subsidies of 142 and 2,456 Malian francs per kilogram for urea and ammonium phosphate, respectively (WARDA, p 50).

12/ Composed of government revenues, operating and maintenance costs, and fertilizer subsidies.

13/ Composed of government revenues, depreciation costs, operating and maintenance costs, and fertilizer subsidies.

14/ Composed of farmer's producer prices, the lump sum payment for milled rice and transport costs to Bamako (i.e., 9.6 MF/KG).

15/ Composed of depreciation costs, operating and maintenance costs, farmer's producer prices (less farmer's fixed fee payments to Office du Niger), milling costs (i.e., 14 MF/KG), and transport costs to Bamako (i.e. 9.6 MF/KG).

16/ Assuming an import price of rice of 210 MF/KG and cost of imported rice in Bamako of 250 MF/KG.

17/ Assuming 100 percent of fertilizer imported.

Source: West African Rice Development Association (WARDA), Mali Office du Niger: Intensification of Rice Cultivation, June 1975.

TABLE 2

IRRIGATED RICE: PROPOSED PROJECTS WITH POPULATION GROWTH [1/]

	Pessimistic Case II [2/]		Optimistic Case I [3/]		Optimistic Case II [2/]	
	1985	1995	1985	1995	1985	1995
Consumed (MT)	35,626	50,058	35,626	50,058	35,626	50,058
Marketed (MT)	69,174	54,742	105,174	90,742	105,174	90,742
Net Cash to Farmer (Million MF)	793	-59	1,619	1,041	2,463	1,741
Cost of Domestic Rice in Bamako (MF/KG)	135	144	111	115	124	128
Consumer Savings Over Imported Rice (MF/KG)	118	106	139	135	126	122
Net Foreign Exchange Savings From Import Substitution (Million MF)	-1,757	-3,675	3,028	46	3,028	1,110

1/ Annual population growth of 2.7 percent per year and farmer's desired cereal stock of one-half years consumption.

2/ Assuming rice price to farmers of 50 Malian francs per kilogram.

3/ Assuming rice price to farmers of 40 Malian francs per kilogram.

TABLE 3

IRRIGATED RICE: PRESENT AND ALTERNATIVE PRICING IN SENEGAL RIVER DELTA

		Present (1974)	Alternative Pricing
1.	Cultivated Area (HA)	9,085	9,085
2.	Yield Net of Losses (MT/HA)	1.98	1.98
3.	Production (MT)	18,000	18,000
4.	Seed Use (MT)	1,200	1,200
5.	Marketed	10,800	10,800
6.	Consumed	6,000	6,000
7.	Depreciation Cost (CFAF/HA) 1/	17,500	17,500
8.	Operating and Maintenance Costs (CFAF/HA)	11,227	11,227
9.	Production Costs (CFAF/HA) 2/	14,750	14,750
10.	Price of Rice to Farmer (CFAF/KG)	36.6	36.6
11.	Value to Farmer of Production Marketed (Million CFAF)	395	395
12.	Net Cash to Farmer (Million CFAF)	261	261
13.	Cash Revenues to Government (Million CFAF) 3/	0	261
14.	Fertilizer Subsidies (Million CFAF)	0	0
15.	Net Cash to Government (Million CFAF)	-261	0
16.	Cost of Domestic Rice in Dakar (CFAF/KG)	80 4/	117 5/
17.	Consumer Savings Over Imported Rice (CFAF/KG) 6/	-3.2	-40
18.	Foreign Exchange Savings From Import Substitution (Million CFAF) 6/	534	534
19.	Fertilizer Imports (Million CFAF) 7/	18	18
20.	Net Foreign Exchange Savings (Million CFAF)	516	516

1/ Estimate of present development costs over average lifetime of 25 years (IBRD, p 32).

2/ Composed of fertilizer, pesticides, implements, mechanical land preparation, and mechanical threshing (IBRD, p 33).

3/ SAED revenues for costs irrigation.

4/ Composed of farmer production costs, milling costs, and transport costs to Dakar.

5/ Composed of depreciation costs, operating and maintenance costs, farmer production costs, milling costs, and transport costs to Dakar.

6/ Assuming an import cost of 74 CFAF/KG and cost of imported rice in Dakar of 77 CFAF/KG.

7/ Assuming 100 percent of fertilizer imported.

Source: IBRD, Agricultural Sector Survey Republic of Senegal, November, 1975, Volume I.

Issue #11 Migration Research Projects

The issue is whether migration is an important enough factor to receive investment.

U.S. Position

Studies to provide ways to predict the effect of migration on national goals are needed. In addition, there will certainly be relationships between migration and development projects.

However, the proposed studies by CGFPI do not directly address the most important question: What are the major factors that affect rural-urban or rural-rural migration and what is the relationship between these factors and such migration. The U.S. is funding such a research study over the next year.

Discussion

A World Bank Report summarizes the importance of domestic migration in Senegal:

> "There are three reasons why questions of domestic migration are important for Senegal: the very rapid growth of Daker, the high population density in the central groundnut basin and the agricultural potential of the under-populated southern part of the country. With large scale irrigation in the Senegal river basin coming closer to fruition, migration related problems have required new relevance." 1/
> (Not to be quoted verbatem at conference)

Several AID consultants as well as the CGFPI report confirm the importance of migration. It is important in light of the difference in urban (4 percent) and rural (1.9 percent) annual growth rates which is due to migration. 2/

AID is presently beginning funding of a team of American and Senegalese researchers to begin investigation with these objectives in mind.

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1. IBRD, Migration and Employment in Senegal, September, 1976, p. i.
2. CGFPI, p. 6.

ANNEX B

UN PROJECTS FOR SENEGAL

Project Number and Title	Executing Agency	Date Approved	Estimated Completion Date	Estimated project cost (US dollar equivalent) UNDP	Government counterpart contribution
AGRICULTURE, FORESTRY AND FISHERIES (0500)				3,034,864	1,369,343
Maintenance and Repair of Fishing Vessels	FAO	11/68	01/75	109,411	
Fishing Technology	FAO	11/68	08/74	135,084	
Centre for the Development of Horticulture	FAO	11/71	01/76	731,000	
Development of the Casamance Forests	FAO	05/72	01/77	543,517	107,647
Formation Professionelle Rurale	ILO	03/73	03/77	926,450	1,255,630
Livestock Development, Eastern Senegal	IBRD	01/74	01/76	171,200	5,882
Developpement De La Peche Artisanale	FAO	07/75	01/78	359,200	184
Reconversion De Petits Bateaux De Peche	FAO	07/74	01/76	35,002	
Tannage De Peaux De Belimlayes	UNIDO	06/75	01/76	24,000	
EDUCATION (1500)				256,768	103,361
Pilot Educational Project	UNESCO	11/68	01/76	189,018	
Creation D'UN Centre National De Documentation Scientifique Et Technique	UNESCO	01/76	07/77	67,750	103,361
GENERAL ECONOMIC AND SOCIAL POLICY AND PLANNING (2000)				3,075,363	1,323,226
Bureau of Organization and Methods (Phase II)	UN	06/71	01/78	1,711,217	1,204,235
Assistance In Development Planning and its Regionalization	UN	02/72	01/78	1,243,696	
Interpreter/Translator	UN	06/72	07/76	120,450	118,991

ANNEX B

UN PROJECTS FOR SENEGAL (CONTINUED)

Project Number and Title	Executing Agency	Date Approved	Estimated Completion Date	Estimated project cost (US dollar equivalent) UNDP	Government counterpart contribution
HEALTH (2500)				3,223,206	1,401,676
Establishment of a Master Plan for Water Supply and Sewerage for Dakar and Surrounding Areas	WHO	06/66	01/75	2,418,576	1,147,033
Study of Water Resources and Technical Assistance in Sanitation	WHO	05/73	01/76	804,630	254,643
INDUSTRY (3500)				4,376,497	1,676,836
Institute of Food Technology, Dakar	FAO	06/64	01/76	2,019,990	994,258
Bridging Operation for Copper Exploration in the Bakel-Gabou Area	UN	12/69	09/74	588,945	64,915
National Society for Industrial Studies and Promotion (SONEP I)	UNIDO	01/70	01/76	721,340	
Foundry Development Centre, Thies	UNIDO	08/73	01/77	729,356	617,663
Establishment of a Shark Skin Tanning Industry	UNIDO	05/73	01/75	3,500	
Bourses De Formation Au Centre De Turin	ILO	04/74	01/76	24,816	
Institut De Normalisation	UNIDO	08/75	10/75	2,500	
Assistance Au Secteau Industriel Et A La Sonepi Pour Le Perfectionnement Des Methodes De Marketing	UNIDO	09/75	01/77	39,000	
AIDE A La Poursuite Des Activites De La Sonepi	UNIDO	02/76	09/76	42,000	
Creation D'Une Entreprise De Pansements Chirurgicaux Et De Coton Hydrophile	UNIDO	10/75	01/76	30,000	
Entreprise De Mouture De Mil	UNIDO	10/75	01/76	29,000	
Fabrication D'Un Petit Tracteau Agricole	UNIDO	10/75	01/76	47,500	
Assistance A La Zone Franche Industrielle De Dakar	UNIDO	06/76	11/76	48,400	
Assistance Au Domaine Industriel De Zinguin	UNIDO	06/76	01/77	50,150	

ANNEX B

UN PROJECTS FOR SENEGAL (CONTINUED)

Project Number and Title	Executing Agency	Date Approved	Estimated Completion Date	Estimated project costs (US dollar equivalent) UNDP	Government counterpart contribution
INTERNATIONAL TRADE (4000)				133,000	168,403
Feasibility Study for The Development of Tourism	IBRD	06/74	06/75	133,000	168,403
LABOR, MANAGEMENT AND EMPLOYMENT (4500)				335,008	443,865
Commercial and Secretarial Training	ILO	01/71	01/76	335,008	443,865
NATURAL RESOURCES (5000)				571,000	
Programme De Travaux Hydrauliques D'Urgence Et Moyen Terme Au Senegal	UN	12/73	01/77	571,000	
SCIENCE AND TECHNOLOGY (6500)				157,100	77,142
Assistance A La Delegation Generale A La Recherche Scientifique Et Technique	UNESCO	05/75	01/78	157,100	77,142
SOCIAL SECURITY AND OTHER SOCIAL SERVICES (7000)				66,100	6,157
Social Security	ILO	12/69	01/76	47,900	
Regime De Retraite	ILO	08/75	04/76	18,200	6,157
TRANSPORT AND COMMUNICATIONS (7500)				255,863	27,310
Telecommunications Planning and Training	ITU	12/74	01/80	255,863	27,310
TOTAL				15,484,769	6,597,319

II. COUNTRY PROJECTS

AS OF 30 JUNE 1977

Project number and title	Code	Executing agency	Date approved	Estimated completion date	Estimated project cost (US dollar equivalent) UNDP	Estimated project cost (US dollar equivalent) Government counterpart contribution
AGRICULTURE, FORESTRY AND FISHERIES (10500)					3,037,019	3,316,1
SEN-71-510 CENTRE FOR THE DEVELOPMENT OF HORTICULTURE	10	FAO	11/71	01/76	731,000	
SEN-71-522 DEVELOPMENT OF THE CASAMANCE FORESTS	40	FAO	05/72	01/78	682,137	103,3
SEN-71-526 FORMATION PROFESSIONELLE RURALE	60	ILO	03/73	01/78	1,015,833	1,205,0
PO SEN-72-013 LIVESTOCK DEVELOPMENT, EASTERN SENEGAL	20	IBRD	01/74	01/76	151,070	5,0
SEN-73-009 DEVELOPPEMENT DE LA PECHE ARTISANALE	30	FAO	07/75	01/78	457,977	1
SEN-74-002 RECONVERSION DE PETITS BATEAUX DE PECHE	30	FAO	07/74	01/76	35,002	
PO SEN-75-019 TANNAGE DE PEAUX DE BELIPLAYES	20	UNIDO	06/75	01/76	24,000	
CULTURE AND SOCIAL AND HUMAN SCIENCES (13000)					56,500	163,0
SEN-75-022 EQUIPEMENT POUR LA CONSERVATION ET LA RESTAURATION DE COLLECTIONS DU MUSEE D'ART AFRICAIN A DAKAR	30	UNESCO	08/76	01/77	20,000	10,7
SEN-75-023 RENFORCEMENT DES ARCHIVES CULTURELLES DU SENEGAL	50	UNESCO	08/76	10/76	11,500	77,0
SEN-75-025 PROJETS DE RECHERCHE DU CENTRE D'ETUDE DES CIVILISATIONS	20	UNESCO	08/76	07/76	5,000	38,3
SEN-75-027 EQUIPEMENT DE LA BIBLIOTHEQUE DE L'ECOLE NATIONALE D'ADMINISTRATION ET DE LA MAGISTRATURE	50	UNESCO	07/76	10/76	20,000	11,2
EDUCATION (15000)					864,907	993,9
SEN-68-009 PILOT EDUCATIONAL PROJECT	22	UNESCO	11/68	01/77	189,916	
SEN-75-001 EQUIPEMENT POUR L'ECOLE D'ARCHITECTURE ET D'URBANISME DE DAKAR	23	UNESCO	08/76	01/78	15,000	20,1
SEN-75-003 CREATION D'UN CENTRE NATIONAL DE DOCUMENTATION SCIENTIFIQUE ET TECHNIQUE	30	UNESCO	01/76	01/78	160,816	99,1
SEN-75-026 MOYENS D'INFORMATION DANS L'ENSEIGNEMENT ET TECHNIQUE AUDIO-VISUELS	50	UNESCO	07/76	01/77	20,073	36,5
SEN-75-029 EQUIPEMENT DU PREMIER CENTRE DEPARTEMENTAL D'EDUCATION POPULAIRE ET SPORTIVE	40	UNESCO	07/76	01/78	15,000	162,7
SEN-75-030 EQUIPEMENT SCIENTIFIQUE D'ENSEIGNEMENT SECONDAIRE ET FORMATION DES PERSONNELS ENSEIGNANT LES SCIENCES	30	UNESCO	10/76	01/78	45,000	34,9
GENERAL ECONOMIC AND SOCIAL POLICY AND PLANNING (20000)					2,959,913	1,155,6
SEN-71-524 BUREAU OF ORGANIZATION AND METHODS (PHASE II)	20	UN	06/71	01/78	1,711,217	1,155,6
SEN-71-525 ASSISTANCE IN DEVELOPMENT PLANNING AND ITS REGIONALIZATION	11	UN	02/72	01/78	1,243,696	
HEALTH (25000)					3,239,829	1,349,1
SEN-66-506 ESTABLISHMENT OF A MASTER PLAN FOR WATER SUPPLY AND SEWERAGEFOR DAKAR AND SURROUNDING AREAS	70	WHO	06/66	01/79	2,418,576	1,100,7
SEN-72-004 STUDY OF WATER RESOURCES AND TECHNICAL ASSISTANCE IN SANITATION	70	WHO	05/73	01/78	821,253	244,3
INDUSTRY (35000)					4,661,704	1,710,6
SEN-64-505 INSTITUTE OF FOOD TECHNOLOGY, DAKAR	24	FAO	06/64	01/79	2,019,590	954,1
SEN-69-517 BRIDGING OPERATION FOR COPPER EXPLORATION IN THE BAKEL-GABOU AREA	22	UN	12/69	01/75	513,190	62,2
SEN-70-514 NATIONAL SOCIETY FOR INDUSTRIAL STUDIES AND PROMOTION (SONEPI)	10	UNIDO	01/70	01/78	721,340	
SEN-71-520 FOUNDRY DEVELOPMENT CENTRE, THIES	21	UNIDO	08/73	01/78	546,073	592,7
PO SEN-73-001 ESTABLISHMENT OF A SHARK SKIN TANNING INDUSTRY	24	UNIDO	05/73	01/75	3,500	
SEN-73-005 BOURSES DE FORMATION AU CENTRE DE TURIN	40	ILO	04/74	01/76	24,816	
SEN-75-002 INSTITUT DE NORMALISATION	30	UNIDO	08/75	10/75	2,500	

PO — PROGRAMME RESERVE PROJECT

II. CURRENT PROJECTS

AS OF 30 JUNE 1977

Project number and title	Code	Executing agency	Date approved	Estimated completion date	Estimated project cost (US dollar equivalent)	
					UNDP	Government counterpart contribution
-75-011 ASSISTANCE AU SECTEUR INDUSTRIEL ET A LA SONEPI POUR LE PERFECTIONNEMENT DES METHODES DE MARKETING	30	UNIDO	06/75	01/77	39,000	
-75-012 AIDE A LA POURSUITE DES ACTIVITES DE LA SONEPI	30	UNIDO	02/76	01/78	81,695	
-75-013 CREATION D'UNE ENTREPRISE DE PANSEMENTS CHIRURGICAUX ET DE COTON HYDROPHILE	24	UNIDO	10/75	01/76	30,000	
-75-014 ENTREPRISE DE MOUTURE DE RIZ	24	UNIDO	10/75	01/78	36,200	
-75-016 CREATION D'UNE USINE DE POISSON SALE SECHE	24	UNIDO	03/77	09/77	32,800	101,209
-75-020 FABRICATION D'UN PETIT TRACTEUR AGRICOLE	21	UNIDO	10/75	01/76	47,500	
-75-032 ASSISTANCE A LA ZONE FRANCHE INDUSTRIELLE DE DAKAR	10	UNIDO	06/76	01/78	32,200	
-75-034 ASSISTANCE AU DOMAINE INDUSTRIEL DE ZIGUIN	10	UNIDO	06/76	11/77	51,950	
-75-820 MANUFACTURING OF A SMALL AGRICULTURE TRACTOR	21	UNIDO	10/75	01/78	58,650	
INTERNATIONAL TRADE (4000)					293,650	384,031
-73-002 FEASIBILITY STUDY FOR THE DEVELOPMENT OF TOURISM	50	IBRD	06/74	01/76	133,000	161,612
-75-007 CENTRE SENEGALAIS DU COMMERCE EXTERIEUR (CSCE)	10	UNCTAD	07/76	01/78	160,650	222,419
LABOUR, MANAGEMENT AND EMPLOYMENT (4500)					369,360	425,967
-71-515 COMMERCIAL AND SECRETARIAL TRAINING	50	ILO	01/71	01/76	335,435	425,567
-76-003 BOURSES EN FORMATION PROFESSIONNELLE	40	ILO	12/76	10/76	13,300	
-76-008 BOURSES EN FORMATION PROFESSIONNELLE	40	ILO	12/76	01/78	20,625	
NATURAL RESOURCES (5000)					427,431	
-73-003 PROGRAMME DE TRAVAUX HYDRAULIQUES D'URGENCE ET MOYEN TERME AU SENEGAL	30	UN	12/73	01/77	562,201	
-75-024 CREATION D'ATELIERS DE REPARATION DE POMPES D'IRRIGATION DANS LA REGION DU FLEUVE SENEGAL	30	UNIDO	12/76	01/78	45,230	
SCIENCE AND TECHNOLOGY (6500)					197,242	74,032
-74-003 ASSISTANCE A LA DELEGATION GENERALE A LA RECHERCHE SCIENTIFIQUE ET TECHNIQUE	10	UNESCO	05/75	01/78	197,242	74,032
SOCIAL SECURITY AND OTHER SOCIAL SERVICES (7000)					71,800	5,908
-69-004 SOCIAL SECURITY	10	ILO	12/69	01/76	47,900	
75-005 REGIME DE RETRAITE	10	ILO	08/75	01/78	23,900	5,908
TRANSPORT AND COMMUNICATIONS (7500)					302,853	24,209
-72-011 TELECOMMUNICATIONS PLANNING AND TRAINING	50	ITU	12/74	01/80	287,373	24,209
-76-006 BOURSE POUR LA FORMATION DE PERSONNEL DESTINE A L'AVIATION CIVILE	40	ICAO	01/77	06/78	15,480	
TOTAL					16,317,208	6,939,130
OF WHICH						
IPF PROJECTS					15,259,857	6,933,485
PROGRAMME RESERVE PROJECTS					558,701	5,645
SPECIAL INDUSTRIAL SERVICES (SIS) PROJECTS					58,650	

- PROGRAMME RESERVE PROJECT
- SPECIAL INDUSTRIAL SERVICES (SIS) PROJECT

ANNEX C

CURRENT HEALTH PROJECTS IN SENEGAL

	Donor Agency or Country	Total Amount ($US)	Other Information
Basic health services development	WHO		Continuing Assistance in various aspects of health services development since 1968
NATIONAL HEALTH PLANNING/LEGISLATION			
National health planning	WHO		1975 - present
Health statistics	WHO		
Nutritional planning	WHO		
Environmental sanitation planning	WHO	70,000	Dakar University
URBAN HEALTH SERVICES			
Technical assistance	France	128,000	Poly-clinique, Pikine
Water improvement & environmental Sanitation - Dakar	WHO		1968 - present
RURAL HEALTH SERVICES			
Rural health services development	USAID	721,000	
Family planning	USAID	428,000	
Health services	UNICEF	252,333	Equipment, materiel, fellowships - health centers
Basic health care - Gossas	Canada	1,000,000	1976 - 1980: Equipment, pharmaceuticals, technical assistance
Nutrition: food assistance	Canada	1,900,000	Grain, Milk
Food donations	Yugoslavia		
HOSPITAL SERVICES			
Fann Hospital improvement	Canada	5,000,000	1975 - 1980
Ambulances	Yugoslavia	30,000	
MANPOWER			
90 Technical assistants	France	959,750	
Fellowships	WHO		
Nursing care training	WHO		1968 - present
Odontology & Stomatology Institute, Dakar	WHO		1970 - present
DISEASE CONTROL			
Venereal disease, trepanometosis programs	UNDP	41,000	
	WHO	59,000	
Smallpox vaccinations	USAID		
Smallpox eradication program	WHO		1967 - present

Table D-1

PRODUCTION OF MAJOR CROPS IN SENEGAL

	Millet			Cowpeas			Groundnut			Rice			Cotton			Corn			Cassava			Cashcrops		
	P	A	Y	P	A	Y	P	A	Y	P	A	Y	P	A	Y	P	A	Y	P	A	Y	P	A	Y
1960	392	762	514	11	45	247	893	977	913	82	70	1,200				27	31	889	168	37	4,531	29	2.1	13,432
1961	407	831	489	15	56	248	995	1,027	969	84	73	1,151				28	32	885	139	36	3,809	27	2.6	10,677
1962	424	865	490	13	49	267	894	1,013	882	90	72	1,256				27	32	847	157	38	4,111	33	2.6	12,648
1963	478	959	498	14	51	276	952	1,084	878	106	75	1,415				27	33	815	153	33	4,612	31	2.7	11,494
1964	532	1,011	526	17	56	298	993	1,055	941	109	87	1,252	0.6	1.7	360	37	47	788	156	33	4,724	32	2.6	12,196
1965	554	1,069	518	14	54	257	1,122	1,114	1,007	125	83	1,517	1.2	1.5	838	41	54	751	150	38	3,976	32	2.4	13,186
1966	423	997	424	18	86	211	857	1,114	785	125	88	1,424	2.2	1.8	1,213	42	54	777	241	64	3,755	35	2.6	13,351
1967	655	1,155	566	30	99	305	1,005	1,164	863	135	101	1,327	4.3	4.0	1,054	57	72	792	239	63	3,784	41	3.3	12,704
1968	450	1,054	427	17	70	246	831	1,191	698	59	78	1,317	9.8	6.7	1,458	25	36	696	233	63	3,717	40	3.1	13,214
1969	635	1,037	612	23	71	317	789	953	827	141	104	1,349	12	9.8	1,172	49	55	881	177	39	4,536	40	3.1	18,821
1970	401	972	412	18	63	281	583	983	593	99	93	1,058	12	14	830	39	51	765	162	39	4,153	52	3.6	14,593
1971	583	975	597	26	71	365	989	1,060	932	108	84	1,242	21	18	1,155	39	49	787	138	31	4,418	70	4.7	14,838
1972	323	936	344	11	86	125	570	1,071	532	44	50	866	24	20	1,154	20	33	625	150	41	3,673	70	4.7	14,860
1973	510	1,094	467	15	53	287	675	1,026	657	64	65	996	33	29	1,155	34	40	862	170	29	4,206	63	4.8	13,125
1974	777	1,155	673	22	59	368	993	1,152	862	117	86	1,366	42	39	1,098	43	49	888	119	33	3,562			
1975	630						1,450			144			45											

P - Production (1,000 tons)

A - Area (1,000 hectares)

Y - Yield (Kg/ha)

The figures have been rounded.

SOURCE: From CRED, Marketing, Price Policy and Storage of Cereals in the Sahel, Senegal Study (Senegal, V^e Plan Quadriennal de Developpement Economique et Social)

Table D-2

BEEF PRODUCTION AND IMPORTS IN SENEGAL

Thousand Metric Tons

YEAR	PRODUCTION	IMPORTS	TOTAL CONSUMPTION
1971	34	39	73
1972	26	29	55
1973	30	24	54
1974	21	64	85
1975	23	61	84

Source: FAO, Production Yearbook, 1973, 1975; Trade Yearbook, 1975.