

I. PROJECT IDENTIFICATION

1. PROJECT TITLE <p style="text-align: center;">NIGER NATIONAL CEREALS PRODUCTION PROGRAM</p>		APPENDIX ATTACHED <input type="checkbox"/> YES <input type="checkbox"/> NO
3. RECIPIENT (specify) <input checked="" type="checkbox"/> COUNTRY <u>Niger</u> <input type="checkbox"/> REGIONAL _____ <input type="checkbox"/> INTERREGIONAL _____		2. PROJECT NO. (M.O. 1025.2) 4. LIFE OF PROJECT BEGINS FY <u>74</u> ENDS FY <u>77</u>
5. SUBMISSION <input type="checkbox"/> ORIGINAL _____ DATE _____ <input type="checkbox"/> REV. NO. _____ DATE _____ CONTR. PASA NO. _____		

II. FUNDING (SOLO) AND MAN MONTHS (MM) REQUIREMENTS

A. FUNDING BY FISCAL YEAR	B. TOTAL \$ millions	C. PERSONNEL		D. PARTICIPANTS		E. COMMODITIES \$	F. OTHER COSTS \$	G. PASA/CONTR.		H. LOCAL EXCHANGE CURRENCY RATE: \$ US (U.S. OWNED)			
		(1) \$	(2) MM	(1) \$	(2) MM			(1) \$	(2) MM	(1) U.S. GRANT LOAN	(2) COOP COUNTRY		
										(A) JOINT	(B) BUDGET		
1. PRIOR THRU ACTUAL FY													
2. OPRN FY <u>74</u>	<u>8.184</u>	<u>1.930</u>	<u>560</u>	<u>.016</u>	<u>8</u>	<u>3.511</u>	<u>2.677</u>						
3. BUDGET FY <u>75</u>	-	-	-	-	-	-	-						
4. BUDGET FY <u>76</u>	-	-	-	-	-	-	-						
5. BUDGET FY <u>77</u>	<u>.694</u>	<u>.080</u>	<u>24</u>	<u>.016</u>	<u>24</u>	<u>.200</u>	<u>.398</u>						
6. BUDGET FY <u>78</u>	<u>.601</u>	<u>.080</u>	<u>24</u>	<u>.016</u>	<u>24</u>	<u>.107</u>	<u>.398</u>						
7. ALL SUBQ. FY													
8. GRAND TOTAL	<u>9.479</u>												

9. OTHER DONOR CONTRIBUTIONS	(A) NAME OF DONOR	(B) KIND OF GOODS/SERVICES	(C) AMOUNT
	<u>FAC</u>	<u>Technical Assistance</u>	<u>\$930,000</u>

III. ORIGINATING OFFICE CLEARANCE

1. DRAFTER	TITLE	DATE
2. CLEARANCE OFFICER	TITLE	DATE

IV. PROJECT AUTHORIZATION

1. CONDITIONS OF APPROVAL					
2. CLEARANCES					
BUR OFF.	SIGNATURE	DATE	BUR OFF.	SIGNATURE	DATE
3. APPROVAL AAZ-OP OFFICE DIRECTOR			4. APPROVAL AID (See M.O. 1025.1 (1))		
SIGNATURE		DATE	SIGNATURE		DATE
TITLE			ADMINISTRATOR, AGENCY FOR INTERNATIONAL DEVELOPMENT		

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PROJECT PROPOSAL: NIGER NATIONAL CEREALS PRODUCTION PROGRAM

PART I. SUMMARY AND RECOMMENDATION

1. Grantee: Government of the Republic of Niger

2. Grant

A. Estimate of Life-of-Project Costs (five years)	\$10,748,780
1. U.S. Contribution	9,478,780
a. Foreign Exchange Component	4,678,780
b. Local Cost Component	4,800,000
2. Grantee Contribution	340,000
3. Other Donor Contribution	930,000
B. Funding Requirements: First Three Years	\$ 8,984,980
1. U.S. Contribution	8,183,780
a. Foreign Exchange Component	4,379,860
b. Local Cost Component	3,787,936
2. Grantee Contribution	231,200
3. Other Donor Contribution (FAC)	570,000*

Does not include concurrent IBRD and FED projects providing significant complementary support for cereal production.

3. Summary Description of Program/Project

This is a project for support of the national cereals production program of Niger. It includes adaptive research, seed production, an extensive system of demonstration plots on farmers's fields, promotion of a recommended package of cultural practices, training centers for extension and cooperative staff and for demonstration farmers, an expansion of the structure of the cooperative and credit organization which provides extension services and delivers inputs to the farmers of Niger, expansion of the use of animal traction, experimental operation of cooperative units in one arrondissement to test new concepts of function and relationship, and the exploitation of the country's rock phosphate deposits to re-establish soil quality for increased yield and to halt desertification.

The opportunities and requirements for technical assistance personnel and for training of Nigeriens in this program are quite limited. The technology applied largely will be that with which the agricultural authorities of the country already are familiar and which they have employed. The program will make inputs and services available where they have not previously reached the farmers of Niger. AID financing will be used for the provision of agricultural inputs, the establishment or improvement of new facilities and services, and the costs of their operation.

Inputs

Program inputs will be:

- the supply of quality seeds of improved varieties of cereals, particularly millet;
- intensive extension and demonstration services emphasizing the use of select seeds and recommended cultural practices;

- the expanded availability of extension and credit services provided by the cooperative system;
- increased training of cooperative and extension personnel;
- expansion of the use of animal traction; and
- excavation and transport equipment for the exploitation of rock phosphate deposits.

Outputs

Program outputs will be higher yields in cereal production per unit of cultivation and of farm labor, strengthened village economies and farmer institutions, and a reversal of the trends of soil deterioration and desertification.

4. Justification of the Project

Program Purpose

The project's purpose is to achieve increased production and availability of cereals at prices within the reach of non-producing consumers, through a sustainable agricultural production system.

Program Goal

The program's goal is to strengthen the predominantly agricultural society of Niger, ending its dependence upon donated external cereal supplies except in years of extraordinary (50-year) drought, and improving the economic condition and performance of the farm community to support a viable and ecologically secure way of life for the Sahelian population.

Target

The quantifiable achievement target for this program is increased cereal production of 200,000 tons by 1980, over the 10-year average for 1965-1974.

Justification

This program is an appropriate response to the Sahel drought situation as it is encountered in Niger. It offers the only practical means to increase cereal production in the relatively short term. The technology involved is of a relatively low order but is all that is available and readily employable at this time. The very simple and inefficient cereal cultivation methods now being employed make possible significant increases in production without advanced technology.

There are substantial risks in undertaking support of the program, but they seem to be either unavoidable or within an acceptable range in terms of the special circumstances of the Sahel. If the drought continues, the proposed investments will not be effective and might be almost entirely wasted. However, one must assume for operational purposes that there will be a return to more normal rainfall patterns. The only alternative is the unacceptable one of mass population transfer and practical abandonment of the production potential of Niger. The activities proposed will help assure greater production than would have resulted in their absence, at whatever levels of rainfall the country does experience in the next few years.

The effort will be concentrated in the southern area of the country, south of latitude fourteen degrees, where rainfall ordinarily has been sufficient for a reasonably productive pattern of cultivation.

The use of selected seed of improved varieties, employed with optimum cultural practices, and the widespread application of sustained-effect rock phosphate are not speculative, hastily-conceived responses to the drought but rather are agricultural improvements of a classic type which must come to Niger in any case. None could have a negative effect on production under

any circumstances, and all would be required for the subsequent introduction of more advanced technology, such as new varieties or hybrids with significantly higher yields. The program predominantly consists of extending facilities and services developed within Niger. A major portion of the U.S. financing will be used for local costs, and there is no important input of a technical assistance nature from AID in the program as requested by the GON after extensive discussions. However, given the slender financial resources available, there is no possibility that the essential facilities and services included in the program could be provided to the cereal producers of Niger without this external financing.

Given a) the lack of prior work on millet, for which a breeding program has just gotten underway in the international research center structure; b) the lack of French-speaking technicians in the United States; and c) the necessity to proceed expeditiously in response to the critical condition in which the country finds itself after an extended period of drought, there is no real opportunity for a greater AID innovative technical or conceptual input into the program. It must be carried out by the existing senior Nigerian agricultural personnel and their French counselors and operating technicians. The relationship with the ongoing program which the recommended AID support would permit will allow the Project Manager and the Area Development Officer, supported by specialized visiting technical specialists and consultants, to seek future opportunities, in the final negotiation of a project agreement and in the early years of the program's operations, to introduce improved technology and more effective operating and organizational methodologies as they are identified by AID and its collaborating institutions and agencies.

5. Major Issues

The following issues are examined in greater detail in Part II, 4 below:

Technical Feasibility. There are aspects of the program which seem questionably feasible with the personnel and facilities proposed and/or available, but it is concluded that the potential exists to achieve the desired increase in cereal production if there is a return of more nearly normal rainfall conditions.

Economic Feasibility/Cost Effectiveness. The cost of establishing basic agricultural services and facilities in Niger is relatively low, and projected economic returns on the proposed investments are favorable.

Equity. The only feasible way to increase cereals availabilities for the country is to make inputs in the southern area where adequate rainfall for cultivation normally can be anticipated. Other means will be required to assure that the increased food supply becomes available for the less privileged portion of the population from areas which have suffered most heavily during the drought.

Price Policy for Cereals. The GON should be required to endorse an appropriate price policy for cereals, and a continuing dialogue with the government should be pursued by the Area Development Office.

Sector Relationship and Dialogue. The proposed program does offer an adequate basis for a continuing interaction with the GON on broader questions of agricultural and economic policy.

Follow-on Costs. The ability of the GON to carry on the program without AID financing after the initial three years is problematic. AID assistance for years four and five should be anticipated. Prospects are reasonably good that all continuing costs could be assumed by the government after 1979.

Personnel Costs. It seems apparent that the program cannot be started unless AID can include coverage of salaries for added Ministry and UNCC personnel in its financing. The GON should be pressed to assume these costs in years four and five.

Fertilizer. The GON's disinclination to use imported chemical fertilizer on cereals, even under grant assistance, may be valid at current price levels and supply conditions. The question of future fertilizer use should be kept open for review when and if price and availability become more favorable . The direct application of powdered rock phosphate from local deposits should be examined.

6. Recommendation

It is recommended that approval be given for the negotiation of a grant agreement with the Government of Niger to provide funds in the amount indicated in I, 2, C above for three-year funding of a projected five-year national cereals production program. The request of the GON amounted to somewhat more than the \$5.0 million which it indicated might be available from AID, and did not include budgeted amounts for some elements of the program, including grain silos for UNCC co-ops, equipment for rock phosphate exploitation, and possible American technicians. The ADO/Niamey should be authorized to negotiate a program grant for financing of GON costs in the amount of \$5,453,780 and, in addition, for up to \$1,980,000 for AID contracting for U.S. or TCN technicians, and up to \$ 750,000 for procurement in the U.S. of excavation and transportation equipment for the rock phosphate operation. The latter two items are stated separately, as the technicians were not specifically requested by the GON and further discussions will be required to firm up their role in the program sufficiently to permit an obligation, while the rock phosphate proposal could

not be developed in sufficient depth or detail during the design team's visit to Niger to be incorporated integrally in the project recommended for approval.

The ADO should be given a great deal of flexibility in negotiating the grant agreement. Due to the difficult conditions which prevailed in Niger after the military coup and installation of a new government, it was not possible to carry out the site visits and consultations that normally would be required. This proposal has been prepared on the basis of technical level discussions, some interim, draft documents describing segments of the program, and an overall discussion with the new Minister of Rural Economy which indicated general government support for the ideas which the team had been discussing with Ministry personnel. The GON has not yet submitted either a formal request for the assistance or a comprehensive written proposal and budget. Developments after the team's departure and during the process of negotiation might permit constructive change in the proposals, perhaps the introduction of features more conducive to program success than those which seemed to represent the government's thinking at the end of the team's visit. ADO Al Baron and Grain Stabilization Project Manager Bill Garvey both are competent and experienced senior officers with extensive background in Niger and in agricultural development operations. The design team had extensive and continuous interchange with them during its work in Niger. They should be given the opportunity to improve the project during the course of negotiations, in directions indicated herein and in other ways that they are qualified to recognize.

The project would benefit from, but does not absolutely require, the participation of qualified junior professional personnel. They must be able to speak French and preferably Hausa. They should be familiar with the very primitive

type of agriculture practiced in Niger, and must be willing to live and work in very austere and rigorous conditions in remote locations in the countryside. There are dozens of ex-Peace Corps Volunteers who have successfully completed tours in Niger and who might meet these specifications. The GON showed some interest in having their assistance in carrying out the seed farm, seed multiplication, and training center components of the program, but there is sufficient question as to the real availability of such personnel in any numbers that we have been able to include them in the program only on a contingent basis. It is recommended that the project be approved at the suggested funding level, which would provide for thirteen such junior technicians if they can be recruited through an appropriate contractor (Near East Foundation; Africare; etc.).

If Americans are not available for this function, consideration appropriately might be given to possible use of French, Belgian or Canadian TCN's. The ADO should attempt to obtain the GON's firm request for this technical assistance and to include the funding in the agreement.

It would also be advisable to have an American input in the training activities for personnel of the extension, cooperative, and seed multiplication systems, and for demonstration farmers. The ADO may be able to secure inclusion of such an advisor during negotiation of the grant agreement. If not, it is recommended that such a specialist, who must be reasonably fluent in French, be stationed in Niamey as the second man on a two-man project management staff for this program. He would be able over a period of time to develop relationships with the responsible personnel of the Ministry which could permit him to have a very constructive influence in the planning of training and perhaps of extension activities generally.

There also could be opportunities in this program for an effective contribution by current Peace Corps Volunteers, particularly in association with an older and experienced ex-Volunteer as described above. Funding for PCVs would not come out of the AID financing, however, and PCVs could be added to the project at any time that the GON develops an interest in their participation. The ADO will want to keep this possibility under review as the implementation gets underway.

It presumably will not be possible before the end of this fiscal year to make a final determination as to the economic and technical feasibility of the proposed rock phosphate exploitation. Certain specific technical questions probably will remain to be decided. The funding should be included in the obligation, however, with conditions precedent established to define the further determinations required and to permit implementation to proceed once they have been completed satisfactorily.

It further is recommended that special conditions and covenants on the following matters, as discussed more fully in II, 3, B below, be included in the grant agreement:

- (a) consultations with AID in determining the OPVN price support level for cereals;
- (b) price policy for the sale of select seed produced under the program;
- (c) submission to AID of a detailed schedule and implementation plan before the initial release of funds;
- (d) agreement with AID on a monitoring and evaluation system, providing for a joint annual review of progress and problems;
- (e) commitment by the GON to make every possible effort to assume all direct salary costs for Nigerian personnel during a possible extension of

AID support for the program into its fourth and fifth years;

(f) commitment by the GON to keep under examination the possible future use of imported nitrogenous fertilizer in cereal production, as a potentially desirable alternative to continued dependence upon grant food assistance, if the price and availability situation for fertilizer should improve in the course of program implementation; and

(g) the necessity of avoiding conflict between the national cereal production program supported by AID and cereal-related activities in the Maradi and Zinder Departments financed under the IBRD and FED projects, with a commitment by the GON to review promptly any problems in this connection that the ADO might find it necessary to bring to its attention.

7. Project Identification Team

The project identification team which made the initial review of potential opportunities for AID assistance to Niger in cereal or and/or livestock production consisted of Hariadene Johnson of AID/AFR/CWR and Charles Hanrahan of the U.S. Department of Agriculture.

8. Project Design Team.

Team Leader/Program Specialist -- Kenneth Levick, AID/TAB.

Research/Agronomist -- Kenneth Rachie, International Institute of Tropical Agriculture, Ibadan, Nigeria.

Economist -- Martin Billings, AID/AFR/Office of Development Services.

Seed Specialist -- James Clifton, AID/USDA Major Cereals Research Project Team at Samaru, Nigeria.

Agriculture Extension Specialist -- Tom Reynolds, retired AID extension advisor with five years service in Northern Nigeria.

Financial Analyst/Project
Design Specialist

-- Morris Solomon, consultant to AID/TAB/Office of Development Administration.

Agricultural Manpower
Advisor

-- James Lucas, Michigan State University, ex-agricultural missionary in Niger with 20 years experience in practical agricultural improvement activities at village level.

Agriculture Credit Specialist

-- Henry Gerber, retired AID credit advisor with previous experience in Mali.

Agronomist

-- Francois Leger, Field Trials Officer in West Africa Francophone countries for AID/USDA Major Cereals Research Project at Samaru, Nigeria.

Program Assistant

-- Dianne Blane, AID/AFR/Office of Central West Africa Regional Affairs.

Part II. Detailed Analysis

1. Nature of the Project

A. Description of the Project

(1) Program Components and Logical Framework Analysis

The program for increased cereal production in Niger includes the following interrelated components:

- (a) An intensified adaptive research effort to develop improved varieties of millet for the specific conditions of Niger;
- (b) A foundation seed farm which will multiply breeder seed released by the research station;
- (c) A system of seed multiplication demonstration centers (15, of which 13 financed by AID), producing improved seed directly and also selecting, training, and providing inputs for contract seed farmers, each of whose one-hectare multiplication plots will concurrently serve as a demonstration unit for the new varieties and for the recommended package of cultural practices;
- (d) Accelerated introduction of animal traction, which offers the most important opportunity to increase the production of participating farmers;
- (e) Expansion of the agricultural-extension cooperative structure of Niger (the UNOC), to extend its coverage into areas where it is not now active;
- (f) Experimental operation of five cooperatives in the ^{Gaya}arrondissement of the Dosso department, to test new roles and relationships for their subsequent possible application in

UNOC generally;

(g) Expansion and improvement of training centers for the instruction of personnel for extension staffing, for various functions in the cooperative system, and for demonstration farmers;

(h) The exploitation of high-quality rock phosphate deposits to provide the fertilizer most essential for increased yields and to maintain soil quality on the acidic, phosphate-deficient, sandy soils of Niger.

A more extensive description of each of these components is provided in Annex I below.

Logical Framework Analysis

Inputs

- (a) Millet breeding research for varietal adaptation and development;
- (b) Continuous supply of selected and controlled-quality seeds of improved varieties of cereals and cowpeas;
- (c) Demonstration and promotion through the extension system of a recommended package of cultural practices and the supply of associated inputs;
- (d) Increased use of animal traction;
- (e) Widespread direct application of powdered rock phosphate;
- (f) Broadened availability of credit and extension services; and
- (g) Trained personnel for these activities.

Outputs

- (a) Annual availability of incrementally-improved varieties of millet and other cereals providing higher yields and increased resistance to drought and other conditions which limit cereal production in Niger;

- (b) Higher yields of cereals per hectare cultivated and per unit of farm labor applied;
- (c) More reliable production in years of reduced rainfall;
- (d) Improved services and stronger farmer institutions at the village level; and
- (e) Improved soil quality and a reversal of the trend to desertification.

Purpose

To achieve increased production and availability of cereals at prices within the reach of non-producing consumers through a sustainable agricultural production system.

Goal

To strengthen the predominantly agricultural society of Niger, ending its dependence upon donated external cereal supplies except in years of extraordinary drought, and improving the economic condition and performance of the farm community to support a viable and ecologically secure way of life for the Sahelian population.

2. Country Program in Cereal Sector

The proposed AID assistance involves general financial support for the national cereals production program. However, some elements of the program are not included in this project or are financed by other donors. The program as a whole has a very high policy priority for the Government of Niger, which has been forced by its dependence upon imported grain during the last two crop years to recognize the importance of increased cereal production and the damaging effect of the relative inattention given to cereals production in previous agricultural programming. The GON has now made increased cereal production a basic target of agricultural policy and resource allocation. The country

cannot neglect the export crops (cotton and peanuts) which have provided the bulk of its foreign exchange earnings in the past, but it now will give priority to cereals production until an improved production system has been established which will permit the people of Niger to grow their own current cereals consumption requirements, to re-establish their on-farm, carry-over stocks, and to fill the emergency supply/market stabilization storage capacity of the UNCC and the OPVN.

The cereals sector program of the GON, in addition to the elements described above for which AID financing will be used, includes the operation of similar activities and services in certain parts of the country where other donors are supporting general rural development. The Fund for Economic Development (FED) of the European Community is financing a comprehensive sub-regional development program in three arrondissements of Zinder Department. This includes the strengthening of UNCC and of extension services, provision of inputs, building farm-to-market roads, and the training of extension personnel and staff members for local cooperatives. Cereal production in this area will benefit from these new and improved supporting facilities and services. This is an area of intensive peanut cultivation, but cereals will benefit from investments made in these arrondissements, since millet or sorghum invariably is grown in rotation with cash crops. Further, the strengthened extension service now will include inputs and cultural practices for cereals in its operation in the area. The International Bank for Reconstruction and Development (IBRD) is expected in the near future to approve a pending project for general rural development in the Maradi Department, involving facilities and services similar to those in Zinder.

A fundamental factor in assistance programming for Niger is that the country's own very limited fiscal resources will not permit the working-level

staffing of agricultural services, particularly the extension system operated by the UNOC. Thus, these services exist only where the cash export crops (peanuts and cotton) have provided the incentive and the economic base for their support or where a foreign donor has financed the establishment of required operational staff positions down to the village level. The FED and IBRD projects thus provide, for the areas in which they function, the personnel and production inputs required for the promotion of cereal production. The AID project accordingly will finance the similar expansion of working-level organizations and services in other parts of the country, while the AID-supported seed system will operate on a national basis, functioning in Maradi and Zinder as well as elsewhere.

The other significant element in the program is the national cereals marketing and stabilization organization, the OPVN. A previous AID project, No. 625-11-150-161, West Africa Grain Stabilization, Marketing and Production, has provided support for this organization, which is described in the attached sector assessment.

3. AID Strategy

The AID strategy response to the special assistance requirements arising out of the Sahel drought in Niger is to concentrate resources on cereal production in a national crop program designed to provide a significant increase in domestic cereal availability within three-to-five years. This direction of AID's efforts and resources was selected with two objectives in view. The primary objective is to end the country's dependence upon food aid from abroad, except in the very worst years of reduced rainfall, and to establish the economic and institutional base for a predominantly rural society which is needed for sound national development. The second objective of the selected strategy is to achieve, through concentration of resources on cereal

production, an operational relationship and continuing interaction with the Government of Niger through which AID can make a constructive contribution to the Government's agricultural and economic policies and programs. AID will help the GON to identify policies and programs conducive to continuous increase in cereal production and productivity, equitable distribution of available cereal supplies, and long-term agricultural development providing an improved way of life for subsistence farmers and the adoption of land-use practices designed to halt desertification and support the increasing population of Niger. This longer-term strategy objective is supported by the selection of a broad range of inter-related cereal production activities for AID financial support.

The AID approach is not only compatible with but practically inseparable from the host country's strategy and policy emphasis. The drought has provided the opportunity which this program seeks to address, as it has forced the GON to recognize that greater attention needs to be given to the domestic food production which previously had more or less been taken for granted. The scarcity resulting from the drought has made it painfully evident to the Government that there is an excessive dependence upon external sources for basic food grains. The problem of inadequate production had been apparent for some time before the worst drought years of 1972 and 1973, but the necessary changes in policy emphasis and resource allocation almost certainly would not have been made in the absence of the acute scarcity of these last two years.

The alternative activities which might have been financed under the special Sahel drought program were in the livestock sector. The initial project identification team which visited Niger in February 1974 found two

projects of possible relevance to the drought situation: (a) spreading the practice of farmer cattle-feeding for market ("embouche paysanne"); and (b) establishing a calf care and feeding center. The cereal production program was chosen because of the greater opportunity it offered to establish a comprehensive sectoral dialogue with the GON and because it responds more directly to the severe shortage of cereals for human consumption which the country has experienced in recent years. Within the cereal sector, two potential activities also were identified which have not been included in the proposed program. They are: (a) improvement of agricultural statistics; and (b) a study of the agricultural potential in the Say arrondissement of Niamey Department, an area of relatively high rainfall but low population density and under-utilization for crop production. The agricultural statistics opportunity is being examined for incorporation in the existing Grain Stabilization project, while the possible study of the Say Arrondissement has been left aside as not being of early relevance to increased cereal production.

PART II. B. BACKGROUND OF THE PROJECT

1. Proposal Development

At the beginning of Niger's second decade of independence, it is faced with serious economic difficulties and few prospects for immediate recovery. The continuing drought during the recent years has seriously affected agriculture and livestock production and has probably negated the gains of previous development efforts. This critical situation reflects the constraints and problems with which each of the countries within the sahelian zone in West Africa (Niger, Upper Volta, Mali, Senegal, Mauritania and Chad) is beset.

In response to joint Embassy and AID alarms, as well as host country appraisal and appreciation of a worsening situation, AID has launched three special programs of relief assistance to the Sahel: emergency/relief efforts, medium-term programs, and long-term programs. The emergency/relief assistance is providing food, animal feed, and transportation of emergency supplies and vaccines required to meet the immediate crisis requirements for population survival in the Sahel. Initially conceived as a single approach, the medium-term program has been divided into two phases: Phase I, Recovery and Rehabilitation; and Phase II, More Complex Medium-Term. The thrust of the Recovery and Rehabilitation program is meeting needs prior to the 1974 harvest period or, at the latest, the 1975 harvest period. The purpose of the Phase II Medium-Term program is the improvement of the deficit food production situation and, consequently, national self-sufficiency in meeting basic food needs. These projects are planned to have a substantial impact within the next three to five years. In an effort to develop and clarify options for the long-term development of the Sahel-Sudano zone, an extensive study also

is being made, on the basis of which future decisions should be possible on large investments for joint African-donor community sponsorship.

The present Niger cereals production project design falls within the category of the Phase II Medium-Term program described above. The focus of each of the Phase II projects in the sahelian countries is on food production (agriculture and livestock) in direct response to the effects of the drought. Food production was selected for emphasis because of the availability of U.S. expertise in the fields of grain production, arid land development and livestock production/range management. Within the design framework of these projects, maximum advantage is taken of other donor technical assistance and of the Peace Corps presence, with only modest inputs of U.S. technical personnel. This personnel policy is pragmatic in light of the relatively short time-frame and the language barrier in francophone Africa. AID programming and managerial staffing is incorporated in the project design.

In January 1974 the Area Development Officer (ADO) was requested to explore with the Government of Niger possible development projects within the framework of the Phase II Medium-Term program. In February 1974 a two-man team of the Special Sahel Task Force visited Niger to discuss in greater detail a major GON effort on increased cereals production. Meetings were held with Nigerien officials of the Ministry of Development and Cooperation and Ministry of Rural Economy, as well as with representatives of the other donor community - FAC, FED, UNDP and CIDA. In agreement with the ADO, the Task Force recommended a comprehensive national cereal grain production program and several less clearly defined activities in the livestock sector (Niamey 570 of February 26, 1974).

Within the framework of a national cereal production program, the GON identified a program of inter-related activities for AID assistance: seed multiplication; village level demonstrations; a pilot farmer credit program for cereals production; research test field stations at the farm level; support to Young Farmer Training Centers; agricultural statistics; and study of agricultural potential in high rainfall areas. Following the endorsement and recommendation for this program by the Task Force to AID/W, a special Sahel program planning seminar was held in Washington for the week of March 18-22. At the seminar the decision was made to continue immediately the dialogue initiated by the Task Force with the GON on the design of an integrated national cereals production program. A scope of work was then drafted based on the substance of the Task Force recommendations and including information gaps to be studied and key issues to be addressed. A multidiscipline team was identified and fielded to Niger on April 8, 1974 for the purpose of designing such a project for the possible obligation of AID funds prior to June 30, 1974. (See Annex II , State 70080 of April 6, 1974, Sahel Medium-Term, Phase II: National Cereals Program, Niger for the scope of work and identification of the project design team.)

2. Prior AID Technical Assistance in the Cereals Sub-Sector

In the recent past much of AID's "regular" technical assistance program for Central and West Africa has been placed within a regional context. Considerable support has been channeled through various regional institutions which are capable of addressing key development requirements of the member countries. The Entente Mutual Aid and Loan Guaranty Fund (EF) of the Council of the Entente is the principal regional organization through which AID has provided assistance to Niger in livestock and grain stabilization. The focus of this assistance has been on the commercialization of cereals (millet and

sorghum) in the principal producer countries of the Entente region - Upper Volta and Niger. Through an expanding market participation of national cereals offices in Upper Volta (OFNACER) and Niger (OPVN), in competition with private grain merchants, it was intended to achieve modifications in market performance: higher prices to the farmers; reduced margins between purchase and sales prices; and more regular flow of grain from farmer to consumer.

AID assistance in this effort was three-pronged: (1) The national cereals offices were supported through operating budgets and working capital provided by other donors (CIDA and FAC) supplemented by counterpart generations from the sale of P.L. 480 Title II sorghum imports. The USG agreed to make available up to 50,000 tons of sorghum over a five year period. Niger imported 15,000 tons in 1971 and 10,000 tons in 1972. (2) In June 1972 a loan agreement was signed with the EF for \$1.8 million to provide financing for the import of required commodities in support of the construction of grain storage facilities in Upper Volta and Niger. (3) Long-term technical assistance personnel have been assigned to both OFNACER and OPVN as grain marketing advisors. (See Grain Stabilization, Marketing and Production PROP, Project No. 625-11-150-161.) Since initiation of the project, AID grant support has totalled \$630,000 including as well in-service participant training to the cereal offices' middle-level personnel. Proposed FY 1974 funding is \$318,000, and \$385,000 is programmed for obligation in FY 1975.

With the onset of the drought emergency in FY 1973, PL 480 sorghum imports for the grain stabilization program were required to supplement the emergency foodstuffs. This drought situation has continued to the

present, requiring therefore a reevaluation of the Grain Stabilization project. This reevaluation of the project is now being performed, and recommendations for project redesign will be incorporated in a PROP revision.

Sub-Sector Studies

The need to stabilize the cereal grains market as the basis for incentive to increase cereals production for self-sufficiency has been recognized for more than ten years. The first detailed study was performed by SEDES in 1963 and is entitled Les Produits Viviers au Niger. More recent studies include:

1. Porter International Company, Weitz-Hettelsater Engineers. A Grain Stabilization Study of the Entente States and Ghana. Kansas City: March 1969. (AID contract)
2. Checchi and Company. Food Grain Production and Marketing In West Africa. Washington, D.C.: March 1970 (AID contract AID/afr-664).
3. Kansas State University, Food and Feed Grain Institute. A Study and Plan for Regional Grain Stabilization in West Africa, Report No. 21. Manhattan, Kansas: December 1970. (AID contract AID/csd-1588)
4. Helden Menzies Associates. Rapport Concernant les Produits Viviers au Niger. January 1971. (CIDA financed)

In collaboration with OPVN and OFNACER, the Council of the Entente synthesized the information contained in these studies in an official request for donor assistance, "Requete pour le Projet de Commercialisation des Cereales et des Niebes et de Stabilisation des Cours en Haute Volta et au Niger". It is on the basis of this request that AID initiated the present Grain Stabilization, Marketing and Production project described above.

3. Other Donor Assistance in the Agricultural Sector

The major development objectives of the Government of Niger are contained in the 10-year targets for the period 1965-1974 which are outlined in two

development plans for 1965-1968 and 1971-1974. The latest plan was a collaborative effort of the GON and the UNDP. Among the stated objectives is the development of the rural sector with a priority on the increased production of food crops, plus improved cash crops and modernized stock-raising. It is to this objective that several members of the donor community have developed a number of projects now underway or proposed for Niger. These projects are listed below.

It should also be noted that the Team Leader immediately contacted resident representatives of the donor community, including CIDA, FED, UNDP and FAC. Although this project will not be jointly financed with another donor, FAC has agreed to provide the services of three seed specialists. The World Bank has previously indicated some interest in joint financing with its rural development project in the Maradi Department, and CIDA informally indicated some possibility of providing fertilizer.

World Bank: Maradi Rural Development

The IBRD is prepared to extend to the GON a proposed IDA credit of \$15.0 million for an integrated rural development project in the Maradi Department. The goal of the project is to increase crop and livestock production and to improve both the physical and social infrastructure of the region. An increase in agricultural production will be achieved through the provision of (a) extension services and farmer credit through the UNCC structure; (b) irrigation schemes; and (c) demonstration research and seed multiplication. Additional activities to be undertaken in the project include improved livestock services and cattle routes; road and bridge construction; reforestation; and improved social services and vocational training. The project will be implemented in the period 1974-1976. In project planning with GON officials, AID has agreed

completely with the necessity for complete coordination with this proposed project. This coordination must be maintained for the duration of both projects.

UNDP/FAO: Pilot Agricultural Development in the Dallol Maouri Region
(Dosso Department)

The specific objectives of this project include the establishment of three pilot agricultural farms; the demonstration of irrigated agriculture; promotion of an improved package of practices; a field trial center for applied research; the introduction and expansion of animal traction; establishment of a training center/workshop for the manufacture and repair of simple farm implements and animal traction equipment, extension of improved livestock practices on the farm level; and the training of extension workers to assure the continuity of the project. This was planned as a four-year project (1972-1976) at a total cost of \$1.1 million. According to the UNDP Resident Representative in Niamey, a joint GON-UNDP decision has recently been taken to terminate this project in 1974. The UNDP ResRep gave several reasons for the failure of the project to achieve any of the objectives to date: lack of farmer participation or interest (psychological factor); lack of farmer interest in irrigated, as opposed to dry-land, farming (physical labor factor); faulty focus on the production of asparagus and coconut palms; and the high cost of animal traction equipment relative to observed benefits.

UNDP: Industrial Processing of Millet

For the industrial processing of millet, UNDP assistance is being offered to the Societe pour la Transformation du Mil (SOTRAMIL) and the Societe Africaine de Developpement des Industries Alimentaires a Base de Mil (SADIAMIL).

World Food Program: Promotion of Cereal Production
(UN-WFP Project NIGER 2133/Q)

The GON has requested WFP assistance for an emergency seed supply program for 1974 for farmers in drought-affected areas. The GON will distribute

5,500 MT of millet seed free of charge to about 183,000 farmers for the next planting season (May-July 1974). The farmers will be given 30 kilos of seed per family, sufficient to plant an estimated 550,000 hectares of land. WFP will assist this program by providing 45 kilos of sorghum for family consumption. The total cost of the WFP project will be \$1,985,500 for the sorghum, transportation to Niger, local supervision and a contribution for internal transportation and distribution.

FED: Development of the Badeguicheri Valley (Tahoua Department)

The objectives of this project are the establishment of village cooperatives for the marketing of food and cash crops; agricultural extension of the improved package of practices; the construction and upgrading of 100 kms of farm-to-market roads; and an increase in general agricultural production. This four-year project was started in 1972; the technical advisor has been on the project site since July 1973.

FED: Rural Development in the Zinder Department (Project 3M)

The objectives of this four-year project are an intensification of the production of food crops (millet and sorghum) in light of an increasing population in the project area; an increase in the production of export crops (peanuts and cotton); the restoration and maintenance of soil fertility; and the promotion of mixed farming. Also included are road improvements, the construction of about fifty wells, and the construction of several agricultural extension training centers. The project is being implemented through the UNCC using the existing ALC and cooperative structure. The project is also called "3 M" because of the location of the project activity in the Mirriah, Magaria and Matameye arrondissements. The total estimated cost of the project is \$2.1 million.

FED: Rice Production

On December 3, 1973, the GON announced the FED agreement to finance a rice production project along the Niger river at a total cost of \$3.2 million. The objectives of the project are an increase in rice production, employment for approximately 925 farmers in the area, and fuller utilization of the rice husking plant at Tilliberi. (Niamey A-01 of January 11, 1974)

FED: Seed Multiplication

For the 1974 planting season, FED will provide a CFA 10 million grant for seed multiplication. See Annex I for project details.

Libya: Agricultural Production

As the result of an official visit to Niger on March 7-9, 1974, a cooperation agreement between the Governments of Libya and Niger was announced for the establishment of three joint organizations to deal with agriculture and livestock production and the development of ranges, forestry and irrigation. No details of the organization and no commitment of funds have been announced to date. (Niamey 709, March 12, 1974)

Germany: Rice Production

At the conclusion of a five day visit to Niger on October 2-6, 1973, the FRG Minister for Economic Cooperation announced an agreement in principle for a soft, untied loan of DM 14,85 million (approximately \$6.0 million) for the financing of two livestock projects and a rice production project to be located near Tilliberi on the Niger river. (Niamey A-81 of December 7, 1973)

Republic of China: Rice Production

The ongoing intensive irrigated rice production project on the Niger river outside Niamey will be expanded by an additional 3,500 hectares to a new total of 4,500 hectares. Of the present 1,000 hectares under cultivation, 400 ha. are under Nigerien management, 300 ha. are in the process of being jointly

worked with the Chinese technicians and the Nigerien farmers, and the remaining hectares are being levelled. Pilot plots have produced 12 tons of rice per hectare with two crops per year. There are 65 Chinese workers on the project, including irrigation, extension and maintenance teams. (Niamey 3262 of October 26, 1973 and Niamey 168 of January 17, 1974)

African Development Bank: Development of the Koumadougou Valley and the Goulbi de Maradi

In its Review of Operational Activities (West Africa II) dated February 1, 1974, the AFDB lists two proposed projects for possible financing through the African Development Fund (ADF):

(1) Agricultural Development of the Koumadougou Valley: The GON has requested a hydro-agricultural study for the development of the valley of the Koumadougou river (50,000 ha.) including river control and irrigation. The total cost of this development scheme is not yet determined, although ADF participation would not exceed FUA 4.0 million. The estimated cost of the study is FUA 130,000 and will take one year to complete.

(2) Agricultural Development of the Goulbi de Maradi Valley: On the basis of an ORSTOM study conducted in June 1971 (financed by the AFDB with UNDP funds of \$20,000), the ADF is prepared to approve a project of flood control and irrigation of the Goulbi de Maradi Valley. The objective of the project will be to increase traditional crop production and to introduce truck gardening. The total cost of the project is not yet determined, although ADF participation will not exceed FUA 4.0 million.

4. GON Activity in the Program/Project Area

As is discussed in detail in this project design, the GON already has government and quasi-government organizations to deal with the agricultural

sector of the national economy. The agricultural extension system is organized from the ministerial level to the arrondissement level (local government), with an additional three levels to the farmer possible in the "development zones" of donor projects. The UNCC and CNCA also provide the administrative framework for cooperative development and farmer credit. To date, outside of the development zones, UNCC and CNCA activity has been largely restricted to the production and marketing of cotton and peanut cash crops. The organizational structure, however, can be strengthened to include cereals production within its scope of responsibility. This AID project design proposed to support this existing structure as outlined in Section 2. A., Management/Organizational Analysis.

5. Country Team Views

During the visit of the project design team to Niger April 6 - May 4, 1974 the Embassy staff was fully briefed by the Team Leader. Upon departure, the Team Leader was assured that this project design reflects the views of the Country Team as top priority for Niger's agricultural development.

6. Date of Application for Assistance

The GON has indicated that its official request for USG assistance will be submitted on May 25, 1974. This request will reflect the GON working documents on which this project design is based.

Section 2. Project Analysis

A. Management/Organizational Analysis

Union Nationale de Credit et Cooperatives (UNCC)

General Aspects: The UNCC is an "etablissement publique", a "from-the-top-down" structure, with pre-cooperative associations as its beneficiaries, even though the concepts "cooperative" and "village mutual" are used.

It is represented by branch offices in five of seven Departments, and in nineteen of thirty-five Arrondissements. Plans call for total country coverage, excluding non-agricultural areas (e.g. Agadez).

235 "Cooperatives" encompass 2401 "Village Mutuals" with approximately 123,000 active farm members. Although obligations, privileges and procedures are spelled out for both levels - and the expression "by-laws" is used - we understand that enabling legislation has never been passed (but is prepared) and Model By-Laws have not been prescribed. The reasons given are the very early stage of cooperative endeavor, and illiteracy. However, a democratic election process for association representatives and mutual liability for loans are known and practiced.

UNCC was originally created for the organized marketing of peanuts and cotton which were sold to SONARA and CFDT, respectively. The "Cooperatives" are the rural assembly points with a weighing scale as focus, and paid personnel to attend them. The next step was the supply of seeds, fertilizer, pesticides, implements, and work animals. The "Village Mutuals" draw up collective requests for such inputs, which are then screened and channeled upward to the Caisse National du Credit Agricole (CNCA) (see below for details). CNCA then makes the necessary funds available to the UNCC for

procurement of these inputs. Eventually, rice was added to the peanut and cotton programs. Some sorghum and millet were also handled.

UNCC, in the course of these gradual developments, has spent a considerable amount of time and money on educational and training aspects, including functional literacy; but its main effort has been directed toward the improvement of agricultural practices and the understanding of the cooperative movement.

Special Aspects: The UNCC has been charged by the GON with a major role in the Cereal Promotion Program, seems well suited for it in view of the foregoing. It is a Government organization and dependent on the GON Budget. It will not, however, be able to discharge new responsibilities without support funds from donor sources. We understand that an injection of \$360,000 is being considered by the U.N. Capital Development Fund, which is intended to compensate more for losses suffered during the drought than for new programs.

CON's proposed involvement of UNCC in the Cereal Promotion Program includes the construction of silos and warehouses, the purchase of vehicles, and the hiring of additional personnel. The total allocation amounts to approximately \$900,000, including operating and training expenditures, for the period from 7/1/74 to 12/31/77. (See Budget Tables)

The Department Chiefs appear to be capable and dedicated persons who, though perhaps still paternalistic in mentality, wish to see the "Cooperatives" and "Village Mutuals" gain autonomy and assume managerial responsibilities. The annual report for 1972-73 points out that a scheme to attain this goal is being tested in the paddy area. At the same time, it is felt that an expansion of this effort is possible only with considerably more training of farmers which, however, can only be undertaken with AID financing. If granted, progress should be more rapid.

Even in regard to ongoing programs, UNCC is short of human resources because of budget limitations. The interest of UNCC executives in making their present-and-future field men more effective than they been in the past is further evidenced by their sincere acceptance of an AID-proposed creation of five experimental Farm Service Centers encompassing 71 villages. As detailed in a special Annex, present patterns of organization will be preserved but the Center will become a real multi-purpose cooperative with: 1) assured two-way communication between members and administration; 2) preparation of farm plans in simplest form; 3) installation of demonstration plots; 4) storage of inputs for timely availability; 5) input credit tied to repayment in kind; 6) storage and marketing of output in close collaboration with OPVN and tied in with marketing credit; 7) creation of réserve stocks for the soudure within easy reach of the farmer and at uninflated prices, etc.

Orientation of farmers with respect to this project by the Arrondissement Office (the five Centers are in one Arrondissement) is scheduled to begin before this cropping season; construction of needed facilities is slated for the last quarter of 1974; and the start of the multi-purpose cycle is scheduled for February-March of 1975.

Caisse Nationale du Credit Agricole (CNCA)

CNCA is an "etablissement publique" with financial autonomy. It started seven years ago with GON-contributed capital of CFA 170,000,000 (\$680,000 US), plus CFA 6,000,000 (\$24,000) in other donations. Over the seven years, it has accumulated reserves of CFA 105,000,000 (\$420,000), and has taken pride in the past in its good repayment record; 98% in the peanut zones, 95% overall.

The bulk of all short (up to two years) and medium (two to five years)

term loans is made for the amenagement of special pilot and irrigation projects, to peanut and cotton growers, and to individuals involved in vegetable gardening and orchards.

As of 9/30/73, CFA 495,000,000 (\$1,980,000) were reported in outstanding loans, CFA 231,000,000 (\$924,000) in medium term, and CFA 264,000,000 (\$1,056,000) in short term. Without taking into consideration that the short term loans may not re-flow according to schedule, owing to the drought, the liquidity of CNCA is extremely low:

	(in CFA)
Capital	176,000,000
Reserves	105,000,000
Other Fixed Assets	<u>2,000,000</u>
	283,000,000
less Medium Term Loans	<u>231,000,000</u>
Available Funds	48,000,000

The GON, early this year, consequently stepped in with a new capital contribution of CFA 200,000,000 (\$800,000).

Since last Report, about 50% of short term and 30% of medium term loans have been repaid on schedule, which may forecast considerable losses. CNCA feels, however, that this situation will improve.

Two other aspects of the Report stand out in connection with the Cereal Promotion Program:

1) almost no cereal production loans have been made in the past (except for paddy);

2) Group Credit on the village level, so much touted as the basic cooperative step, amounted to slightly over only 10% of all loans made.

Obviously, these two aspects need strengthening when the Cereal Promotion Program gets under way (see also Budget Tables). The Executive Director of

CNCA, who appears to be well-versed in financial affairs and well-seated in the saddle of CNCA's operations, expressed CNCA's willingness and ability to participate in this effort.

Ministry of Rural Economy

See section VII of the attached Sector Assessment of Agriculture in Niger.

Office de Produits Vivriers Nigerien (OPVN)

OPVN was created in 1970. It is charged with the responsibility of buying, storing, and selling food staples with the objective of stabilizing price and supply. The basic pattern envisaged is for OPVN to purchase enough attractive to the farmer, and to sell during the soudure at a price which will cover its costs but which would be lower than the usual soudure market price. The net effect should be to reduce the fluctuation in price during the year and to encourage the farmer to produce more food staples because of the higher price he would receive at harvest time. The organization has had little experience with its supposed major role, since it began operations during the drought and has been fully occupied with distribution of imported grain rather than buying domestic grain. This emergency task has helped OPVN to mature more rapidly than it otherwise would have.

It is generally conceded that the OPVN has poor access to the farmers growing food staples as compared to local commercants. The advantage of the latter appears to be commitments of crops to the commercants before they are harvested on the basis of loans advanced before and during the growing season.

The new government of Niger has been critical of OPVN's management, charging it with inefficiency and corruption. However, senior officials of

the responsible ministry (Rural Economy) stated to the design team that the regular OPVN task must be done. The emergency grain distribution might be assigned elsewhere, and new leadership for OPVN might be necessary, but the grain price stabilization function which is of crucial importance for the cereal program will remain with OPVN.

B. Technical Feasibility

1. Appropriateness of Technology - The project will promote the use of the most economical technology immediately available and make provision for improving the technology in the future. In discussing technology it should be borne in mind that on the basis of climate and soil, as well as consumer preference, millet is the major cereal crop in Niger and is likely to remain so for a long time. The important aspects of technology are the package of practices that can be made available to cultivators, the breeding and testing of new varieties, production of foundation seed, seed multiplication, training of personnel, and the means of delivering the package of practices to farmers (contact with farmers, training, availability of inputs, and credit arrangements). These aspects will be discussed in various time frames.

a. Package of Practices

(1) In the immediate time frame, the package of practices available includes the following:

- (a) Existing millet, sorghum, and cowpea varieties;
- (b) Closer spacing of planting of millet;
- (c) Treatment of seeds with fungicide and insecticide before planting to prevent losses and improve plant vigor. It should also make possible earlier and larger acreage planted;
- (d) Greater emphasis on prompt as well as thorough weeding;
- (e) Promotion of use of animal power to improve tillage and weeding, conserving moisture and permitting greater acreage per family;

- (f) Pure stands of cowpeas and insecticide treatment which can easily double the yield of cowpeas;
 - (g) Systematic rotation of crops with emphasis on legumes to increase the nitrogen content of soils; and
 - (h) More systematic use of animal manure and compost.
- (2) In the medium term the following improvements in the package are provided for:
- (a) A seed for millet which is more responsive to soil fertility, the P-3 Kolo, will become available to farmers on a regular basis from the seed multiplication program for the growing season of 1976 with an increased amount scheduled for 1977 and subsequent years (see Table 1 for yield data);
 - (b) Short, higher-yielding sorghum varieties that have been tested in Samaru will become available from the seed multiplication program. These varieties should yield substantially more than presently used varieties; and
 - (c) Depending on development of phosphate deposits in Niger, it may be possible to remove phosphorus as a limiting factor in crops. This would be especially rewarding for the grain legumes-peanuts and cowpeas.
- (3) In the longer term, hopefully within five years, the higher yielding millet varieties that are more drought

FARMERS' YIELDS OF MILLET UNDER VARIOUS CONDITIONS
 ESTIMATED BY M. NABOS, DIRECTOR OF IRAT FOR NIGER

Annual Mm. Rainfall (not well distributed)	Practices*	Fertilizer	Yield Per Hectare	
			Local Variety	P-3 Kolo
350	Good	None	650	1000
250	Good	None	500	600
220	Good	None	400	400
350	Good	50kg./h	900	1800
250	Good	50kg./h	600	900
220	Good	50kg./h	400	400
350	Usual	None	500	600
250	Usual	None	400	450
220	Usual	None	300	300
350	Usual	50kg./h	650	900
250	Usual	50kg./h	450	600
220	Usual	50kg./h	300	300

*"Good" practices mean seed treatment, planting, spacing and weeding which is recommended by the Agriculture Ministry. "Usual" practices mean the common seeding and tilling practices.

resistant than presently used varieties or P-3 Kolo will become available. The research component of this project is designed to breed such millet varieties; the seed farm will provide a capacity to create a foundation seed; and the seed multiplication centers are designed to make suitable quantities available to cultivators once the foundation seed becomes available (see below).

- b. Research effort of millet - The project proposes to help fund a concentrated research effort to achieve a high-yielding drought-resistant composite millet variety. The Study Team and GON considers this to deserve an intensive effort. Millet is and is likely to remain the major cereal grown in Niger. It is preferred by consumers and is very well adapted to the Niger climate and growing conditions. Its genetic qualities and the available strains elsewhere in the world should make it possible to breed a millet which yields about double that of local varieties even under conditions of moisture stress, 50% greater yield than P-3 Kolo under favorable moisture conditions, with the possibility of constant improvement. The recommendation is for a composite rather than a hybrid for several reasons. A composite would be easier to multiply and make available to farmers. There is better opportunity to achieve a more drought-resistant variety and there is greater potential for long-term improvement. By concentrating the effort of a team of three scientists* and supporting personnel and

*The French assistance program (FAC) has agreed in principle to recruit and fund the scientists with the Project funding support expenditures.

facilities on millet alone and making available short-term consultant assistance, it is believed that a dramatically-improved composite variety can be developed in 3-4 years.

- c. Other applied research effort - It is expected that promising varieties of maize, sorghum, cowpeas and other legumes will be tested by IRAT under Nigerian conditions and, if found suitable, will be put into production for seed. To encourage contacts with other research centers, provision has been made for short-term consultants who would be called on for assistance as appeared useful. For example, IRAT will be encouraged to keep in close touch with IITA on its work with cowpeas.
- d. Foundation seed farm - The Government of Niger is making available a seed farm near Niamey for a facility to produce foundation seed. The farm has irrigation facilities which will permit the rapid production of foundation seed under carefully controlled conditions. Irrigation should make it possible to produce three seed crops per a year. The Project will furnish equipment to increase the irrigation capability, vehicles, and seed-processing equipment.
- e. Seed Multiplication Centers - As foundation stock seeds become available, they will be produced on a large scale in seed multiplication centers. There will be six Centers established in 1974 for operation in 1975 and seven more centers established one year later. Each Center will maintain a 60 hectare plot on

which seeds will be produced directly and will also serve as a demonstration and training center for cultivators who will be producing seeds on contract. Cultivators in neighboring villages will be chosen to serve as demonstrators of the recommended package of practices to produce one hectare of the desired seed. This would serve the double purpose of producing seeds for subsequent distribution and demonstrating to a wider cultivator audience the recommended package of practices.

f. Centre de Formation de Jeunes Agricole (CFJA) - There are four CFJA's which have been used to train young men in the use of oxen and improved farming practices. At the conclusion of their training they were sold a yoke of oxen and equipment on credit by the UNCC and were given four years to pay. Many of them used their oxen to good advantage in their villages. However, due to the drought and the poor crops, many were not able to make their payments and either lost their oxen or sold them. This has caused some disappointment; nevertheless, the CFJA's have succeeded in introducing animal traction to many areas of Niger.

To obtain greater advantage from their training centers, the GON proposes to use two of the CFJA's, and one more which is to be built, as training centers for more mature men to be trained as agricultural extension agents for service in cooperatives. They will receive nine months training in the

use of animal traction, improved farming practices, and how to communicate these improved practices to the farmers. When they complete their training, they will be paid employees working in the cooperative, serving several villages in that vicinity. They will be supplied with a yoke of oxen to be used for demonstrations and custom work. They may have a small farm of their own. They will instruct the surrounding villages on the use of improved farming practices and will arrange demonstration plots in each village.

g. Delivery system - The Project proposes three major initiatives in the delivery of packages of practices:

- (1) The contracting for seed by the Seed Multiplication Centers (described above) is for the purpose of producing supplies of seed. But it is also designed to create demonstration plots in villages. There will be 1440 such demonstrations in 1975 and 3600 new demonstrations each year thereafter. In the interest of control and administrative convenience, the demonstrations will be sited in a more concentrated way than would be desirable purely for purposes of extension.
- (2) More intensive efforts in areas where Cooperatives have operated in the past. Present plans are to make use of procedures which have been successful in expanding groundnut production unless better arrangements can be derived from the experimental effort (see (4) below).

Unfortunately, hiring and training of personnel for additional staffing is programmed to take place in calendar year 1974 and 1975 and only in calendar year 1976 will partial operations start. An effort will be made to accelerate this schedule.

(3) Expansion of effort in areas that have had no cooperatives in the past. The Project schedules partial operations in 1977. Procedures would be the same as (2) above.

(4) Five Experimental Centers that would bring a full range of information, inputs, credit and marketing services to cultivators in villages in the arrondissement of Gaya. The area was chosen because the relatively favorable moisture conditions would permit concentration on deriving the most effective delivery procedures. The five Centers are to start operations in Calendar year 1975, and the plan is to apply the lessons learned in the five centers to the regular delivery systems described in (2) and (3). There will be particular stress on achieving frequent, regular, and uninhibited interaction between staff and villagers through village representatives. The lack of rapid and reliable feedback is seen as the greatest deficiency in past extension efforts.

2. Environmental Impact - The recommended practices should improve soil structure and check soil erosion. Systematic crop rotation, careful

use of manure and compost, and cultivation of the soil before the first rain fall should have the effect of improving the environment. The potential widespread direct application of powdered rock phosphate will improve soil quality and help check desertification.

3. Judgment on Technical Soundness - The Project plans are deemed technically sound, providing implementation is well-managed.

C. Economic Feasibility

The Project should be seen in the context of the cultivator's options. He responds to the stocks he has on hand, his most recent experience, the technology he perceives to be available to him and the price that he can expect from the output. Figure 1 illustrates his perceptions in ordinary times. At the existing technology and the price he receives in normal times, he would produce quantity Q_1 which is a response to a low price P_0 which is characteristic at harvest time under normal marketing procedures. Q_0 represents his subsistence requirements and $Q_1 - Q_0$ represents the amount available for marketing. In times of drought, in retrospect, the quantity $Q_1 - Q_0$ becomes small or even negative, and the price rises substantially.

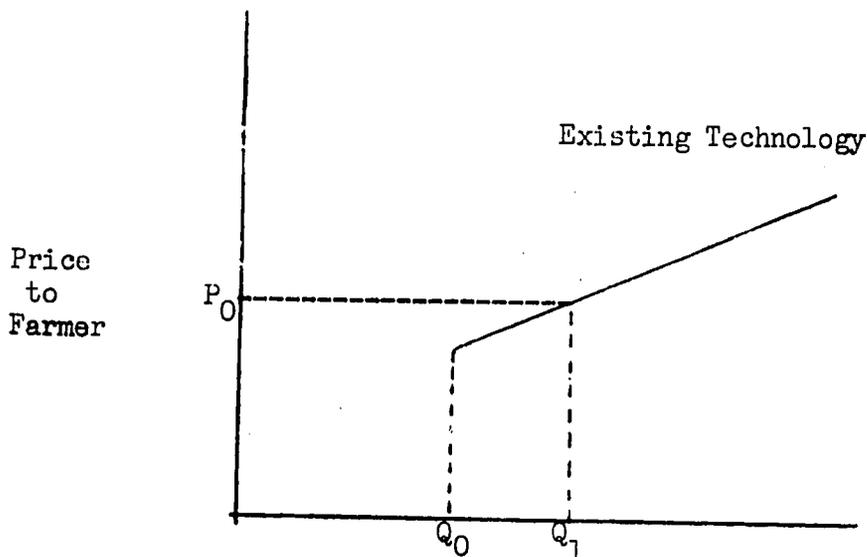


Figure 1 - supply curve

The Project attempts to make available a new set of options to the cultivator. An improved technology shifts his supply curve to the right and through more orderly marketing yields a higher price to the farmer even while the price to the consumer (including some farmers) is the same or lower as a result of a reduced range of price fluctuation within the year. This is illustrated in Figure 2:

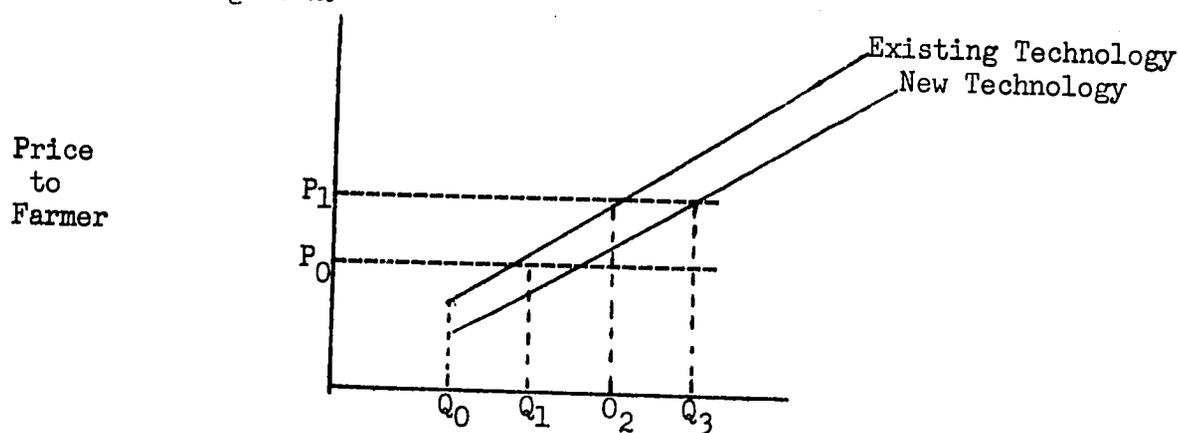


Figure 2 - Supply Curves

With an improved technology even at price P_0 , the quantity he will attempt to produce will be Q_3 instead of Q_1 , thus increasing the amount available for marketing. But in addition, if through more orderly marketing (support prices and bonded loans at harvest time) the price to the farmer is raised to P_1 , the quantity he will try to produce will be further increased to Q_4 .

The nature of the new technology must be seen in various contexts, the level and variation of rainfall, the planting and tillage practices, the level of fertilization, the genetic variety planted, and the interaction among those variables. Table 1 gives the yields of millet for a relevant

range of circumstances. It can be seen that while P-3 Kolo yields substantially more at 350 mm of rainfall than local varieties, at lower rates of rainfall its advantage may tend to disappear. In view of the irregular moisture conditions, it is imperative that Niger have a millet variety whose yield is greater under favorable moisture conditions and whose productivity is more stable under conditions of moisture stress. Thus, P-3 Kolo is seen as an interim measure until a more desirable composite becomes available. The seed farm, seed multiplication centers, and the delivery system being set up under this project should make it possible to take early advantage of such a development.

It should be recognized that in response to the high price of millet, the past crop failures in cotton, groundnuts, sorghum, and to some extent, millet, and in response to their low inventories, farmers are planting larger total acreages, predominantly in millet. Good growing weather would enable farmers to build up their inventories the first year. A second good year would probably bring substantially lower market prices at harvest, unless the price was supported. Similarly, should a combination of improved practices and better weather bring several good harvests, there would be a need for obtaining a prompt shift to crops that can be exported, such as cowpeas, groundnuts, or cotton. Such shifts can be greatly facilitated by suitable price incentives, for grains as well as other crops, prompt information dissemination among cultivators, as well as managed marketing and storage. To the extent that the Project meets its objectives, it should be possible for Niger to assure itself of an adequate food supply by maintaining a suitable reserve stock at reasonable prices to the consumer, and at the same time, resume its exports of agricultural products to obtain

foreign exchange.

Thus, the Project should have the effect of both providing a more stable cereal supply and increasing the foreign exchange availability.

D. FINANCIAL SOUNDNESS OF PROJECT

(1) Project Budget

The estimated cost of the project for the initial three-year period is as follows:

United States	\$8,183,780
Other Donor (3 FAC technicians)	570,000
Government of Niger (farm and land)	231,200
	<u>\$8,984,980</u>

The breakdown of expenditures by functional segment is given in Table 2.

TABLE 2
Estimated U.S. Costs of Project
By Functional Segment

<u>Segment</u>	<u>CY 1974</u>	<u>CY 1975</u>	<u>CY 1976</u>	<u>CY 1977</u>	<u>Total</u>
IRAT Research Support	100,000	300,000	120,000	120,000	\$ 640,000
Foundation Seed Farm	68,000	120,000	80,000	80,000	348,000
Multiplication Centers	68,880	181,352	218,816	218,816	687,864
Demonstration Farms	-	375,630	497,860	394,580	1,268,070
CFJA (YFTC)	308,000	850,000	148,000	148,000	1,454,000
UNCC (Routine)	133,800	296,440	260,320	226,320	916,880
UNCC (Experimental)	107,630	7,668	7,668	-	122,966
Fertilizer	250,000	500,000	-	-	750,000
U.S. Technicians	280,000	510,000	510,000	510,000	1,785,000
Short Term Consultants	25,000	70,000	60,000	40,000	195,000
Participant Training	-	8,000	8,000	-	16,000
	<u>1,316,310</u>	<u>3,219,090</u>	<u>1,910,664</u>	<u>1,737,716</u>	<u>8,183,780</u>

Table 3 gives the major elements of the United States contribution to the project.

Table 4 gives the scheduled United States expenditures by calendar year, function and category.

TABLE 3
Major Elements of U.S. Contribution

	<u>CALENDAR YEAR</u>				<u>Total</u>
	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	
U.S. Personnel	255,000	510,000	510,000	510,000	\$1,785,000
Short Term Consultants	25,000	70,000	60,000	40,000	195,000
Local Personnel and Oper. Exp.	40,000	454,068	623,928	658,260	1,776,256
Supplies	8,000	76,000	118,000	118,000	320,000
Animals	2,880	73,920	74,880	74,880	226,560
Equipment	321,600	991,200	184,800	124,800	1,622,400
Buildings	612,400	729,400	-	-	1,341,800
Not Otherwise Classified	51,430	306,502	331,056	211,776	900,764
Participant Training	_____	<u>8,000</u>	<u>8,000</u>	_____	<u>16,000</u>
	1,316,310	3,219,090	1,910,664	1,737,716	8,183,780

TABLE 4
Scheduled United States Expenditures
By Calendar Year, Function and Category

Category of Expenditure	CALENDAR YEAR				Total
	1974	1975	1976	1977	
Research					
Buildings	80,000	100,000	-	-	180,000
Equipment	-	80,000	-	-	80,000
Operating Expenses, Including Labor	20,000	120,000	120,000	120,000	380,000
Total for Research	100,000	300,000	120,000	120,000	640,000
Foundation Seed Farm					
Land Preparation	26,000	-	-	-	26,000
Irrigation Extension	-	22,000	-	-	22,000
Vehicles	14,000	4,000	-	-	18,000
Threshing & Seed Clng. Equip	-	14,000	-	-	14,000
Local Personnel	8,200	16,400	16,400	16,400	57,400
Supplies (inclgd. Fert.)	8,000	40,000	40,000	40,000	128,000
Operating Cost	11,800	23,600	23,600	23,600	82,600
Total Foundation Seed Farm	68,000	120,000	80,000	80,000	348,000
Multiplication Centers					
Land	-	-	-	-	-
Buildings	42,600	53,200	-	-	198,800
Wells	12,000	14,000	-	-	26,000
Oxen	2,880	3,360	-	-	6,240
Harness and Equipment	4,800	5,600	-	-	10,400
Food for Trainees	-	6,912	14,976	14,976	36,864
Fertilizer/Insecticides	-	35,955	77,901	77,901	191,757
Seed	-	45	99	99	243
Personnel	-	58,080	125,840	125,840	309,760
Training Material	36,000	4,200	-	-	7,800
Total Multiplication Centers	68,880	181,352	218,816	218,816	687,864
Demonstration Farmers					
Seed Premium	-	57,150	124,800	124,800	306,750
Seed Operation Credit	-	1,843	2,150	-	3,993
Fertilizer/Insecticides Operation Credit	-	64,397	75,130	-	139,527
Oxen	-	34,560	74,880	74,880	184,320
Harness/Equipment	-	57,600	124,800	124,800	307,200
Dept. Supervsn. Fixed Assets	-	104,000	26,000	-	130,000
Operating Cost	-	56,080	70,100	70,100	196,280
Total Demonstration Farmers	-	375,630	497,860	394,580	1,268,070

Scheduled United States Expenditures
By Calendar Year, Function and Category (cont'd)

2.

Category of Expenditure	CALENDAR YEAR				Total
	1974	1975	1976	1977	
CFYA					
Buildings	308,000	348,000	-	-	656,000
Animals	-	36,000	-	-	36,000
Equipment	-	318,000	-	-	318,000
Operating Cost	-	148,000	148,000	148,000	444,000
Total CFYA	308,000	850,000	148,000	148,000	1,459,000
UNCC General					
Buildings	133,800	228,200	-	-	362,000
Equipment	-	12,000	60,000	-	72,000
Operating Cost	-	24,240	112,320	154,320	290,880
Training	-	32,000	88,000	72,000	192,000
Silos	-	-	-	-	-
Total UNCC General	133,800	296,440	260,320	226,320	916,880
UNCC Special					
Buildings	45,000	-	-	-	45,000
Equipment	52,800	-	-	-	52,800
Ass. Ext. Oper.	-	7,668	7,668	-	15,336
Training	9,830	-	-	-	9,830
Total UNCC Special	107,630	7,668	7,668	-	122,966
Fertilizer					
Equipment	250,000	500,000	-	-	750,000
US Technicians					
Proj. Manager	30,000	60,000	60,000	60,000	210,000
Assistant Manager	30,000	60,000	60,000	60,000	210,000
B EX PCV	195,000	390,000	390,000	390,000	1,365,000
Participant Training	-	8,000	8,000	-	16,000
Total US Technicians	280,000	588,000	578,000	550,000	1,996,000
Short Term Consultants	25,000	70,000	60,000	40,000	195,000
TOTAL	1,316,310	3,219,090	1,910,664	1,737,716	8,183,780

(2) Benefit - Cost Analysis

In designing the project, the Team and their Nigerien counterparts have tried to put together the project so that the parts are individually cost effective. The hope was that the resulting project would have outputs with a value that was substantially in excess of the value of inputs.

There are many favorable aspects to this project which are important but which do not lend themselves to valuation. Such aspects are a research and delivery system that will unify villages, prepare people for change, give greater assurance of an adequate food supply, and reduce fluctuation in prices of food. The effect on income distribution as well as level of income should be favorable.

There are improvements in cowpea cultivation that are in prospect but are not taken into account in benefit-cost calculation in the interest of computational convenience. Similarly, the benefits to be derived from the five experimental service centers are not included. In general, the bias of our estimates is to understate the value of benefits.

The benefit-cost analysis has taken the form of estimating the flow of costs (by whomever they accrue) for the period mid-1974 to 1984. Even though the United States will be committed to make contributions until December 1977, the calculation assumes that activities will be carried out until December 1984, financed by the Government of Niger or otherwise.

The cost of the project can be estimated readily from the project costs and by adding the farmers' inputs, namely seeds other than what they buy or receive from the multiplication centers. Labor is not included in costs.

The chief source of benefits that the project will generate is the increased yields of millet and sorghum from the use of superior varieties

and the adoption of an improved package of practices. With moderately good weather, farmers should be able to increase their yields of grain by about 100 kg per hectare through these means. The plan of the project is to distribute the new varieties and offer advice, credit, inputs, and marketing services to the 50% of the farmers that are most favorably situated with respect to potential and receptivity. But even with this selectivity, one should expect substantial slippage from the potential 500 kg increase per hectare. The calculations accordingly assume increases of 100-250 kg/ha over the life of the program. Starting in 1979, it is planned for farmers to start cultivating a new high yield millet that is more drought resistant.

The calculations of value of benefits include a range of assumptions that are considered realistic possibilities. The assumptions are indicated in Table 3.

Table 3
Assumption on Benefits Used In Calculation
of Rates of Return

Assumption Set	Average Gain of Grain, Kg/ hectare for Period		Value Per Ton of Added Grain for Period	
	1977-1979	1980-1984	1977-1979	1980-1984
I	100	150	\$80	\$80
II	100	150	\$120	\$80
III	150	200	\$80	\$80
IV	150	250	\$80	\$80
V	150	250	\$120	\$80

Annual rates of return have been derived for each assumption set. It should be borne in mind that the rates given are the approximate annual rates

at which the project generates value-added (or income) per unit of investment. It is a dynamic output/capital ratio. It answers the question, "For every unit of investment (no matter the source) at what annual rate is income being generated?" The rates of return are as follows:

<u>Assumption Set</u>	<u>Value Added Rate of Return</u>
I	39.3%
II	46.0%
III	51.0%
IV	56.8%
V	63.0%

Even on the basis of the most conservative assumption, the rate of return is extremely attractive.

These calculations do indicate, however, that the actual return will be extremely sensitive to the average gains realized by farmers receiving seeds and services. If one would use the experience in most developing countries as a guide, even assumption set I might appear optimistic. Only if the management of the effort is relatively good for such national production programs can the range be considered realistic.

E. The Social and Anthropological Feasibility of the Project

Introduction

Any program to be instituted in a developing country must be adapted to the culture and thinking of the people. Programs designed with disregard for the culture and mentality of the people often are regarded as foreign, their concepts will not be accepted or their methodologies practiced wholeheartedly.

It is important that the cereals program be acceptable to the Nigerian population.

Each of the recommended practices should be considered in relation to the social and cultural thinking of the people. The main recommended practices are :

- Use of improved seed;
- Treatment of seed;
- Density of planting;
- Weeding;
- Fertilizer; and
- Animal traction.

The farmers of Niger are positively disposed towards extension guidance. There is a strong correlation between prior extension contact and the current utilization of improved practices. One of the most frequently-cited changes desired in their villages by farmers questioned in a FED 1972 sample survey was the presence of an extension agent. This attitude augurs well for the introduction of new technology.

The Use of Improved Seeds

The people have been using seed from the grain that they eat. However, when the people find a certain kind of seed that they like, they will save the

seed and plant it. This is especially true of songo. In areas where peanuts are grown, the government has distributed improved seed, and the people have been happy to use it. Since they have already experienced the value of good peanut seed, they are psychologically prepared to accept improved millet seed.

Seed Treatment

This is not a new practice. More than two-thirds of farmers in the program area already follow this recommendation.

Density of Planting

At present, most of the people plant in widely-spaced rows. They think this results in more sturdy stalks and larger heads. However, IRAT recommends planting 1m X 1m. It will take a little teaching to show the people that the greater number of stalks more than offsets the smaller size of the heads and therefore is profitable for them. This is especially true if fertilizer is used. Since millet is such an important food for them, they are willing to adapt ideas that will produce more, if they can see it work.

Weeding

The Nigerien farmer realizes that good weeding is desirable but sometimes fails to get around to it promptly. They do not have a full appreciation of the damage done by weeds. Teaching will help them to put more effort into good weeding. There are no taboos to be overcome here.

Animal Traction

Animal traction is an important part of the cereal production project. Using oxen will enable farmers to increase production in three ways.

Firstly - It will enable the farmer to cultivate the land before the rains begin. This practice makes it possible for the rain to soak in better, and often increases the yield up to 15%.

Secondly - With oxen power one farmer can more than quadruple the amount of land that he can farm by traditional hand methods of farming.

Thirdly - If the farmer is taught the proper care and use of the oxen, he will have much more barnyard manure for his cropland.

Animal traction calls for some departures from tradition. Traditionally, cattle owners are not farmers, and farmers are not cattle owners. Farmers will have to be taught both how to train and care for oxen, and how to use ox-drawn equipment. These changes have already begun in some areas. Young men who have been trained in the CFJA have learned to use and care for oxen and equipment, and each was provided with a pair of oxen and a set of equipment on completion of his training. In 1971 there were 1000 pairs of oxen being used in Niger, so the practice has been introduced in some areas. These people have already accepted this new method of farming, and are enthusiastic about it.

Donkey-drawn equipment also is to be made available through the cooperatives. The donkey is the most lowly of beasts in the minds of Africans, and some think they are not strong enough to pull a cultivator. However, over a hundred farmers purchased donkey cultivators in the Maradi area, and are well pleased. They say that one man and a child with a donkey can cultivate three or four times as much as one man can do by hand. It is interesting to note that the neighbors of those using oxen or donkeys are filled with praise for what the animals can do. Most of them would like to use animal traction themselves if they could afford it. We can safely say that in areas where this practice has been used that it is already accepted in the culture of the people, just as the automobile and the radio .

Fertilizer

Most Africans are aware of the value of animal manure but are not informed how to preserve its value. For instance, they tie animals in an area without

bedding, and much of the value of the liquid manure is lost. Also many farmers arrange with shepherds to camp on their farms so the cattle will fertilize the farms at night. This has some value, but as the manure is left exposed on top of the ground, it loses much of its value.

Most farmers follow the tradition of burning any stalks, grass, or refuse from their farms. Old grass fences, corn stalks and old grass roofs are burned, thus losing much humus and some nitrogen.

One of the improved practices to be taught is the preparation of compost. All of this wasted grass and cornstalks should be used for bedding for the animals. This would preserve the value of the manure and would facilitate the decay of the grass and stalks, thereby providing both humus and nitrogen for the enrichment of the soil. Since nitrogen fertilizer is so costly, it is important to conserve all possible soil nutrients. It is possible that lack of strength or ambition and lack of transportation may hinder some from using compost.

Millet is their favorite crop. Many farmers say that the most important thing they want is support and guidance in millet culture. Since they are so concerned about growing millet, the more progressive farmers will be willing to use compost and commercial fertilizer, if they can be shown that the yield will be sufficiently increased so as to make it profitable. As others see the value of this practice, more of them will follow that example.

The direct application of rock phosphate will involve understanding a new type of fertilizer. However, a sample survey showed that 50 percent of Nigerian farmers "know of" the use of commercial fertilizer and report that they do not use it only because it is not available or is too expensive. They should be easily able to understand this new form of fertilizer, particularly when its long-term effect on soil quality is explained. One-third of farmers surveyed

in 1972 spontaneously cited soil impoverishment as the biggest problem in their villages.

It will be important to work out a distribution and sales program for rock phosphate that accords with the farmers attitudes and ability to pay. Some subsidization may be necessary, as it would be difficult for farmers to appreciate and be willing or able to capitalize the yield increase over a possible 10-15 year future. Special attention should be given to this problem of pricing, credit, selection of beneficiaries, etc.

Section 3. Project Implementation

A. Project Execution

1. Upon approval of the project, ADO/Niamey will negotiate a grant agreement with the Government of Niger. This grant agreement should;

(a) set forth the conditions to be met and the responsibilities of both parties, including the stipulation of disbursement and documentation procedures and requirements, preferably as recommended in below,

(b) outline a rough time schedule for the activities provided for in the project and specify the organization responsible for carrying out the activity,

(c) provide that the Government of Niger will submit to AID within 60 days time a detailed schedule of activities to be carried out by its agencies within the rough time schedule of 2. above;

(d) call for AID Niamey to provide to the Government of Niger within 30 days a detailed time schedule of activities for which it is responsible under the rough time schedule of 2. above;

(e) Require the Government of Niger, in consultation with ADO/Niamey, to draw up a detailed evaluation and monitoring plan for the project within 60 days of the signing of the project. (see below)

2. In accordance with conditions of the grant agreement, an advance of funds will be made by ADO/Niamey to the Government of Niger when conditions stipulated have been met.

3. AID will contract with suitable organizations to recruit personnel whose recruitment is their responsibility.

4. The Government of Niger will initiate procurement and recruitment for which it has responsibility.

Implementation Plan

The Government of Niger has proposed a tentative plan and schedule for implementation. Table 2 presents the major activities that have been indicated along with anticipated periods for implementation. These should be regarded as provisional. See Table 2 for Schedule.

Recommended Disbursement and Procurement Procedures

It is strongly recommended that maximum flexibility in both procurement and disbursement procedures be allowed for the timely implementation

- Tentative Implementation Schedule (continued)

1974

1975

1976

1977

First Six Multiplication Centers (continued)

Purchase Fertilizers and Insecticides

Obtain and Store Seed

Hire Personnel

Train Personnel

Following Seven Centers

Construct Buildings

Build Wells

Purchase Oxen

Purchase Oxen Equipment

Arrange Board for Trainees

Purchase Fertilizers and Insecticides

Obtain and Store Seed

Hire Personnel

Train Personnel

Demonstration Farmers

Arrange for Input Credit

Procure Inputs

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	1974	1975	1976	1977
Purchase Fertilizers and Insecticides				
Obtain and Store Seed				
Hire Personnel				
Train Personnel				
Construct Buildings				
Build Wells				
Purchase Oxen				
Purchase Oxen Equipment				
Arrange Board for Trainees				
Purchase Fertilizers and Insecticides				
Obtain and Store Seed				
Hire Personnel				
Train Personnel				
Arrange for Input Credit				
Procure Inputs				

1974 1975 1976 1977

UNCC (continued)

Train Field Auxiliaries

Operate Present Areas

Survey Areas of Expansion

Operate Expanded Areas

Establish Demonstration Plots

Distribute Seed

Experimental Service Centers

Contact Villagers

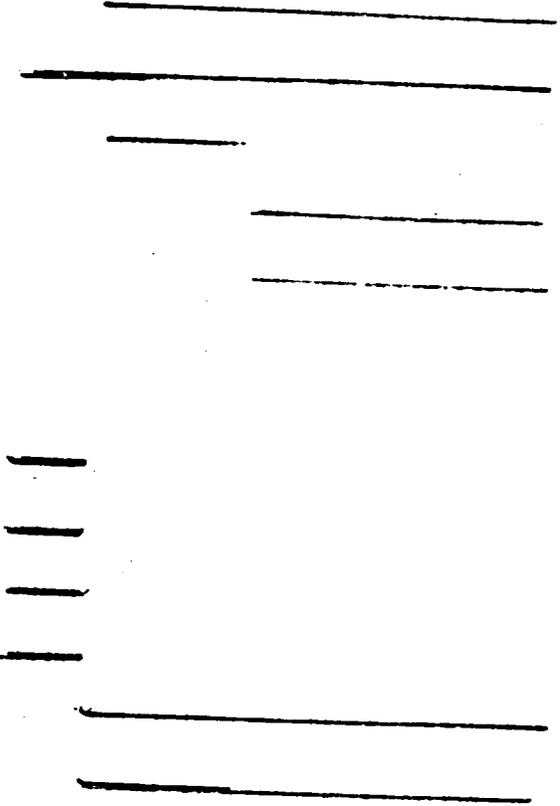
Construct Buildings

Purchase Equipment

Hire or Allocate Personnel

Train Staff and Field Auxiliaries

Establish Input Procurement/Output Marketing Cycle



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Phosphate

Make Feasibility Study



of this project. In discussion with the GON officials, it was agreed that as much as possible of the project activity will be initiated immediately upon negotiation of the Grant Agreement in order to take some advantage of the 1974 planting and harvest season (see Project Implementation Schedule for details of July-December 1974 activity). With agreement in principle on the urgency of project implementation, it is further recommended that the procurement and disbursement procedures established for the Phase II, Relief and Rehabilitation program be followed. Details of these procedures are included in Article V (Procurement) and Article VI (Disbursement) of the Sahel Drought Recovery Program Grant Agreement for Niger and in the Basic Implementation Letter No. 1 dated March 15, 1974, Articles V and VI.

Responsibility for the procurement of goods and services should be with the Government of Niger. AID would then expect the GON to take whatever steps it considers necessary and appropriate to assure that procedures used for the procurement of goods and services and designed to produce the lowest price available, provided however, that timely execution of the project will not be hampered. Compliance

with this requirement can generally be assured by the procurement of the goods and services by means of normal commercial practice and/or government procurement in the Republic of Niger. The GON would also establish a special account with its designated disbursing agent exclusively for the receipt, management and disbursement of all funds provided under the Grant Agreement. Financial records for this account would be maintained for control and audit purposes.

B. Conditions and Covenants

Prior to the first disbursement or issuance of the first Letter of Commitment under the Grant Agreement, the Government of Niger shall furnish to AID in form and substance satisfactory to AID:

- (1) A stated policy for the buying and selling of food grains produced in Niger. The policy document shall include a coordinated marketing and price structure designed to minimize extreme price fluctuations by offering an adequate incentive price to the farmer for increased production and an appropriate selling price to the consumer

for internal consumption. This price policy should also encourage increased production for the establishment of grain stocks and for export. This policy will be implemented through the UNCC and OPVN organizations.

(2) A stated policy for the purchase of seeds by the farmer.

The purchase of improved varieties of millet and sorghum and other food grain seeds will be facilitated through the UNCC organization. The cost to the farmer should be higher than the cost of ordinary seed so that, once the seed service is fully operational in providing improved seeds to the farmer, the system can be self-supporting with an autonomous accounting system.

(3) A detailed plan for the implementation of the project.

The preliminary project implementation schedule submitted to the project design team appears to be overly conservative in setting intermediate UNCC action targets. This schedule can perhaps be "speeded up" upon closer examination by the GON project officers.

(4) An evaluation and monitoring plan to be initiated immediately upon project approval. This plan should be incorporated in the reporting responsibilities of the Ministry of Road Economy and the UNCC so that problems can be immediately recognized and the necessary corrective action taken. The GON should participate with the AID Project Manager in quarterly evaluation meetings where problems can be jointly resolved. There should be an annual joint project review with participation from AID/W.

(5) An agreement understanding that the GON will keep open for future review the question of chemical fertilizer use in the production of cereals, contingent upon the eventual availability of fertilizer at reasonable prices.

(6) An agreement^{to}/make every effort to assume salary costs of Nigerien personnel hired for the project during the fourth and fifth years of activity.

C. Evaluation and Monitoring Plan

The Government of Niger has, under considerable time pressure, proposed a tentative implementation schedule which can become the basis for an evaluation and monitoring plan. Table 2 in II,3,A above presents the major activities along with the indicated period of execution. An improved schedule may be available for incorporation in the Grant Agreement. It is desirable that a much more detailed schedule be drawn up at an early date the necessary activities, tapping the experience and perceptions of those who will be responsible for planning and executing these activities.

It was not possible during the design team's visit to discuss an evaluation and monitoring plan with the GON, due to the change in government and the tentative nature of program plans. A suggested plan is described below. The ADO may use these or comparable ideas in assisting the GON to prepare the evaluation and monitoring plan required as a condition of project initiation.

A Project Manager should be designated by the Government of Niger within two weeks of authorization of the Project. His responsibility

will be to create a detailed plan including a schedule and cost estimates, assemble a monthly progress report on the achievement of scheduled activities, their cost, difficulties encountered, and the initiation of corrective action. He will obtain data on progress from the persons designated as the segment managers of the Project. The Segment Managers will be responsible for initiating appropriate corrective action on the basis of the monthly reports.

The segments would be:

Applied Research on Millet

Seed Farm

Seed Multiplication Demonstration Centers

CFJA Schools

UNCC expansion and extension services

Experimental Co-ops in Gaya Arrondissement

Phosphate mining and distribution

The Project Manager and Segment Managers, will participate within four weeks of the authorization of the project in an orientation

seminar which they will be briefed on modern scheduling techniques.

The briefing will be conducted by an expatriate expert in work planning and scheduling. Under his guidance, the Segment Managers will draw up a detailed schedule for progress and costs and agree to a reporting format and procedures for inducing corrective action.

The reporting format and procedures will be by the Project Manager for the duration of the Project. The reporting of activities will be in the same terms as laid out in the plans.

The level of detail of activities will be sufficiently fine to cover relatively short periods of time. Thus, for a major building, the activity "construct building" might be broken down into smaller activities such as:

- Design building
- Order materials
- Store materials
- Hire personnel
- Prepare site
- Construct foundation

- Erect wall
- Install roof
- Install electrical system
- Install plumbing; and
- Finish building

or the activity" Purchase Equipment" might be broken down further to:

- Obtain catalogues
- Place order, and
- Obtain delivery

Each of the detailed activities would be scheduled beforehand.

periodically at monthly intervals, actual progress would be compared with actual cost. These comparisons would be the basis for corrective action, where indicated.

A copy of the progress report will be made available within designated period after the end of the reporting period being reported to segment managers, ADO/Niamey, and AID/Washington.

The responsible GON officials should participate with the AID Project Manager in quarterly evaluation meetings where problems can be jointly resolved. There should be an annual joint project review with participation from AID/W.

Section 4. Major Issues

Technical Feasibility. Does the proposed program have the potential technical power to achieve its purpose? While the production increase which is potentially available in the project's three-to-five year term is limited, it is sufficient to permit achievement of the production increase required to end Niger's dependence upon external cereals if rainfall returns to even sub-normal levels. Should the drought continue at anything like its 1972-73 intensity, there is no viable agricultural production system in Niger with the technology currently available or anticipated in the near future. The proposed investments are necessary to make it possible for Niger to take advantage of technology improvements which can be anticipated for the longer term, such as high-yielding millet and sorghum varieties and high-protein sorghum.

Economic Feasibility/Cost Effectiveness. The proposed expenditures cannot be examined in isolation, as they would not by themselves be sufficient to accomplish the program's purpose. The concurrent IBRD and FED investments in the Maradi and Zinder Departments respectively are essential complements to the proposed AID assistance. The three programs together offer the prospect of a significant upgrading of the technology practiced by the bulk of Niger's farmers in cereal production and the consequent ability of the country to provide its own essential food supply except in possible future periods of such severe drought as has been experienced in 1972 and 1973. This will not be a one-time improvement, for these programs will establish agricultural service and support systems (research, seed supply, extension, input delivery systems, credit, fertilizer availability) which are required for and which will permit the continuous further improvement in agricultural production. While most of the proposed expenditure will cover local costs, the facilities and services to be financed are very inexpensive, so that the return on this investment can be relatively high. In terms of overall cost effectiveness, the investment offers a favorable comparison with the cost of continuing to provide cereals from outside of the country for a portion of the population of Niger. Unless early progress is made to improve the cereal production system, the expanding population of Niger will require external supplies even in normal rainfall periods.

Equity. Is it necessary and why is it proper to concentrate the program's expenditures in the relatively favored southern areas of the country, where farmers can be expected to get back on their feet fairly quickly when rainfall improves to even lower-than-normal levels? How will this program benefit the nomads and pastoralists who have lost their means of production?

The overriding necessity for Niger is to produce the cereals required to feed its people. The only way that can be accomplished is by improving methods in the southern part of the country where normal rainfall makes a sustained production system potentially achievable, and where the delivery and contact system to reach the farmers is already in existence or can readily be established. There is no possible way to increase production by working with the scattered population of the more northerly areas, where adequate rainfall always will be problematic and where the cost of establishing the infrastructure and supporting services would be prohibitive in comparison with possible benefit. The pastoralists will have to be helped to re-establish their way of life with other means and through other programs. When rainfall is near normal levels, they will again have the capability of trading products and services of their herds for the cereals they will need. The international research center system hopefully will make available over the longer term a drought-resistant, short season millet which would permit them to grow a subsistence crop in years of normal rainfall.

Price Policy for Cereals. Will the GON have the ability and the will to stabilize the price of cereals at levels providing an adequate incentive for their production in amounts required for current consumption and carryover stockage? This will be a different area of program management. Determination of the precisely appropriate price level and of the optimum method for its administration are complex matters on which even American specialists do not yet agree. The new military government of Niger has not yet been able to express any position on this key question. Its current policy in setting prices for the sale of imported grain seems to be dominated by a concern for consumers, but this may be an understandable reaction to the near-complete destitution of the non-salaried population. AID, through the Grain Stabilization Project, has been involved in this problem for three years and currently is planning further assistance to improve the basis for effective price determination. The GON should be required to endorse an appropriate price policy in the project agreement for this proposed assistance, and a continued dialogue with the government should be pursued by the Area Development Officer (ADO) during project implementation.

Sector Relationship and Dialogue. Does the proposed assistance provide the opportunity for a continued interaction with the GON on broader questions of agricultural and economic policy? Given the central importance of cereals in the consumption pattern and the economy of Niger, particularly as the drought emergency has focused attention on cereals availability, it seems evident that the ADO will have adequate opportunity during implementation of this program to pursue a dialogue on price policy and other key considerations for overall economic direction of the country.

Follow-on Costs. Will there be follow-on costs after this program is completed which the GON might not be able to meet? Does the initial AID funding imply continued financing that might be difficult for the Agency? This proposal is for three-year funding of a GON cereal production improvement program which would have continuing costs, although at lower levels than during the initial period, if it were to be carried on and if the initial investment were not to be wasted. It is unlikely that Niger will be able to finance the full post-1977 costs. The country has some prospect of achieving self-financed modernization if the current search for oil is successful. That development could not occur fast enough, however, to be significant with respect to this program. Thus, it must be recognized that there will be strong pressure for AID to continue financing the cereals production effort for at least an additional two years. The GON might be able to assume all salary costs for this period. By 1979, the success of the program itself could have generated the additional income which would permit the GON to carry it on without further external support for the basic operating costs.

Personnel Costs. Should AID finance the cost of salaries of personnel added to the rolls of the Ministry of Rural Economy and of the UNCC under this program? There seems to be no alternative to AID financing of these costs. Other donors, such as the FED and the IBRD, support the full cost of additional personnel in their projects. The GON was only able as recently as 1970 to get by for the first time without general budget support from France, and it has been necessary this year to reinstitute French financial assistance for routine government operating costs not included in development activities. The extension and cooperative structure is staffed at the operating level only where an external donor or a commercial export crop has provided the resources. It has not proved possible to identify non-salary, program-related costs previously carried by the GON which could be shifted to the AID account to release government funds to cover new personnel costs. The essential agricultural services cannot be established without external financing of salaries, and it is accordingly concluded that AID should cover these costs unless it is absolutely impossible.

Fertilizer. The design team's technical personnel felt strongly that it would be necessary to provide fertilizer (diammonium phosphate, DAP) if the program's goal of a significant increase in cereal production were to be achieved in three years. However, there not only is a real question as to the availability of either DAP or nitrogenous fertilizer for Niger, but the GON has taken the position that it does not wish to use even grant assistance funds to procure fertilizer. The responsible authorities of the Ministry of Rural Economy feel that the very high current fertilizer prices will not be reduced in the foreseeable future to levels which would make it economical to apply fertilizer in cereal production in Niger. The apparently attractive alternative of direct application of local rock phosphate was identified and is incorporated in the program, subject to examination of certain technical and economic questions. It is concluded a) that there is a valid possibility of achieving the required five-year increase in cereal production without imported fertilizer; b) that the use of powdered local rock phosphate should be pursued if it proves feasible; and c) that the program should be supported even without the availability of imported fertilizer.

ANNEX I
PROJECT DETAILS

A. Adaptive Millet Improvement Research

Importance - Millet (Pennisetum typhoides S. and H.) is by a considerable margin the most important and preferred food crop in Niger. 1972 millet production exceeded that of the second and third most important crops, sorghum and cowpeas, by 4.4 and 6.4 times, respectively. An estimated million tons are produced annually on 2.3 million hectares (940,000 metric tons on 2.61 million ha for 1971 and 1972). Since the present technology of millet production remains at a low level with a national yield level of only 400kg/ha, any improvement could have a multiplicative effect in building up a surplus for recurring famine years; permitting the diversion of some of the present acreage to other food and/or cash crops; improving direct human nutrition in a rapidly expanding population (2.7% annual growth rate); and providing a valuable export commodity to the country's more wealthy neighbors (especially Nigeria).

The essentiality of a dynamic, rapidly-advancing adaptive research program was immediately obvious to the design team. Without reasonable opportunities for early increases in productivity levels (by adopting the present improvement package), and the longer term possibilities for revolutionary advances, there would be little need to develop the infrastructure required for a comprehensive "National Cereals Program". It is the considered opinion of the Team that "delivering" the present package at the farmer level is a highly worthwhile objective, but that both medium-and-longer-term (4-8 years) potential yield increases amply justify a major production scheme with infusions of outside capital.

Research Strategy - Pennisetum millet is among the easiest of plants to

manipulate genetically by virtue of its ease of crossing, its high rate of natural outcrossing (80%), and the very broad range of genetic variability available. Physiologically, millet is one of the most efficient species of commercial crops, having the C.4 (Hatch-type) carbon assimilation systems and in being exceptionally well-adapted to the high temperature, poorly-distributed moisture, and coarse-sandy soils of the Sahelian region. Moreover, a millet improvement program could rapidly exploit progress made in similar tropical regions--such as India--where technology is more advanced. Important outside sources of germplasm, technology, and information would be the GAM and IRAT programs centered at Bambey, Senegal; the IAR project at Samaru and Kano in Nigeria; Indian programs, particularly at Delhi, Punjab and Gujarat; International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) located at Hyderabad, India; the Arid Lands Agricultural Development (ALAD) program in Lebanon; and the USDA-ARS program located at Tifton, Georgia.

Plant improvement can be oriented toward developing improved "pureline" strains, composite varieties, or hybrids. It is likely that all three forms could be involved in this program, utilizing both the conventional variety or line and population improvement breeding methods. The latter method based on the principle of recurrent selection has been widely adopted on other outcrossing species like maize, sorghum, and cotton. It is now generally acknowledged that population improvement aimed at developing composite varieties is most appropriate for improving outcrossing species in developing countries. Moreover, it greatly facilitates production and distribution of improved seeds.

Concurrent with developing improved plant types and varieties is the need to evolve production practices designed to maximize productivity within reasonable risk limits of dryland environments. The several parameters of

management including tillage practices; fertilizer and soil amendment applications; planting, intercultivating and harvesting operations; populations and spatial arrangements; and weed, pest and disease control will need to be carefully studied with changes in varieties, price structures, and technological improvements. For example, the availability of cheaper forms of fertilizers (rock phosphate) or more effective agricultural chemicals--like systemic fungicides and chemicals--could make profound changes in production practices and even in the improvement strategy itself.

Characteristics of Scheme - An effective millet adaptive research program for Niger featuring population improvement aims to develop improved forms and varieties together with optimal management and plant protection practices for them and to deliver the entire package to the farmer as rapidly and expeditiously as possible. In order to achieve these objectives the scheme should have the following features:

1. Accept for the program at the outset the best available local varieties (P3 Kolo for the East Central region and Hainiki Rai for the West) with presently-recommended practices.
2. Integrate research, seed production and extension as closely as possible to speed the delivery system and provide for a two-way flow of information.
3. Develop two basic packages for the following conditions:
 - (i) Millet for semi-arid conditions (about 400 mm or more rain)
 - (ii) Millet for arid conditions (less than 400 mm of rain).

This program assumes the total integration of all aspects of the improvement practices including varieties, management, and plant protection. While not incorporated in the current GON proposed, this program characteristic should be kept in mind as implementation proceeds. Under such an arrangement, improved

seeds and practices should reach the most progressive farmers within two years, and anyone else wishing to adopt them within four years following confirmation of their real advantage. It is suggested that such a rapid delivery system would be possible by establishing mobile production/demonstration teams closely integrated with the research, seed production and extension programs.

Research Activities. Three basic areas of adaptive research will be involved: plant improvement, plant protection, and management practices. Since these are closely interrelated, it is essential this be a closely integrated team effort. It is further assumed that major emphasis will be given to population improvement involving the continuing infusion of new germplasm and resulting in a perpetual rising productivity level as well as greater tolerance of stresses and diseases. Greatest immediate genetic gains will be made in developing and adapting more effective plant types and subsequently concentrating favorable additive genes for yield, broadbased (horizontal) resistance to diseases and drought, and environmental insensitivity (daylength and temperature). The end-product of this program can be improved strains, composite varieties, and parental lines for hybrids.

Plant protection and agronomic research concurrently would deal with numerous parameters relative to the latest plant forms and strains. These should further examine the latest technological developments with potential for increasing yield levels and greater efficiency of productivity. Particularly relevant in this area are new, more effective agricultural chemicals and more efficient fertilizers. Moreover, permanent shifts in price structures will shift the balance of optimizing practices.

Proposed Staff - The staff required to meet the needs of the basic

research program is as follows:

Plant breeder - 1

Plant Pathologist or Physiologist - 1

Agronomist - 1

The French assistance program (FAC) has agreed in principle to provide the salaries and assignment travel cost for these three additional positions on the IRAT staff in Niger.

Operating Costs. It is proposed that the A.I.D. project cover the cost of research assistants, labor, and other operating expenses, at CFA 45,000,000 per year.

Capital requirements. Construction of housing, laboratories and farm buildings will be necessary to accommodate this research program and are estimated as follows:

Housing laboratories and service (farm) buildings--CFA 45,000,000

Agricultural equipment--CFA 10,000,000

Laboratory equipment--CFA 10,000,000

The proposed siting for major experimentation is the Tarna Experiment Station at Maradi. However, there would be considerable merit in considering a location nearer Niandy from the point of view of accessibility, living amenities, obtaining supplies, and being close to the political center of the country. Possibilities are the former President Diouri's farm and the rice experimentation site at Kolo. This change in location was not supported by IRAT and the Ministry of Rural Economy but should be explored further, as it would enhance considerably the prospect for successful recruiting for these important research positions.

The successful mounting and operation of a Niger Millet Improvement Program could be expected to have a major impact on food production in Niger within a comparatively short period of time. Early agreement on program direction and method and appointment of scientific staff--especially a vigorous, dynamic and able plant breeder--are vital. Assuming this program can be established early in 1975, the following schedule of events could be expected, assuming favorable circumstances and determined efforts by all parties:

- 1975: Recruitment of staff; develop facilities and working arrangements; commence construction of buildings; order equipment; assemble germ-plasm; and grow-out first experimental crops. Concentrate on semi-arid/subhumid (23 Kolo) millet first - to be merged with new dwarf synthetics developed at Senegal.
- 1976: Further develop an intensive population improvement program for semi-arid (above 400 mm) millets during first irrigated season (February-May); initiate extensive testing program for inbred (5-1) lines, varieties, and hybrids during main rainy season; expand agronomic and plant protection experiments; and carry out second-cycle recombination during the first (October-January) irrigated dry season.
- 1977: Continue breeding program as described above and develop the second population for arid conditions (less than 400 mm rainfall) by merging dwarf synthetics with desert varieties. Commence production/demonstration program on new, semi-arid/subhumid population. Carry out extensive yield tests of improved varieties, populations, and hybrids from different sources. Expand production/demonstration activities and begin training Selected Village Demonstrators (SVD's).

1978: Continue testing and breeding program in three seasons per year. Replace P3 Kolo in production/demonstration program with new composites or hybrids. Commence production/demonstration program in arid zone and expand training program.

1979: Continue breeding and testing program; introduce new, shortduration composites in arid zone. Expand production/demonstration and training of farmers at the secondary demonstration level.

1980: Achieve complete coverage of new millet for the semi-arid zone; continue breeding, demonstration and training programs. Replace short-duration millet (Hainiki Rei) with new composites in production/demonstration program in the arid zone.

Improved millet prototype. As an aid to visualizing the impact of revolutionary new millet forms grown with improved cultural practices and adequate plant protection (as required), a descriptive profile of an elite millet composite is outlined below:

1. Dwarf to medium-dwarf height (100-150 cm) and resistant to lodging.
2. Daylength and temperature insensitivity to permit better management.
3. Profuse basal and nodal tillering with erect or semi-erect leaves.
4. Large (diameter and length), compact earheads with good quality seeds.
5. Highly drought-resistant; strong and extensive root system becomes dormant during dry periods, grows rapidly; early maturing (80-90 days).
6. Resistant to major diseases of the region: downy mildew, striga, sinut, and ergot (horizontal resistance to mildew).
7. Bold, bright, uniform seeds with good milling, taste, and nutritive qualities.

Equally important but not directly observable is the ability to respond

to favorable conditions when moisture and soil fertility are adequate. Thus, eventual grain-yielding potential should exceed 6,000-7,000 kilos per hectare when moisture is adequate or under irrigation, pests and diseases are controlled, and soil fertility is not limiting (nitrogen fertilizers applied at 100 or more units per ha adequately balanced with phosphorus, potash, and minor nutrients). Assuming reasonably widespread adoption of such a composite with the improved package of practices, even without nitrogenous fertilizer, it should be possible to double or triple Niger's millet production more easily than increasing India's wheat production in the late 1960's.

B. Foundation Seed Farm

The improved millet variety, P3 Kolo, and improved sorghum varieties have been available in Niger for some years, but have never become widely used, due to the absence of a seed multiplication system and the inadequacy of the extension structure. There was an unstated but common assumption until recent years that food production was not a problem requiring significant governmental attention. Now that cereal production is a major emphasis of government policy, the structure is being developed through this and the concurrent IBRD Maradi and FED Zinder projects to complete the facilities and services required to support the Nigerien farmer in food as well as commercial crop production.

A primary requirement is a foundation seed farm to take breeder seed from the research stations and multiply it under controlled, quality-maintaining conditions. IRAT has produced seed in relatively substantial quantities on some occasions in the past, and, for example, has ten tons of P3 Kolo on hand in the Spring of 1974. This has been an occasional and ad hoc operation, however, and there has not been a sustained system for the initial multiplication of seed. The government now proposes to establish a new Seed Service in the Ministry of Rural Economy. It would be an autonomous unit, having separate accounts to permit the determination of true costs. Its chief would report directly to the Technical Director of the Ministry, and would have no other responsibilities, so that he could devote his full time and complete management attention to quality seed production, through a foundation seed farm and a further system for volume multiplication and distribution.

The foundation seed farm will be established on irrigated acreage directly across the river from Niamey, on what was President Diouri's farm before the recent military coup d'etat. The farm, now government property, has extensive

facilities for both flow and sprinkler irrigation. It has some of the required buildings and equipment, and can be almost immediately put to effective use for seed production. An investment of only CFA 10.0 million (\$40,000) is required to equip the farm fully. Its operating costs will be CFA 20.0 million (\$80,000) per year. It is hoped that the seed system eventually can be self-financing through the sale of seed to farmers, but for at least the first three years, it will be necessary to finance operating costs under this project. The farm will be managed by a Nigerien B.Sc. agronomist. The director and staff of the IRAT headquarters office for Niger in Niamey will provide technical guidance and supervision. Initial emphasis will be given to millet and sorghum seeds, but the targeted annual production from the farm will be as follows:

millet	21,120 kilos to plant	2,750 hectares in M ₂ multiplication					
sorghum	24,000 kilos "	"	1,320	"	"	"	"
cowpeas	67,000 kilos "	"	2,800	"	"	"	"
corn	216 kilos "	"	nine	"	"	"	"
wheat	1,250 kilos "	"	12½	"	"	"	"

It would be desirable to provide an ex-PCV to support the farm manager, if a qualified individual can be made available as discussed in above.

C. Seed Multiplication System

Planning for the seed multiplication system has been based on the target of providing select seed for one-half of the acreage planted in major food crops in Niger, on the assumption that it will be possible to reach and to motivate that portion of the farmers to use select seed. With the composite varieties to be employed initially, farmers will be able to keep their own seed, but it is desired to provide them with new seed every four years, both to maintain varietal

quality and to introduce the new varieties that are expected to come out of the research stations. The annual requirements for seed from the multiplication system are calculated as follows, based upon the indicated acreages of anticipated annual planting of each crop by the farmers of Niger:

<u>Crop</u>	<u>Total Planting Target Coverage</u>	<u>X 25%</u>	<u>Seeding Rate*</u>	<u>Seed Required</u>
millet	$\frac{2,000,000 \text{ ha}}{1,000,000 \text{ ha}}$	250,000 ha	8 kg/ha	2,000,000 kg
sorghum	$\frac{600,000 \text{ ha}}{300,000 \text{ ha}}$	75,000 ha	16 kg/ha	1,200,000 kg
cowpeas	$\frac{700,000 \text{ ha}}{350,000 \text{ ha}}$	87,500 ha	24 kg/ha	2,100,000 kg
corn	$\frac{3,000 \text{ ha}}{1,500 \text{ ha}}$	375 ha	24 kg/ha	9,000 kg
wheat (for 100% of farmers)	$\frac{500 \text{ ha}}{500 \text{ ha}}$	125 ha	100 kg/ha	12,500 kg

*Seeding rates are increased to allow for losses and shrinkage. The common millet seeding rate is 6 kg/ha, for example.

Multiplication of seeds in these amounts through contract/demonstration farmers will require acreage as indicated below, assuming the yield levels achieved currently by the better farmers employing recommended cultural practices:

millet	2,500 ha
sorghum	1,200 ha
cowpeas	2,800 ha
corn	9 ha
wheat	12½ ha

The government plans to arrange this level of operations through fifteen seed multiplication and demonstration centers. A.I.D. support is requested for

thirteen of these centers. They would be run by the Ministry of Rural Economy Seed Service, and would be located in areas where the previous establishment of extension services by the Ministry or by UNCC, or the operation of a donor-assisted development program, has made the farmers relatively sophisticated and ready to employ new technology and to accept the guidance and control required for efficient production of quality seed. Seed will be distributed through the UNCC extension and cooperative structure, where it now exists and where it will be spread through this program. Where UNCC does not reach, the Agricultural Service of the Ministry of Rural Economy, which has representation down to the Arrondissement level, will provide the channel for seed distribution, supplemented by local shopkeepers at the village level. The use of contract farmers for seed multiplication is the only feasible way for the Government of Niger to undertake operations on the scale required. The multiplication farmers of necessity will have to be contacted for selection, instructed, provided with inputs, and kept under close supervision and control through the growing season and the harvest. Their one-hectare plots can serve as demonstrations for other farmers in their villages of the value of new select seeds and of the cultural practices being recommended through the extension system. It accordingly is proposed to use the seed multiplication system to the maximum extent for demonstration and extension.

Each seed multiplication center will have its own 60-hectare farm for direct production, to provide a minimum, assured supply of seeds without dependance on contract farmer performance and to serve as a training and demonstration site for its sub-Departmental area. This farm would be operated with oxen and would reinforce the extension of animal traction, which offers one of the most important

means for increased cereal production. Each center would contract each year with an average of 240 multiplication/demonstration farmers to grow improved seed on one-hectare plots. These farmers would pay for the seed they would plant, and, as currently anticipated, would receive a premium price of CFA 10 per kilo above the market price at harvest time for the seed produced on their multiplication plots. The center staff would have a major responsibility for controlling the amount and quality of seed returned by the contract farmers, based upon their knowledge of yields in the area and their direct observation and supervision of the harvest, to assure that only select seed would be purchased for further distribution. The multiplication/demonstration farmers would be changed each year, to maximize the demonstration/extension impact of this aspect of the seed program. Each year's group would be selected in a quarter of the surrounding area, again changed each year, to limit the area of geographical coverage and of staff travel for supervision and control. In the fifth year, when operations would return to the same area as in the first year, the best of the previous contract farmers would again participate while new farmers would be chosen to replace those whose prior performance did not justify their retention in the program. The seed multiplication system by itself thus in four years would provide an intensive extension and instruction contact with 14,400 farmers. They would be provided, through UNCC credits, all necessary inputs of seed, fertilizer, seed treatment chemicals, insecticides, and herbicides. It further is assumed that 20% each year of the demonstration/multiplication farmers would choose to take advantage of credit, training, and extension support to convert to ox culture; this aspect of the program is described in more detail in below.

The total acreage thus used each year for sorghum and millet multiplication, with cowpeas being added later after the cereal system has been established effectively, will be as follows (acreage requirements are increased by 10% to provide separation space around fields to limit variety deterioration):

	<u>Zinder</u>	<u>Maradi</u>	<u>Tahoua</u>	<u>Dosso</u>	<u>Niamey</u>
Millet	495	550	275	550	880
Sorghum	220	440	330	264	66

The program would be set up and initial centers established during 1974-1975. The first six centers (two in Zinder; two in Tahoua; one in Niamey; and one in Dosso) would grow a multiplication crop in 1975. The other seven centers for A.I.D. financing would be in production in 1976.

The centers would be staffed with a Technical Agent, a graduate of the agricultural training school at Kolo, assisted by a junior monitor, a graduate of a Young Farmers Training Center, who would have particular responsibility for working with the multiplication/demonstration farmers. Fifteen salaried resident laborers would be included in the center staff, to operate the 60-hectare farm.

The responsibilities assigned to the two relatively inexperienced staff members of the centers seem to be very great. Efforts should be made to increase the personnel assigned, as they can be made available through the training system. The government recognizes the desirability of technical assistance support for these centers and would be interested in having Niger-experienced ex-PCVs if they could be made available. This would be a difficult assignment, involving hard, practical work, with very austere living conditions at isolated locations. It is anticipated, nevertheless, that there may be some returned PCVs who would understand precisely what they would be getting into and would like to return to Niger as salaried junior professionals to undertake the task.

The centers in each Department would be guided and supervised by a specialized agricultural agent at the Departmental headquarters. He would be responsible particularly for determining the time and conditions for planting, techniques and timing of cultivation depending upon seasonal characteristics, varietal purity analysis, and the general organization of the annual campaign.

The proposed funding of the seed multiplication program is indicated in above.

D. The Package of Improved Practices

Farmers using the local practices typically get 300-500 kilograms of grain per hectare. With this low yield, it is difficult for them to provide food for themselves, much less provide for the urban population or store up for a dry year. To increase production, IRAT has tested a package of improved practices that usually double the present yield. The project purposes to take this set of improved practices to the farmer through the agricultural extension agents working in the local UNCC cooperatives, the staff of the Ministry of Rural Economy when UNCC is not yet established, and the seed multiplication demonstration farms. The practices are:

1. Cultivating the soil before the first rain - In many areas, the ground is somewhat hard. When the first rain comes, much of the water runs off and is wasted, rather than soaking in. By cultivating with a spring-toothed cultivator those farmers who have access to animal traction break up the soil and enable it to absorb much more of the moisture, thereby giving the plants a better start. Sometimes this practice alone increases the yield by as much as 15 per cent.

2. Use of improved seeds - The local varieties of millet give a very low yield and do not respond well to fertilizer. IRAT developed P-3 Kolo by selecting from local varieties. Without the improved practices, it yields but little better than the local variety and, with less than 250 mm of rainfall, might not do quite as well. It does respond better to high fertility and the improved practices than the local. It matures in

ninety-five days. IRAT is experimenting with another variety that will mature in seventy-five days. With sparse rainfall in recent years, the early-maturing, drought-resistant varieties could assure a crop. IRAT also has a variety of cowpeas, TN 88-63, which matures in seventy-five days, and can produce a crop with 250 mm of rain. It has been known to produce two tons per hectare. Improved sorghums are available from IRAT and from the West African Major Cereals Project at Samcio, Nigeria.

3. Pure stands of cowpeas - Cowpeas are ordinarily intercropped with millet. Substantially increased yields can be obtained by cropping cowpeas by themselves and spraying with insecticide. This avoids extensive damage from insects to both the foliage and the bean.

4. Planting at the right time - Millet should be planted at the first rain that dampens the soil to a depth of four inches. If a planting rain has not come by 15 June, then it should be planted in the dry ground to be ready when the first rain comes. Peanuts should be planted after the first heavy rain following the planting of millet.

5. Seed Treatment - When the seed is planted in the dry ground, it is subject to mildew and attack by insects or other pests. To avoid this, the seed should be treated with insecticide-fungicide mixture. This is mixed with the seed in a gourd just before it is planted. This usually results in better germination.

6. Density - The recommended spacing of hills of millet is 1m X 1m. Sorgho spacing is .80m X 60m. This is closer than is common, but it is found to increase yields.

7. Weeding - The first weeding should be done ten days after planting, at which time the plants should be thinned to three in a hill. Another weeding should be done at twenty-four days, and others as needed. Proper weeding does increase the yield.

8. Animal traction - Cultivating by hand limits what a man can farm. The only way to expand the size of the farm for a given number of laborers is to employ animals to cultivate. Two men and a pair of oxen can easily cultivate more than can ten men by hand. Recently, some farmers have been cultivating with a donkey cultivator, and have found that one man and a boy with a donkey can cultivate as much as three or four men by hand. The implement that is recommended for use with oxen is the ARARA which is made in Senegal. It consists of a frame with various attachments such as a plow, a spring-tooth cultivator, and a peanut digger. Use of oxen has four advantages: a) they enable the farmer to cultivate the soil before the first rain, so as to conserve moisture; b) they enable him to expand the size of his farm; (c) they enable him to plow under organic material which helps preserve soil condition with reduced periods of fallow; and d) the oxen produce needed fertilizer for the farm.

9. Use of fertilizer - Most of the soils in Niger have been depleted and need fertilizer. The price of commercial nitrogen is so high that it is not economical to use. However, millet does respond well to manure. Any kind of waste grass or vegetable matter can be made into compost with animal manure, and can be used in place of commercial nitrogen fertilizer. Tests have been made at IRAT which show that the same results can be obtained with compost as with commercial nitrogen fertilizer. Considering the high cost of nitrogen, it is important to conserve any waste stalks,

grass, old roofs, or fences, and use them for bedding for the animals, to retain the value of the manure, and supply humus.

All soils in Niger are deficient in phosphate. Peanuts respond well to phosphate. It is recommended to apply it to peanuts, which provides a significant after-effect on millet the first (40%) and second (20%) years after application, through residual phosphate in the soil.

E. Expansion of Animal Traction

As pointed out in other parts of this documentation, the introduction of Animal Traction is of greatest importance for the increase of cereal production. It allows for more acreage to be put into cultivation, it permits plowing before the rain - a practice which often increases yields up to 15% - because it prepares the soil for better moisture conservation, it provides manure which contributes further to higher yields. For these reasons, the 15 Seed Multiplication Demonstration Centers will be designed to teach the use of animals along with other cultural practices.

Each center is planned to receive four pairs of oxen with equipment, although this may prove to be only half the amount necessary to work 60 ha. The equipment consists of a cart, and a multipurpose tool bar, with attachments including a moldboard plow, a cultivator, and a peanut lifter. Farmers being trained in seed techniques will also be instructed in how to use these implements, how to care for the animals, and the care and use of manure.

It is expected that 20% of the participating farmers (i.e., 240x15x20%=720) annually will wish to purchase oxen and equipment after having seen them functioning at the Centers. Credit will be made available through UNCC.

According to statistics of the year 1971, there were only about 1000 teams of oxen used for agricultural purposes in the country. Reasons for this limited use are: lack of credit and lack of knowledge in use and care of animals. Since credit for the acquisition of animals and equipment is part of the project, an annual increment of 72% above the base year will be able to avail themselves to this improvement. Over four years, the

number of oxen in use should reach about 4000 vs. the 1000 present. Repayment will be stretched out over 4-5 years. Credit per farmer is figured at \$320, but purchase of implements not needed for cereal production could be postponed, thus reducing the amount to \$220. This, in turn, would make it possible to finance more farmers.

With a pair of oxen and equipment, a farmer can cultivate 4-5 times as much land.. Thus, if he has only five hectares, he can do custom work for neighbors, which will help them to cultivate more and will help him pay off his debt faster. The total of 2880 pair of oxen would permit putting from 20,000 to 25,000 more hectares into cultivation, aside from raising the yield per ha.

F. Union Nigerinne de Gredit et de Cooperation

The Cooperative System will be involved in the Cereal Promotion

Program in three phases:

- (a) strengthening of its present structure;
- (b) expansion into new areas; and
- (c) opening of five experimental Farm Service Centers.

Phase (a) In the second half of 1974 and all of 1975, it is planned to construct three distinct warehouses. Three delegates and six supervisors will be hired. Office and living space for the delegates and supervisors will be constructed. Information meetings in the village will be the main task of the year.

In 1976, demonstration plots will be established, and demonstration farmers will be selected and trained.

In 1977, the first seeds will be distributed, further extension work be undertaken, demonstration farmers will receive additional training, and Assistant Extension Workers will be selected and trained.

Phase (b) - The first year, 1975, will be mainly devoted to data

collection in districts covering about 1250 villages for integration into 125 cooperatives.

For 1976 it is planned to construct seven district warehouses and eight offices with living quarters, for the seven District Delegates plus forty-two Supervisors to be recruited.

1977 follows the pattern of 1976 under (a).

Village silos form part of both (a) and (b), 180 for 1976 and 180 for 1977. The total number of Extension Agents is expected to reach 500 for both phases.

The following table gives the geographic distribution of the 125 cooperatives

Phase (c) - The Centers will become real multi-purpose cooperatives with (1) assured two-way communication between members and administration; 2) preparation of farm plans in simplest form; 3) installation of demonstration plots; 4) storage of inputs for timely availability; 5) input credit tied to repayment in kind; 6) storage and marketing of output include collaboration with CPVN and tied in with marketing

credit; 7) creation of reserve stocks for the soudure within easy reach of the farmer and at uninflated prices, etc.

Orientation of farmers with respect to this project by the Arrondissement Office (the five Centers are in one Arrondissement is scheduled to begin before this cropping season. Two-day visits by District officials at the villages will lead into a two-day orientation course for ten elected village representatives. Of these ten, five will become village delegates to the Co-op, and three of these, or others, will become permanent liaison or sub-extension men. These latter will constitute the two-way communication link by frequent and regular visits to the Co-op. They will be paid the going wage for each day given to this work. Finally, eight representatives from each Co-op will receive seven days training at the District level.

Construction of needed facilities is slated for the last quarter of 1974; and the start of the multi-purpose cycle is scheduled for February-March of 1975.

Table follows:

TABLE
Expansion of UNCC

Department	District	Number of
Niamey	Ouallam	12
	Filingue	15
	Tera	15
	Say	8
Dosso	Dosso	10
	Loga	5
	Gaya	5*
Tahoua	Tahoua	10
	Illela	6
Maradi	Dakoro	5
Zinder	Goure	20
	Tanout	14
Total		125

There are approximately 10 village mutuals per cooperative and 5 village delegates per mutual

*Five experimental farm centers of phase (c)

G. Young Farmers Training Centers (CFJA)

Four Young Farmers Training Centers were built about 1965, located at Diffa, Maradi, Bellande, and N'Dounga, to serve four of the five Departments in the agricultural zone of Niger. Another is to be built in Tahoua Department under this project, completing the coverage of one for each Department.

These Young Farmers Training Centers were created for the purpose of teaching young farmers all important production practices for the major agronomy and horticultural crops, with special emphasis being given to the use of oxen and animal traction equipment in farming operations.

Candidates from 21-30 years of age were chosen by village officials to receive nine months of training at the centers, after which each was provided with a pair of oxen and a set of ox-equipment on credit with four years to pay for it. While at the training center, each student was provided food and lodging and 2000 CFA (\$8.00) per month half of which was used as down payment on the 80,000 CFA loan for oxen and equipment. Ox-equipment consisted of a cart and multi-purpose tool bar with plow, cultivator, ridger, and peanut lifter.

Their training consisted of animal traction, care of oxen, care and use of animal manure, crop rotations, the use of pesticides, fertilizers, vegetable gardening and the production of citrus, guava, and dates. In addition to agriculture, they were taught adult literacy, French, major local languages, and simple money management. About two-thirds of the training was of a practical nature, with remainder being classroom theory.

Three staff members were employed for each of the training centers.

Facilities for each center include a dormitory, classrooms, office-space, oxen and equipment, shelter for oxen, tool shed, limited storage for crops, and approximately one hectare of land for each student. N'Dounga and Maradi have eighty hectares of land each.

The past operations of most of the training centers have not been as successful as was expected due to a number of problems, most of which can be adequately overcome. Among the problems hampering success were poor selection of candidates for training, little follow-up after candidates completed their training, no spares available, and too large a debt to be repaid in too short a time.

In 1972, there was a change in the mode of operation of the Maradi center that made the operations more successful. UNCC became involved, and candidates for the training were chosen by village representatives of UNCC. Better-quality candidates were chosen, and UNCC provides the follow-up and collects the loan re-payments. Candidates feel a responsibility to go back to their villages and succeed. This experience will be used in other training centers in the future.

New Plans for Young Farmers Training Centers

Further support and re-equipment of two of the centers are to be taken over by other projects. The one at Diffa will be operated under the Lake Chad Basin Commission and the one in Maradi will become a part of the World Bank project.

The center at N'Dounga with eighty hectares of land is to be expanded to take care of eighty students. The one at Bellande will accommodate twenty-six, and the new center is to be built in Tahoua to accommodate eighty students. These are to be upgraded to become part of the cereal

program, turning out extension staff to work at village level.

Training will continue as in the past, with additional training added to teach the extension teaching methods and techniques, so that they can effectively communicate to the farmers what they have learned at the centers. They will be taught in teams of six to eight trainees each and will learn group psychology and how to develop leadership and become leaders in the villages.

Staff - Staff will need to be increased from four, now scheduled for the centers, to eight, four of which are expected to be ex-Peace Corps volunteers who know French and Hausa language.

Facilities - Additional facilities to provide for upgrading the training will include lodging, additional dormitories, classrooms, storage, water tanks, deep wells, water pumps, irrigation and watering equipment, vehicles, oxen and equipment, furniture, and kitchen equipment.

Project funds will also be used for maintenance and operating costs. The proposed budget is shown in II, 2, D above.

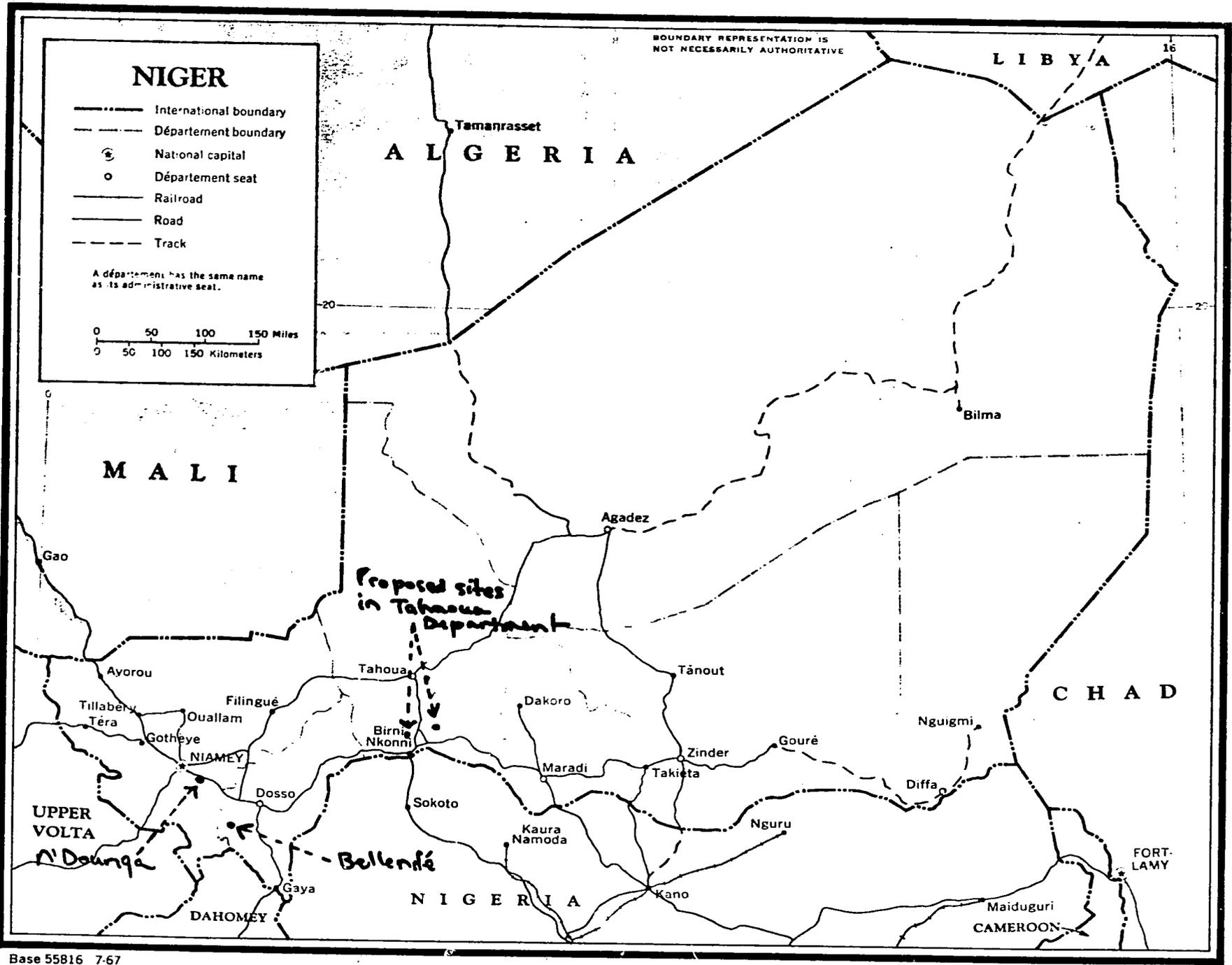
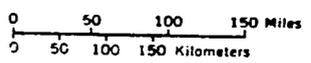
LOCATION of YOUNG-FARMER TRAINING CENTERS for AID SUPPORT

BOUNDARY REPRESENTATION IS NOT NECESSARILY AUTHORITY

NIGER

- International boundary
- - - Département boundary
- ⊙ National capital
- Département seat
- Railroad
- Road
- - - Track

A département has the same name as its administrative seat.



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H. Rock Phosphate Exploitation

Niger has a substantial deposit relatively high-quality (30-40% P₂O₅) rock phosphate near Tahous, centrally located in the country with reasonably good road access to all important agricultural areas. A study of potential commercial exploitation feasibility was made several years ago (1971?) by a Canadian aid team. It was concluded that the project would not be economically feasible, when simple super phosphate in the relatively small amounts required in Niger for peanuts and cotton (?) was being imported at CFA 12/kg. That study is being reexamined now that the price has quadrupled and supply is uncertain at almost any price.

IRAT has made tests in Niger and other Western African countries of the direct application of powdered rock phosphate. The typical soils of Niger are acidic dune sands. A single application in 1967 produced the yield increases indicated below, as an average of three millet crops in the years 1969, 1971, and 1973:

Amount applied(kg/ha.)	0	150	300	450
Average yield (kg/ha.)	1,197	1,486	1,600	1,748

The design team raised with GON authorities that possibly that a large-scale program of direct application of powdered rock phosphate might well be the most directly effective and sure means of increasing cereal production. The GON showed strong interest and has undertaken to obtain a copy for A.I.D. of the Canadian study, which we also are seeking directly from CIDA through Embassy Ottawa.

Niger has a cement plant near Tahous which uses gypsum from a deposit near the rock phosphate beds. The cement plant is idle during the four-month rainy season each year and the clinker grinding capacity

of this plant could be used for three months each year to powder rock phosphate. Cost involved would be the direct operating charges and additional maintenance, as the basic costs of the plant are carried by the cement operation.

There was little more information than this available at the time the design team left Niger. Many details of economic and technical feasibility need to be examined. However, it is proposed that the excavation and transportation equipment required for potential utilization of this domestic resource to improve soil quality and increase cereal yields be included in the A.I.D. project approval decision. No major capital installations seem to be required. Transport costs will be substantial, but it seems highly unlikely that they could be high enough to make the project infeasible. A distribution system and a method of pricing and credit for individual farmers or villages would have to be worked out. Some of the necessary answers could be available by the time a grant agreement is executed at the end of June 1974.

Satisfactory conclusion of other analysis and planning steps could be made a condition precedent for use of the funds, with a deadline as early as September or October 1974. Alternatively, it might be possible to anticipate financing for this portion of the program from special Sahel funds for which there is not a Fiscal Year 1974 obligation requirement. In this case, it perhaps would be preferable to defer this decision until it can be made on a more firm basis. If this is not possible, ^{the} probability that final analysis can be completed before the end of CY 1974 and that its conclusions will be positive seem sufficiently strong to permit inclusion of

\$750,000 for this item in an obligation yet this fiscal year.

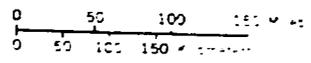
In the meantime, it would seem appropriate to:

- (a) urge the Ministry of Rural Economy to set up trials of rock phosphate effect on farmers fields, to verify the results achieved at the research station; and
- b) arrange for a two-man team (agronomist; geological engineer) from TVA to proceed to Niger in June or July to make an initial analysis of the proposal and to determine what further studies and planning steps need to be undertaken, including more precise costing of equipment requirements.

NIGER

- International boundary
- - - - - Département boundary
- ⊙ National capital
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- +—+—+— Railroad
- +—+—+— Road
- - - - - Track

A département has the same name as its administrative seat.



BOUNDARY REPRESENTATION IS NOT NECESSARILY AUTHORITY

113

M A L I

1931-1960
300 m.m.

1973

UPPER
VOLTA

1972

DAHOMÉY

Tamanrasset
A L G E R I A

L I B Y A

Bilma

Agadez

C H A D

Gao

Ayorou

Tahoua

Tanout

Tillabéri

Guallam

Illeouba

Dakoro

Téra

Gotheye

NIAMÉY

Birni Nkoni

Maradi

Jakarta

Goure

Nguigmi

Doucou

Sokoto

Sokoto

Kaura Namoda

Nguru

Yaya

NIAMÉY

N I G E R I A

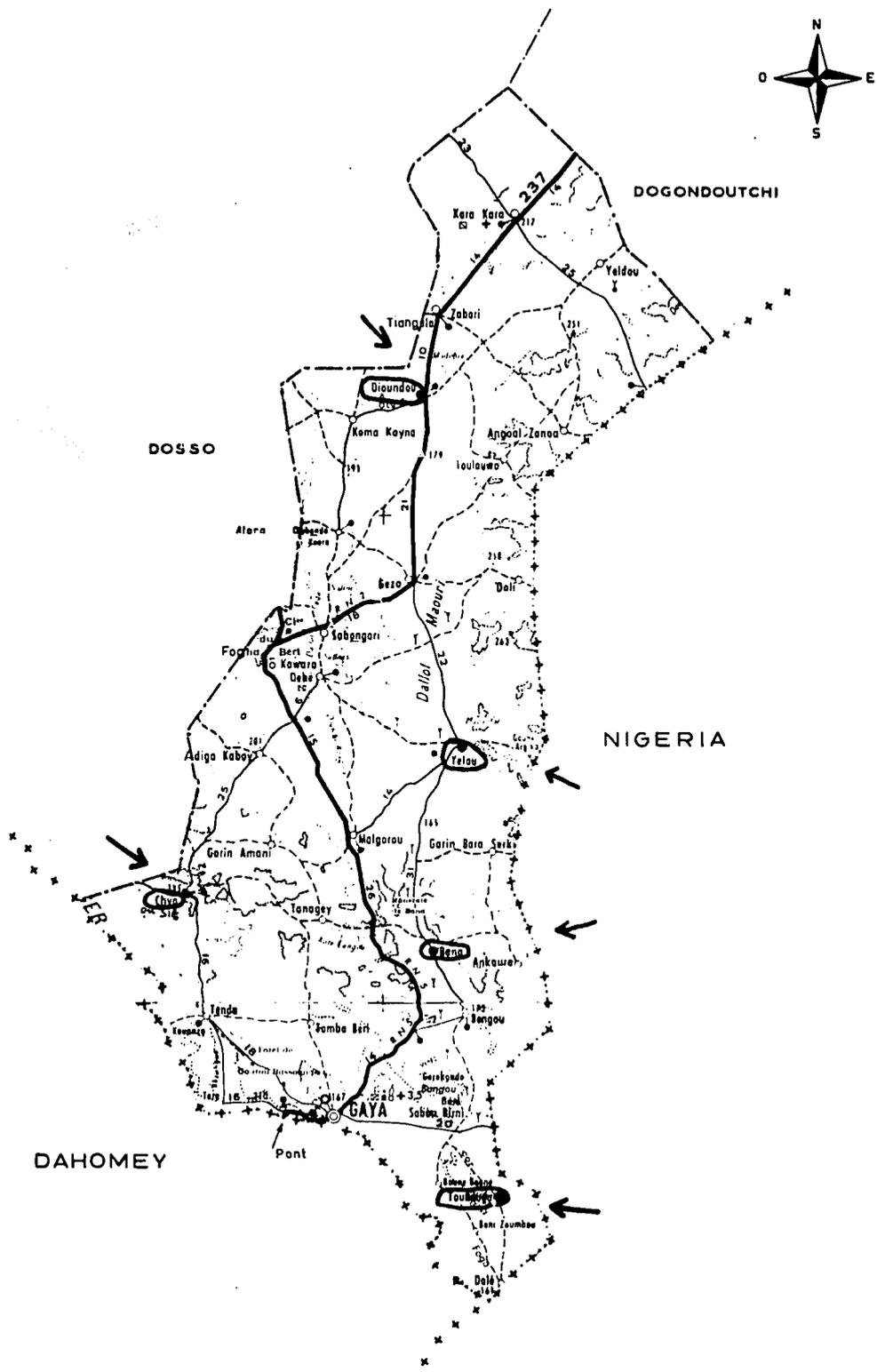
Kano

FORT-LAMY

Maiduguri
CAMEROON

ARRONDISSEMENT DE GAYA

LOCATION OF EXPERIMENTAL COOP SERVICE CENTERS



A. SECTOR ASSESSMENT OF AGRICULTURE IN NIGER

I. THE NATIONAL ECONOMY

The Government of Niger's principal objectives for the 1965-1974 plan period were to improve infrastructure and to accelerate the rate of economic growth through investment in agricultural productivity improvement programs, especially those aimed at increasing the yields of Niger's main export crops of groundnuts and cotton. Six years of deficit rainfall, the last three of which have developed into the most serious drought in living memory, however, have resulted in an acute shortage of food, and have forced Government to reassess its policy. Highest priority is now being given more exclusively to agriculture, in particular to increasing the production of staple food crops.

Since 1967, the economy has deteriorated because of the drought; this has caused a decrease in agricultural and livestock production by some 30% between 1967 and 1971, and further serious declines occurred in 1972 and 1973. Per capita income was estimated at CFAF 25,300 in 1970 (US \$90), but has decreased substantially since then.

It is difficult to gain more than an impression of the state of the economy because official figures are scattered, tend to be out-of-date and, except for the export crops, likely mis-stated. The government, for example, uses two annual per capita availability figures for cereals (177 kg. and 300 kg) depending upon the office. Population is probably underestimated: one finds both 4,468,000 and 4,220,000 in common use as the present figure. This reflects two differing growth estimates, which, when projected from the common baseline of 1960 yields differing estimates (CEF gives 2.7 and IMF is 2.5). Similarly there appears to be a systematic over-estimation of cereal production (795,000 and 840,000 tons are variously used to measure cereals actually available for human use in 1977-74). Meaningful price data is very hard to come by, and is difficult to compare as individual enumerators report at differing times and use varying measures in their reporting. As a result price trends can only be said to be generally up, likely over 30% on the average for African urban consumers in the past five years and sharply up this summer.

Exports are hard to measure because so much vanishes over the border to Nigeria where better peanut and livestock prices are to be found. In 1970, exports accounted for only 14% of the GNP of which peanuts accounted for 60%, livestock 15% and cotton 5%. Very little tonnage is lost and may be made up by unreported imports from Upper Volta and Mali. Minerals provided most of the rest.

If the present rate of population growth (say 2.7%) were to continue unchanged, Niger's present population of 4,100,000 (which is likely an underestimate) will double by the end of the century. Urban growth is even greater and the rate itself seems to be accelerating. From its present level of 350,000, urban dwellers and city consumers are expected to increase to 624,000 by 1982 and certainly will double again by the end of the century.

The rural sector generates an average income of about CFAF 17,000 per capita (US \$60, base 1970), of which some 32% or US \$19, is cash income. The sector directly supports about 93% of the population, agriculture - 73% and livestock rearing - 20%, and contributes about 50% of GDP (55% in 1967 and 48% in 1971). In terms of value, 80% of the sector's output is food crops most of which are consumed by the farm families that produce them. Agricultural exports amounted to 81% of total exports in 1968, but because of the drought declined to 48% in 1972. Conversely livestock exports increased from 13% to 20% during the same period; unfortunately this increase was also a consequence of the drought which induced the distress sale of livestock. Agriculture and livestock exports accounted respectively for CFAF 6.6 billion and CFAF 2.7 billion in 1972.

Manufacturing plays a miniscule role in the economy (4.3% of GDP in 1970). There seems little in the sector where Niger has an obvious comparative advantage. The limits of the domestic market require high per unit costs as economies of scale cannot be attained. Some economic union with its neighbor Nigeria would appear to be the country's best hope to make best use of its resources.

Mining, and uranium in particular, has been the only ray of light in an otherwise depressing economic scene. One mine presently is in production and a second will go into operation shortly. The income from these mines has become substantial and is now a fifth of the GDP, up from about zero a decade ago. Uranium is now the country's leading exchange earner as groundnuts have suffered more than proportionately from the drought.

If agriculture is the dominant activity in Niger, precariousness of food production is the dominant fact of that activity, which is made yet more serious by the unrelenting growth in population without corresponding increase in productivity. When drought strikes farmers turn away from cash crops and give priority to food crops to sustain or replenish food stocks. Thus the effect of the drought has been two-fold. One, to decrease per capita availability of cereals even as farm resources have been strained to the limit to produce these crops. Two, to greatly reduce area under cash crops, which crops provide two-thirds of Niger's foreign exchange income. As a result farm incomes have fallen, real incomes to non-farm people have fallen, national income has declined, and Niger has become even more of a debtor nation than is normally the case.

Unable to produce much on its own Niger must import. In 1971 it imported goods and services valued at \$54,000,000 (while exporting \$38,000,000). The country has been able to reduce the rate of import growth by various economies, in particular, or just lack of exchange. Over the first ten years after independence the rate of imports grew at 12%, but over the year 1968-71 this declined to 8.7%. Niger has experienced a sharp fall in its terms of trade in recent years, but its performance reflects world peanut prices, and to a less extent uranium and cotton. As go these prices, so to a large extent will Niger's terms of trade and ultimately her balance of payments. Equilibrium has been maintained in this regard through support by international donors: primarily FAC and to a growing extent FED. Smaller amounts are received from AID, UN, IDA and Canada. Unless Niger is able to find and develop petroleum resources, or some similar high value export, it is very likely to

remain dependent on international largess for the indefinite future.

A large share of GON resources come from direct taxes on farm compounds. Although farmers may pay this at any time during the year, farmers usually pay immediately after harvest when they have the proceeds from present sales available. The tax amounts to some 2,000F/per capita. In recent years this burden has become proportionately larger as production fell and government revenues have shrunk. As well as farmers have been often unable to pay. Debt and taxes are two current costs which farmers must cover. In addition a few essentials are needed - cloth, kerosene, metal, some food-stuffs. These have risen in price in real terms in recent years.

Niger has included transportation in its planning documents as a priority area. The country has great difficulty in moving agricultural surplus, where they exist, to deficit areas, due to the extremely poor state of the road network. Markets are consequently poorly integrated, and the value added from transport is far greater than much of the consuming public can reasonably bear. Furthermore, even when workers' inputs were available, these cannot be moved to farmers because of the lack of roads.

The scale of Niger's aid dependence is large and likely to rise. In 1969-71 the country received \$34,800,000 in bilateral and multi-lateral aid, representing a per capita aid inflow of \$8.90 (this is median by Sahelian standards, which range is set by Senegal \$13.29 and Upper Volta \$4.72). Niger has been able to obtain and sustain a considerable aid flow which represents in 1972 almost 11% of the GNP of the country.

Lacking this support Niger could be hardpressed, if at all able, to even meet recurrent operating expenses. With aid it has been able to mount some development-investment, until the drought caused funds to be diverted to short-term survival. The public investment program 1971-74 has been: (1) transport and communications, 61%; rural development industry agriculture, 15%; education, 7% public health, 4%; energy and minerals, 2%.

II. THE AGRICULTURAL SECTOR

Agriculture remains the country's leading sector. The Niger Government has set itself the usual rural development goals, giving priority to basic foods, and especially since the drought some effort to mobilize a rural surplus. Cereal crops have not, however, been the center of attention for most of the post-independence period.

A series of good rain years following independence through the latter sixties afforded Niger sufficient cereal production to cause some complacency in this regard. On the assumption that self-sufficiency was assured and having surplus cereal resources, Niger opted for a rapid expansion of cash crops: in particular peanuts, but cotton as well where soil conditions permitted. This program of expansion continued throughout the sixties and up to the recent past when it became evident that the drought was not a year or two setback, but a prolonged problem. A number of farmers in the Maradi area had seriously extended themselves into peanuts to the point where they were able to meet self-sufficiency needs. These persons doubtless have suffered more than proportionately in the last three years.

As a consequence of the drought Government has reordered its agricultural policies by moving away from the past emphasis on export crop production to pursue new priorities. In order of importance these are to:

- (a) increase food crop production;
- (b) conserve natural resources and proof against drought; and
- (c) accelerate the systematic use of water resources for agricultural production purposes.

The thrust of the new policies is sound and in accord with A.I.D.'s and the World Bank's assessment of the needs of the situation.

These new policies have been translated in practice to promoting integrated rural development projects which cover specific areas and which include all economic and proven means of bringing about production and productivity increases. Two such projects were started in 1971, at Badeguicheri and in Ziner District, and are financed by FED. In order to obtain the quickest and highest returns from the investment of scarce resources, Government is carrying out its rural development projects in areas of highest agricultural potential. Badeguicheri lies in the fertile valley bottoms of Ader Doutchi Maggia, and Ziner produces with the Maradi District, in which latter, the project described in this report is located, 90% of the country's groundnut crop.

The GON, through its cash crop marketing agencies, encouraged cash crop production by considerable technical help and the provision of needed inputs, especially fertilizer. An incentive price was announced at planting time. By the late '60s, however, government became concerned at the lack of progress in cereal production and in particular, the considerable fluctuations in price, to both producers and consumers in the latter months before harvest price. Typically, when governments are insensitive to prices, this can have unpleasant political implications in urban areas where civil servants are often the largest and best organized pressure group in a country. Niger is not an exception.

In 1969-70 steps were taken by the GON to moderate consumer price fluctuations through the establishment of a self-supporting buffer stock and stabilization program to be managed by the Office des Produits Vivriers du Niger (OPVN). OPVN has as its basic mandate to: (1) reduce cereal price fluctuations; (2) maintain cereal stocks to affect prices and act as a reserve for contingency; (3) encourage cereal production. The assumption was made that farmer production decisions would be significantly affected if some floor price was to exist and that, as a result of this, farmer incomes might to some degree, be stabilized.

III. AGRICULTURAL SECTOR PERFORMANCE

The drought has affected the sector profoundly. Thus while the country was self-sufficient in food in the early sixties, imports of 120,000 tons of cereals in 1972/1973, and 250,000 tons in 1973/1974, were necessary in order to avert widespread famine. The national cattle herd has been halved since 1967, with the heaviest losses occurring in 1968 and 1973. To offset low yields, farmers have been expanding the area under cultivation both by cultivating fallow land and by cropping areas in the north previously used solely

for grazing (Annex 1, Table 4); and as usual in drought conditions farmers have been giving highest priority to their food crops with the consequence that export cash crop production has declined rapidly.

There is good reason to believe that Niger could feed itself in cereal in the short-run at least if rainfalls were to return to the normal prevailing in the early '60s. In the longer-run, however, and assuming no change in farm technology, acreage undercrops must grow proportionately if per capita cereal production is to be sustained (estimated at 250 kg. per capita per year). This would be possible if marginal land were of equal quality. In fact, this is very unlikely and there is some indication that per hectare yield may already be declining in part as the result of the use of land of poorer than average quality. / Becker has calculated the trend of annual yields for millet and sorghum and the two combined to be minus 1.56, minus 3.73 and minus 2.08 respectively. The equivalent trends in annual crop area for these crops are plus 2.96, 3.02, and 2.98. The estimated compound trends (1960 to 1971) for these crops are plus 1.36, minus .82 and plus .85. The time parameter was not found to be significant and it can be concluded that over the most recent twelve year period in Niger there has been no sustained growth in actual cereal output.

IV. AGRICULTURAL SECTOR RESOURCE ENDOWMENT

Niger is landlocked with an area of 1.3 million sq km, 75% of which is desert, 12% arable land, and only 2% cultivated (Annex 1, Table 1). Lying between latitudes 10 degrees and 25 degrees N, its rainfall decreases from 800 mm at its southern border to less than 25 mm in the north. About half the population of 4 million is concentrated in the 8% of the country lying between the southern border and isohyet 500 mm, an area of about 105,000 km², where population pressure averages 19 inhabitants/km² but is as much as 100/km² where valley bottoms are particularly fertile. Population growth is estimated at somewhere between 2.2% and 3.1% per year.

The climate is Sahelian with a dry season that lasts for eight months. Rainfall decreases from 700 mm at the border with Nigeria to 300 mm in the north, with isohyets decreasing approximately 100 mm for each 50 km of latitude. The rains start in July, are at their peak in August, and end in September. Rainy days average 47 at Maradi, but there are great variations in rainfall, particularly at the beginning and end of the rains when a shortfall in precipitation can have disastrous results through shortening the growing season. Soil erosion is a problem due to the high intensity of the rains. Soils are sandy and their fertility decreases from south to north. In the valleys, soils are alluvial and have a high clay content.

V. CEREALS PRICE SITUATION

A price policy can play a modest role in Niger as a mechanism with which to accelerate capital formation in the target sector. It can do this by providing farmer producers with a stream of income from cash and cereal crop sales which are of sufficient reliability (that is to say, minimum fluctuations over some minimum level) such that farmers can plan saving and investment programs. The extent to which resources can be transferred through the price system from the urban sector is limited in Niger by the very small and relatively poor urban market. There simply is not much resource value available to be shifted to agriculture. Furthermore, the extent to which resources can be produced from the sale of crops is also limited by political constraints. Consumer price, for example, will only be allowed to rise within strict limits. The range to which price can of itself transfer resources from the urban sector, therefore, is limited on a number of accounts.

Of great importance is the opportunity to stabilize farmer incomes. However, it must be made clear that those farmers who have excesses to sell are those which are the more efficient, prosperous and likely better situated. Equity considerations would not be directly served by stabilization of farm incomes. Smaller units which sell little would be barely affected. Stabilization could possibly affect lower incomes urban persons to the extent that a sufficient supply of cheap staples were forthcoming. An equity trade-off exists.

The basic incentive for improving production will be provided only when a new technology permits declining per unit costs. Under such conditions, prices would fall, once again affecting larger farm units and consumers for the most

part. Cost of production should not be an implicit basis for determining support costs because decline in per unit costs should be the incentive, not some "high" price which would hurt low-income consumers on the one hand, and affect sales of excesses by large producers on the other. Only when a technology becomes available that is divisible to farms of all scale of operations will equity production criteria be satisfied. In this instance, prices will affect income levels more than production decisions, which is the unique aspect of subsistence agriculture compared with a commercial agriculture as regards price policy: Western price policy assumes equilibrium pricing at the margin in a fully commercialized sector.

Nevertheless, a cereals price policy is needed and can play a role, albeit a modest one. It can act to help reduce rural debt. It can have some impact on capital formation. It can be a tool to give government both a buffer stock and a reserve. In this last regard, prices can have an important distributive and consumption effect. But the allocation effect is unlikely to be great as regards the major subsistence staple.

There is a commonly believed naive notion that economists set prices. In fact, the usual situation is that prices are usually set as a result of a consensus among political forces, and in particular, where consumer staples are concerned. In the OPVN case, an inter-ministerial group meets and selects a price, often quite different from what OPVN needs to cover its operating expenses. Indeed, the sale price for coarse grains has been sufficiently low that these cereals of themselves (millet and sorghum) cannot cover costs to the agency, and profits for niebe and rice sales have been used to cover the deficit. Lately, even this has been insufficient. The official buying price has been

25 CFA/kg, and GON has allowed grain to be sold at the same price, so that OPVN has to absorb storage and transport costs. Imported grain sells for as little as 10-15 CFA/kg. In buying grains, the OPVN must compete actively with the traditional traders and grain dealers, the commercants, who play the role of marketing, storage, arbitrage, and who provide consumption and production credit. There is every reason to believe them to be competitive.

Consumption credit, especially for foodstuffs, is very scarce in rural Niger. In a normal, or better than average year, farmers would typically be able to produce enough grain to see them through the buying season. If however, rains fall, reserves will reflect the lesser yield such that numerous farmers would find themselves unable to get through the hungry season comfortably. In such a case, commercants would sell some of their holdings to farmers, who typically lack cash. In lieu thereof, commercants offer credit, taking sufficient standing grain to cover the loan plus interest. This is likely to be high as both food and credit are scarce. In the event several bad years come in a row, many farmers can fall deeply into short-term debt to cover food needs.

Commercants handle this business quite efficiently. They commonly keep the harvested grain in the farmer's store on their own account. Resale to farmers involves only a transaction; often no transport is required at all. This economizes on two scarce goods - transport and off-farm storage. Loss due to movement is also minimized. The ill-effect is that farmers can find it very difficult to emerge from debt unless a good series of harvests come along, when total output might offset debt and also cover reserve needs. To the extent farmers are unable to emerge from debt, savings and investments are difficult.

The result of all these trends, in the context of the drought, has meant that rural living standards have fallen markedly in recent years for farmers,

who make up some 75% of the total population of Niger. They have fallen into short-term debt (one estimate suggests that 100% are in this condition). In addition, farmers have had to give up cash crop production just to be able to feed themselves, and have consequently, due to poor harvests, suffered declining levels of food production and nutrition. Even the increasing off-farm search for cash incomes does not appear to have offset farm production losses. The granaries are seriously depleted, as is the entire market network for grain. It may take several good harvest years to make up the gap so that farmers can emerge from debt, and have surplus to sell.

A rising price for basic commodities adversely affects lower income groups more than proportionately. It is not at all uncommon for lower income groups to have an income elasticity for basic cereals of from 0.5 to 0.8 . With respect to the price elasticity of demand for cereal staples, and given the homogeneity condition and what appears to be a reasonable assumption about cross-elasticity (no close substitution outside of the classification), one can assume that price elasticity is the same as income elasticity, but with signs reversed. This would suggest that price does play an important role in consumption. In Niger, where cereals have an unusually important place in diets (in excess of twenty ounces per day), and where cash incomes are typically very low, the higher figure may not be far out of line. Price increases in an economy such as the Nigerien not only cut against the lower urban groups, but mainly help larger, better-located and perhaps more efficient farm units, which typically have some excesses to sell.

Demand for cereal in Niger must certainly increase proportionately with the average increase of population, and more than proportionately from urban growth. If the present rate of population growth (say 2.7% p.a.) were to continue

unchanged, Niger's present population of 4,100,000 (which is likely to be an underestimate) will double by the end of the century. Urban growth is even greater, and the rate itself seems to be accelerating. From its present level of 350,000 urban dwellers and city consumers, the urban consumption population is expected to increase to 624,000 by 1982 and certainly will double again by the end of the century.

Pressure on supply is certainly going to lead to real increases in price, and, given the likely shapes of supply functions, much more than proportionately to extra quantity produced. Experience elsewhere suggests that urban consumption in absolute per capita terms is significantly greater than that of rural persons, which reflects higher urban cash incomes. Part of this demand will be deflected toward superior cereals such as wheat (for bread) and rice. However, absolute demand for millet will increase as well. When it is recalled that African agriculture is typically labor short and that a very large share of this urban growth is likely to come from the ranks of young male farm people, it seems likely that the pressure on supply may be greater yet, in particular if technologies do not ~~change~~.

In addition to an adequate and regularly updated data base, an effective price stabilization program will have to develop some reserve capacity, a good administrative cadre and the agreement that OPVN can set prices such as to be self-supporting.

Given the small proportion of total cereals produced which are marketed, perhaps 15%, a very small regulatory buffer stock would have to be kept. OPVN estimates this stock at less than 10,000 tons. In addition, a reserve stock would be needed to give Niger some margin in the event of sudden adversity.

Clearly, a year's reserve is beyond the financial means of the country, even assuming adequate supply was available from which to build. The Conseil de l'Entent estimates that such a reserve would have to be about 25,000 tons now and over 30,000 tons by the early 1980's. Such a stock would afford urban areas a three-month reserve. Imported materials could be used to build up the stock, which might allow these goods to be put to good use without destabilizing prevailing prices to the extent that they discouraged farmer marketings.

If the necessary support were available, Niger could attempt a buffer stock operation managed with an open market system but offsetting shortfalls through price regulation and even rationing (perhaps on a zonal basis). In such a system, urban "poor" needs could be satisfied by a levy taken from farmers at some "normal" price and sold on a rational basis at some "fair" price. Such a scheme would ameliorate the effect of a small crop on low-income persons. Farmers could sell the balance of any "reserve" into the free market; as a result, grain prices would become both higher and lower than would prevail under equilibrium conditions. To the extent that additional surpluses were sold freely into open markets, the effect would be to shoot up prices higher than without the levy. The consequent shortage would therefore be concentrated in the urban higher-income groups.

A further ramification could be to identify grain surplus areas and to procure in these zones. These surplus zones would then be quarantined from free-market movements, at near or equal normal market prices (by limiting aggregate demand through inter-zonal trade restrictions these prices would be lower than otherwise). This would economize on administration by allowing concentration of effort. But it does make for a more complicated distribution system.

A very useful additional activity open to government is to reduce market imperfections and in particular, ignorance-induced local price variations. Continual and current price reporting over public radio on grain would greatly improve farmer v. commercant bargaining. If a government alternative price was to exist during the time when farmers pre-sold grain to commercants, and this were widely published, farmer's bargaining would be greatly improved. Niger would be very ill-advised to attempt to replace the role of the commercants. It would do better to introduce a new competitive element which will assist farmers by reducing uncertainty on the one hand and raising farmer's prices on the other. Commercants play an important role in gathering produce and shipping it to market, often at a fairly cheap price. Government would have to undertake part or all of their activity were commercants to be too effectively replaced. Furthermore, usual risk may play an important role in the gathering of excesses in the first place. In the absence of doubt, farmers might be reluctant to sell in any but the best of years.

It is to be hoped that government will act to promote rapid technological change in cereal production. In particular, improved millet varieties are needed that do not increase risk to farmers and which do not require fertilizer to produce a higher yield. The bulk of nitrogen-based fertilizer comes from natural gas and these prices have risen with that of oil. A fertilizer like urea which was selling at \$40.00 a ton in 1971, today fetches \$260.00 a ton in the world market where it is available. Morocco, the world's major phosphate exporter, tripled its prices earlier this year to \$42.00 a ton and is considering another increase in July. It is clear that the present fertilizer shortage will hit particularly hard those countries, such as Niger, that are most reliant on marginal supplies. The GON would be well advised not to place too much faith in fertilizer as its answer to the grain shortage.

VI. THE PRODUCTION SYSTEM

More than ninety-five percent of all agricultural production is from small farms with less than five hectares per family in cultivation annually. Because land tenure is mostly based on use rather than outright or titled ownership, the acreage of cultivators is determined by the size of family, availability of animal power and the need for fallow. The first concern of the farmer is to produce his food supply. In nearly all areas, millet is the first priority of crops grown and is planted before anything else on the upland areas. The lower wetter areas are planted to sorghum as the second priority of crops grown. Traditionally, cowpeas and peanuts are intercropped with the grain crops. Peanuts, especially in the development zones, are often grown also in pure stands as a primary cash crop. Cotton is grown in some areas as a cash crop, but it is usually planted last, after farmers feel that they have sufficient food crops. Rice is the most profitable cash crop where irrigation can be practiced, but the acreage planted is much less than that of the other grains. Few farmers specialize on any particular crop, but nearly all produce a combination of grain and cash crops, the mix being determined by the usual rainfall pattern. Most farmers don't keep cattle, and most cattlemen don't farm. Less than one percent of the farmers use animal traction; thus farming is done mostly by hand. Surplus grains are sold by most farmers at harvest time to pay off debts and taxes.

A typical small Nigerian farm size would include a man and his wife who can together cultivate approximately three hectares. Under normal conditions, two of the three hectares would be planted in a cereal grain; the third hectare would probably be planted with peanuts. Under the present drought conditions, however, the farmer is limiting cultivation to millet, sorghum and niebe to assure an adequate food supply for personal consumption. A typical medium-sized farm household would include four or five young males who also farm. Each boy can cultivate an additional two hectares, with young girls able to cultivate a small garden plot. Most of these households do not hire farm labor under normal circumstances. The family probably would own several goats and donkeys, but no livestock. On the higher income farm, additional labor can be hired for the planting season. Hired farm laborers are usually paid CFA 200 per day including two meals. Middle-income farmers can also afford to keep livestock as well as goats and donkeys. Members of the household might also earn additional income from trading or a vocational skill. Enough grain would be cultivated to feed the family, and additional hectares would be planted with a cash crop.

Most cultivators use traditional varieties of millet and sorghum seeds, plant their grain too far apart and tend to weed later than is most desirable. While a large percent treat their seeds, there is evidence that their treatment is not effective. During ordinary times, when moisture conditions permit, cultivators plant millet or sorghum following a planting of groundnuts to rely on the residual fertility of the phosphate application and the nitrogen buildup. Cowpeas is intercropped with millet with rather poor results due to the lack of insecticide treatment. Because most cultivators rely on hand labor, weeding and cultivating techniques are the bottleneck to increased acreage and to the conservation of rainfall moisture.

The agricultural implements commonly used by the subsistence farmer include an axe, a long-handled hoe for planting, a curved hoe for cultivating and weeding, and a knife for harvesting. This farmer prepares the land by burning the brush and all refuse from the field, plants after the first rain, and then cultivates and weeds the field twice before harvest.

There is widespread appreciation of the value of manure as evidenced by the practice of inviting herdsmen to bed their cattle on land after a harvest. But much of the benefit is dissipated by exposure to air, wind and sun. Relatively few farmers make compost. Any serious attempt to make and use compost would require animal power to transport the relatively large tonnage required. Relatively few farmers ever use chemical fertilizer on the cereals, with the exception of rice.

The most significant cost of production is labor at critical points in the growing cycle. These critical points are immediately after the first and second rain and at weeding time. The use of animal power would make it possible for a family to more than double its coverage and to do a more adequate job. A team of oxen makes it possible to prepare the land for planting before the rains and, at the same time, makes it possible to plant a larger area. (Animal power can permit a more prompt, thorough, and frequent weeding and cultivation).

The three primary factors which inhibit farmers from adopting new technology are lack of contact with extension workers to teach an improved package of practices, lack of available farming inputs, and limited knowledge of animal traction practices. Also, an important inhibiting factor against the adoption of P-3 Kolo has been the poor moisture conditions of recent years. Apparently P-3 Kolo does no better, if not worse, than traditional varieties under conditions of moisture stress. According to one authority, where rainfall is 250 mm or less, P-3 Kolo does considerably worse than traditional varieties. With regard to sorghum, the varieties presently available to farmers have been limited in their potential. Non-familiarity with the use of oxen, combined with poor moisture conditions, has limited the use of procedures that could increase the acreage under cultivation and conserve moisture. The high cost of purchasing oxen and animal traction equipment also inhibit the spread of this practice. Without oxen, farmers do not have enough time to weed and cultivate at recommended intervals, and they are handicapped in making compost. Tradition may also hinder some farmers from planting with the recommended seed density. A lack of physical strength or lack of psychological motivation to plant a large farm are secondary inhibiting factors. Lack of surplus income and fear of drought also hinder some farmers from purchasing fertilizer.

Mechanisms for bringing production-increasing commodities to the farm are: (a) applied research; (b) seed multiplication; (c) extension services at the cooperative level; (d) radio programs; and (e) cooperatives to supply credit and agricultural inputs.

The cost of production for the subsistence farmer is minimal because he and his family can provide the farm labor themselves. His only costs are for seed, basic farm implements and food supplements for his family. For the middle-income farmer, the following is a conservative estimate of budget costs for farming one hectare of millet: land preparation - CFA 200; seed purchase - CFA 100; seed planting - CFA 400; cultivation and weeding twice - CFA 3,000; harvesting - CFA 800. The total estimated cost of production on hectare of land, therefore, is CFA 4,500.

The planting season begins with the first rain which is expected in mid-June. Millet is planted immediately, followed by peanuts and sorghum after the second rain. Cotton can next be planted, and by late July or early August the farmer may plant cassava. Cassava will not be harvested until the middle of the next rainy season.

Employment opportunities on the village level are generally limited to the following job categories: butcher, tanner, weaver, blacksmith, tailor, leatherworker, mat weaver, and firewood chopper and vendor. Some traders are followed in the family tradition, and others are learned by an ambitious villager. The common laborer wage rate is approximately CFA 200 per day.

VII. THE INSTITUTIONAL STRUCTURE SERVING THE AGRICULTURAL SECTOR

There are Nigerian institutions which assume primary responsibility for the agricultural development of Niger: the Ministry of Rural Economy, Environment Climate and Population Assistance; the Union Nigerienne de Credit et de Cooperation (UNCC); and National Fund for Agricultural Credit (CNCA). The Niger Development Bank (BDRN) was established in 1961 as a commercial and development bank for all economic sectors, and for private as well as public sectors.

The Ministry of Rural Economy

The Directorate of General Agriculture is one of the four directorates of the Ministry of Rural Economy, the others being: livestock and animal industries, water resources and forests, and civil works. The functions of this directorate are defined by Decree No. 8/MER of June 22, 1966:

- to organize, improve, and increase production;
- to perform the technical preparation of agricultural development plans, and supervise their execution;
- to protect crops through phytosanitary inspection, and control of packing and storing of agricultural products;
- to teach farmers modern agricultural techniques;
- to work with cooperative and marketing agencies to improve the quality of agricultural production.

The directorate staff totals 179 and includes 4 engineers, 12 agricultural advisors, 29 'conducteurs de travaux agricoles', 23 'agents techniques d'agriculture' and 111 'moniteurs'. The directorate is decentralized in 7 'departments' and 30 'arrondissements' of the country, and in 149 agricultural units headed by a 'moniteur' (extension worker) at the village level. Each unit serves about 20,000-30,000 people or 3,000-4,000 farmers.

The results of this very low ratio of extension workers to farmers have been poor. The main achievement to date has been farmer acceptance of fungicides for seed dressing. Some 17,000 tons of fungicides were sold in 1972, enough to treat about 50% of available groundnuts seeds. The use of fertilizers, however, is practically non-existent (435 tons in 1971 and 680 tons in 1972).

Union Nigerienne de Credit et de Cooperation (UNCC)

UNCC is a parastatal organization, with a board of 20 directorates and a managing director who is appointed by the Council of Ministers. It was established in 1962 and reorganized in 1967, when its banking and credit activities were transferred to Caisse Nationale de Credit Agricole (CNCA). Its financial position is weak as short term liabilities exceed short term assets and are far in excess of equity and long term borrowing.

UNCC's functions as defined by the law of September 20, 1967 are:

- (a) to promote the establishment of cooperatives and train their representatives;
- (b) to assist cooperatives in marketing their production and in providing farm inputs;
- (c) to provide cooperatives with technical assistance; and
- (d) to manage irrigation schemes and other Government projects.

UNCC employs 384 people, including 112 extension workers. Less than 15% of the staff have civil servant status; the remainder have been hired under UNCC terms of employment. There are a total of 16 French technical assistants financed by French aid programs.

UNCC has three divisions: administration, cooperatives, and production. The cooperative division is responsible for the creation of new cooperatives and together with 'Animation' and 'Alphabetisation', for training farmers. It keeps accounts for the cooperatives and supervises the cooperative education and mutual guarantee funds. It arranges financing for crop marketing, partly using cooperative savings deposited with it and is the middleman between cooperatives and marketing agencies.

The production division is responsible for cotton production in the country. Compagnie Francaise des Textiles (CFDT) has provided it with technical assistance since 1964. In 1972 UNCC had 41 extension agents in cotton areas, for 405 villages and a total population of 293,000 people. Virtually all cotton growing areas are covered. Cotton production increased regularly until 1971 when it reached 9,000 tons of seed cotton. Since then it has decreased every year to 4,900 tons in 1973. The country's production potential is estimated at about 20,000 tons.

Caisse Nationale de Credit Agricole (CNCA)

CNCA is 100% Government owned. It has a Board of Directors of 20 members (the same as UNCC's): the Ministers of Rural Economy, Finance, Interior, Econo-

mic Affairs, Economic Development; the President - Director General of BDRN; the Directors of BCEAO and Credit du Niger, three deputies at the National Assembly, seven representatives of cooperatives, and the President of a Government import-export corporation. The Director of CNCA is appointed by the Council of Ministers. CNCA accounts are kept in accordance with commercial banking practices. The Ministry of Finance carries out an audit on the GOR's behalf.

CNCA has a staff of 10 at headquarters in Niamey and is represented by UNCC agents in the seven districts.

CNCA has no share capital; its permanent resources are Government grants totalling CFAF 170 million (US\$ 680,000) at present. Another source of financing has been current and short term deposits by Government owned corporations, which reached a peak of CFAF 400 million (US\$ 1.6 million) in mid-1972.

CNCA operations have included (a) medium and short-term loans to finance agricultural production development; (b) short-term advances to UNCC to finance primary marketing of groundnuts, cotton and rice; and (c) short-term loans to other Government and semi-public corporations to finance the marketing of different agricultural products.

NIGERAgricultural StatisticsA. Land Use (ha)

<u>'Departement'</u>	<u>Total Area</u>	<u>Area Under Cultivation</u>		<u>% of Total Area</u> <u>1972/1973</u>
		<u>1971/1972</u>	<u>1972/1973</u>	
Niamey	9,030,000	969,800	1,021,100	11.3
Dosso	3,100,000	484,500	401,900	13.0
Tahoua	10,668,000	368,400	380,200	3.6
Maradi	3,858,000	384,700	424,000	11.0
Zinder	14,543,000	429,900	434,100	3.0
Diffa	14,022,000	92,400	15,800	0.1
Agadez	71,479,000	-	-	-
Total	126,700,000	2,729,700	2,677,100	2.1

B. Population by Area

<u>Climatic Zone</u>	<u>Rainfall</u> <u>mm</u>	<u>Area</u> <u>'000 km²</u>	<u>Population</u>	
			<u>Total</u> <u>'000</u>	<u>Inhabitants</u> <u>per km²</u>
Sahelo-Soudanian	550-850	100	1,900	19.0
Sahelian	350-550	200	1,300	6.5
Sahelo-Saharan	100-350	300	750	2.5
Saharian	3-100	700	-	-
of which (a)	75-100	100 to 150	-	-
(b)	3-75	600 to 550	-	-
		1,300	3,950	

NIGERAgricultural StatisticsGross Domestic Product at Current Prices 1967-1971

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
	(In billions of CFA francs)				
Agriculture, hunting, forestry, and fishing	53.71	50.96	50.09	46.42	51.95
Mining and quarrying	0.03	0.12	0.11	0.11	1.21
Manufacturing industries	6.17	6.49	6.28	10.98	11.92
Electricity, gas, and water	0.41	0.44	0.60	0.69	0.82
Construction	2.18	2.36	3.14	3.31	3.07
Commerce	13.79	13.30	14.42	15.39	14.70
Transport, storage, and communications	2.77	2.64	3.13	4.16	4.21
Other <u>1/</u>	18.53	19.21	20.04	20.62	21.24
<u>Total</u>	<u>97.59</u>	<u>95.52</u>	<u>97.81</u>	<u>101.68</u>	<u>109.12</u>
	(In percent of total)				
Agriculture, hunting, forestry, and fishing	55.1	53.3	51.3	45.6	47.6
Mining and quarrying	-	0.1	0.1	0.1	1.1
Manufacturing industries	6.3	6.8	6.4	10.8	10.9
Electricity, gas, and water	0.4	0.5	0.6	0.7	0.7
Construction	2.2	2.5	3.2	3.3	2.8
Commerce	14.1	13.9	14.7	15.1	13.5
Transport, storage, and communications	2.8	2.8	3.2	4.1	3.9
Other	19.1	20.1	20.5	20.3	19.5
<u>Total</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Sources: Data provided by the Niger authorities; and IMF staff estimates.

1/ Including finance, insurance, real estate, and business services; community, social, and personal services; and government services.

NIGER

MARADI RURAL DEVELOPMENT PROJECT

Agricultural Statistics

Areas and Production of Major Crops

	<u>1966/67</u>	<u>1967/68</u>	<u>1968/69</u>	<u>1969/70</u>	<u>1970/71</u>	<u>1971/72</u>	<u>1972/73</u>
Millet - area ('000 ha)	1,740	1,865	1,895	2,270	2,380	2,350	2,370
- production ('000 t)	841	1,000	732	1,095	880	958	918
- yield (kg/ha)	480	535	385	480	370	405	380
Sorghum - area ('000 ha)	545	530	556	595	605	580	580
- production ('000 t)	280	350	215	290	337	267	208
- yield (kg/ha)	508	660	390	485	555	460	360
Cowpeas - area ('000 ha)	608	689	745	968	980	999	920
- production ('000 t)	67	77	74	159	84	72	144
- yield (kg/ha)	110	112	99	164	85	72	155
Rice - area ('000 ha)	9	11	15	15	16	17	17
- production ('000 t)	20	32	39	39	37	27	32
- yield (kg/ha)	2,200	2,800	2,550	2,500	2,300	1,600	1,900
Groundnuts - area ('000 ha)	339	357	432	320	356	394	417
(unshelled) - production ('000 t)	288	298	252	207	205	256	260
- yield (kg/ha)	849	836	584	647	575	650	620
Cotton - area ('000 ha)	16	17	17	20	20	21	15
- production ('000 t)	6.7	6.2	7.0	10.6	9.2	8.9	6.0
- yield (kg/ha)	411	360	404	623	460	420	400
Total Cultivated Area ('000 ha)	3,257	3,469	3,660	4,188	4,357	4,361	4,319

Source: 'Direction du Service de l'Agriculture'.