

PD-AAI-261

ISN 163

683-0225/

42

**UNCLASSIFIED**

**PROJECT PAPER**

**NIGER**

**CEREALS RESEARCH PROJECT**

**(NO. 683-0225)**

**USAID/NIGER**

**AGENCY FOR INTERNATIONAL DEVELOPMENT**

**UNCLASSIFIED**

PROJECT DATA SHEET

1. TRANSACTION CODE

**A**  
A = Add  
C = Change  
D = Delete

Amendment Number

DOCUMENT CODE  
3

2. COUNTRY/ENTITY

NIGER

3. PROJECT NUMBER

683-0225

4. BUREAU/OFFICE

AFR

06

5. PROJECT TITLE (maximum 40 characters)

Niger Cereals Research Project

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY  
02 15 92

7. ESTIMATED DATE OF OBLIGATION

(Under 'B' below, enter 1, 2, 3, or 4)

A. Initial FY 82

B. Quarter 1

C. Final FY 92

8. COSTS (\$000 OR EQUIVALENT \$1 = )

A. FUNDING SOURCE	FIRST FY 82			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	2735	2150	4885	7000	3600	10600
(Grant)	( 2735 )	( 2150 )	( 4885 )	( 7000 )	( 3600 )	( 10600 )
(Loan)	( )	( )	( )	( )	( )	( -- )
Other U.S.						
1.						
2.						
Host Country	--	307	307	--	2773	2773
Other Donor(s)						
<b>TOTALS</b>	<b>2735</b>	<b>2457</b>	<b>5192</b>	<b>7000</b>	<b>6373</b>	<b>13373</b>

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) SH	141	080	--	--		10,600		10600	
(2)									
(3)									
(4)									
<b>TOTALS</b>				--		<b>10,600</b>		<b>10600</b>	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

090 050 020

11. SECONDARY PURPOSE CODE

121

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code BR BS R/AG XII  
B. Amount 10600 10600 10600 10600

13. PROJECT PURPOSE (maximum 480 characters)

To strengthen the capacity of INRAN to undertake cereals research programs whose results can be disseminated to farmers via the extension and cooperative system.

14. SCHEDULED EVALUATIONS

Interim MM YY MM YY Final MM YY  
07 84 11 86

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000  941  Local  Other (Specify) 935

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a page PP Amendment)

17. APPROVED BY	Signature			18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
	Title	John L. Lovaas	Date Signed MM DD YY 10 27 86	

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: AAA/AFR/DE [Signature] / John W. Koehring [Signature]

SUBJECT: Niger Cereals Research Project (Project No. 683-0225)

Problem: Your approval is required to execute a grant of \$10,600,000 (FY 82 = \$4,885,000) from the SH Appropriation to the Government of Niger for the Niger Cereals Research Project (Project Number 683-0225), authorize a source/origin waiver (from Code 000 to Code 935) for the purchase of vehicles for the subject project, and satisfy Section 121(d) concerns.

Discussion: This project is one of two designed concurrently as a sequel to the Niger Cereals Production (NCP) Project which started in 1975 and is scheduled to be completed in June of 1982. The first phase project had four fundamental components: applied research, seed multiplication, cooperative development and agricultural extension. This project will focus on food crop research and will build upon ongoing successful activities of the first phase project. These activities will be implemented by Niger's national agronomic research organization (INRAN). Additionally, the project will develop the capacity of INRAN to undertake cereals research programs whose results can be effectively disseminated to farmers through existing extension and cooperative systems. This project is to be authorized for ten years (1982-1992); however, financing is to be approved for only the first five years. It is expected that, based on evaluations, project paper amendments will be submitted in years 3 and 5 to propose financing for years 6 - 8 and 9 - 10, respectively. During the initial five years, project activity will focus on three major areas which include: (1) the development of INRAN's capacity to manage (a) its improved research programs, (b) its physical and human resources and (c) its linkages to other international research institutions and to the GON's extension programs; (2) the development of INRAN's capacity to support its (a) sciences, (b) soil and plant analysis, (c) food quality of grain analysis, (d) in-service training, (e) statistical support services and (f) data processing; and (3) the development of specific research programs concentrating on three principal interrelated food crop research areas (millet, sorghum and cowpeas).

From a long-term perspective, the project will assist INRAN's development into an institution which can continually introduce new technology and methods into Niger's agricultural sector and provide a continually expanding base of scientific knowledge to support agriculture. By the end of the project INRAN will be expected to make significant progress in developing (1) three major research areas oriented to increasing small farmer productivity; (2) effective administrative, technical and support functions in support of INRAN and scientists working for the organization; and (3) strong national research/extension linkages with domestic as well as with several international entities operating inside and outside of Niger. In addition, the project will provide twenty academic training

programs in the U.S., fifteen short-term training programs, twelve in-service training programs and improved library facilities.

Technical assistance will be provided through a collaborative assistance contract between Purdue University (with Alabama A&M as a sub-contractor) and INRAN. A five-person research team will be provided to assist INRAN in the implementation of the project. The team will be backstopped by Purdue University in the U.S. and the cereals program Management Unit in the field. At some point in the near future, Peace Corps will furnish volunteers to assist in various aspects of the project.

The Implementation Plan contained in the PP has been carefully reviewed by the Project Committee which believes the Plan is realistic and establishes a reasonable time frame for carrying out the project. A waiver request is presented in Tab 2 to permit the purchase of Geographic Code 935 vehicles for use in the project.

The project has been determined by the Mission to be economically, socially, financially and technically feasible. The Government of Niger agencies responsible for project execution are judged adequate to provide the administrative and technical capability required for project implementation. An Initial Environmental Examination established a negative/resolved determination.

The project conforms to and supports both the Government of Niger's Development Plan and the Mission's most recent Country Development Strategy Statement. The USAID/Niger Mission Director has attested that sufficient planning and analysis have been performed to provide a reasonably firm cost estimate to the U.S. Government, and that the requirements of Section 611(a) of the Foreign Assistance Act of 1961, as amended, have been met.

Life of Project AID financing is \$10,600,000 of which \$3,600,000 (34%) will be for local costs. The estimated cost budget is as follows:

	<u>First Year</u> <u>FY 1982*</u>	<u>LOP</u> <u>(\$000)</u>
Technical Assistance Personnel		
Long term	610.0	2570.0
Short term	120.0	530.0
Research Associates	10.0	240.0
Training	46.5	1212.0
Commodities	223.0	850.0
Construction	248.5	248.5
Other Costs	265.0	1640.0
Contingencies	193.3	769.8
Inflation	24.3	1611.0
Cost of Contract	<u>162.5</u>	<u>928.7</u>
Total	1,903.1	10,600.0

The Government of Niger will contribute \$2,773,000 or 21% of the total project cost of \$13,373,000. It is expected that all of this will be in the form of cash payments for operational costs and salaries for personnel.

\*Because of forward funding, FY 82 obligation (\$4,885,000) exceeds FY 82 cost estimate.

The first year and LOP obligation amounts requested are not the same as presented in the FY 1982 Congressional Presentation. A Congressional Notification has been prepared and was forwarded to Congress on December 10, 1981 and the waiting period expired on December 24, 1981.

The Project Review was held on November 17, 1981. Irvin Coker, AAA/AFR/DP, chaired the Africa Bureau Executive Committee for Project Review (ECPR), which met on December 2, 1981. The ECPR, agreeing with the conclusion of the prior Review that there were no unresolved issues, recommended that the project be forwarded to you for authorization.

The statutory checklists have been satisfactorily completed and are included as Annex K to the Project Paper. Pursuant to Section 121(d) of the Foreign Assistance Act of 1961, as amended, before AID funds can be obligated for this project, a determination is required that the Government of Niger will maintain a system of accounts with respect to AID funding which will provide adequate identification of and control over the receipt and expenditure of those funds. USAID/Niger has certified that the accounting system at INRAN, the GON institution that will handle the AID-funded local currency accounts of this project, is adequate to meet the criteria outlined in paragraph 2 of State 313799 (Attachment B). Therefore, you are being asked to sign a determination (Tab 3) that Section 121 (d) concerns have been satisfied. Appropriate Conditions Precedent and Covenants for inclusion in the Grant Agreement have been prepared. No issues exist in Niger with respect to U.S. concerns for human rights.

Project officers who will be responsible for the project are: Michael Huffman, AFR/DR/SWAP and Dr. Wilbur G. Thomas, ADO/USAID/Niger.

Recommendation: That you sign the attached Project Authorization, (Tab 1), and thereby approve the proposed grant of \$10,600,000 for the implementation of the first five years of the Niger Cereals Research Project, and the requested waiver for the purchase of Code 935 vehicles (Tab 2), and that you sign the Section 121 (d) determination (Tab 3).

Clearances:

DAA/AFR, WHNorth                       
AFR/DR/ARD, AHartman                      (Draft)  
AFR/SWA, YJohn                      (Draft)  
GC/AFR, LDeSoto                      (Draft)  
AFR/DP, SSharp                      (Draft)  
AFR/DR/SWAP, JRMcCabe                      (Draft)  
AFR/DR, NCohen                       
AFR/SWA, GMacArthur                      (Draft)  
AFR/DP, ICoker                      (Draft)

Drafted by: AFR/DR/SWAP, Michael G. Huffman and USAID/Niger,  
Wilbur G. Thomas, ADO:at:3/17/82

## Project Authorization

Name of Country : Niger  
Name of Project : Cereals Research Project  
Number of Project : 683-0225

1. Pursuant to Section 121 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Niger Cereals Research Project (the "Project") involving planned obligations in an amount not to exceed \$10,600,000 in grant funds over a five year period from the date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project.

2. The Project will develop the capacity of Niger's national agronomic research organization (INRAN) to undertake cereals research programs whose results can be effectively disseminated to farmers through existing extension and cooperative systems. The Project emphasis will include: 1) The development of INRAN's capacity to manage (a) its improved research programs, (b) its physical and human resources and (c) its linkages to other international research institutions and to the GON's extension programs; 2) the development of INRAN's capacity to support its (a) sciences, (b) soil and plant analysis, (c) food quality of grain analysis, (d) in-service training, (e) statistical support services and (f) data processing and 3) the development of specific research programs concentrating on three principal interrelated food crop research areas (millet, sorghum and cowpeas).

3. The Grant Agreement which may be negotiated and executed by the officers to whom such authority is delegated in accordance with AID regulations and Delegations of Authority, shall be subject to the following terms and covenants and major conditions, together with such other terms and conditions as AID may deem appropriate.

### 4.a. Source and Origin of Goods and Services

Goods and services including ocean shipping, financed by AID under the Project for activities in Niger, shall have their source and origin in Niger or in countries included in AID Geographic Code 941, except as AID may otherwise agree in writing.

### b. Conditions Precedent

The Grant Agreement will provide in substance as follows:

1. Prior to any disbursement, or the issuance of any commitment documents pursuant to which disbursement will be made, the Grantee shall furnish to AID in form and substance satisfactory to AID, evidence that a Nigerian Project Director has been assigned and delegated all necessary authorities required to implement the project.

2. Prior to any disbursement, or to issuance by AID of documentation pursuant to which disbursement will be made, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

- a. Evidence that sites for construction, satisfactory to AID, have been selected and have been made available to the project.
- b. Evidence that the GON has established an accounting system for the control of project funds which meets generally accepted accounting standards.
- c. Plans, bid documents, cost estimates and contracts (standard language).

c. Covenants

1. The Government of Niger will covenant to provide sufficient financial resources to cover all capital and operating costs of INRAN during the life of the project.

2. The Government of Niger will covenant to actively participate in mid-project and end-of-project special evaluations (years 2 1/2 and 5). As these special evaluations will recommend future levels of AID support to INRAN, the level of future GON support to INRAN will have to be known. The GON will covenant to make this information available in a timely manner during the special evaluations. It should be noted by the GON that the level of AID support for INRAN beyond the initial five years of this project will be reduced as a percentage of combined AID/GON support during the initial five years.

3. The Government of Niger will covenant to furnish sufficient human resources necessary to the effective and permanent functioning of INRAN during the life of the project. Assignments of personnel will be for a period of not less than three years.

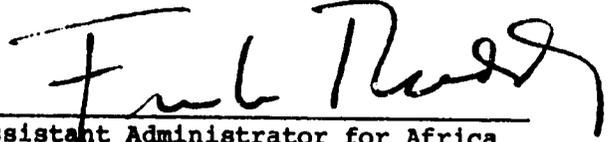
4. The Government of Niger will covenant to provide sufficient financial resources to cover all costs for installation of electricity and water service for the Kolo research station.

d. Waivers

Notwithstanding paragraph a. above, the following waiver to the A.I.D. regulations is hereby approved:

The requirement set forth in Handbook 1, Supplement B, Chapters 4 and 5, that commodities procured with grant funds have their source and origin in the U.S., is waived based upon the justification set forth in the Project proposal, attached hereto, to permit the procurement of six two-wheel drive sedans and twelve four-wheel drive light trucks at an approximate total cost of \$250,000, which have as their source and origin included in

Code 935. It is hereby determined that exclusion of procurement of these vehicles from Free World countries other than the cooperating country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program, and that special circumstances exist which justify a waiver of the requirements of Section 636(i) of the Foreign Assistance Act of 1961, as amended.



Assistant Administrator for Africa

3.18.82

Date

Clearances: As shown on Action Memorandum

Drafted by:GC/AFR,LDeSoto:at:3/17/82

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: AFR/DA/ John W. Koehring 

SUBJECT: Vehicle Procurement Waiver for Niger Cereals Research Project (683-0225)

Problem: The implementation of the subject project requires the procurement of 18 vehicles (two and four-wheel drive light trucks and sedans) of non-U.S. manufacture. In order to allow such procurement, you are requested to grant:

- (1) a source/origin waiver of Geographic Code 000 (U.S. only) to Code 935 (Special Free World); and
- (2) a waiver of provisions of section 636(i) of the FAA.

Facts:

- (a) Cooperating Entity: Government of Niger
- (b) Authorizing Document: Action Memorandum and Project Authorization to the AA/AFR
- (c) Project: Niger Cereals Research, 683-0225
- (d) Nature of Funding: Grant
- (e) Description of Goods: 6 two-wheel drive sedans; 12 four-wheel drive light trucks
- (f) Approximate Value: \$250,000
- (g) Probable Source: Niger
- (h) Probable Origin: EEC or Japan

Discussion:

A. Source/Origin Waiver:

In accordance with AID Handbook 1B, procurement of commodities from Code 935 source and origin under grant-financed projects requires a waiver. Handbook 1B, Chapter 5B4b(7) states a waiver may be granted if there are "such other circumstances as are determined to be critical to the success of project." The success of the Niger Cereals Research Project is dependent upon the provision of adequate transportation and for this reason the project includes a grant of 18 vehicles. In the past, the Mission imported approximately one hundred International Scout vehicles for various projects. These vehicles are no longer being manufactured and there is no longer even the limited dealer support that was available previously. American Motors recently attempted to establish a dealership in Niamey but was unsuccessful. No U.S. manufactured vehicles are represented by a dealer and, therefore, there are no available spare parts, service facilities or trained mechanics familiar with U.S. vehicles.

USAID/Niger would welcome the opportunity to show the American flag and US engineering skill by using U.S.-manufactured vehicles in the AID/GON development projects. However, to do so without a viable local dealer for essential service and parts support is not only detrimental to the achievement of the project's objectives but is contrary to the best interests of the United States.

B. Waiver of Section 636 (i)

In addition to the general source/origin limitations on the procurement of commodities, Section 636(i) of the FAA prohibits the procurement of vehicles of non-U.S. manufacture. However, the provisions of Section 636(i) may be waived when special circumstances permit it. Under Handbook 1B, Chapter 4C2d(1)(b), special circumstances are deemed to exist if there is "present or projected lack of adequate service facilities and supply of parts for U.S.-manufactured vehicles."

Since there is an inability to provided service and parts for U.S.-manufactured vehicles and this capability now exists only for vehicles of Code 935 origin, the special circumstances criterion set forth above is satisfied.

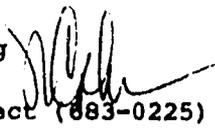
Recommendation: For the above reasons, it is recommended that you:

- (1) Conclude that special circumstances exist which merit a waiver of the provisions of 636(i) of the Foreign Assistance Act of 1961, as amended;
- (2) Approve a vehicle procurement source/waiver from the Geographic Code 000 to Code 935; and
- (3) Certify that exclusion of procurement from free world countries other than the cooperating country and countries included in Code 941 would seriously impede the attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program.

Clearances:

PMSU, WMseks (Draft)  
CONT, BWhipple (Draft)  
PRM, MGolden (Draft)  
A/DIR, JLoVaas (Draft)  
GC/AFR, LDeSoto (Draft)

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: AAA/AFR/DB/John W. Koehring   
SUBJECT: Niger Cereals Research Project (883-0225)  
RE: Delegation of Authority No. 144

Problem: Section 121 (d) of the Foreign Assistance Act of 1961, as amended, (the "FAA") precludes any new obligation of Sahel Development Project funds for disbursement by a foreign government until the Administrator has determined "that the foreign government will maintain a system of accounts with respect to those funds which will provide adequate identification of and control over the receipt and expenditure of those funds". On January 6, 1982 the Administrator delegated the authority to make this determination to you in Delegation of Authority No. 144.

Discussion: In anticipation of this requirement, the Africa Bureau at the beginning of FY 1982, initiated a process of "certification review" and "certification" by Mission Directors and office heads. This review is designed to establish the adequacy of host country accounting systems. The certification requirements are spelled out in State 278344 dated October 20, 1981 (Attachment A). This cable was followed by State 313799 dated November 25, 1981 (Attachment B) which was prepared by the Office of Financial Management and established for the Missions the minimum standards for host country accounting systems which must be met prior to certification. State 010545 of January 15, 1982 (Attachment C) further instructed Missions on certification and the information basis for requesting AA/AFR determination for FY 82 SDP obligations.

In accordance with this procedure, USAID Niamey has certified (Niamey 0963 dated February 18, 1982, Attachment D) that the accounting system at INRAN, the GON institution that will handle the AID-funded local currency accounts of this project, is adequate to meet the criteria outlined in paragraph 2 of State 313799 (Attachment B). The Mission considered the following factors in its review of the accounting system in use in INRAN:

1. INRAN maintains separate accounts for the different funds and will be able to account for AID funds separately from other accounts.
2. INRAN has a capable financial management staff including a director of finance, a treasurer, four accountants and an inventory clerk. Purdue University will also have on board a financial management specialist to control contract expenditures and act as an assistant to INRAN.
3. INRAN receives FNI funds for its operations and disburses from its own account. AID, therefore, will be reimbursing expenditures already made which gives more control over allowable costs and precludes the use of an advance.
4. AID will initially review 100 percent of invoices submitted for reimbursement and disallowances will be to the account of INRAN and will not prejudice AID's interest.

5. The Director of INRAN is authorized by the GON to commit funds and make disbursements. He is a designated 'ordinaireur delege' and has authorities for approving payments. This makes the internal approval procedure of INRAN much more flexible as far as quick approvals and rapid processing. In other words, the payment process does not require sending documents outside the organization for approval and processing and cuts down the time required to process payment requests. The AID vouchers could be handled rapidly and kept on a current basis which enhances accounting control.

6. USAID/Niger will assist in setting up a sub-system for disbursement by authorized line items of the project agreement and will review INRAN's internal controls related to cash payments, gasoline purchases and control of inventories. USAID/Niger will require INRAN to use the same degree of care for AID funds as they use with their current internal operations. Their current procedures and controls are adequate to meet the requirements of State 278344 and State 313799 as well as other requirements of the GON and USAID/Niger.

7. Payments to remote locations are limited in the new project, but will be controlled by INRAN's current system and all other controls are maintained at INRAN's central headquarters.

Recommendation: Based on the Mission's review and findings and the Mission Director's certification, that the AA/AFR make a determination that the Government of Niger has a system of accounts with respect to these funds which meets the requirements of Section 121 (d) of the FAA, as amended.

Approved ✓

Disapproved \_\_\_\_\_

Date 3.18.82

Clearances

AFR/DR/SWAP: JRMCCabe [Signature]  
GC/AFR: LDeSoto [Signature]  
DAA/AFR: WHNorth [Signature]  
AFR/DR: NCohen [Signature]  
AFR/SWA: JBierke [Signature]

Drafted by: AFR/DR/SWAP: MGHuffman: at: 2/2/82

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ACRONYM LIST

AAPC	Afro-American Purchasing Center
APS	Agricultural Production Support Project
BEPRO	Bureau of Studies and Planning of the Ministry of Rural Development
CFJA	Centre de Formation des Jeunes Agriculteurs (Young Farmers Training Center)
CID	Consortium for International Development
CIDA	Canadian International Development Agency
CILSS	Comité Inter-états pour la Lutte Contre la Secheresse au Sahel
CNCA	Caisse Nationale de Crédit Agricole (National Agricultural Credit Bank)
CPT	Centre de Perfectionnement Technique (Farmer Couple Training Center)
CRSP	Collaborative Research Support Programs
FAC	Fonds d'Aide de Coopération
GON	Government of Niger
IADS	International Agricultural Development Service
IARC	International Agricultural Research Center
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IITA	International Institute of Tropical Agriculture
IMEC	Inter-Ministerial Executive Committee
INRAN	Institut National de Recherches Agronomiques du Niger (National Agricultural Research Institute of Niger)

INTSORMIL	International Sorghum/Millet Research Program
IPM	Integrated Pest Management
IRAT	Institut de Recherches Agronomiques Tropicales et Cultures Vivrières (French Agronomic Research Institute)
IRSH	Institut de Recherches en Sciences Humaines (Niger Social Science Research Institute)
NDR	Ministère du Développement Rural (Ministry of Rural Development)
MESR	Ministère de l'Enseignement Supérieur et de la Recherche (Ministry of Higher Education and Research)
MP	Ministère du Plan (Ministry of Plan)
NCP	Niger Cereals Project (Phase I) or National Cereals Program
NCR	Niger Cereals Research Project (Phase II)
OPVN	Office des Produits Vivriers du Niger (Food Marketing Board of Niger)
PC	Program Coordinator
PCMU	Program Coordination and Management Unit
PID	Project Identification Document
PMSU	Project Management Support Unit (USAID)
PVO	Private Voluntary Organizations
SAFGRAD	Semi-Arid Food Grain Research and Development
UNCC	Union Nigérienne de Crédit et de Coopération (Nigerien Credit and Cooperative Union)

## 1. Recommendations and Summary

### A. Recommendations

1. Size of Grant: \$10,600,000
2. Waivers: Transportation requirements for AID-financed projects in Niger have been severely handicapped over the past three years by a lack of local support capability (both parts and maintenance) for American-made vehicles. American Motors recently attempted to establish a dealership in Niamey but was not successful. A blanket waiver for the purchase of non-US vehicles was recently granted but it was limited to fifty vehicles to be purchased and utilized in other projects. Therefore, a supplemental waiver permitting the purchase of Code 935 two and four-wheel drive vehicles for use in this project will be required and is included in Annex Q.

### B. Summary Findings

1. Achieving the Government of Niger's (GON) and AID's sector goals of long-term food self-sufficiency and improved standards of living for rural people will require increases in agricultural productivity within the several agro-ecological zones of Niger. Such productivity increases can only occur as a result of agronomic and other technical research which must, in turn, be made available to the Nigerien farmer in a form that is acceptable and easily adaptable to his particular circumstances. The research, the technology, the extension services and the ready availability of inputs necessary to achieve this goal for Niger are, at present, inadequate.
2. The current GON projects in rural development being supported by AID and other donors with emphasis on production inputs, extension delivery systems and credit, face considerable risk of being less productive than they otherwise might be unless improved and expanded research results are forthcoming.
3. The Institut National de Recherches Agronomiques du Niger (INRAN) is the appropriate official organization to provide the critically important research input into the above described program.
4. In order for INRAN to fulfill this role, not only is an increased amount of research necessary but considerable "institution-building" from within will be required.
5. INRAN can benefit substantially by outside assistance from an American university both to increase the quantity and quality of agronomic research and to augment the institution-building effort.

6. A long-term host-country contract is an appropriate form for the conduct of such a research and institution-building activity.

Accordingly, a project has been designed, described fully below, which will require a grant of 10.6 million U.S. dollars for an initial five-year period beginning in the first quarter of FY 1982. The GON contribution to the project will amount to a U.S. dollar equivalent of \$2,773,000 or approximately 21 percent of the total project cost (\$13,407,000). This contribution represents primarily in-kind contributions for GON-paid Nigerian personnel, the operation and maintenance of research stations, vehicles and equipment, and participant trainee support.

The PID for this project was submitted in April 1980 and approved on July 23, 1980. State 194803 authorized the Mission to proceed to the preparation of a Project Paper. An Initial Environmental Examination was submitted with the PID and a negative determination was approved by the Assistant Administrator for Africa. All of the issues raised at the PID review in Washington have been satisfactorily resolved during the final project design.

The project has been determined to be economically, financially and technically feasible. The GON agencies responsible for project execution, with the support of project-provided technical assistance, have been found to be adequate to provide the necessary administrative capability for project administration. The Mission Director has attested that the GON has the financial capability and human resources to maintain and utilize effectively the goods and services procured under this project (611(e) Certification). The Director has also attested that sufficient planning and analyses have been performed to provide a reasonably firm cost estimate to the U.S. government and that a determination can be made that the requirements of 611(a) of the Foreign Assistance Act, as amended, have been met.

The project along with its companion Agricultural Production Support Project is in conformance with and supports both the GON's Development Plan and the Mission's Country Development Strategy Statement. The Social Soundness and Economic Analyses indicate that the beneficiaries of this project will ultimately be the rural population of Niger who are among the poorest people of the world. Thus, this project also conforms to the Congressional Mandate.

The project meets all other applicable statutory criteria. The statutory checklist can be found in Annex L.

### C. Summary Project Description

This project is one of two designed concurrently as a sequel to the Niger Cereals Production (NCP) project which started in 1975 and is scheduled to be completed in December 1981. That

first phase project had four fundamental components: applied research, seed multiplication, cooperative development and agricultural extension. Follow-on assistance for the latter three components plus a component intended to strengthen the Nigerian agricultural input supply system have been designed into this project's companion project, the Agricultural Production Support Project (APS). This project, Niger Cereals Research (NCR), will help to develop a long-run capacity in applied agronomic research in Niger necessary to promote sustained increases in food production. The continued efforts of the two projects constitute an integrated National Cereals Program for Niger.

The purpose of the Niger Cereals Research Project is to develop the capacity of INRAN to undertake cereals research programs whose results can be disseminated to farmers via the extension and cooperative system. This is of necessity a long-term objective. Full achievement of the project purpose will take longer than the five years provided for in this initial effort. A collaborative effort between Purdue University (selected for design and implementation by the collaborative assistance mode) and INRAN will result in an increased capacity to implement and support an effective research program involving Niger's basic food crops--millet, sorghum and cowpeas.

During these initial five years, project activity will focus on three major areas:

1. The development of INRAN's capacity to manage its improved research program, its physical and human resources, and its linkages to other international research institutions and to the GON's extension program via the accompanying Agricultural Production Support project.

2. The development of INRAN's capacity to support its research program in the areas of library and information services, soil and plant analysis, food quality of grain analysis, in-service training, statistical support services and data processing, etc.

3. The development of specific research programs concentrating on three principal research areas each of which is intimately interrelated with the others:

- a. An Interdisciplinary Team Research Program of Crop Improvement for each major cereal crop (millet, sorghum, and cowpeas) which will involve breeders, plant protection specialists, agronomists, and cereal quality specialists and which will identify the major constraints to expanding productivity in each crop and develop knowledge and plant materials designed to meet these constraints. These efforts will be concentrated at the Iarna station near Maradi and at the Kolo station near Niamey.

- b. A Farming Systems Research Program which initially will comprise farmer surveys designed to more clearly characterize the farm enterprise, including its resources and their use, the practices employed, and the constraints to expanding production. Subsequently, this research will include on-farm testing of specific interventions and technologies to determine their acceptability and impact upon the farm. This research will be carried out in several villages in several different ecological zones within the administrative regions of Niamey and Maradi.
- c. A Production Systems Research Program which will develop systems of cultural practices appropriate for production of cereals in the various ecological regions and by the various kinds of farm enterprises. Work will focus on the development of recommendations for intercropping, fertilizer use, time of planting, density and spacing, weeding and pest control and similar concerns including cost/return and related management analysis. Work will be originated at the Tarna and Kolo stations, but will also be conducted, including both research and demonstration efforts, at a number of sites in several ecological zones in the administrative regions of Niamey and Maradi.

The project will provide to INRAN over a five-year period, 24 person-years of technical assistance by a U.S. university staff, and 12 person-years of field research effort by research associates provided by the university. The long-term technical assistance in institutional development staff will include a plant breeder, a production agronomist, two agricultural economists and a team leader who also serves as an advisor to the Director of INRAN. Short-term inputs by U.S. staff, totaling 53 person-months, will be utilized in the development of the research programs as well as in the enhancement of administrative and support functions. Training will be provided to Nigerien staff through some 20 academic programs and 30 person-months of specialized short-term training. The project will be implemented by INRAN which will have the benefit of a long-term contractual arrangement for technical assistance with Purdue University which has also been selected to conduct the design phase of this project. INRAN will also be assisted by Alabama A & M University through a subcontract with Purdue.

#### D. Alternative Strategies

1. One alternative initially considered by the design team was that of the establishment of several new research stations at a number of different geographic locations. However, an emphasis on expanded infrastructure would probably be unwise at this time. It would be unlikely that INRAN could utilize

effectively additional research facilities with the numbers of trained researchers currently available or likely to be available within the near future. The emphasis should be placed upon a more effective utilization of facilities now existing in Niger. There is a need to strengthen the research activities at certain geographic locations in order to focus on the problems specific to their respective ecological zones. Therefore, Purdue University has recommended that project activities for the next few years focus upon existing, but under-utilized, facilities, with only a modest expansion of the physical structure at one research station, Kolo. The justification for upgrading this particular station is that research data applicable to the Western part of Niger is not being generated in sufficient quantity to serve this zone. The research staff at Kolo can supervise experiments at Ouallam to the northeast and in Gaya to the southeast. Ouallam is 100 km. north of Kolo in a reduced rainfall area (350+ mm) and has newly constructed facilities which have not yet been used effectively for research. Gaya is approximately 200 kilometers to the south in the 800+ mm rainfall zone. Thus, research in three distinct and important rainfall zones can be supervised from the Kolo research station.

The majority of project inputs will continue to flow to the Tarna station at Maradi where a large physical infrastructure and research staff already exists. By providing needed technical assistance, commodities, training and budget support, the Tarna station will more effectively fulfill its role as a primary research center for Niger. It will also be better equipped to supervise research at various substations in south central Niger.

2. The design team also considered the alternative of recommending that the project not be implemented. This was rejected since the project, as described herein, is both feasible and highly important to Niger and to achievement of Niger's overall sector goals. A number of factors including population growth and increasing pressure on fragile land with dwindling natural fertility make it essential that changes occur in the technology used in agriculture in Niger. More people need to be better fed from essentially the same land base, and farmers' productivity must go up in order to provide some increase in the standard of living. Research in Niger is essential to achieve these changes, and it is not now occurring in the required quantity and quality to yield the desired results.

For example, the technical package being recommended by the extension service is based upon limited research findings. Essentially the same technical package is recommended for application in all areas of Niger, although it is widely recognized that there are at least three distinct climatic zones. Moreover, after six years of breeding sorghum and millet, no improved varieties have been developed which consistently outyield the local varieties under similar growing conditions. Among other questions concerning appropriate research is the question of the contribution being made by the row spacing

markers recommended by the extension service and sold to farmers by the GON. Thus, dependable supportative research is required for increased agricultural production and a project based on this objective should be implemented.

#### E. Project Issues

USAID/Niger and GON officials have concurred in the identification of the following as major project issues and, accordingly, the project has been designed to minimize to the extent possible any difficulties these issues could cause project implementation. USAID/Niger will maintain a project to monitor and assess the impact of these issues on the attainment of project objectives. These five issues are briefly described as follows:

##### 1. Financial Support of INRAN by the GON

The extent of financial support to INRAN has been obscured with the recent shift of this research organization from the Ministry of Rural Development to the Ministry of Higher Education and Research. As a result, certain financial support from the MDR has been eliminated while replacement finance from the MESR has not yet been formulated or published. Thus, government budgets seem to indicate a reduction in future year commitment as evidenced in published figures. Interviews with officials in INRAN and the ministries concerned have provided reassurance that sufficient financial support will be forthcoming to cover capital and operating costs. Nevertheless, a covenant will be included in the Grant Agreement to assure the needed level of support.

##### 2. Roll-Forward

Purdue University, INRAN and the USAID Mission are in full agreement that the long-term nature of the institution-building process requires a commitment of resources beyond the five years of financing called for in this project paper. Purdue has, therefore, recommended the use of an innovative contracting tool developed by BIFAD called roll-forward. Under the roll-forward system, institution-building efforts would be treated as a long-term program with an updated planning horizon. The concept is implemented by providing for phased special evaluations of the project's progress in achieving its objectives followed by amendment requests to add more money to finance additional years up to a project ten year LOP. That is, after completion of the first 30 months, a special evaluation will be conducted. If project objectives are being satisfactorily met, the Mission will request appropriate additional funding to cover years six through eight. A second special evaluation

will be held at the end of year five for the purpose of determining if funding for years nine and ten should be requested. The special evaluations will also focus on GON budgetary support to INRAN. Specifically, its planned increases in annual allotments which will allow phased reduction of U.S. assistance over years six through ten. The evaluation team might consider recommending that condition precedents be included in the amendments for years six through eight and nine through ten that require the GON to furnish evidence that their financial support to INRAN for those periods will be at or above the level discussed with them during the special evaluations.

### 3. The Role of Alabama A & M

The draft Project Paper submitted by Purdue University does not fully define the role of Alabama A & M University. Additional information on that university's role in technical assistance and participant training is needed, as is greater description of Alabama A & M backstopping capacity.

During the contract negotiating phase of activities, the Mission will require that Purdue and Alabama A & M define more clearly their respective roles, outline their specific contributions to the project effort and assign responsibilities for particular project implementation actions. In requiring this pre-contract exercise, the Mission does not wish to hamper the flexibility of the contractor to carry out its tasks as it sees best. The Mission does desire to see a clear definition of respective duties before committing significant amounts of funds to implementation.

### 4. Procurement of Commodities

As indicated in the Procurement Section of Implementation Arrangements it is anticipated that Purdue will be responsible for procurement of all scientific/technical commodities under the project. Part of the consideration going into a final decision is dependent upon the overhead that Purdue will charge for this function as compared to the surcharge used by AAPC. Large, easily defined equipment and household furnishings and appliances might be procured using either AAPC, Purdue or USAID directly depending upon cost considerations. With respect to vehicles, the Mission foresees direct USAID procurement.

## II. Project Description

### A. Relationship of the Project to the Sector Goal

Although foodgrain production in Niger has recently kept pace with population growth, agricultural productivity of labor or land is not increasing. Since the period of the great drought, increases in food production have been achieved largely at the expense of the traditional export crops, peanuts and cotton. The generally accepted view in Niger is that yields are declining. In order to increase production, farmers are moving into less accessible, increasingly marginal low-yielding lands. In the already cultivated areas, production is being increased by reducing the fallow periods, thereby causing deteriorating soil conditions.

During the current Development Plan period, the Government of Niger has given top priority to the achievement of food self-sufficiency. This is defined, in the short run, as producing enough food during years of normal rainfall to meet the needs of the population, and in the long run, as being able to accumulate enough surplus stocks during good years to cover deficits during drought years. The target for food production increases in rainfed areas is 2.2 per cent per year. The difference between the 2.2 per cent increase in rainfed foodgrain production and the population growth of 2.7 per cent is to be made up through rice and other irrigated production.

The assumption underlying the Plans's rainfed agriculture projections is that area will increase slowly and yields will remain stable. However, the goal of the GON during the current Plan is to reduce the magnitude of soil destruction through improved cultural practices. The technical package for increasing production has been improved upon in the last 16 years but there is still improvement to be made in its production-increasing capacity. Nevertheless, inadequate or lagging yields since the mid-1950's have convinced the GON and most observers that the long-term viability of agriculture in Niger is dependent on increasing productivity of rainfed intensive cultural practices rather than continued increase in areas using traditional extensive practices.

The technical package that is currently available for increasing yields consists, in a first phase, of selected seeds, chemical and organic fertilizers, insecticides, proper plant spacing and thinning, timely planting and timely weeding. Although present technical packages can improve yields for some farmers, there is however, the need for continual improvement of the packages through applied and adaptive research for sustained increases in production. Recent experiences have shown that farmers adopting the technical package move to animal traction and eventually to a full integration of livestock and crop production, resulting in a wider use of available agricultural resources. All of these improved practices do in fact, result in

significant increases in yields. However, some may entail increased cash outlays and may contribute to reduction of farm labor requirements as well as improve the income position of adopters. In view of the proven potential of existing technical packages, the CON's agriculture program is focusing on introducing these new practices to farmers and finding methods of adapting the practice in ways that will induce the farmers to accept them.

The main thrust of the agriculture program in Niger is the regional productivity projects. These projects are designed to address all farm-level constraints to increased production in an integrated fashion. They provide basic extension services and establish systems to support the new technology. The most important of the productivity projects are located in the departments of Zinder, Maradi, Dosso and Niamey and smaller productivity projects are about to get underway in Tahoua and Diffa. These projects receive substantial financial and technical assistance from external donors: the Maradi and Dosso projects are financed mostly by the World Bank, the Zinder project by the European Development Fund, and the Niamey Project by AID. The Tahoua Productivity Project is being assisted by Germany while Canada is expected to support the Diffa project.

An essential complement to these productivity projects is an adequate system of agricultural support services at the national level. The most essential supporting services are: research, extension, input delivery, credit, infrastructure (primarily roads), and sound policies relating to prices, subsidies and marketing. Regardless of how well designed, well staffed or well funded regional production projects might be, they cannot have a substantial long-term impact on agricultural production without an effective support system at the national level. The GUN does in fact have programs in all of the areas listed above. INRAN is the national organization that has taken over the research activities previously carried out by the French research organization, IRAI. Niger has two important agricultural training institutions, the Department of Agronomy at the University of Niamey and the Institute for Applied Rural Development (IPDR) in Kolo. Perhaps the organization with the largest role in rural development is the national cooperative union (Union Nationale de Cooperation et de Credit--UNNC) which is involved in virtually all aspects of agricultural development at the village level. The main function of cooperatives in Niger has traditionally been to market agricultural products. In recent years, however, they have played key roles in most of the productivity projects with respect to extension (selection of demonstration farmers and "farmer-agents"), input distribution and credit. The UNCC has its own input distribution organization, the Centrale d'Approvisionnement (CA), and is the representative of the National Agriculture Credit Bank (CNCA) at the village level.

Most of the national-level agricultural institutions have received donor assistance especially since the drought, and are significantly more effective than they were 10 years ago. The largest single project in support of Niger's agricultural institutions in recent years has been the AID-funded Niger Cereals Project (NCP), which was started in 1975 and is scheduled to be completed in 1981. Since the Niger Cereals Research Project (NCR) proposed herein is a follow-on to the NCP project, the major activities and accomplishments of the NCP project are described briefly below.

#### B. Niger Cereals Project (Phase I)

The Niger Cereals Project was designed in 1974 in the context of the Sahelian drought. Food shortages resulting from drought caused a heightened awareness on the part of the GON and the donor community of the need for increased food production. The project was designed to increase the production of food grains by improving the institutional capacity of the GON to identify improved production techniques, communicate this knowledge to small farmers and strengthen the framework for the provision of necessary agricultural services and inputs. The first phase project consisted of four interrelated components: applied research, seed multiplication, cooperative development and agricultural extension. The research activities started under the NCP project will be continued and expanded under this project.

The seed multiplication component of the NCP project was designed to increase the supply of superior varieties of seed and to train a corps of Nigerian technicians and farmer seed producers in the techniques of seed production, processing and distribution. A National Seed Service was to have been established that would assume responsibility for the coordination, evaluation and control of this program. Infrastructure constructed under this component included a Foundation Seed Farm and five Seed Multiplication Centers (SMC) that would produce seed to be further multiplied by contract seed growers. Establishment of a National Seed Service was started within the Agricultural Service through a national decree in 1978. However, the seed service was slow to become operational because of a limited technical package with respect to improved seeds. Recent improvements in seed multiplication and adoption of the technical package by cooperating producers have prompted the GON to develop a Seed Coordinating Committee as well as a National Seed Office. The first annual meeting of the Committee was convened this year and a viable seed production and distribution policy was established.

The cooperative component of the NCP project was designed to help the UNCC extend its coverage into areas where heretofore it had not been active. To increase UNCC's capacity to deliver agricultural inputs and market farm output, training was planned for top managers, cooperative field agents and cooperative leaders and members. The project also financed the construction of eight arrondissement-level office complexes. The number of

cooperative organizations has doubled during the life of the NCP project. Although these rural cooperatives remain nascent organizations, their functions are continually expanding. The training provided by the NCP project to both field-level cooperative agents and elected cooperative officials, has contributed significantly to both the numerical and functional expansion of Niger's cooperative system.

The agricultural extension component was originally designed to expand and improve the extension division of the Agricultural Service. Participant training was provided to form the nucleus of an extension training division. To increase the effectiveness of the extension program, vehicles and other commodity support were provided and additional personnel were hired. Arrondissement-level office complexes were constructed and two young-farmer training centers were expanded. The extension component of the NCP project was modified in 1978 to take into account the GON's evolving rural development strategy toward greater decentralization in appropriate situations. With the start of the various regional productivity projects, primary responsibility for the policies and planning of their extension efforts was transferred to these projects.

The adaptive research component was designed to further develop and test improved varieties of millet, sorghum, and cowpeas for location-specific conditions throughout the different ecological zones of Niger. The project financed locational and on-the-farm adaptive research trials in association with the National Agronomic Research Station (Tarna) located in Maradi. The need to expand agronomic research with respect to Niger's food crops and the need to further strengthen Niger's National Agronomic Research Institute (INRAN) prompted the GON to request financing and development of a separate but related Niger Cereals Research project.

As direct result of the NCP project, the medium and long-term skills profile of the Agricultural Service is being diversified. To a service staffed heavily with agronomists, three individuals trained in natural resources development and an agricultural economist are being added. All returned participants will be assigned to responsible positions within the Agricultural Service where they can directly apply the skills and knowledge acquired from project-funded training.

At the end of the NCP project, the extension, cooperative and research programs will have been strengthened, primarily through better infrastructure and training at senior and middle levels. Perhaps more importantly, both AID and GON now have a much clearer understanding of the institutional constraints facing agriculture. This will enable future institution-building efforts to be better focused and more relevant to the current needs of the country.

### C. Project Purpose

Since its inception in 1975, INRAN has been charged with major responsibility for conducting agricultural research in Niger. INRAN inherited at its creation the research programs and facilities developed by the French Institut de Recherches Agronomiques Tropicales et Cultures Vivrieres (IRAT). The research programs and the form of organization which IRAT developed were not particularly oriented toward the needs of Nigerien farmers to increase food production. IRAT's main purpose was to increase the productivity of export crops. Thus, INRAN has been faced since the beginning with the need to reorient the agricultural research program of Niger to serve the requirements of the rural population in basic food crop production. INRAN is a young organization still in a relatively early stage of organizational development. If the country is to achieve its rural development goals, INRAN must rapidly become the kind of innovative and productive institution which can furnish the technology required.

INRAN is facing a number of constraints to its ability to provide meaningful research to the agricultural sector. First, INRAN has not been able to obtain sufficient quantities of several critical resources, particularly scientific manpower. Secondly, it has not always been able to mobilize effectively the available resources in a number of critical areas. For example, scientists have not always been sufficiently supported in their research activities with reliable laboratory analyses, statistical services, library and other information resources, etc. Moreover, substantial amounts of time are consumed by scientific personnel in administrative activities. Thirdly, insufficient interdisciplinary efforts exist between the various research disciplines such as agronomy, animal husbandry, agricultural economics, forestry, etc. The fourth constraint is that INRAN has not focused its efforts sufficiently on researching production practices adapted to site specific environments within which agricultural production takes place. There are three rainfall zones in the cultivated zone with a variety of land form and soil types. This diversity has not been adequately taken into account in the design of current research programs.

These constraints on agronomic research have profound implications for Niger's extension program. The extension program as presently designed has not responded well to the diversity of farm practices in the country and is generally attempting to convince farmers to adopt what is essentially a uniform nation-wide package of technology. Neither research nor extension can expect to have a substantial impact on production levels unless these problems are addressed. Assistance to INRAN must, therefore, be oriented to enable INRAN itself to modify and expand its program in order to ensure greater interdisciplinary cooperation, to use more effectively its resources in meeting high priority research needs, to provide technology well adapted to various site specific factors, and to ensure that dissemination of research output is facilitated.

The effort begun with this project will permanently strengthen the capacity of INRAN to provide the sustained flow of research findings required to increase the productivity of Nigerien agriculture. Initial efforts will focus on INRAN's capacity to conduct research on rainfed cereal grains and will involve identification of significant research needs in Nigerien agriculture, conceptualization of specific activities designed to overcome the constraints on INRAN's ability to meet those needs, and finally, implementation of the program of activities.

#### D. Outputs

The above mentioned strategy will focus activities on three principal outputs:

1. Growth and development of INRAN's capacity to administer and manage its research program, its resources and its linkages to other institutions. The project will assist INRAN in developing its capacity to set priorities for research programs and to manage research stations, equipment, machinery, and other resources. The project will also assist INRAN in strengthening linkages with extension programs through ties to productivity projects, and especially with the expanded extension programs of the Ministry of Rural Development through the coordination activities with the APS project. INRAN will also be assisted through this project in strengthening ties to research institutions outside of Niger including ICRISAT, SAFGRAD, appropriate AID Collaborative Research Support Programs (CRSPs) and others.

2. Growth and development of INRAN's ability to support its researchers' efforts through service functions. The project will assist INRAN during the initial five years in:

- o Expanding library resources and their accessibility;
- o Strengthening plant and soil analysis capacity;
- o Development of food grain quality analysis capacity;
- o Increasing the data handling and statistical analysis capability;
- o Improving the in-service training programs for research support staff;
- o Expanding availability of farm machinery for support of research.

3. The growth and development of specific research activities oriented around a comprehensive, integrated and systematic approach to research. These programs will build on existing efforts, will use INRAN and contractor staff in multiple roles, will require interaction between the programs, will ensure expansion of INRAN's knowledge of on-farm situations and will, by their nature and by the way in which they are organized, result

in the creation of strong linkages between extension and research at every level. It is also a part of the project strategy to encourage the development of those research activities which will expand simultaneously both the attention given to variability across the different ecological zones of Niger, variability among farm enterprises and the need to carry research efforts through the phase of testing and demonstration under farm level conditions. These are facilitated within the project by assisting INRAN to develop its farming systems research program in a number of different villages and by stimulating the development of cereal production systems research efforts in several ecological zones. Research and demonstration activities will be tied to efforts of the regional productivity projects in at least two different administrative regions.

During these initial five years, the project will carry out the following three specific research programs:

- a. An interdisciplinary team research program of crop improvement for each major cereal crop (millet, sorghum, and cowpeas) which will involve breeders, plant protection specialists, agronomists, and cereal quality specialists and which will identify the major constraints to expanding productivity in each crop and develop knowledge and plant materials designed to meet these constraints. These efforts will be concentrated at the Tarna station near Maradi and at the Kolo station near Niamey.
- b. A farming systems research program which will comprise initially farmer surveys designed to more clearly characterize the farm enterprise, including its resources and their use, the practices employed, and the constraints to expanding production. Subsequently, this research will include on farm testing of specific interventions and technologies to determine their acceptability and impact on the farm. This research will be carried out in several villages in the different ecological zones within the administrative regions of Niamey and Maradi.
- c. A production systems research program which will develop systems of cultural practices appropriate for production of cereals in the various ecological regions and by the various kinds of farm enterprises. Work will include focus on understanding and development of recommendations for intercropping, fertilizer use, time of planting, density and spacing, weeding and pest control and similar concerns including cost/return and related management analysis. Work will be originated at the Tarna and Kolo stations, but will also be conducted, including both research and demonstration efforts, at a

number of sites in several ecological zones in the administrative regions of Niamey and Maradi.

E. End of Project Status

The long-run purpose of the project will be achieved as INRAN develops into an institution which can continually introduce new technology and methods into Niger's agricultural sector, provide a continually expanding base of scientific knowledge to support agriculture, and through these, have a sustained positive impact on the development of Niger's agriculture and upon the welfare of rural people. At the end of the project, INRAN should be characterized at that time as an institution which is highly valued by society, self-sustaining, and effectively linked to a wide variety of other institutions in Niger and internationally. However, the specific length of time which will be required to achieve the long-term purpose is clearly not now known for it will depend on several factors: the quantity and quality of staff, material inputs, the motivation to develop a particular type of institution and ultimately on the active support of the GON. The process can be assisted and made more rapid by effective institution-building assistance in this project.

While a timetable for achieving full institutional development cannot be established, it is possible to identify levels of progress that should be attainable within the next five years. By that time the contractor, Purdue University expects to have assisted INRAN in achieving the following:

- a. Three major research areas will have been created and oriented to increasing small farmer productivity. There are:
  - o interdisciplinary crop improvement research program for millet, sorghum and cowpeas;
  - o farming systems research in two administrative departments
  - o cereals production system research program in at least two ecological zones, and regions (departments).
- b. The administrative, technical and support functions and structures will have been strengthened and oriented to enhancing the productivity of INRAN and the scientists working for it.
- c. Strong national research/extension linkages will have been established under the overall National Cereals Program and additional linkages with several international entities operating both within and outside of Niger will have been strengthened.

As in any institutional development process, progress toward the ultimate objective is difficult to measure in an objective fashion. These modest five-year targets are, however, described in a way which should facilitate evaluation and which should guide project implementation.

#### F. Project Inputs

The Contractor, Purdue University, will make available to INRAN 24 person-years of long-term technical assistance and 12 person-years of field research activities by doctoral-level candidates from Purdue University. The long-term technical assistance staff will consist of a team leader, a plant breeder, a production agronomist, and two agricultural economists. In addition, Purdue will provide 53 person-months of short-term technical services designed to improve administrative and research support functions including soil and plant tissue analysis, library and other equipment use and research management. Participant training will consist of 20 scholarships at the undergraduate, graduate and Ph.D. levels. Up to 15 of these individuals over the five year span of the project may return to Niger for Purdue-sponsored thesis research; 30 person-months of short-term training in the U.S. is also scheduled. Commodities, including equipment and supplies required for the execution of the research programs, will be provided. Eighteen two and four-wheel drive vehicles will be procured, nine of which will be purchased initially and then replaced after three years. Project funding will be provided to refurbish the existing office, laboratory and seed storage facilities at the Kolo research station. The project will fund 12 in-service training programs to be carried out by INRAN, with Purdue University assistance, to upgrade its B and C-level technicians. Both AID and the GON will contribute to operating and maintenance costs of this project. There will be a mid-project and a final project evaluation which will assess the progress made toward achieving the project purpose. The Financial Analysis will enumerate project costs in detail.

#### G. Planned Project Activities

The following paragraphs will describe the immediate activities which will be undertaken as concrete steps toward implementation of the overall, long-term institutional development objectives of the project:

##### 1. Strengthening the Human Resource Base

INRAN needs significant quantities of additional resources to permit development of the capacity to meet future demands for its output. Staff numbers must be increased, particularly in some of the high priority research areas, if output is to be expanded and become more directly usable. Some of the current research staff do not have sufficient methodological training or adequate scientific background to fully carry out INRAN's research

requirements. The technical assistance to be furnished by Purdue University and Alabama A & M University will address this problem of human resources directly. The team leader will allocate a considerable portion of his time to working with INRAN administrators in order to ensure such a contribution by this project.

One of the more important means by which the project will expand INRAN staff capability is through daily interaction with the U.S. project staff. In these efforts, attention will be given not only to the technology transfer function, but to all of the elements of the institution-building focus. Each U.S. staff member will be expected to interact substantively and regularly with several INRAN staff counterparts. Each U.S. staff member will be involved in the on-the-job training program to help build INRAN staff capability.

In addition, 20 scholarships for academic training will be provided at the undergraduate, graduate and Ph.D. levels. For those students selected for training at Purdue or other appropriate universities, arrangements will be made for most of the graduate and Ph.D. candidates to return to Niger to conduct thesis research as an integral part of INRAN's project research. Also short-term specialized training opportunities will be made available for up to 15 individuals during the five year project period. The specific training to be provided will be identified by INRAN project staff with the advice of Purdue and Alabama A & M universities.

INRAN will be assisted in expanding its capacity to conduct in-service training programs for all levels of staff, but especially for mid (B) and lower (C) level technicians and support staff. The project will assist in conducting twelve in-service training programs over the five-year period in a manner that will ensure INRAN's capacity to continue such programs after the termination of outside assistance.

## 2. Strengthening Administrative and Management Support to Research Activities

Project activities over the next five years are expected to bring about several important changes in INRAN. Assistance will be provided to INRAN to analyze the needs for reorganization. INRAN will also be assisted in developing more effective priority setting and planning for their research efforts. INRAN probably will be requested to consider some decentralization of authority and assistance will be provided in this regard. The options for use of computer equipment for administrative activities will be explored and measures to reduce administrative loads on INRAN scientists will be examined. In addition, INRAN's efforts to increase the efficiency of utilization of land, labor, farm machinery, laboratory equipment, library resources, station facilities and other resources will be encouraged and supported.

### 3. Strengthening Capability to Provide Technical Support Functions Important to Research

The availability of certain kinds of support is essential to the conduct of agricultural research. Budgets for such support services are often inadequate. The problem is recognized by INRAN and attempts will be made to address the situation using resources available under this project. Specific measures to be taken include the following:

#### a. Plant and Soil Analysis

INRAN already has a well-equipped laboratory for soil analysis in the ecology research department, and there are several trained soil scientists currently working in it. As interdisciplinary research programs begin to develop, the soil scientists should play a substantially increased role in research currently involving only plant breeders or general agronomy researchers. Greater demands upon their time and increased laboratory work will be required as this project proceeds. Short term staff time will be provided to assist the laboratory in expanding its contribution to the research effort.

The same laboratories and personnel also conduct limited plant tissue analysis. As the procedures are similar and equipment requirements overlap, it will be possible to conduct increasing foliar, root and other plant tissue analysis in this same basic facility. Project funds will be used in support of the laboratory section of INRAN for personnel training, purchasing of equipment, supplies, etc.

#### b. Cereal Quality Analysis and Testing

An analytical capability is fundamental to cereal quality improvement programs. High yielding millet, sorghum and cowpea varieties are of little value if they remain unused because the grain does not produce a food product acceptable to the farmer/consumer. Where cereals provide the staple diet, as in Niger, there is also a need to ensure that the quantity and quality of grain protein meets certain minimum nutritional standards. The cowpea, sorghum and millet breeders in Niger have explicitly included grain quality in the objectives of their respective breeding programs. For example, easily milled, bright yellow grains have been identified as desirable in sorghum. Faster cooking grain has been identified as an objective of cowpea improvement. INRAN does not presently, however, utilize known laboratory methods to ensure breeders that desired quality is being obtained. The building which houses the soils laboratory would appear to be adequate for installation of additional facilities to do cereal quality testing.

A small Cereal Quality Section will be established under the project at the Soils Laboratory building in Niamey, by providing short-term staff services, training and a modest amount of

equipment and supplies support. Objectives of the new Cereal Quality Section should be:

- o To provide morphological description of local cereal varieties (pericarp, color and thickness, presence or absence of testa, endosperm texture, seed size and shape, etc.);
- o to develop detailed description for processing and preparation of cereals for the major food products;
- o To identify both acceptable and undesirable characteristics of sorghum, millet and cowpeas for each food product;
- o To establish procedures for testing the milling and cooking quality of grains for each major food product; and
- o To establish taste panels representing the major regions of Niger to evaluate the cooking and taste quality of the grains prior to the release of new varieties.

An area especially desirable and appropriate for the participation of women is in cereal quality analysis, where a knowledge of traditional food preparation is essential. The Project will specifically request the GON to recruit women for training in this discipline and for staffing of the Cereal Quality Laboratory. The evaluation of new cereal varieties for processing desirability and taste acceptability prior to their release and distribution to farmers will be done by taste panels, also primarily composed of women, who are homemakers familiar with the preparation and cooking methods of the various food products. Thus, women will have a direct input on the types of grains bred and released for farmer production.

Biochemical analyses (protein and amino acids) and microscopic examination of local varieties, can be conducted at Purdue's Cereal Quality Laboratory until a Nigerian is trained in cereal chemistry.

#### c. Library Resources

Examination of the central collection of library materials at Niamey and Tarna has led to the conclusion that they are inadequate for INRAN's needs. The library resources available to INRAN will be expanded substantially. Accessibility to the resource by researchers will also be enhanced. There is within INRAN an unknown quantity of additional, and perhaps more valuable, resources in departmental and, in some cases, individual collections. Under current conditions, however, it appears that Nigerian researchers find literature review difficult, and thus do far less relevant reading than is necessary to ensure that they take full advantage of prior research

efforts. Bibliographic search services are not provided, documents are hard to find, and the collection is physically scattered.

INRAN cannot afford to proceed without using the benefits of prior experience. It cannot afford to use excessive amounts of limited researcher time to find documents, and it cannot afford to provide each department with duplicate copies of relevant material. A centralized system must be developed to address specific needs. This project will furnish short-term staff to work with INRAN on this problem, and provide for document purchase, equipment and supplies necessary to improve the system, and short-term training.

#### d. Data Analysis and Statistical Consulting

The design of experiments, analysis of data collected and the drawing of conclusions from such data are all fundamental processes in INRAN research. As many researchers do not have, and should not be expected to have, the total background necessary to conduct all of these steps without assistance, a central support program is essential. This service now exists but has some deficiencies. The service does not have adequate staff, nor capacity to analyze extensive sets of data. Further, the section must develop the capability to support research without replacing the crucial role of the researcher. There is an apparent tendency for some researchers to receive results of statistical analyses and then present them without further consideration or interpretation. Lack of knowledge of researchers' constraints and of the environment also prevents the section from doing a more effective job in statistical and design consulting.

Under this project long-term academic training will be provided at various appropriate universities which will permit expansion and upgrading of the section. Also short-term staff assistance will be furnished to meet urgent needs for improved methods of work. As the Farming Systems Research will use micro-computers to be installed at Tarna and at Kolo, it becomes feasible to develop an overall system using a micro-computer at each of those sites, plus a larger mini-computer in Niamey. Data handling, particularly data input characteristics and programming will be totalling compatible. Thus farming systems data can be encoded at Tarna and Kolo, verified and partially summarized by those people most familiar with the data collection, and moved later to Niamey for larger scale analysis, comparisons across sites, and use in model building. The statistical section would also develop programs for analysis and summary of standard or common types of research data which could be utilized by agronomic researchers, breeders,

etc., on the in-station micro-computers. Administrative use of the Niamey mini-computer is also expected.

While the micro-computers are required early in the project, the development of capacity to use the Niamey based mini-computer effectively is expected to take several years. In all efforts in this area, project activity will be directed with careful attention to the appropriateness of the support role and of the researcher role.

#### e. Farm Machinery Availability and Use

Despite its general inappropriateness on Nigerian small farms, there are valid reasons for use of certain kinds of farm machinery on the research stations. The need to utilize efficiently scarce, well trained researchers and technicians, and the need to conduct activities in a timely fashion, and among such reasons. The project will assist INRAN in expanding its capacity to ensure availability of appropriate farm equipment for researcher use. Initially short-term staff will be provided to INRAN to identify machinery parts required to develop a systematic inventory of existent machinery, to repair that which is repairable, to develop routine maintenance capacity, and subsequently to purchase some new equipment. Inventory and assignment record system will also be developed by INRAN to ensure more effective future use and facilitate sharing of machinery. The concern raised in Phase I about suitability of equipment has been carefully noted. Considerable care must be taken to ensure elimination of such problems in the future. Necessary steps in this regard are indicated in the procurement and implementation plans. Analysis of equipment needs and recommendations will be found in the technical analysis (Annex C).

#### 4. Expanding and Strengthening the Linkages Between INRAN and the International Scientific Network

There are a number of international research organizations outside Niger which are working on problems and/or crops similar to those in this country. INRAN will be encouraged to develop stronger relations with these organizations in order to avoid unnecessary duplication of effort, to take advantage of advances in scientific research being undertaken elsewhere and to gain access to methods, techniques and personnel for INRAN's programs. Some cooperation has already occurred with outside institutions. For example, ICRISAT has maintained a millet breeder at the Tarna Station for several years and has an expanding regional research program important to Niger and other West African States. IITA in Nigeria has carried out cowpea variety trials and furnished genetic

materials to INRAN.

Project activity will strengthen both the linkages and the INRAN capacity to maintain these linkages. To some extent, this has already begun as a result of the selection of Purdue University to implement the project. Purdue is already strongly tied to the international network of agricultural research organizations. Purdue and its sub-contractor Alabama A&M University will utilize their connections to assist INRAN in creating those linkages essential to its programs and interests. A list of the potentially important international research programs with which linkages can be facilitated is provided in Annex E.

Special attention will be given to the development of linkages with those universities involved in relevant Collaborative Research Support Programs (CRSP) with AID. Purdue University will facilitate linkages with the sorghum/millet CRSP, the bean/cowpea CRSP and the tropical soils management CRSP. Alabama A & M will facilitate linkages with the peanut CRSP. These programs are focusing impressive arrays of scientific manpower on problems of vital interest to Niger and similar countries. This project will encourage the application of CRSP talent, knowledge and ability to INRAN's specific research interest, and the same time, foster the ability of INRAN to seek out and establish on its own functional linkages with outside programs. The project will contract with CRSP researchers for specific studies and the long-term contractor staff will assist INRAN in developing the specifications and requirements for such studies.

##### 5. Expanding and Strengthening the Linkage Between Research and Extension

The NCR and APS projects will work jointly toward the development of effective research linkages with extension at two levels. INRAN needs to be linked with extension at the operational level in order to assure awareness of the farmers' problems, their constraints and how extension perceives and deals with these factors. INRAN also needs immediate reaction from the farmer and/or extension agent as to the utility or feasibility of research ideas, and proposed materials, techniques, and/or methods. This provides the "self-correcting" mechanism which is so often missing in research programs isolated from reality. At the operational level, INRAN will be assisted in organizing its programs to obtain a coordinated research extension linkage through five principal mechanisms:

- a. a continuous evaluation of the research and extension activities in Niger with a view to integrating the two programs;

- b. the development of an office within the Ministry of Rural Development (the Extension Support Center) which will serve to institutionalize this linkage;
- c. the utilization of the university contractor (Purdue) to provide extension linkage services in the companion APS project;
- d. assistance in further development of INRAN's recently established extension liaison function;
- e. the coordination of all project implementation activities under one organizing body, the Program Coordination and Management Unit (PCMU);
- f. research on cereal production systems will involve the applied research staff member from the appropriate productivity project, with testing of results carried out jointly with the productivity projects on the farmer training centers (CPT's) and similar locations.

A process for joint participation of research and extension personnel in analyzing and planning their respective programs will be institutionalized. The extension staff under the APS project will participate in an annual evaluation of the research program and in defining research objectives and, conversely, research personnel will participate in an annual evaluation of extension results and in designing of extension programs. A system for close interaction between research and extension at the field level, essential to the above concept, will be established. The final output will be a more problem-oriented research program which will integrate the socio-economic constraints of the setting in the research program. Also more direct participation of extension personnel as well as the farmer himself in the applied aspects of research results, testing and demonstration will be achieved. The Applied Research Advisor under the Agricultural Production Support Project will maintain a continuous liaison between extension operations and the research activities of this project as well as undertake analyses of the applied research programs and their relation to extension activities.

It will also be important to expand and improve the mechanisms for the flow of communications between INRAN staff and extension personnel. The project will assist INRAN in conducting several seminars each year which bring together both groups for additional discussions beyond that provided for in the current "annual report of research" format. Publications and other forms of individual communication will also be expanded. Project resources will support these efforts,

providing personnel and materials, INRAN and the Purdue project staff will work together with the Agricultural Production Support Project through the mechanism of the Program Coordination and Management Unit to develop policy guidelines which can facilitate the strengthening of the research/extension linkage and resolve particular constraints to improved linkages.

#### H. Relationship of the Project to Other Donor Programs

There are several programs maintained within INRAN by external donors which may have some effect on project activity and NCR success. Most are, however, fairly specific in their scope of work, and there is not major program which coincides with the project. There is an important new project with three expatriate scientists provided by the Comite Inter-etats pour la Lutte Contre la Secheresse au Sahel (CILSS) as part of a regional program in Integrated Pest Management located at Tarna. While this project is new, and ties may develop later, it does not now seem to have close ties with INRAN researchers or INRAN programs. As activity develops in the IPM project and data become available, it should be possible to assist INRAN to incorporate certain aspects of the IPM work into this project. IPM could make important contributions to NCR/INRAN efforts by the interdisciplinary research teams, and particularly in the area of the Cereals Production Systems Research.

Canadian scientists under Canadian International Development Agency (CIDA) auspices are working at the Tarna station conducting taxonomic studies and developing a national insect collection which will in the long-run be quite useful to INRAN. No conflict exists nor is there any real overlap of effort.

CIDA, jointly with USAID, is supporting a project with INRAN entitled "Tapis Vert", which uses U.S. and Canadian private voluntary organizations (PVOs) to develop a village-oriented "appropriate technology" approach to soil conservation efforts. The project is working with tree planting, small dams and other barriers to erosion and similar activities. Some of Tapis Vert's efforts are directly related to the NCP project in that they deal with crop rotation, intercropping, contour plowing and legume trials. The "Tapis Vert" project has expressed a need for additional research data, thus a rationale exists for coordination between the two projects. Specifically, it might be possible for NCR to provide "Tapis Vert" with a number of innovations over time which could be effectively tested under village conditions in dry environments.

The French government is currently assisting INRAN in a number of ways. Funding has been received for work in peanut

research, and for range pasture and forage grass research. There have also been a number of French technical assistance experts undertaking research in INRAN. Several of these are playing important roles in those areas where the NCR project must work to achieve its objectives. As a crucial problem with INRAN is the shortage of scientific staff, and as freeing INRAN staff to pursue training is extremely important to project goals, it would be a particular concern if the French technical assistance contribution to INRAN were to be reduced. Some French experts are reaching the point where contract renewals are being considered, but INRAN is not now certain whether the number of experts provided will be maintained. The Mission will consult with FAC representatives and encourage the continuation of their support to INRAN.

ICRISAT has for some time maintained a millet breeder at Tarna. This effort is highly complementary to that of the NCR project. Integration of the work done by this millet breeder with the interdisciplinary efforts proposed for millet under NCR, should work to the advantage of both programs. As discussed elsewhere in the paper, ICRISAT will develop a major regional center in Niger. While this center will not conduct locally oriented research, the program will produce information vital to INRAN. The NCR project will maintain close coordination with the developing ICRISAT program by assisting INRAN to use the research products of ICRISAT, by developing priorities for project activity in INRAN research, and particularly by avoiding duplication of research effort.

During the next year, a World Bank group will prepare a study of and plan for the overall research program of Niger. It will be important to examine carefully the recommendations of that group for implications for INRAN and the NCR project. The World Bank panel has been advised of preliminary plans for this project and will be fully informed of the final design. It appears likely that the approach and objectives of this project will be consistent with the World Bank's recommendations as evidenced by similar efforts in other countries.

### III. Project Analyses

#### A. Technical Analysis Summary (See Annex C)

##### 1. Previous Research

Prior to 1974, agricultural research in Niger was directed by French institutions and was oriented on a regional West African basis rather than being tailored to specific national needs. Thus, the primary agricultural research facility of Niger is located at Maradi, some 700 km from the capital city of Niamey. Maradi is the center of an important agricultural production area. Early experiments were largely oriented towards the improvement of export crops: cotton and peanuts. Because relatively little attention was given to subsistence crops, millet, sorghum and cowpeas, the needs of the peasant farmer were largely ignored.

In 1974 the GON established INRAN as the national organization responsible for giving scientific and technical support to the problem of rural development, and to plan and carry out research in the different branches of agriculture: ecology, agronomy, animal husbandry, forestry, agricultural economics and training. At this time the GON also identified the goal of self-sufficiency in food grains as a national priority. This shift of focus from export crops to subsistence crops represented a fundamental change in research policy.

The means by which these objectives were to be met were not clearly defined so that young Nigerien researchers with little or no experience in research, planning and management, found it difficult to meet the specified goals.

Between 1976 and 1980, the first phase of the Niger Cereals Project was funded by AID. The NCP Phase I made a substantial contribution to the research capability by upgrading research facilities and training research staff, both in-country and abroad. NCP Phase I physical plant improvements included the construction of three buildings at the Maradi station and seven buildings at Ouallam. Research investigations showed that substantial increases in yield could be obtained by purification of local varieties of millet, sorghum and cowpeas since these varieties were better adapted to the various ecological zones of Niger. Experiments with rotation systems of legume-grain, including a local legume variety, demonstrated a very positive effect on yield. (See Technical Analysis--Annex C., Section II, Evaluation of Research Component in Phase I.)

Although a great deal of scientifically sound research was conducted during Phase I, very little progress was made at integrating the research into complete technological packages, translating it into appropriate farming systems, and ultimately, delivering the finished product to the farmers. (See the

Technical Analysis--Annex C, for a more complete assessment of Phase I.)

## 2. Current Status

INRAN's research facilities include seven stations, one substation, seven field stations, and 11 research laboratories. The principal station (CNRA) is at Tarna, near Maradi. Much of the CNRA facility is relatively new, partially constructed under Phase I. The senior research staff, including the Director, are trained to the M.S. level. During Phase I, the Nigerien staff lacked the ability to initiate and direct innovative research programs which could respond effectively to the needs of their country. Now, major research programs have been commenced in millet and cowpea breeding, and plant protection (entomology and pathology). Smaller programs and sections exist for animal husbandry, general agronomy and vegetable culture. Investigations at CNRA are heavily oriented toward individual disciplines. A small research station is located at Kolo. This station is run by a Nigerien sorghum breeder, the only professional level researcher at the station. A sorghum breeding program and variety testing is conducted at Kolo. At the Ouallam substation, which was built under Phase I, virtually no research activities are as yet underway and the facilities are currently being used for seed multiplication.

The Soils Laboratory in Niamey is well equipped and staffed. Although the laboratory has modern and sophisticated equipment, additional training for the staff is needed for the efficient use of this resource. There is also a potential conflict between the role of the laboratory as a research activity and its role as a service operation for other agricultural scientists.

In general, the various research programs in Niger are fundamentally sound. However, most of the research is discipline oriented, with little crossover of ideas and personnel among related programs. The research staff is top-heavy with plant breeders, while there are no Nigerien researchers in the supporting disciplines of agronomy, plant physiology and agricultural engineering. Most research programs suffer from inadequate and uncertain budgeting as well as the need for additional trained technical staff. Lack of field equipment, supply (inventory) as well as proper maintenance and transportation are constant problems to researchers. In some cases, the facilities are inadequate for the size of the research effort, especially at Kolo. There is a large library building at CNRA, but it lacks an adequate supply of reference material, nor is there any staff assigned to library and reference duties.

## 3. Improvement of Capability and Relevance of Research

Although there have been many examples of professional research activities conducted in Niger by Nigerien and expatriate workers alike, very little of the output has

effectively benefitted the farmer. Although part of the problem lies with an ineffective extension service, the nature and relevance of the research is also at fault. There has been considerable emphasis on basic research, which is better left to the resource-rich countries and/or international institutes. Greater emphasis should be placed on applied research on problems which are specific to Niger. Varieties and production practices are needed for each specific ecological zone. To do this requires some decentralization of the research effort, such as an expanded activity at Kolo and Ouallam. Research in Niger should also be focused on an end product which is directly usable by the farmer. This means an ultimate research output which is a complete technological package appropriate to some set of Niger farming systems as opposed to simply a new variety or an improved cultural practice. A multidisciplinary research approach best produces this type of research output.

Analysis indicates the desirability within INRAN of a coordinated three-pronged research effort: (1) multi-discipline commodity research, (2) production systems research, and (3) farming system research. The commodity research component supplies the basic ingredients: improved varieties, plant protection, and improved cultural practices. The production systems component develops alternative packages of production: inter-cropping, rotation, management choices, etc. The farming systems research activity characterizes the farm enterprise and integrates the production packages which are most appropriate into farm-level tests at the village level. Through the NCR project, Nigerien and Purdue research staff will interact across these three research areas to provide relevant technological packages to the Nigerien farmers. INRAN's support and service functions (statistical analyses, in-service training, plant and soil analyses, etc.) are important to the effective functioning of the research activities. A brief description of the three research areas follows (also see Technical Analysis--Annex C.):

- a. Commodity Research. The concept of commodity research (millet, sorghum, cowpeas) implies a team approach rather than organization and operation within single disciplines. Too often research is conducted for its own sake, with each researcher operating independently. Plant breeders tend to focus on producing the highest yielding variety without regard to the micro-environment in which it must exist. Agronomists risk developing management practices which are not consistent with the behavior and performance of specific varieties, or which are un-economic. There is also the likelihood of researchers pursuing "pet" projects or research aimed at publication which has little relevance to the country's needs. However, when all researchers, breeders, agronomists, pathologists, soil scientists, etc. have the same research objectives--namely the improvement of a specific commodity--these tendencies can be more readily avoided. The primary objective of this research

is the development of improved varieties of acceptable quality, which provide potential to increase productivity of the crop.

- b. Cereals Production Systems. This research activity has the responsibility of developing and testing agronomically sound production practices specific to the principal ecological zones of Niger. The production team involves the participation of crop breeders, agronomists, pathologists, entomologists, soil specialists and agricultural economists. A typical production package might include improved early cycle millet and cowpea varieties for the drier crop zone, cultural practices to conserve soil moisture, a rotation system which maximizes legume/cereal production, and cultural practices (early planting, weeding and crop residue clean-up) to control pests. For the more humid production areas, longer cycle varieties, dense plant populations and one or two fertilizer inputs may be added. Each of these production practices, and especially the logical combination in production systems after testing at the research stations, should be further tested at various locations (farmer training centers, substations and testing centers), under conditions similar to those under which farming occurs.
- c. Farming Systems Research. Farming systems research begins with a diagnostic stage indentifying, quantifying and analysing the existing systems, developing typologies of farms and of farming, and particularly identifying the constraints which prevent farmers from expanding production. This process provides a socioeconomic evaluation of the traditional production systems and understanding of those factors which affect the potential adoption and use of improved systems. The next stage is the identification of possible improvements of the technology, defining gaps in it, in consultation with farmers' extension services, the commodity research teams, production systems research teams, and their research support services. The potential improvements to the technology proposed by extension personnel and the production systems research activity are tested in farmers' fields. Successful improvements are then disseminated to the extension program with the range of farm and farming types for which they are expected to be applicable.

#### 4. Conclusions

In the judgement of the team, the project design outlines a sound approach to improve INRAN as a research institution which is effective and responsive to the needs of Niger.

The project inputs, technical assistance, training, commodities, construction and research budget support will directly impact on three research areas: commodity improvement, production systems and farming systems plus supporting services, to improve both the quantity and quality of research outputs. This approach to agricultural research should also help ensure that a greater amount of the research output is both applicable and acceptable to the farmers. Emphasis on institution-building by this project will make INRAN a more effective organization, both administratively and technically, so that it will grow and develop to meet the current and future needs of Niger.

## B. Economic Analysis

### 1. Project Analysis

It is generally accepted that a strong national agricultural research system, integrated with the rural development program, oriented towards identifying and seeking solutions to the needs of the farmer, can make a major contribution in improving the productivity and welfare of the rural population. While research results do not, in general, have a market value, research is a recognized area of necessary investment by governments and donors.

The economic rate of return for this project has not been estimated ex-ante. However, ex-post studies have shown a relatively high rate of return to investment in agricultural research. Three studies in Latin America indicate rates of return of 50-100 percent, and one study in Asia, 75-102 percent. For LDC's in general, Evenson and colleagues propose rates of return of 40-60 percent. (See Senegal Agricultural Research Project Preparation Report, IADS, July 1979).

Research investments are, however, uncertain in their results, involving investments in the development of human capital and important time lags between the investment and the production and subsequent utilization of the results.

The adoption of the results, with consequent economic benefits, usually also depends upon parallel investments in rural development projects. Furthermore, the returns from investments in rural development may be relatively small unless there is an adequate research output to extend.

The existence of a strong national agricultural research system also makes it more likely that considerable investments in research in the international agricultural research centers and in developed countries can be profitably adapted and disseminated in an LDC.

This project is designed to help fulfill the GON objective of continued future ability to satisfy the food needs of the growing population, mostly relying on rainfed agriculture.

Very little progress can be or should be expected at raising yields in the northern edge of the crop production zone in Niger (350-450 mm rainfall). Agricultural production in this area is marginal at best and is better suited to livestock production, but is being cropped because of population pressure on the land. A realistic, if modest objective for this area would be to stabilize crop yields at present levels while halting the decline in soil fertility. If, by introducing agronomic practices which conserve soil moisture and fertility, the Project enables subsistence farmers to avoid the disastrous effects of total crop failure during the worst crop years, they will at least be protected from total loss of income and food.

Little progress should be expected from breeding programs to increase yields for the drier arable regions, since existing local varieties may already be optimally suited by natural selection for survival in extreme years but having sacrificed the genetic potential to maximize production in good years. It may be more productive in the long run for the Project to encourage the return of this land to livestock production, for which it is better suited. Breeding programs in Niger currently emphasize the selection and purification of local varieties and their return to their zone of adaptation, but little increase in yield has been achieved.

For the more productive arable regions of Niger (450-800 mm rainfall), yield increases of 25% to 100% are realistic during the LOP by introducing improved agronomic practices and improved varieties. However, due to the long lag time involved in breeding, multi-locational testing and seed multiplication, improved varieties may not have an impact on yields until a Phase II of the Project. Even where improved varieties are in the final stages of selection in current breeding programs, the testing and seed increase steps would delay their distribution to farmers until the 4th or 5th year of the project.

However, improved production practices can be developed and tested to increase farmer yields by Year 2 or 3 of the Project. Yields of millet, sorghum, and cowpeas have been doubled in Niger in research stations and farmer demonstration trials by adding modest levels of fertilizer and other improved practices. In the U.S.A., the average farmer has been able to achieve only 70% to 75% of experiment station yields using the same inputs. Given a harsher climate and lower resource base, a more realistic success rate for an average Nigerien farmer would be 25% to 50% of research station yields.

Even so, this increase would mean an additional 75 kg./ha. of millet or sorghum per hectare at a minimum and an additional 150 kg./ha. at the maximum 50% efficiency rate. Intercropping of cowpeas with sorghum or millet can add 100 kg./ha. of a protein-rich food to the diet or household income without reducing the yield of the primary millet or sorghum crop. The addition of a year of cowpeas culture to a rotation system increases the subsequent yield of sorghum or millet by 100 kg./ha. or more in Niger. Additional yield increases are possible with proper date of planting, proper plant population and pest control during the LOP. Yield increases of 100% or more are probably not

feasible on a consistent basis until the final year of the Project or until Phase II when improved varieties are available and coupled with improved agronomic practices. The impact of this Project will also depend on the effectiveness of the various activities of the APS Project. For example, the production of high quality planting seed by the seed multiplication centers could increase yields by 10% to 20% alone due to good stand establishment and early seedling vigor.

## 2. Recurrent Cost Analysis

The organization of INRAN, including its stations, substations, field support units and laboratories has 21 specific units plus a number of administrative units. To direct this, there are 18 A level and 6 A2 level staff including those in central administration. There are 18 B level, 28 C level and 9 D level support staff on the national payroll. INRAN staffing levels are clearly insufficient. Various proposals have been made to increase staff, with varying needs cited. Proposals include: one proposal for 60 A level staff for 1981-82, another 62 A1; 25 A2; 39 B1; 84 B2 and 138 C for the period 1980-84, and another for 118 baccalaureat graduates to start B.S. degree level training between 1981 and 1985. While none of these is likely to be totally fulfilled, it is clearly expected that INRAN will add staff at all levels during the project period.

The NCR project focuses largely on expanding and improving or somewhat modifying efforts in research program areas that are important in INRAN's central research responsibility. It therefore, becomes very difficult to determine whether the increased staff numbers projected to occur as the project proceeds constitute a recurring cost burden due to the project or whether they would have been added anyway based on the existing five-year plan with perhaps a different mix of responsibilities. It does seem that the first question which must be answered is the increasing salary cost resulting from upgrading staff through the use of 20 academic training positions.

An additional problem in the recurrent cost analysis is the difficulty in assessing the reduction in cost which may offset substantially any cost increases. Assistance provided in the NCR project will enable INRAN to increase the effectiveness with which research is conducted. Decreased costs or increased output for similar costs may be expected as a result of:

- o staff training at all levels;
- o use of project staff to resolve problems currently constraining research output;
- o greater use of information techniques, and new ideas available from other programs;
- o repair of existing and provision of new farm machinery;
- o use of new laboratory and research equipment and small computers, thus increasing output with less input of labor;
- o improved maintenance and better inventory, thus increasing utility of equipment and machinery;
- o better definition of research objectives and improved focus on requirements for acceptable results including consumer acceptability.

With these and other potential means of developing a more cost effective program being important project contributions, there is a real question, impossible to answer here, whether the project will in fact result in a net increase in recurrent costs as compared to the alternative "without project" situation.

Estimating the recurrent costs which may be incurred as a result of project activity, requires consideration of four main problems:

- a. Information available on personnel utilization does not permit us to predict requirements at various levels. That is, if an A level scientist is added at Tarna in agronomy, can he be serviced by some of the existing support staff and labor? If not, how many additional people will be required at what levels?
- b. It is not yet clear what level of people will ultimately do which jobs. For instance, previous proposals for INRAN operation of farming systems survey work indicate need for a "category 8" person, while previous experience in such work suggests that a "category 5" person is more appropriate and provides 40 percent lower cost with longer job tenure.
- c. It is difficult to determine the total cost of adding people. While basic salary scales plus social cost benefits are known, it is normal to provide other incentive payments for responsibility, and in relation to job location, family size, etc. It is not now possible to estimate the effect of these items.
- d. It is difficult to determine the current and expected levels of the major components of INRAN's budget. This is complicated by an apparent indication in the five year plan that investment funds for INRAN are proposed to decline to almost nothing by the end of the plan. Further, those funds anticipated for 1980 and 1981 have not been totally provided.

Our estimates of the expected recurrent costs are subject to all of the considerations outlined above. These estimates based on post project salary and cost levels, include the following annual recurrent costs:

a.	Academic trainees increased in grade earning additional \$3,750/yr 20 x 3750	\$ 75,000
b.	Non-academic trainees increased salary as result of short course training of \$1,000/yr 5 x 1000	5,000
c.	New staff added as a direct result of project A level - 7 at 2,000,000 cfa/yr B level - 12 at 1,200,000 cfa/yr C level - 20 at 890,000 cfa/yr Overall cost	210,000
d.	Research operations - New costs net impact of project	150,000
e.	Vehicles - 5 vehicles replacement and operation	50,000
f.	Computer maintenance and operation	10,000
g.	Equipment maintenance and replacement (400,000 x 20%)	80,000
h.	Maintenance of Kolo construction (250,000 x 10%)	25,000
i.	Maintenance of library and other support functions developed (net effect of project)	<u>50,000</u>
	TOTAL	\$ 655,000

Thus, recurrent costs attributable to this project would appear to be on the order of \$655,000 per year by the year 1987. This should not be in excess of 20 percent of INRAN's overall budget at that time, and should be counterbalanced substantially by reduced cost per level of output and other increased efficiencies introduced by the project. In any case, it should be clearly sustainable by INRAN at that time.

### c. Social Soundness Analysis

The Niger Cereals Research Project is designed as an institution-building project intended to strengthen INRAN's ability to undertake cereals research programs responsive to small farmers' circumstances. Consequently, it is envisioned that with the achievement of the above, contribution will be made toward the attainment of food self-sufficiency in Niger and the improvement of the rural standard of living.

The anticipated beneficiaries of the project include: (1) INRAN's professional and technical staff, and recipients of the training that will be made available through this project; and (2) the Nigerien farmers who are the ultimate beneficiaries of the improved research efforts of INRAN. Indirectly, the Nigerien urban consumers will benefit from increased food supplies. Likewise, other institutions and productivity projects involved in agriculture and/or are users of INRAN's research output will also be affected.

INRAN, as a social system, is analyzed in detail in Annex D. Like all formal organizations, INRAN has an array of characteristics which reflect its official status. These include its organizational structure, its research programs, its resources, an explicit or implicit philosophy of operation or "doctrine", and its pattern of leadership at any given time. As a corporate body with decision-making powers, INRAN also has various relationships with other institutions in its social environment. Values and behavior patterns demonstrated by INRAN personnel in the performance of their duties also affect the institution. These include the social networks linking INRAN personnel as individuals and as groups (such as research departments) within INRAN and with the larger community.

The Social Analysis annex analyzes the anticipated interaction between INRAN as a social system and the intervention proposed in the Niger Cereals Research project. In introducing organizational and operational changes, a discussion is made on how the following can be achieved to make INRAN an effective and responsive research institution:

- (1) influence the role of the research stations;
- (2) bring about an increase in interdisciplinary research;
- (3) help INRAN work more closely with extension services and with the farmers; and
- (4) demonstrate the value of particular kinds of training for a number of INRAN researchers.

While the main focus of this project is to strengthen INRAN as a research institution, the ultimate measure of success lies in INRAN's development of cereals production technologies that will be of maximum

value to Niger's small farmers. Because farmers' adoption of these technologies serves as a major indicator of the value of INRAN's work, the proceeding section will present the socio-cultural and economic factors that may impact on farmers' response to the technology themes. For this purpose, the Niger Agricultural Sector Assessment (1979) and the FY 1983 Niger CDSS were used as primary sources of information.

Farming System: The traditional concept of the farming system in Niger is often described in terms of a nuclear family production unit of seven members cultivating rainfed millet and sorghum, primarily for home consumption. Farm size is usually determined by the amount of labor available during the short rainy season. It is assumed that each family owns a few animals, particularly small ruminants, for meat and sale. In some areas, small fields of peanuts and cotton are grown for cash income.

The above description of the farming system in Niger however, implies a system that is static and has remained unchanged over several generations. It implies a homogeneity across farms, which in fact recent studies have disproved. Considerable variation exists across ecological zones and among ethnic groups, in terms of farm size and organization, cultivation practices, and yields.

Farm sizes, for example, range from 5.2 to 16.9 hectares, while area per worker varies from an average 1.3 to 4.4 hectares. Labor input per hectare amounts to as high as 175 days, to as low as 29 days. Studies on the variations of farm sizes and labor utilization suggest that: (1) availability of land is more significant than availability of labor in determining farm size; (2) the need for cash income forces some families to export labor from the farm, thus limiting the amount of labor available to family holdings; or (3) some individuals place a much higher value on the opportunity costs of other uses of time. It will be pointed out also that an important determinant of farm size and area per worker in Niger appears to be rainfall zones, which is logical if one assumes that yields decline as rainfall declines. Thus, more acreage is required to produce more food. However, because of the rapidly diminishing availability of non-marginal farm areas, there is a need to gear research and technology development to intensive, rather than extensive farming systems.

The family as a production unit, also appears to be undergoing a metamorphosis in Niger, due largely to continuing pressure for land and monetary income. The advantages of the large family are much less assured now than in the past. To the head of a household, a large family may no longer offer the security and protection that it did previously. This is particularly true when family holdings no longer institute a viable economic unit. Furthermore, when adequate food supplies can no longer be assured from the family collective fields, subordinates see less benefit in remaining with the family unit, especially when attractive off-farm employment opportunities are available. With the reduction in the size of family labor, declines in productivity usually result.

Soil Resources: Reconnaissance soil surveys and other studies indicate that Niger's overall soil resources are moderately poor. This conclusion is derived on the soil's inherently low fertility, climatic limitations, physical characteristics, and the "fragile" and unstable nature of soils which are put under cultivation following a period of bush fallow.

The traditional systems employed to maintain soil fertility and productivity in Niger are no longer adequate. Now intensive systems which will eliminate or reduce reliance on bush fallow must be devised. The growing demand for food requires that yields per hectare of cultivable land must be dramatically increased. This can be done by the development of measures to improve soil fertility and productivity, coupled with the development of higher-yielding, drought and disease resistant crop varieties for each of the important soil and climatic zones. In order to increase soil fertility, the following measures are needed: (1) improved crop rotation; (2) wider use of chemical fertilizers; and where feasible, (3) incorporation of livestock in the farming program, to provide a source of manure and enable use of animal traction.

Land Tenure: Current land tenure practices in Niger are a mixture of the traditional African, Islamic, and commercial systems. The present land tenure system is communal, where it is recognized that residents of villages have the right to use as much land of the community as they require to meet their needs. In no way can land be alienated from the community. Usufructuary rights to land are held by the family, while the village head maintains the traditional community control of land. Land reverts to the community in the event of abandonment. Normally at death, land is transferred to the heirs of the cultivator.

Islamic law is also applied in controlling land tenure. Under the basic laws of inheritance, the properties of the deceased (including land over which there is right of usufruct) are divided following the complex Maliki Shariya formulae. An important aspect of the Muslim code is that it bestows inheritance rights upon women, and in many areas, has allowed inheritance through the female line.

It will be noted that based on a limited study on land tenure status in the highly commercialized area near Maradi, it was found that almost 41% of the sampled area is exploited by individuals who acquired land usage rights through means other than inheritance, such as through monetary transaction (pledge or sale).

As far as farmer investment in land improvement is concerned, there appears to be no resistance where security of tenure is assured (i.e., for land that is inherited, received as a gift, or bought). In the case of pledged land or land acquired through loan however, investment in land improvement (such as fertilization or manuring) is almost nonexistent, since in such cases, the farmer is only sure of the crops planted during the current year. While there are indications that

this is not prevalent, to the extent that security of tenure affects farmers' acceptance of improved practices, such a constraint deserves close monitoring by INRAN and this project's implementors.

Women's Participation in Rural Economic Development: At the outset, it will be pointed out that there is a paucity of information that specifically addresses the role of women in rural Niger. Studies that have been conducted have tended to concentrate in the Maradi and Zinder areas, and often have not been defined well enough to focus on women's circumstances as food producers and participants in the rural economy. Thus, only by extrapolation from general cases, or through inferences, can an analysis of women's role in the rural milieu be made here. This methodology is obviously inadequate, particularly in the light of local-specific variations that exist in Niger.

Women in Niger are generally responsible for food preparation and child-care activities. In addition, most rural Nigerienes cultivate small fields independently, aside from assisting in the cultivation of their husband's larger fields. It is generally known that women's productivity as farmers are lower than those of the men's. There are several reasons for this. In most cases, women have very limited, or no access at all, to credit and production inputs which are necessary for the adoption of yield-raising production technologies. While the major concerns of UNCC is to satisfy the credit demand of the village as a whole, the distribution within villages remain the prerogative of village leaders and cooperateurs, who are almost always, men. In addition, since all extension agents are males (with the exception of animation and health, in which case agricultural production is given minimal emphasis), women farmers have virtually no direct access to technical information.

Other factors that account for women's yields being lower are:

- (1) The plots given to women by their husbands are usually far from the village. Aside from the time lost walking to and from the fields these plots tend to be the least fertile.
- (2) Because of the numerous demands on women's time, they are often unable to put in the amount of labor necessary to obtain optimal yields. Assistance from the husband is normally limited to seeding. Children occasionally help, but only after they have finished working for their father.
- (3) Women do not have rights over the household's livestock manure, even though women own most of the animals. Since men construct the corral, the use of the manure remains their prerogative.

If INRAN is to meaningfully achieve its goal of contributing to the attainment of food self-sufficiency in Niger and to the improvement of the quality of rural life, it cannot ignore the critical role which women play in food production. A more thorough and local-specific understanding of women's role in the farming systems must be gained, including a better knowledge of the constraints that women face as farmers. Under this project, sex and age-disaggregated data will be gathered through the farming systems survey, before technology packages are developed by INRAN.

In order to expand women's participation in research and technology development, the Project will specifically request the GON to involve women in INRAN's activities, particularly in cereal quality analysis. Women will be recruited to staff the Cereals Quality Laboratory, and training in this discipline will be provided them. Furthermore, the evaluation of new cereals varieties for processing and taste qualities will be done by panels, also to be comprised primarily of women. On a broader scale, women's recruitment as professional staff members of INRAN will be encouraged. While the operation of the Nigerien Fonction Publique does not allow for direct efforts to recruit women, indirect measures will be taken. Foremost among this is through media coverage of women in scientific pursuits to serve as role models in encouraging women to seek employment in the field of agricultural research.

Approach to Increasing INRAN's Relevance to the Food Production Sector: The critical concern for the NCR project is that to date, neither research nor extension are prepared to handle the existing and increasing variability existent in Niger's farming systems, as described above. Thus, these services are not prepared to serve well the small farmers of Niger. A prime example is that farmers routinely work with several millet varieties of differing maturities, while extension programs are able generally to work with only one. Ferguson, in the Niger Agricultural Sector Assessment, indicates that fertilizer recommendation from research/extension programs, have a sameness that would indicate a uniformity in soils, crops, climate, and cultural practices, which in fact does not exist. Enger, in the same document, indicates that research in Niger (based on studies by Shanti Conly) has had no feedback mechanism and that varieties are being extended regardless of specific regional, physical and human resource characteristics. Technology packages are tested in an isolated research setting and not in a farmer setting. Farmer reaction is not used as a measure of economic viability. At present, there is a paucity of information which analyzes the economics of adopting improved packages of technology. This type of analysis is critical and will be undertaken in this project because it provides indications of farmers adoption rates. Expected returns to farmers' labor will determine farmers' willingness to provide the additional labor required by improved technological packages, while returns to cash investment determines farmers' willingness to assume indebtedness to finance the technology. The opportunity cost of land, labor, and capital

investments will be determined since they affect farmers' responsiveness to improved technologies.

In general terms, therefore, the NCR project must, based on these analyses, provide for a strategy which will ensure steady progression towards a system which is responsive to the sociocultural and economic situation of small farmers.

The project design is therefore based on two levels of concern: (1) feasibility within the INRAN social system; and (2) appropriateness of long-term project effects within the social system constituted by Niger's small farmers. Effective combination of these two levels of concern is demonstrated in the following elements of project design:

- (1) Greater emphasis on more site specific research. Over time, INRAN is expected to develop research efforts within, and appropriate to, a greater range of soil and rainfall conditions, regions with differing predominance of ethnic groups and thus varying farming and family patterns.
- (2) Expanded emphasis on cultural practices in agriculture with specific efforts to identify the kinds of small, but effective and economically viable changes in farming practices which farmers can implement without major capital requirements and which do not involve sizeable risk taking.
- (3) Addition of grain quality analysis from both a nutritional and food preparation perspective, as a key feature in crop improvement efforts.
- (4) Emphasis on developing mechanisms to ensure more direct contact between farmers and researchers and between extension personnel and researchers, thus enhancing direct and immediate feedback to research from the farms and improving the relevancy of the research effort. Development of ties to productivity projects, use of farming training centers and other measures are included.
- (5) Use of a partial farming systems research approach to build a more complete and local-specific understanding of farms, farmers and their families, and farm-level decision-making management processes, while creating greater linkages between farmers in general and the research process. The farming systems approach is a central theme in the design constituting an element which simultaneously embodies: learning from and about farmers; providing orientation to plant breeders and other "physical" scientists; integration of various kinds of technology into approaches feasible to the farm level; and obtaining early feedback.

The project thus has been designed to work effectively within INRAN, build on the programs already underway in INRAN, strengthen the roles of INRAN within the set of institutions involved in rural development in Niger, and assist INRAN in building over time, a program which produces output relevant to, highly valued by, and rapidly adopted by an increasing number of Nigerien farmers. The project design process has considered to the extent possible the socio-economic factors which may affect the project in these various areas and has resulted in a design considered feasible in view of them.

Conclusion: Recognizing the critical role played by farmers in determining the success of any research institution, inherent in this project's design are measures to ensure local participation in technology development. These include the development of communication and feedback mechanisms between farmers, researchers, and the extension personnel. The farming systems research approach to be employed in gaining better understanding of farmers' circumstances is also a means by which local-level participation will be solicited in developing relevant and acceptable production technologies. The NCR project will ensure that farmers of various types will be equitably represented when contacts are developed, especially in light of the variations that exist in farming systems, access to production resources, and other such critical factors that determine farmer decision-making in choice of production systems.

The rate at which spread effect (i.e., diffusion and replicability) can be expected to occur depends in large part on the effectiveness of the NCR project in institutionalizing within INRAN, a capability to develop only technologies that are suitable to farmers' resources, particularly those that are affected by their socio-economic circumstances. In addition, the success by which improvements in the operations of the extension system are made will likewise determine the rate of spread effect. Through the NCR project, the accompanying proposed Agricultural Production Support project, and through the initiatives of the various productivity projects being implemented in Niger, such improvements are being made, or will be made.

Equally critical factors that will affect spread effect are the enforcement of sound and equitable pricing and marketing policies for production inputs and outputs, the adequacy and timeliness of input availability and delivery, the availability of sufficient storage and transport facilities, and the existence of other such production-related support services. Access to production resources (e.g., land, inputs, credit) are likewise determinants of farmers' willingness and ability to adopt improved technologies and assume related risks. To the extent that INRAN can develop technologies that circumvent constraints associated with any of the above, this should be done. However, beyond that (e.g., bring about changes in pricing and distribution policies) is clearly not within the scope of the NCR project. Nonetheless, it is contingent upon the implementators of this project and INRAN, to be aware of, and closely monitor, constraints to technology adoption that any of the

above may cause, and bring them to the attention of the GON for resolution.

The project activities proposed in the NCR Project approach INRAN Institution building needs from several directions simultaneously. Hence the NCR has an excellent chance of initiating some long-term, self-sustaining changes in INRAN even under the worst conditions.

Whether all areas of project activity become self-sustaining clearly depends on GON's ability and willingness to commit adequate resources (e.g., operating funds, personnel). While the strength of the overall Nigerian economy is one factor in GON's future support for research, INRAN's ability to demonstrate the value of scientific research with concrete results which contribute to GON goals is also important.

Some of the long-term benefits expected from the NCR project are not dependent on increased GON funding. Improved research management capacity and better training for researchers should result in greater research productivity, even at current levels of GON support, for example. The project has also been expressly designed to increase the probability that changes in the INRAN research program initiated under the NCR will continue after the project ends. In particular, project technical assistants will be in a position to give a strong impetus to team research programs involving Nigerian colleagues from several INRAN research departments. Library resources provided under the project ultimately should also provide long-term benefits.

#### D. Administrative Analysis

The National Cereals Program has two components, the Niger Cereals Research project and the Agricultural Production Support project. The NCR project will be implemented through collaborative assistance with Purdue University within INRAN which reports to the Ministry of Higher Education and Research. The APS project will be implemented by several units reporting to the Ministry of Rural Development. The overall program will be monitored and coordinated by the Program Coordination and Management Unit which is under the supervision of the Ministry of Rural Development. The operation of this unit and the arrangements for ensuring coordination and joint policy establishment are described in Section B of the Implementation Arrangements.

During Phase I of the Cereals Project, the Ministry of Rural Development was responsible for all components of the project as INRAN was at that time a part of the MDR. Thus, the new management structure for Phase II is relatively untried and will require some experience by all parties before everything moves along smoothly. Moreover, the Inter-Ministerial Executive Committee which will provide overall guidance to the National Cereals Program can also act to help resolve any interministerial disputes if they arise. Nevertheless, it has been concluded by the Mission that the administrative structure which this project intends to establish is both feasible and practical.

The NCR project will not totally rely on the PCMU administrative structure. An important part of the collaborative process of developing a long-term relationship with the U.S. university institution contracted to help implement the project, will be the fostering of an administrative capability within INRAN. INRAN will require this growing administrative capacity in order to meet the responsibilities of managing and supporting their research programs and establishing and maintaining linkages with outside organizations. The institution selected to design this project, and to be the implementation contractor, Purdue University, has considerable experience in the administration of major development projects. Specific capacity for such support exists in the Division of International Programs in agriculture, as described in Annex F.

Purdue University will subcontract with Alabama A & M University for assistance in implementation activities including the provision of one of the long-term staff members. Alabama A & M

will also provide short-term staff, will conduct training programs, and will assist INRAN and Purdue in the development of project strategy. Alabama A & M with Purdue, will facilitate the development of linkages between INRAN researchers and those international research efforts in which the University participates. Alabama A & M will be expected to develop long-term linkages with INRAN through the project. The capacity of Alabama A & M to contribute to the project is also described in Annex F.

#### E. Environmental Analysis

An Initial Environmental Analysis was prepared in the Project Identification Document and was signed by the Mission Director on April 24, 1980. A negative determination was approved on July 23, 1980 by the Assistant Administrator for Africa in State 194805. The IEE and copies of the approval cable can be found in Annex L.

#### F. Engineering Analysis

##### 1. Project Description

An office building consisting of three offices and a laboratory will be built to provide additional space for required staff. Two houses will also be constructed while two existing houses will be remodeled to accommodate staff associated with this project. In addition, an existing warehouse will be sealed to permit fumigation of seeds while another will be constructed as a seed collection facility.

##### 2. Project Site

All facilities will be constructed on existing INRAN property at Koln, about 30 kilometers southeast of Niamey. The site is on a bluff overlooking (from the west and the south) a valley area used for experimental agricultural projects. The soil is silty sand in nature, though well compacted and suitable for building purposes. There is easy access to the site. Water and electricity are available. Water is supplied from the river by a pump station about a kilometer away. Although a separate water storage tank is also available, at present is not supplied from the existing well due to non-functioning of the existing generator. There is good natural drainage on the site which is within easy access of quarries and construction material sources within the Niamey area.

##### 3. Justification for Construction

The project will need additional qualified staff if the agricultural research efforts are going to be sustained or enhanced. Two staff persons are contemplated, one an American, the other a Nigerien, in the age group and with the technical skills of such a level that it would be reasonable to expect that

they will be married with families. Hence, housing to accommodate staff and family is proposed. Construction of offices and laboratory as well as the seed collection facilities is also required to support an increased level of research effort, since it is envisioned that research efforts at Ouallam and at Gaya will be administratively supervised from the site at Kolo.

#### 4. Construction and Design Criteria

All buildings will be one-story integrated column and beam grid type with brick walls, concrete slab floors and corrugated aluminium or asbestos roofing. Footing and foundation slabs should be designed for no more than 1.5 kg/cm<sup>2</sup> of allowable soil resistance. Design should also take into consideration maximum wind velocities of 150 kilometers per hour.

#### 5. Cost Estimates

Approximate unit costs of \$500/m<sup>2</sup> were used for office buildings, laboratories and housing facilities, whereas \$450/m<sup>2</sup> was used as unit cost of warehouse construction. It is envisioned that all construction will be completed within one year. Therefore, inflation would only be in effect on an average of 6 months; thus only 10 per cent of the cost of construction is allowed for inflation. A breakdown of costs is shown below:

Office Bldg. and Laboratory - 140m <sup>2</sup> @ \$500/m <sup>2</sup>	\$ 70,000
Staff houses (2) at 100m <sup>2</sup> each @ \$500/m <sup>2</sup>	100,000
Seed collection facility (warehouse) 30m <sup>2</sup> @ \$450/m <sup>2</sup>	13,500
Sealing of existing warehouse (lump sum)	15,000
Repair and remodeling of existing houses (L.S.)	25,000
Electrical and water hookups	10,000
Grading and site preparation	<u>15,000</u>
	248,000
10% inflation allowance	<u>24,850</u>
	273,350
15% contingencies	<u>41,000</u>
<u>Total construction cost</u>	<u>\$314,350</u>
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### 5. Construction Contract

Tenders will be invited through an open bidding process after advertisement in the public media in Niger. All construction work will be advertised under a single contract. The dollar value of the work is not large enough to merit advertisement in the United States since it is fairly certain that American contractors will not be interested in such a small contract considering the high cost of mobilization and demobilization into and out of landlocked Niger. USAID review of the bid analysis and concurrence with the recommendations will be required before the award is made.

### 6. Implementation Schedule

The time required for the various steps in the tendering and construction process is estimated as follows:

1. Approval of Project Paper (6 weeks)
  2. Preparation and signing Grant Project Agmt (4 weeks)
  3. Preparation of Bid Documents and Invitation for Bids (two months)
  4. Bid Analysis, Recommendation and Award (2 weeks)
  5. Construction (5 months)
- Total Time Required: 10 months

### 7. Supervision

Day to day supervision of the work will be performed by the Public Works Section of the Ministry of Transport and Urbanism. The USAID Engineer will coordinate with the Public Works staff with respect to field inspection at certain milestones during construction.

### 8. Contract/Payment Procedure

There will be a fixed-price contract for all construction under this project. An advance of 30 per cent will be given to the contractor at the start of the work and the balance paid after completion of the work to the satisfaction of the Ministry of Transport and Urbanism and USAID. The GON will be responsible for any costs that AID cannot finance and/or that exceed the \$314,350 budgeted for this project construction.

### 9. 611(a) Requirements

The Mission Engineer has reviewed the preliminary plans, the site, unit costs for similar type construction, supervision and implementation schedule as well as the contracting procedures and considers the planning done to be sufficient and technically sound. Therefore, the project meets the 611(a) requirements of the FAA Act of 1961 as amended.

#### IV. Implementation Arrangements

##### A. General Approach to Implementation

Selection, planning and implementation under collaborative assistance. The Niger Cereals Research Project is being designed and implemented using the collaborative assistance approach, a direct AID to contract for design and a host country contract between the GON and Purdue University for implementation. The collaborative assistance approach, is designed to: (a) increase the implementation authority and responsibility of both the contractor the and host country institution; and (b) encourage more effective collaboration between all participating parties at important stages of the project including the design phase. Thus, selection of a contractor institution was carried out early in 1981 with considerable involvement of GON representatives, resulting in selection of Purdue University from among the qualified institutions who indicated clear interest in the project. At the time of selection, Purdue University indicated that, it would utilize Alabama A & M University as an important partner and subcontractor during the proposed implementation phase. Purdue University fielded a design team of five individuals during the period mid-April to mid-May, with an Alabama A & M representative present for part of the period. This team worked with a number of counterparts from INRAN to prepare the initial draft project paper in Niger.

Immediately following the design phase, Purdue University will be involved in a "post-design" mobilization phase. This activity provides for continuing contact with INRAN including detailed preparation for the implementation phase in order to reduce the inevitable time gap between planning and implementation. Thus, Purdue will be discussing current research efforts with INRAN, providing new germplasm of interest, and beginning contracts between U.S. research programs and INRAN scientists. A Purdue staff member will spend several weeks in Niger prior to implementation becoming familiar with INRAN research and discussing future research plans. The University will also identify prospective implementation staff and begin language training and other preparation during this period. Arrangements for staff housing in Niger and similar needs will be started as well. The post-design mobilization period is scheduled to end **December 31, 1981**. Following the GON, Purdue and AID agreement on the design of the project and the signing of a contract between Purdue University and the GON, implementation can begin. As provided for under collaborative assistance, and as will be described below, Purdue will work with INRAN leadership in a collaborative approach to the management of project activities.

##### B. Liaison and Coordination in the Overall Cereals Project

At the request of the Government of Niger, the APS project and the NCR project will be treated as a National Cereals Program (Projet Cerealier). It is the view of the GON and the Mission

that the four components of the APS project plus the NCR project are critical elements in Niger's efforts to achieve long-term food self-sufficiency and as such should be closely coordinated. A Coordination and Management Unit (Cellule de Coordination) was created for this purpose during the Phase I Niger Cereals Project. This unit now consists of a Coordinator, his deputy, an accounting officer and secretarial support. The AID Project Manager is also attached to this unit although he is supervised by the Mission Agricultural Development Officer.

For the expanded Phase II program, the Program Coordination and Management Unit (PCMU) will be strengthened and slightly restructured, and an Inter-Ministerial Executive Committee (IMEC) will be created to set broad guidelines for the program. The organization chart for the IMEC and PCMU is shown in Figure 1.

The membership of the IMEC will be as follows:

MDR	-	Secretary General, Chairman
"	-	Agriculture Service (SA)
"	-	Bureau of Studies and Planning (BEPRO)
"	-	Cooperative Organization (UNCC)
"	-	Rural Engineering (GR)
"	-	Project Coordinator (PC)
MESR	-	Agronomic Research Institute (INRAN)
MP	-	Directorate of the Plan and Planning (DPP)

The Ministry of Rural Development (MDR) will have primary responsibility for the two projects ("Ministere de Tutelle").

Liaison relationships will be maintained with the Ministries of Plan (MP) and of Higher Education and Research (MESR). These liaisons will occur principally at the Inter-Ministerial Executive Committee (IMEC). However, in case of problems not resolved at the IMEC, direct ministerial consultations are provided for.

The IMEC will define policy and set broad substantive directives. The Project Coordinator (PC), will be the executive secretary of the IMEC. The PC will prepare agenda for regular quarterly (or semi-annual) meetings of the IMEC, defining issues that require attention and resolution. The PC will recommend to the Chairman of the Committee the need for special meetings to resolve urgent problems which may arise between the regular quarterly meetings.

The Project Coordinator will have primary responsibility for assuring that the directives of the IMEC are executed and for providing direction and oversight of the project implementation and evaluation. The PC will be provided a broad mandate to enable him to operate across service and ministerial lines in order to achieve inter-service and inter-ministerial cooperation.

Figure 1

Organization Chart for Administration  
of the Combined APS and NCR Projects

MESR

MDR

USAID

MP

InterMinisterial Executive Committee (IMEC)

Executive Secretary

Coordination and Management Unit (PCMU)

Coordinator (N) (Executive Secretary)

Management Specialist (C)

Research/Extension Liaison  
and Evaluation Officer (C)

Accountants (2N)

Charge Cooperative Operations (N)

Charge Research Operations (N)

Charge Agricultural Operations (N)

Auxiliary Personnel (N)

Secretary (3)

Chauffeur (3)

Laborer (5)

Niger Cereals Research (INRAN) | Agriculture Production Support APS

Support for  
UNCC Supply  
Center

Cooperative  
Training  
Center

Extension  
Support  
Center

Seed Multi-  
plication  
Program

N = Nigerien

C = Contract Technician

He will be administratively responsible to the Minister of Rural Development.

The PC will direct the activities of the personnel listed for the PCMU whether they be national or expatriate personnel of the MDR, of INRAN, or of the UNCC. The Unit will have five GON professional employees, including the Coordinator, plus two AID-financed expatriate advisors. One advisor, the Management Specialist, will be responsible for day-to-day administration of those aspects of project implementation which directly involve AID and must be consistent with AID regulations. This includes off-shore procurement, contracting for technical assistance, overseas training, and construction for the APS project. Purdue University will provide similar support to INRAN under NCR for technical assistance, training, and to an extent, procurement. The second expatriate advisor position is the Research-Extension Liaison/Evaluator. For the first four years of the project, he will be the individual primarily responsible for creating an effective liaison between research and extension. In this capacity he will also serve as advisor to the Research-Extension Liaison Office of the Extension Support Center (see APS Project paper). He will also be responsible for setting up an evaluation program to measure the impact of the National Cereals Program in an overall sense. This will involve coordinating the evaluation program of each component as well as incorporating the results of impact evaluations carried out in other parts of MDR.

The Charges for cooperatives and for research will be detached from their respective services. The Charge for Research Operations will be assigned by INRAN. The post of Charge for Agriculture Operations, will be filled by the Director of the Extension Support Center. The role of the Charges will be to monitor implementation in their respective organizations so that the PCMU will then be in a position to identify problems and resolve them in an expeditious manner. This will be particularly useful when the required actions are inter-service, inter-ministerial or joint GON and AID.

The PCMU will also have an accounting section which will be responsible for disbursement of funds provided by AID and maintaining records of funds provided by the GON. As decisions are made by the IMEC that have resource allocation implications, this section of the PCMU will prepare the budgets accordingly. This section will also be responsible for submitting periodic accounting reports to AID and to various component Charges.

The PCMU will have its own budget for GON personnel, technical assistance, equipment, training and operating expenses. A special allocation will be provided for the physical facilities to be refurbished at Kolo. Budget details are shown in Part V below.

Several specific areas of overlapping interest between NCR and APS might be mentioned. INRAN has identified its need for

expanded capacity to produce printed documents, slide presentations, and other visual-aid material and similar communication materials, in order to make information available to extension workers. INRAN will be assisted in developing its capability in this area without duplicating the facilities proposed as the "Documentation Center" for the extension support program under APS. It is essential that INRAN's contribution to the program of work of that Center and its access to those facilities be assured.

Overlapping interests exist in the training area as well. All MDR extension and INRAN staff to be trained in U.S. academic training programs should be provided well-organized, special components in their programs which deal with the rationale and the means by which effective research/extension linkages occur. Trainees from both projects would benefit from being together for at least a portion of their training. Certain short-term training programs may also be developed by combining one or more INRAN staff with MDR extension staff. Careful coordination between administration of INRAN training programs and those developed under the extension support program of APS, will be necessary to take advantage of these opportunities.

It will also be important to assure that coordination occurs between the individual advisors provided in the extension component of APS and the Purdue staff in NCR. Given the NCR project focus on assisting INRAN to develop the kinds of research output which extension can use to good advantage, it is especially crucial to maintain effective operational-level coordination between the Applied Research Advisor, to be provided MDR under APS, and the Production System Agronomist, to be provided INRAN under NCR. The strategies and program of work developed with assistance and guidance of these two individuals must come together in a compatible fashion at several points. Very careful coordination between Purdue and the contractor chosen to help implement the extension component of APS will be required. For this reason, while the other components of APS may be appropriate for implementation by a private firm under contract, the Mission and GUN have concluded that the extension component should be implemented by Purdue University as well.

### C. Project Management

As noted above, the PCMU has primary oversight and problem-solving responsibilities except for those actions that require inter-service coordination or direct AID involvement (e.g. preparation of PIO/Cs, PIO/Is and PIO/Ps). At the level of each component, each implementing organization will have its own implementation plan and its own management arrangements. For those components found under the APS project, see the Management arrangements section of that Project Paper. Implementation management for the Cereals Research Project is summarized below:

## 1. Country Management

During implementation, the Niger Cereals Research Project will be managed by the Project Director who is expected to be the Director-General of INRAN. The Purdue University five-person team will be headed by a Team Leader who will advise the Project Director on matters related to attaining the objectives of this project. The U.S. staff will work within and support the improvement of the research efforts of the various research departments and sections of INRAN. They will work with INRAN staff in more than one department and frequently in more than one location. Initially, Purdue University will assign to INRAN five individuals on long-term assignment: a team leader, a plant breeder, a production agronomist, a senior agricultural economist and a junior agricultural economist. Job descriptions for these positions are provided in Annex I. Figure 2 indicates the interrelated nature of the initial long-term staff assignments of the U.S. team. All U.S. team members will be staff members at Purdue University or Alabama A & M University. The team leader will serve as the principal advisor to the Project Director in all phases of the project and also has an overall administrative responsibility for in-country Purdue personnel within the parameters of Purdue's obligations under the host country contract. Work plans for each team member will be developed in conjunction with INRAN within 90 days.

One possible approach to organizing certain activities at INRAN might be to form "work groups". Purdue University is recommending a system to be made up of appropriate INRAN staff and one or more of the U.S. staff members. Under the general direction of the Director of INRAN, these groups may conduct studies of specific problems or concerns of INRAN, develop detailed plans for use of specified project inputs and propose to INRAN actions required to further project activity.

Some of the work groups which might be established are partially described below. These work groups may only be required for short periods of time or they may become longer assignments depending upon their assigned tasks. They will function much as such work groups currently do in INRAN.

Initial work groups which might be established include:

- a. Documentation and libraries. This work group might be responsible for development of recommendations for purchase of library related equipment and supplies, for determination of need for short-term staff assignments in this area and analysis of INRAN staff need for expanded bibliographic needs. The work group might, over time, develop an inventory of library resources of INRAN, and develop a system for ensuring greater availability to and use by researchers of INRAN's expanding collection of scientific literature.

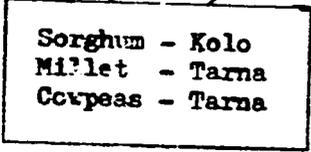
- b. Purchase of equipment and supplies. This work group might be assigned the task of recommending use of project resources for purchase of certain kinds of commodities and equipment. The work group could develop mechanisms for receiving requests for equipment and supplies from those research programs and support areas being assisted by the project, and for screening and prioritizing them. This work group would be able to ensure that specifications for items recommended are sufficiently accurate and detailed to ensure compatibility with INRAN needs and environment. The work group might, over time, develop a system for improving INRAN's inventory of information on equipment, and analyze means of increasing the multiple or shared use of high value equipment. This work group could also be assigned the task of recommending means of improving maintenance of INRAN equipment. It could also develop plans for use of one or more short-term staff assignments related to careful evaluation of existing farm machinery, repair of repairable items, development of parts supply and repair capability for farm machinery, as part of preparation for any additional purchases.
- c. Training in the U.S. and third countries. A work group in this area could be responsible for developing an updated plan related to staff training at the A and B levels, which describes over a period of years ahead the clearly anticipated needs for training outside Niger including information on the likely candidate(s), their prior training/training needed, expected date of departure and duration of stay. This plan should consider various donor sources of training, but should result in clear recommendations for use of project resources. Careful forward planning of this type is essential if training resources are to be well utilized and especially to ensure preparation for the conduct of thesis research in Niger as foreseen in this project.

While the work groups described above would meet the most immediate needs, others which might be warranted include in-service training program development, linkage development with U.S. and other international research institutions, etc. By the second year of the project activity, it is anticipated that a work group could be developed to plan for project supported seminars with extension personnel and to develop planning for an expansion of INRAN publication efforts. The development of an ongoing series of research publications is an important element

Figure 2.

LONG-TERM STAFF ASSIGNMENTS

Positions:	Team Leader Research Organization and Development	Plant Breeder and Agronomist	Production System Research Agronomist	Junior Agricultural Economist	Senior Agricultural Economist
Principal Location:	NIAMEY	KOLO	TARNA	TARNA	NIAMEY
Principal Responsibility:	Research Priorities and Program Studies  Human Resource Development  Support Functions  Extension Communications  Linkages to Research Network  Administration	Interdisci- plinary Program on Crop Improvement	Cereal Production Systems Research Program	Farming Systems Research Program	Farming Systems Research Program
Secondary Responsibility:	Research programs in area of tech- nical special- ization	Cereal Pro- duction Systems Re- search in Niamey district	Inter- disciplinary Program on Crop Improve- ment in Tarna district	Cereal Pro- duction Systems Re- search Program in Maradi district	Cereal Production System Research Program in Niamey district



in INRAN development. Publication and other extension-oriented communication efforts should also be expanded through cooperation with the APS project.

Methods of effectively managing the resources for operational research activities will be given close attention on a priority basis. Purdue University will make recommendations to INRAN (1) for a system of allocating these scarce resources on a periodic basis and (2) for a system of managing these same resources. Once such a system has been developed, project funds will be disbursed to INRAN to finance approved research using INRAN's regular administrative procedures.

INRAN will provide office space for Purdue's staff members which the project will renovate where necessary. Space will be required for the team leader, an administrative assistant/-accountant and a secretary at INRAN headquarters in Niamey, for the agricultural economist and a research associate at INRAN's Department of Agricultural Economics in Niamey, for the plant breeder and a research associate at Kolo, and for the remaining two Purdue staff members, a research associate and a secretary at the Tarna station in Maradi. Local hire employees of the project will include the secretary, administrative assistant/accountant and a driver in Niamey, and the secretary and a driver in Maradi. The AID Mission and the Embassy will furnish all of the usual support facilities provided to all contractors, including duty free entry privileges and tax-free status, currency conversion, limited medical services and letter mail access through the Embassy for U.S. project employees.

## 2. Contract Management

Under its contract, Purdue will develop an on-campus capacity to coordinate and manage the training and other services to be provided in the United States and to provide scientific and logistical backstopping to the project. This coordination effort will be carried out by Purdue's International Programs in Agriculture office. The office will ensure access to and support from other divisions of the University for both technical and logistical purposes.

Purdue staff for the project will be drawn from the departments of the School of Agriculture to the extent that suitable staff can be identified. Where necessary, Purdue will seek qualified staff outside the University, preferably through appropriate arrangements with other institutions especially Alabama A & M. In any case, assignment of faculty staff to this project will not change their long-term employment status with the University. The expatriate advisors will continue to be faculty members of their departments at Purdue and will receive technical backstopping and support from that department. Coordination activities on the campus will require a half-time coordinator, a part-time training coordinator, a part-time administrative assistant, and a secretary. The coordinator

and/or other members of Purdue's administration are expected to be in Niger several times during the first year and at least once per year thereafter. Additional details on management activities in the U.S. will be found in the following sections on Procurement and Participant Training.

In a manner analogous to Purdue, Alabama A & M University will also participate in the project management functions in the U.S. Alabama A & M is expected to contribute at least one long-term staff member and a number of short-term staff. They will share in responsibility for training.

#### D. Procurement

It is anticipated that Purdue will be responsible for all offshore procurement of commodities under this project with the exception of vehicles, household furniture and appliances and office furniture and equipment which are expected to be procured by PIO/C utilizing the Afro-American Purchasing Center. INRAN and in-country Purdue staff will prepare annual procurement plans for commodities to be purchased by Purdue which will be submitted to USAID for approval. After such approval, Purdue may proceed without further USAID approvals as long as any deviations from the plan do not exceed 10 per cent of the dollar values presented in the procurement plan. It is anticipated that Purdue's technical departments: Agronomy, Agricultural Economics, Computer Science, etc., may also review the commodity specifications requested by the project. Particular attention will be given to electrical equipment to ensure that it is compatible with the electrical system of Niger. In-country staff will inspect commodities upon delivery to ensure compliance with specifications. As a policy, air freight will be used for all but the heaviest or lowest priority items.

For commodities to be purchased in Niger, INRAN will be responsible for arranging purchases of office and other supplies using local currency provided by this project. As with purchases of imported commodities, approval of USAID will be by means of annual procurement plan. Regular INRAN suppliers will be utilized in order to take advantage of discounts available to government services.

Inappropriate and unserviceable vehicles have been a problem in projects in Niger. Therefore, a waiver for the local purchase of 18 non-U.S. vehicles is being requested (See Annex K).

The GON will be responsible for contracting for the refurbishing of the facilities at Kolo to be financed by this project. Local construction contractors will be used for the work. Plans for this reconstruction have been reviewed by the Mission engineer and have been determined to meet the 611(a) requirements.

Long-term leases reimbursable under this project for the housing (three in Niamey and two in Maradi) of the expatriate staff will be signed by Purdue University. Housing will be equivalent in size, quality and cost to those provided to AID direct-hire personnel. Smaller houses and/or apartments will be provided for the research associates. In-country expatriate staff will be reimbursed by Purdue for basic utility costs.

#### E. Administration of Participant Training

Purdue University will, with assistance by Alabama A & M, take responsibility for all facets of administration of training programs to be provided outside Niger for INRAN staff under the project. Purdue staff in-country will assist INRAN in identifying training needs and development of training plans. The Purdue staff will assist INRAN in the preparation of training documents including applications and PIO/Ps. Purdue on-campus staff will seek appropriate placement of academic trainees and develop detailed programs for non-academic trainees. Purdue and/or Alabama A & M will furnish the training for a substantial portion of the programs. In other cases, the University will be responsible for communication of training objectives, project background, INRAN needs and relationship of training to project objectives. Purdue will be responsible for monitoring all training in progress, providing support for students and ensuring communication between the project, INRAN, and trainees.

Purdue will periodically develop and provide for academic trainees in the U.S. special extra-academic programs designed to help ensure that project and INRAN objectives are met; special activities related to experiment station management or research/-extension interaction are two likely examples. Purdue will work with academic departments and major professors of trainees engaged in graduate study to ensure that thesis research topics contribute to INRAN objectives. Communication with and involvement of in-country Purdue staff in this process will be essential. Purdue will seek opportunities for several students in the same university to develop a joint interdisciplinary thesis research topic, in keeping with such emphasis in the overall project.

#### F. Implementation Schedule

##### 1. Pre-implementation Activities

- Nomination of Purdue Coordinator
- Selection of remaining project staff
- Begin intensive French language training
- Preparation of priority commodity list
- Initiate training and research planning
- Contract negotiations

## 2. Implementation Activities and Responsibilities

<u>Activity</u>	<u>Responsibility</u>	<u>Date</u>
-Implementation contract signed	Purdue/GON	January 1982
-First two team members arrive	Purdue	February 1982
-First commodities ordered	INRAN/Purdue	February 1982
-First vehicles purchased	USAID	February 1982
-Final three team members arrive	Purdue	March 1982
-Nigerien project staff in place	INRAN	March 1982
-IFB for Kolo construction issued	PCMU	April 1982
-First commodities arrive	Purdue/Inran	May 1982
-One research associate arrives	Purdue	May 1982
-Production systems research begins	INRAN	June 1982
-Commodity research underway	INRAN	June 1982
-Maradi farming systems sites established	INRAN	June 1982
-Construction contractor selected	PCMU	July 1982
-First group participants depart for U.S.	Purdue/INRAN	August 1982
-Construction starts	PCMU/contractor	August 1982
-Two in-country training programs held	INRAN	October 1982
-Construction completed	Contractor	December 1982
-New commodities ordered	INRAN/Purdue	January 1983
-Participants depart for U.S.	INRAN/Purdue	January 1983
-Niamey (or Kolo) farming systems sites established	INRAN/Purdue	January 1983
-Second commodities arrive	Purdue/INRAN	May 1983
-Two research associates arrive	Purdue	June 1983
-Two in-country training program held	INRAN	Sept. 1983
-Commodities ordered	INRAN/Purdue	December 1983
-Participants depart for U.S. and first participants return	Purdue/INRAN	January 1984
-Commodities arrive	Purdue/INRAN	April 1984
-Two research associates arrive	Purdue	June 1984
-Mid-project evaluation	AID/Purdue/INRAN	July 1984
-Participants depart	INRAN/Purdue	August 1984
-One research associate departs	Purdue	Sept. 1984
-Two in-country training programs held	INRAN	Sept. 1984
-Commodities ordered	INRAN	November 1984
-Participants return, participants depart	INRAN/Purdue	January 1985
-Commodities arrive	INRAN	May 1985
-Final research associate arrives	Purdue	June 1985
-Participants depart	INRAN/Purdue	August 1985
-Two research associates depart	Purdue	Sept. 1985
-Two in-country training programs held	INRAN	October 1985
-Final commodity ordered	INRAN	November 1985
-Participants return, participants depart	INRAN/Purdue	January 1986

-Final commodities arrive	INRAN/Purdue	April	1986
-Final participants return	INRAN/Purdue	August	1986
-Three research associates depart	Purdue	Sept.	1986
-Final in-country training programs	INRAN	October	1986
-Final project evaluation	AID/Purdue/INRAN	November	1986

### G. Evaluation Plan

This project will be evaluated in conjunction with the Agricultural Production Support project. These two projects together address the major national-level institutional constraints to increased agricultural production. The PCMU provides the mechanism for coordinating the group of interventions so as to maximize the long-term impact on agricultural development. The project design of the APS project calls for an Extension Liaison/evaluator to the PCMU responsible for evaluations. One of this person's responsibilities will be to design an evaluation program that will measure the extent to which national-level constraints are alleviated and the impact this has on agricultural production and farm incomes. The Extension Liaison/evaluator will coordinate his evaluation responsibilities with those advisors in the individual components, including the NCR project, who also have evaluation responsibilities.

As noted in the Project Background section, the impact of improved national institutions in Niger takes place in the short-term through the regional productivity projects. At present, these projects are often constrained by factors that can only be addressed at the national level. Thus in one respect, the success of the APS and NCR projects will be seen in the increased effectiveness of productivity projects, whose objectives are to increase agricultural productivity in their respective regions.

The approach that will be taken in evaluating the overall impact of this project at the farmer level will be to utilize studies and evaluations carried out by the evaluation units of the productivity projects and special studies carried out by other organizations such as the Rural Economy Section of INRAN and the Monitoring and Evaluation Unit (BEPRO) in MDR. Analytical tools will be developed to measure relationships between the interventions of the APS and NCR projects and progress in rural areas. The organizational arrangements for these evaluation activities will be made by the evaluation advisor to the PCMU soon after his arrival in early 1982.

There will be an annual review by AID and INRAN with the participation of the U.S. university contractor at the end of each fiscal year. This evaluation will determine the progress of the project in making timely delivery of inputs utilization of

project resources and the success in achieving stated project outputs. Major problems and constraints will also be identified at this time, as well as recommendations for modifying or re-directing the activities of the project. Finally, the evaluations conducted after the first thirty months and year five will serve as the justification for forward planning as described in the issues section under roll-forward.

Two major external reviews will take place, at mid-project (30 months) and at the end of the project (year five). These evaluations will assess the progress of the project towards achieving the project purpose and be major determinants for the continuation and modification of project activities. Both evaluation teams should be multi-disciplinary in nature, with broad experience in evaluating agricultural development, and more particularly, institution-building projects. If at all possible, one or more members of the evaluation teams should have had some substantive involvement with INRAN prior to the project initiation. Continuity of some panel members from the first to the second evaluation is recommended.

Each time that an evaluation is conducted, the evaluation team should refer to figure 1 in Annex D which presents an organizational chart of INRAN. Progress in improvement of personnel and resources in support of each division within INRAN should be recorded.

V. Financial Plan

A. Cost Projections

The budget projections for this project reflect the estimated cost of inputs required to achieve the three project outputs described in the project summary. The total AID five-year project costs amount to \$10.6 million. The initial FY 1982 funding obligation will amount to \$4,885,000. The GON will contribute \$2.77 million over the five years of the project or approximately 21 per cent of total project costs of \$13,373,000. The GON contribution consists primarily of personnel and support costs of INRAN and its principal research stations. Contingency costs have been estimated at 10 per cent while inflation is 10 per cent for U.S. personnel, commodities, training, etc. The GON also calculates approximately a 10 per cent rate of inflation.

## VI. Conditions and Covenants

The Mission, in consultation with the REDSO Legal Advisor, recommends the following conditions precedent to any disbursement under the Project Agreement:

1. Prior to any disbursement, or the issuance of any commitment documents pursuant to which disbursement will be made, the Cooperating Country shall furnish to AID in form and substance satisfactory to AID, evidence that a Nigerian Project Director has been assigned and delegated all necessary authorities required to implement the project.
2. Prior to any disbursement, or to issuance by AID of any commitment documents for the construction of buildings or other prior construction services, the Grantee shall, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:
  - a. Evidence that a site for the construction, satisfactory to AID, has been selected and has been made available to the project.
  - b. Evidence that the GON has established an accounting system for the control of project funds which meets generally accepted accounting standards.
  - c. Plans, bid documents, cost estimates and contracts (standard language).

The Mission and the REDSO Legal Advisor also recommend the following covenants to the Project Agreement:

1. The Government of Niger will covenant to provide sufficient financial resources to cover all capital and operating costs of INRAN during the life of the project.
2. The Government of Niger will covenant to actively participate in mid-project and end-of-project special evaluations (years 2 1/2 and 5). As these special evaluations will recommend future levels of AID support to INRAN, the level of future GON support to INRAN will have to be known. The GON will covenant to make this information available in a timely manner during the special evaluations. It should be noted by the GON that the level of AID support for INRAN beyond the initial five years of this project will be reduced as a percentage of combined AID/GON support during the initial five years.
3. The Government of Niger will covenant to furnish sufficient human resources necessary to the effective and permanent functioning of INRAN during the life of the project. Assignments of personnel will be for a period of not less than three years.

4. The Government of Niger will covenant to provide sufficient financial resources to cover all costs for installation of electricity and water service for the Kolo research station.

Table 1.

<u>Summary Cost Estimate and Financial Plan</u>					
	<u>AID</u>			<u>(\$000)</u>	
	<u>FX(\$)</u>	<u>LC</u>	<u>GON</u>	<u>TOTAL</u>	<u>%</u>
Technical Assistance:					
Long-term Personnel (25 p.y.)	1722.7	847.3	-	2570.0	19.2
Short-term Staff (53 p.m.)	355.1	174.9	-	530.0	4.0
Research Associates (12 p.y.)	120.0	120.0	-	240.0	1.8
Construction	111.7	136.8	-	248.5	1.9
Commodities	584.0	266.0	1140.0	1990.0	14.9
Training	1146.0	66.0	240.0	1452.0	10.9
Other Costs	500.0	1140.0	662.6	2302.6	17.2
	<hr/>				
Sub Total	4539.5	2751.0	2042.6	9333.1	69.8
Contingencies	473.7	296.1	204.0	973.8	7.3
Inflation	1059.1	551.9	526.3	2137.3	16.0
Cost of Contract	928.7	-	-	928.7	6.9
	<hr/>				
Total	7021.0	3613.0	2772.9	13372.9	100.0

Table 2. Costing of Project Outputs/Inputs

(\$000)

	<u>#1</u>	<u>#2</u>	<u>#3</u>	<u>Total</u>
Technical Assistance:				
Long-term Personnel (25 p.y.)	550.0	---	2020.0	2570.0
Short-term Staff (53 p.m.)	100.0	270.0	160.0	530.0
Research Associates (12 p.y.)	--	---	240.0	240.0
Construction	248.5	--	--	248.5
Commodities	102.0	351.0	1537.0	1990.0
Training	456.0	162.0	834.0	1452.0
Other Costs	1082.1	131.7	1088.8	2302.6
	<hr/>			
Sub Total	2538.6	914.7	5879.8	9333.1
Contingencies	294.8	91.2	587.8	973.8
Inflation	547.6	184.9	1404.8	2137.3
Cost of Contract	928.7	--	--	928.7
	<hr/>			
Total	4320.7	1201.8	7884.4	13372.9

- Output #1: Growth and development of INRAN's capacity to administer and manage its research program, its resources and its linkages to other organizations.
- Output #2: Growth and development of INRAN's ability to support its researchers' efforts through support functions.
- Output #3: Growth and development of specific research activities oriented around a comprehensive, integrated and systematic approach to research.

Table 3

## Yearly Cost Estimates (\$000)

Output #1	Year 1		Year 2		Year 3		Year 4		Year 5		Total	
	U.S.	GON	U.S.	GON								
-----												
T. A. Personnel:												
Long-term (5 p.y.)	130.0	--	105.0	--	105.0	--	105.0	--	105.0	--	550.0	--
Short-term (10 p.m.)	40.0	--	20.0	--	40.0	--	--	--	--	--	100.0	--
Construction	248.5	--	--	--	--	--	--	--	--	--	248.5	--
Commodities	46.0	--	7.0	--	45.0	--	2.0	--	2.0	--	102.0	--
Training	7.5	8.0	46.5	25.0	37.5	42.0	57.0	65.0	67.5	100.0	216.0	240.0
Other Costs	162.0	24.9	168.0	31.3	211.0	31.3	176.0	31.3	215.0	31.3	932.0	150.1
-----												
Sub Total	634.0	32.9	346.5	56.3	438.5	73.3	340.0	96.3	389.5	131.3	2148.5	390.1
-----												
Output #2												
F.A. Personnel:												
Short-term (27 p.m.)	60.0	--	80.0	--	80.0	--	30.0	--	20.0	--	270.0	--
Commodities	30.0	8.0	96.0	10.0	68.0	15.0	53.0	15.0	38.0	18.0	285.0	66.0
Training	12.0	--	19.5	--	34.5	--	54.0	--	42.0	--	162.0	--
Other Costs	4.0	22.4	4.0	22.3	4.0	22.4	4.0	22.3	4.0	22.3	20.0	111.7
-----												
Sub Total	106.0	30.4	199.5	32.3	186.5	37.4	141.0	37.3	104.0	40.3	737.0	177.7

Table 3 (cont)

## Yearly Cost Estimates (\$000)

Output #3	Year 1		Year 2		Year 3		Year 4		Year 5		Total	
	U.S.	GON	U.S.	GON								
T. A. Personnel:												
Long-term (20 p.y.)	480.0	--	385.0	--	385.0	--	385.0	--	385.0	--	2020.0	--
Short-term (16 p.m.)	20.0	--	40.0	--	40.0	--	40.0	--	20.0	--	160.0	--
Research Asst. (12 p.y.)	10.0	--	40.0	--	80.0	--	80.0	--	30.0	--	240.0	--
Commodities	147.0	176.0	61.5	194.0	141.5	213.0	61.5	234.0	51.5	257.0	463.0	1074.0
Training	27.0	--	87.5	--	151.0	--	217.0	--	351.5	--	834.0	--
Other Costs	99.0	39.8	126.0	61.6	150.0	85.9	153.0	103.1	160.0	110.4	688.0	400.8
Sub Total	783.0	215.8	740.0	255.6	947.5	298.9	936.5	337.1	998.0	367.4	4405.0	1474.8
All Outputs												
T.A. Personnel												
Long-term (25p.y.)	610.0	--	490.0	--	490.0	--	490.0	--	490.0	--	2570.0	--
Short-term (58 p.m.)	120.0	--	140.0	--	160.0	--	70.0	--	40.0	--	530.0	--
Research Asst. (12 p.y.)	10.0	--	40.0	--	80.0	--	80.0	--	30.0	--	240.0	--
Construction	248.5	--	--	--	--	--	--	--	--	--	248.5	--
Commodities	223.0	184.0	164.5	204.0	254.5	228.0	116.5	249.0	91.5	275.0	850.0	1140.0
Training	46.5	8.0	153.5	25.0	223.0	42.0	328.0	65.0	461.0	100.0	1212.0	240.0
Other Costs	265.0	87.1	298.0	115.2	365.0	139.6	333.0	156.7	379.0	164.0	1640.0	662.6
Sub Total	1523.0	279.1	1286.0	344.2	1572.5	409.6	1417.5	470.7	1491.5	539.0	7290.5	2042.6
Contingency	193.3	27.9	128.5	34.4	157.2	40.9	141.8	47.0	149.2	53.8	769.8	204.0
Inflation	24.3	--	125.9	34.4	323.3	86.0	459.5	155.8	678.0	250.1	1611.0	526.3
Contract Cost	162.5	--	192.2	--	215.5	--	186.7	--	171.8	--	928.7	--
Total	1903.1	307.0	1732.6	413.0	2268.5	536.5	2205.5	673.5	2490.3	842.9	10600.0	2772.9

NIGER CEREALS RESEARCH PROJECT  
OBLIGATION SCHEDULE

FY 82	\$4,885,000
83	1,050,000
84	1,000,000
85	1,700,000
86	<u>1,965,000</u>
Total	\$10,600,000

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project:  
From FY 82 to FY 86  
Total U. S. Funding \$10, 634,000  
Date Prepared: October 8, 1981

Project Title & Number: Niger Cereals Research, SR3-0225

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To assist Niger in achieving self-sufficiency in food production and improve rural standards of living.</p>	<p>Measures of Goal Achievement: Increased crop production, quantity and variety of crops marketed, purchases of basic goods and reduced seasonal migration. Improved nutrition, literacy, soil conservation and general skills level.</p>	<p>Lack of basic food shortages as evidenced: a. stable prices, b. positive balance of trade in basic food items, c. volumes of food items marketed as local markets and stored on and off-farm, d. project records and surveys as compared to baseline data collected under Phase I.</p>	<p>Assumptions for achieving goal targets: Rains arrive on time and in quantities needed. GON price policies remain attractive for farmers. The marketing system maintains current level of efficiency. GON commitment to attaining food self-sufficiency remains high.</p>
<p>Project Purpose: To develop the capacity of INRAN to undertake cereals research programs whose results can be disseminated to farmers via the extension and cooperative system.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status. 1. Three major research programs established: a. Crop Improvement Research for millet, sorghum &amp; cowpeas; b. Cereals production systems in two ecological zones; c. Farming systems research in two departments 2. Strengthened administrative, technical and support functions enhancing the productivity of the INRAN organization and the scientists working for it. 3. Established linkages with national &amp; international research organizations.</p>	<ol style="list-style-type: none"> <li>Annual reports of INRAN</li> <li>On-site inspections</li> <li>Research publications</li> <li>Extension communications</li> <li>Contractor reports</li> <li>Changes in extension package content over time &amp; by region.</li> </ol>	<p>Assumptions for achieving purpose:</p> <ol style="list-style-type: none"> <li>Adequate INRAN budgets continue</li> <li>Other donor support does not decrease significantly</li> <li>Extension programs develop capacity to utilize more information.</li> <li>Inputs are available to producers.</li> </ol>
<p>Outputs: Growth and development of INRAN's capacity to administer and manage its research program, its resources and its linkages to other institutions</p>	<p>Magnitude of Outputs: 1. -Analysis of reorganization needs conducted -Budgeting subjected to analytical studies -Fiscal management partially decentralized -20 Academic Training programs in the U.S. completed or underway -15 short term training programs completed in the U.S. or 3rd countries -12 In-service training programs held for INRAN staff</p>	<ol style="list-style-type: none"> <li>-INRAN and contractor reports -On-site evaluation -Site visits -Examination of selected productivity project reports</li> </ol>	<p>Assumptions for achieving outputs:</p> <ol style="list-style-type: none"> <li>INRAN accepts idea of interdisciplinary research efforts</li> <li>GON provides adequate financial resources to INRAN</li> <li>INRAN can identify and release sufficient numbers of individuals for training.</li> <li>Cooperation with GON's extension programs is forthcoming.</li> </ol>
<p>Inputs:</p>	<p>-Applied research staff of productivity projects are participating in INRAN research -Productivity project staff testing research results for application -Program of communication to extension expanded -INRAN staff provided feedback through participation in tests/demonstrations at CPTs, etc.</p>		<p>Assumptions for providing inputs:</p>

**PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK**

Life of Project: \_\_\_\_\_  
 From FY \_\_\_\_\_ to FY \_\_\_\_\_  
 Total U. S. Funding \_\_\_\_\_  
 Date Prepared: \_\_\_\_\_

Project Title & Number: \_\_\_\_\_

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><b>Outputs:</b></p> <p>2. Growth and development of INRAN's ability to support its researcher's effort through support functions.</p> <p>3. Growth &amp; development of specific research activities oriented around a comprehensive, integrated &amp; systematic approach to research</p>	<p><b>Magnitude of Outputs:</b></p> <p>2. -Library expanded &amp; documents more accessible                      -Increased demand for plant analysis                      -Analysis of food quality of grain is initiated                      -Farm machinery availability is expanded.</p> <p>3. -Improved varieties for at least one zone and at least one soil type ready for release in each crop                      -Expanded body of knowledge for</p>	<p>2. -INRAN &amp; contractor reports                      -On-site evaluation                      -Project records</p> <p>3. -INRAN and contractor reports                      -Site visits                      -Project records                      -Review of scientific publications</p>	<p>Assumptions for achieving outputs:</p>
	<p>these crops is available.                      -Farming system data collection &amp; analysis under way in two departments &amp; at least 2 ecological zones.                      -Results disseminated within and outside of INRAN                      -Cereals production system research efforts underway in at least two or more Departments                      -GON budget allocation increasing                      -Results affecting extension package in several locations.</p>		<p>Assumptions for providing inputs:</p>

**PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK**

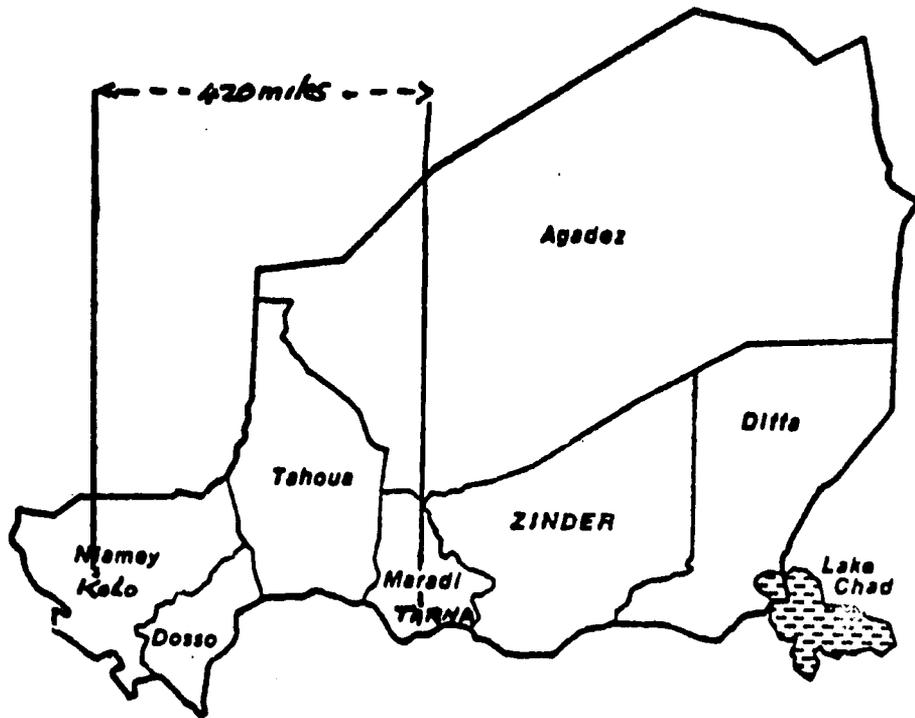
Life of Project:  
From FY 82 to FY 86  
Total U. S. Funding \$10,634,000  
Date Prepared: October 8, 1981

Project Title & Number: Niger Cereals Research, 683-0225

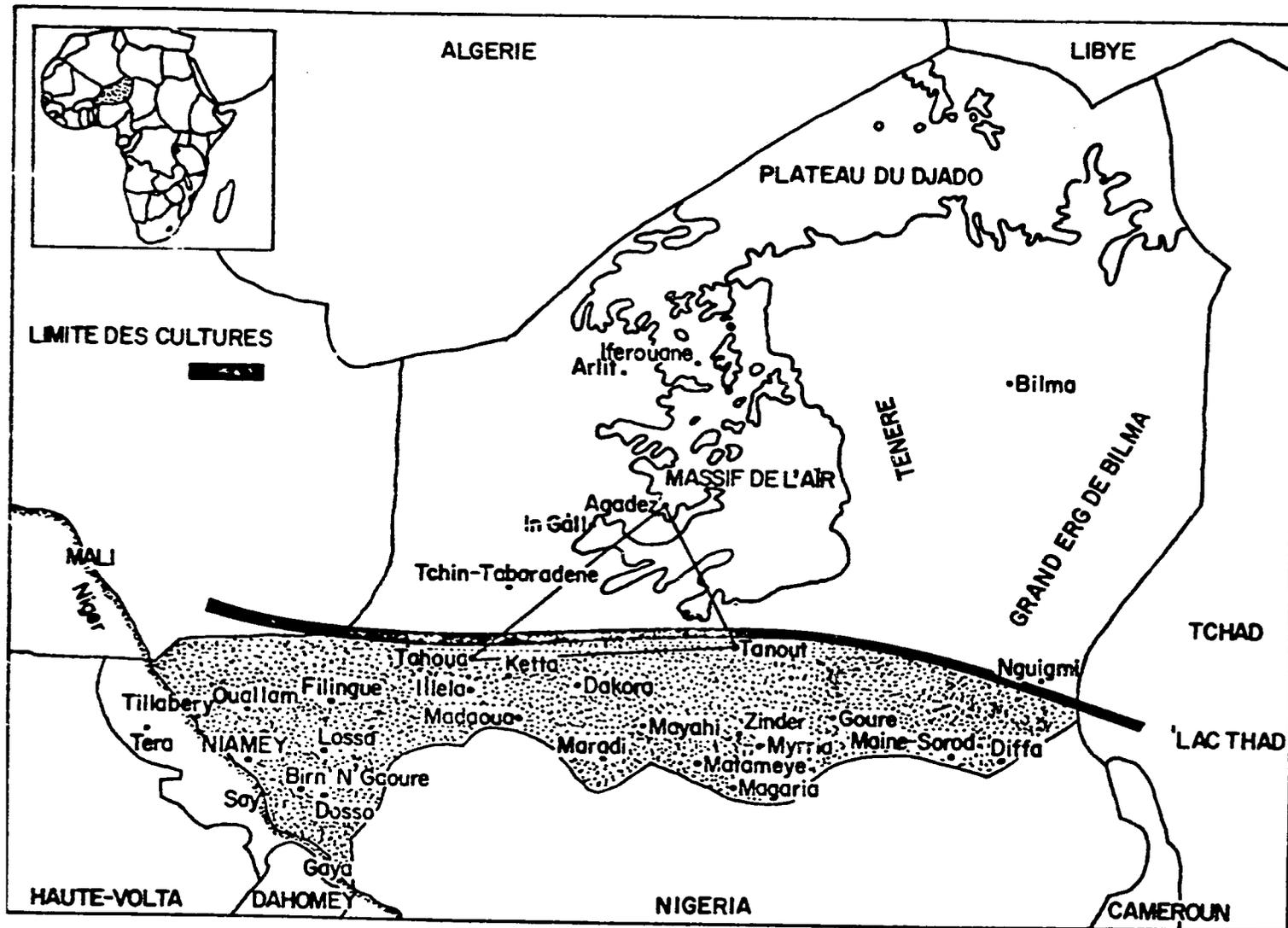
NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Inputs:</p> <ol style="list-style-type: none"> <li>1. Long term U.S. staff providing technical and institution building assistance.</li> <li>2. Research associates providing research efforts in Niger and in U.S.</li> <li>3. Short term U.S. staff providing technical and institution building assistance</li> <li>4. Long term academic training for INRAN/ Staff</li> <li>5. Short term U.S. and 3rd country training for INRAN staff</li> <li>6. Equipment, supplies and library material</li> <li>7. Operational funds for conduct of applied research</li> <li>8. Remodling and expansion of Kolo research statitca</li> <li>9. Vehicles</li> <li>10. Contracts for research services of CRSF programs or other international organizations</li> </ol>	<p>Implementation Target (Type and Quantity)</p> <p>4 Senior staff for 5 yrs (20 person-yrs) 1 Junior staff for 5 yrs (5 person-yrs)</p> <p>3 Research associates for 4 years (12 person-years)</p> <p>53 person-months</p> <p>20 scholarships (60 Person years)</p> <p>15 programs (30 person-months)</p> <p>See detailed budget</p> <p>1 new building, others refurbished</p> <p>18 two and four-wheel drive vehicles 4 contracts</p>	<p>MEANS OF VERIFICATION</p> <p>Contractor reports and records</p> <p>Contractor and INRAN records On-site verification</p> <p>Contractor reports and records Contractor reports and records</p>	<p>IMPORTANT ASSUMPTIONS</p> <p>Assumptions for providing inputs:</p> <ol style="list-style-type: none"> <li>1. Funding for contract implementation is available as needed.</li> <li>2. Housing needs can be met</li> <li>3. Vehicle waiver granted</li> </ol>
	<p>Magnitude of Outputs:</p>		<p>Assumptions for achieving outputs:</p>
<p>Inputs:</p>	<p>Implementation Target (Type and Quantity)</p>		<p>Assumptions for providing inputs:</p>

**ANNEX B**

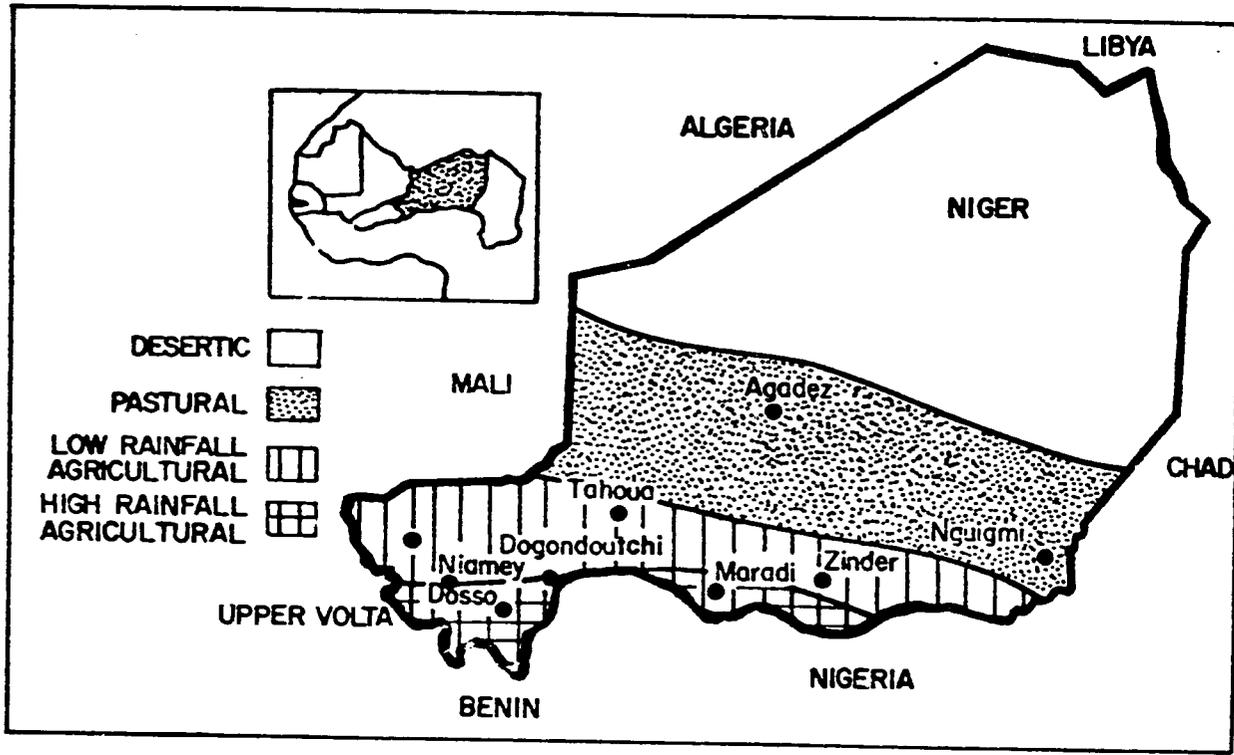
**Maps and Ecological Zones**



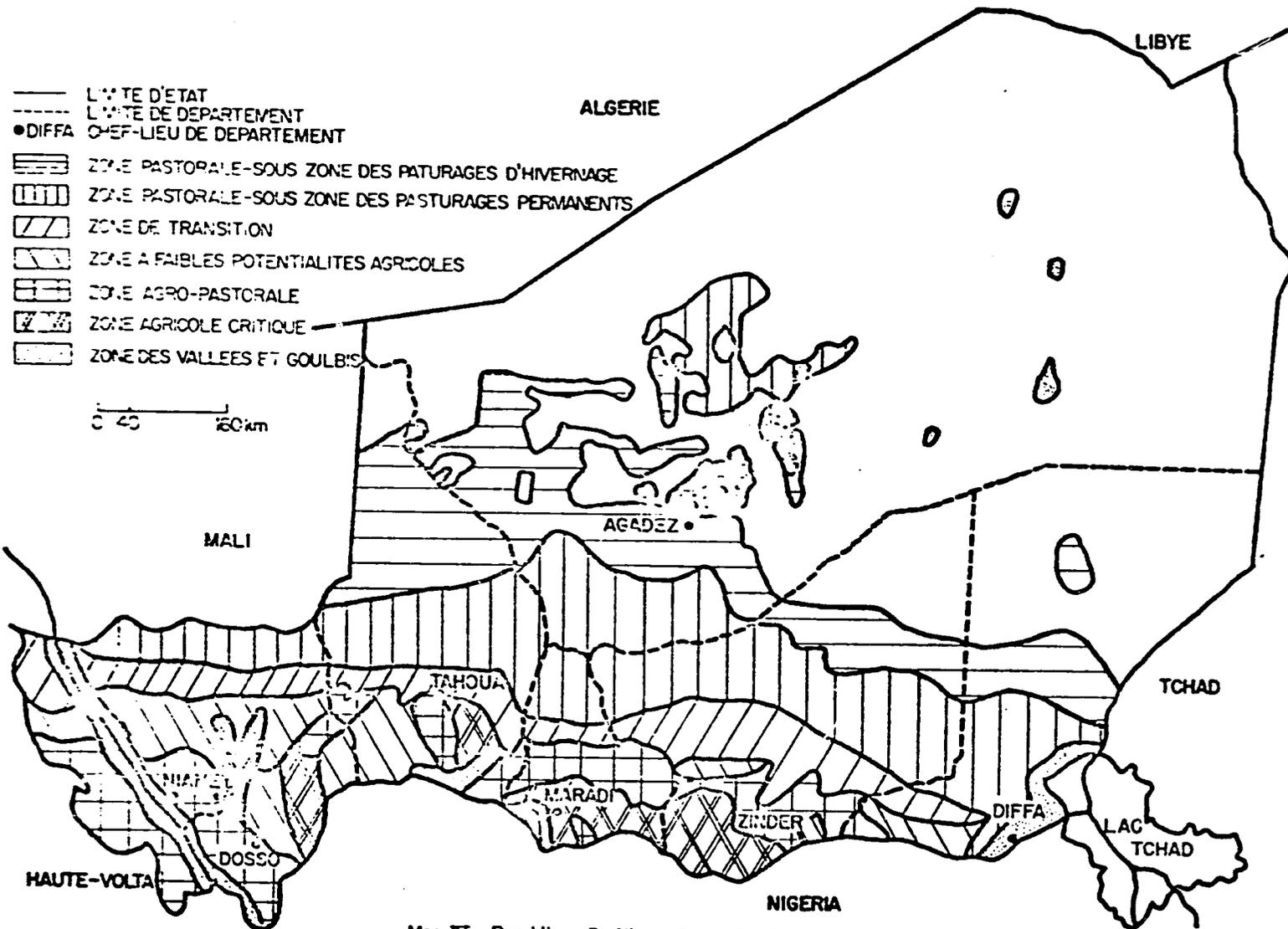
Map I Location of the Departments (states) of Niger



Map II Research Sites From Ag. Sector Analysis 1979



Map III Rainfall Map Showing Agricultural Zones-Niger



Map IX République Du Niger - Cartes Des Zones

**ANNEX C**

**Technical Analysis**

## ANNEX C. TECHNICAL ANALYSIS

### I. RESEARCH COMPONENT OF TECHNICAL ANALYSIS

#### A. Historical Background

1. Early Research - Niger was a former French colony, and because of this all of its scientific research was conducted by French institutions. For example, geology research was conducted by the Bureau de Recherches Geologiques et Minieres (BRGM), forestry by Centre Technique Forestier Tropicale (CTFT), animal husbandry and veterinary science by Institut d'Elevage et de Medicine Veterinaire Tropicale (IEMVT) and agriculture by Institut de Recherches Agronomiques Tropicales et Cultures Vivrieres (IRAT). These institutions were directed and staffed by expatriates and research in the latter was largely oriented towards export crops -- peanuts and cowpeas.

After the independence of Niger in 1960, the Government of Niger (GON) expressed a desire for research organizations which were more responsive to the needs of its people. In 1968 the Conseil National de la Recherche Scientifique et Technique (CNRT) was formed to define the research needs of Niger.

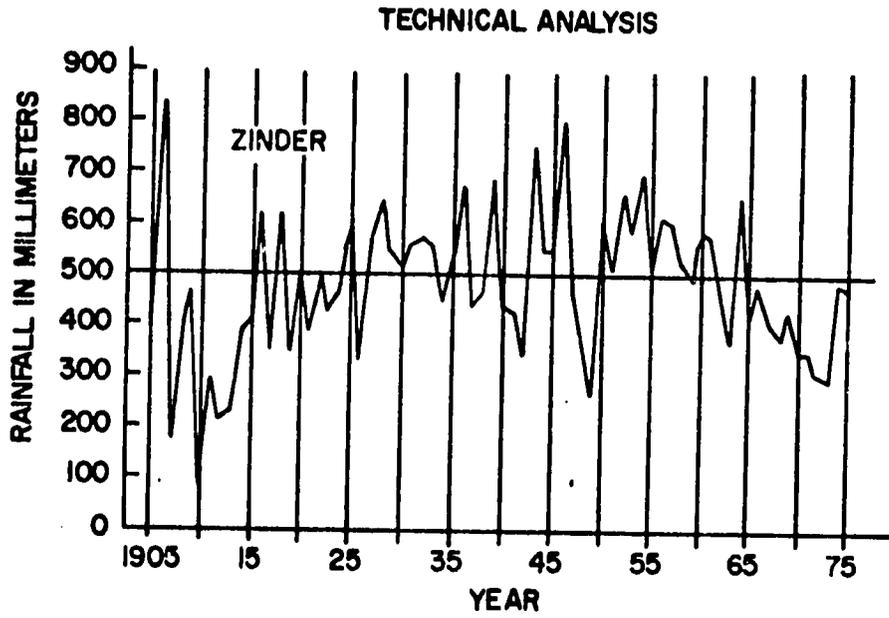
2. The Creation of INRAN - By 1974 the CNRT was able to advise GON on agricultural research and GON created the Institute National de Recherches Agronomiques du Niger (INRAN). INRAN took over the facilities of IRAT at Tarna and Kolo (Map II), and defined an ambitious research program which laid emphasis on investigations which were related to local needs. The declared overall objectives of INRAN in 1974 were "to give scientific and technical support to the problem of rural development and to plan and to carry out research in the different branches of agriculture: ecology, agronomy, animal husbandry, forestry, agricultural economics and training". Recently the objectives of GON in respect to its agricultural programs have been more specific: one of them is self-sufficiency in cereal grain, and INRAN's first priority in the five year development plan 1979-83 is to pursue agricultural research that will identify and improve higher yielding varieties which are well adapted to Niger's diverse soil and rainfall conditions.

In 1975 INRAN was a young and founding national organization when one of the recurrent rainfall shortages typical of Sahelian West Africa occurred. This was the worst and longest drought since 1906, Figure I. For seven consecutive years, 1970 to 1976, Figure II, the mean annual rainfall was less than 400mm, and for four of these years it was below 350mm. Charoy (1974) and Brown (1979) have shown that the minimum water requirement for millet in Niger over a 114 day growing period is 366mm. This shortage upset the delicate balance between agricultural production of food, fiber and fodder and the number of men and animals who could be supported in Sahelian countries. The extent of human suffering caused international attention to be focused on the area.

USAID responded to the needs of the distressed countries by offering substantial assistance. One of the assistance projects was Niger Cereals Project (NCP).

### II. EVALUATION OF RESEARCH COMPONENT IN PHASE I

#### A. General Statement



**Figure I Magnitude and Variability of Rainfall in Zinder.**

# TECHNICAL ANALYSIS

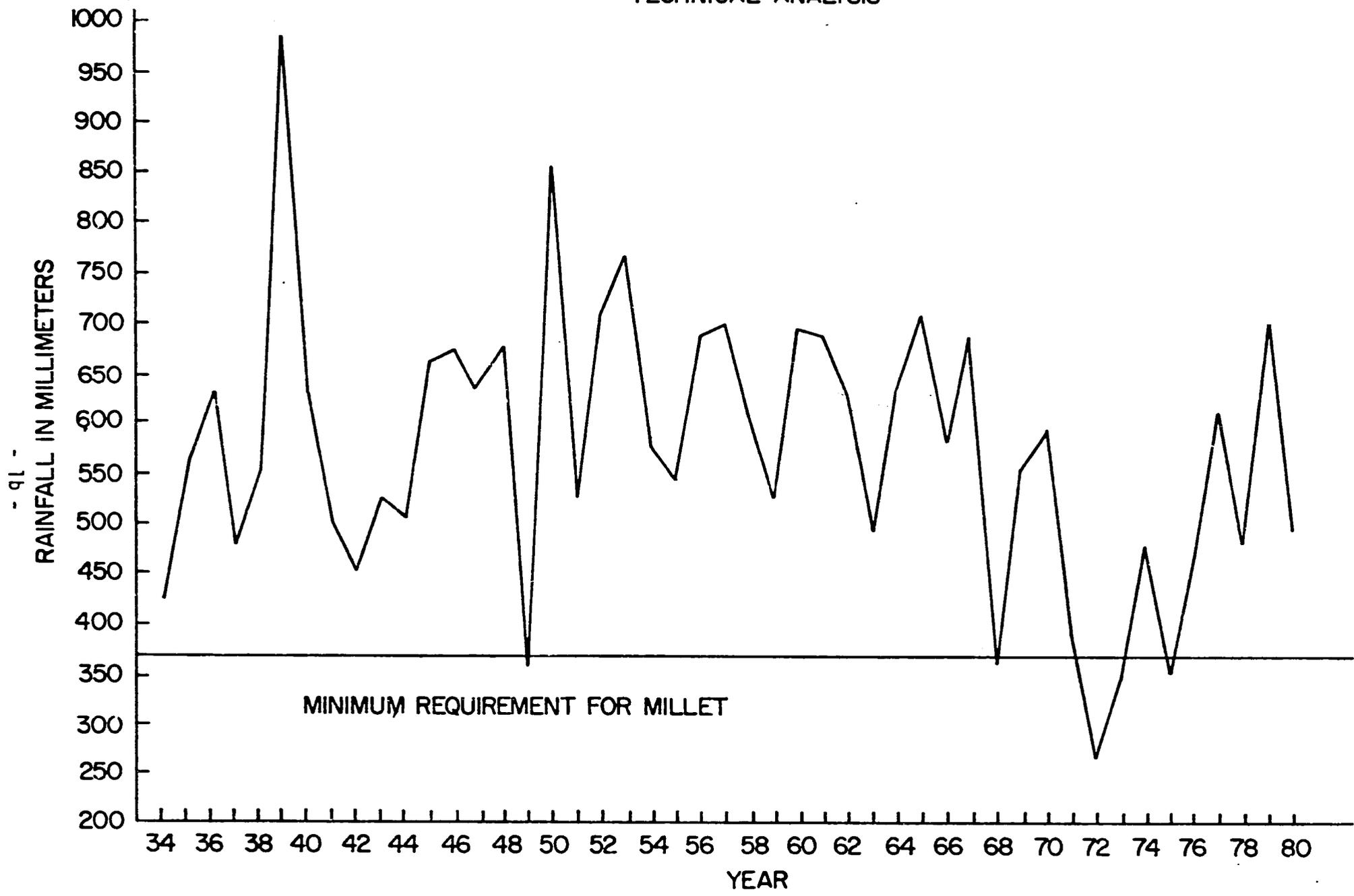


Figure II Annual Rainfall Maradi, Niger

The evaluation<sup>3/</sup> of the components of Phase I - seed multiplication, cooperatives and extension - which have been regrouped as APS is dealt with in the Niger Agricultural Support Project Paper. The assessment of the Research component of Phase I is given in AID document project number 683-0225. Purdue is fully aware of the successes and other experiences of the pioneering NCP, Phase I. INRAN was only one year old when it entered into contract with CID<sup>4/</sup> in its first large Sahelian contract. It is not the intention of Purdue to catalogue the successes or so-called failures of the initial NCP, but it is necessary to analyze and to make some assessment of the prior experiences in order to build on those which are positive, and to remedy those which have been negative.

B. Technical Assistance Personnel

The technical assistance provided to the research component between July 1976 and December 1980 were as follows:

- Expert Scientists stationed at the Centre National de Recherches Agronomiques CNRA, at Tarna, at Maradi.
  - Plant Breeder-----27 months
  - Agricultural Engineer-----27 months
  - Agronomists-----40 months
  - Agricultural Chemist-----12 months
- Consultants
  - Allen, B.L. (1978). Report of Soils of Tarna, Doukoudoukou, Guecheme and E.L. Hamdallaye stations. CID, Texas.
  - Krieg, D., (1978). Sorghum at Tarna. CID, Texas.
  - Lamborn, R.E., Krieg, D., Johnson, D.A., and Dewey, D. R. (1978). Report on Laboratory and Library Requirements. CID, Utah.

C. Technical Assistance in Research Contributions

1. Plant Breeder - The Plant Breeder produced at Tarna, ten varieties of sorghum which were superior to any cultivars grown in Niger, and these are being tested in other parts of the country. (Harvey, 1979.)

2. Agricultural Engineer - The expertise of the agricultural engineer was used by AID and GON to assist in the design and construction of buildings funded under the NCP Project. These buildings are listed under "Buildings" in the subsequent section E. He also made studies of water use efficiency, with and without irrigation, in relation to cultural practices and related these to yield. (Foerster, 1979.)

He and the Agronomist collaborated on studies of the effect of slope on millet yield, and concluded that a 5% slope is the upper limit for millet in Niger.

3. Agronomist - There were two CID Agronomists - one from 1976 to 1979, and the other from 1979 to 1980. The first agronomist assembled, reviewed and analyzed findings from IRAT (Niger) and INRAN, which were relevant to millet, sorghum, cowpea and peanut research in Niger. He field tested, in collaboration with Nigerien researchers, some of the hypotheses which appeared as a result of these studies. These findings have formed the basis for changing concepts in INRAN's approach to research (see Section IV). Some of these findings are:

- INRAN (1978) (1980)
  - Botorou and Brown concluded that several local varieties produced as well as the recommended varieties of millet, P3 Kolo and CIVT, and gave

higher yields at specific sites in the country.

- INRAN (1978)  
Adamou and Brown demonstrated that dune sorghums gave poor yields in Niger, and that of the valley sorghums tested L30 was the most productive, but the farmers preferred 1/2 MSB because of its grain quality.
- INRAN (1978)  
Maga, Adamou and Brown verified that the selected varieties of cowpeas were superior to local varieties - TN 4 - 69 for areas of high rainfall, and TN 88 - 63 for areas of lower rainfall (< 600mm).
- Brown  
Special Report. 'Legumes in the rotations at CNRA'. Niger increased millet yields two to four times.
- Brown, Charoy and Roesch (1979)<sup>5/</sup>  
A case was made for the use of local phosphate as a fertilizer in Niger.
- Brown, Charoy, Roesch and Courcelles (1979)<sup>5/</sup>  
There is no need for potassium fertilizer on mecaceous dune sands of Niger.

The second agronomist carried out research on the effects of fertilizer management in pure and mixed cultures. He reported that millet and legumes in rotation had reciprocal benefits and by careful placement of fertilizer, higher yields could be realized with less urea and phosphate (Cunard, 1980, 1981).

4. Agricultural Chemist - The Agricultural Chemist examined the methods of analysis used for plant and soil analyses, the system of storekeeping and the method for identifying and following samples through the National Soils Laboratory in Niamey. He found that there was great need for direction of young, well trained and enthusiastic but inexperienced Nigerien staff. He could only accomplish one year of assistance before the end of his tour, but there was an improvement in the efficiency of technicians and in the reliability of results determined in the laboratory.

#### D. Training

1. In-Service - All the CID research scientists participated in the in-service training for technical and field staff at INRAN during the tour. A fair estimate of the number of in-service trainees is probably 100, but many of these are no longer with INRAN.

2. Long and Short-Term Overseas - Eight Nigeriens received university training in the U.S. in areas of agriculture - five to the Master's level and three to the Bachelor's level. Thirteen others have received short-term training in the U.S. or third world institutions.

#### E. Buildings and Equipment

The following buildings were constructed for the research component of the project: one laboratory, one conference/administration/library complex at CNRA, Tarna, and an office building at the Station Experimentale Hydrologique Agricole (SEHA) near Tarna. The research substation of seven buildings at Ouallam was also completed. Laboratory and surveying equipment were bought for INRAN.

The Agricultural Engineer took part in the designing and in the supervision of the construction of these buildings for research, and gave similar service to the seed multiplication component of the project at the foundation seed farm

at Lossa and at four of the seed multiplication centers: Doukoudoukou, Guecheme, Magaria and El Hamdallaye.

### III. CONSTRAINTS IN PHASE I. PLANS FOR RESOLUTION IN PHASE II

There is clear evidence presented in the preceding section that the research component did make some significant contributions to research in INRAN. There were, however, some constraints which limited the optimum performance of CID scientists. The most serious were inadequacy in the French language, poor delivery systems for materials, ill defined lines of authority between AID, GON, and CID, and lack of Nigerien counterparts.

Every one of the evaluation teams<sup>2</sup> made reference to these limitations, a clear indication that the contractor for Phase II must devise systems to reduce and, if possible, completely eliminate these constraints. Information from several reports leads us to agree with AID's overall evaluation (Dickherber, December 12, 1980) that "the blame must be jointly shared by AID, GON and CID".

In order to correct language deficiency, this contractor has included in its design phase budget funds for French language training and has already tested systems on campus for teaching French.

Niger is land-locked and it is predictable and inevitable that delivery time by surface freight can be from nine to twelve months. CID researchers reported that certain equipment ordered for their research never arrived until 1978, when their first tour was already completed. Most of the equipment remained in INRAN, Niamey and never reached CNRA, Tarna where it was needed for research. This contractor has adequate systems on campus to expedite deliveries and will support INRAN's capacity to do likewise. Serious consideration is given to shipping all commodities by air freight.

Lines of authority and linkages between AID, GON, and CID were not clearly defined initially, and at every evaluation meeting this question was raised. As late as 1978, when the first tour of researchers was already complete, serious discussions were still being held between AID, GON, and CID concerning coordinators' understanding of agreements. (See Sections 5.4 and 6.1 of the 1978 Evaluation Report) This contractor will endeavor to have lines of communication clearly defined but flexible from the inception of the project. This is particularly possible since the designer of this project will also be the implementing agency.

Niger does not have the numbers of qualified personnel required to meet the demands for counterparts sought by all the agencies with programs in the country. INRAN is less than ten years old, and is unable to adequately supply counterparts; yet, under the pressure of contractual agreements, Niger promises to meet the requests for counterparts, which it cannot easily supply.

Purdue will therefore take the reasonable view that the project will begin with a minimum of counterparts, and train counterparts as the project progresses. Thus the question of counterparts can be honestly and openly resolved. Further, the Purdue scientists will be working across different disciplines, especially in the early years of the contract. Staff should thus have working relationships with several "counterparts" on a part-time basis. This should make it possible for the senior researchers to make valuable contributions to INRAN's institutional development.

### IV. INRAN - AN INSTITUTIONAL ANALYSIS

## A. CHANGING CONCEPTS IN INRAN

In Phase I of NCP (1976-1980), some members of INRAN saw the project as a means of increasing hardware, materials and physical infrastructure in Niger. Thus the construction of buildings, and the delivery of vehicles or laboratory equipment was a primary interest of INRAN's representatives. The completion of one foundation seed farm, five seed multiplication centers and purchase of substantial amounts of laboratory chemicals and equipment, which were put into storage, were projects outputs. While completion of a spacious library facility at Tarna was given high priority, GON did not provide an efficient sub-professional librarian. Although several Nigerien researchers spoke of the great necessity for library facilities, no special effort to improve the situation was made. Today, however, many members of INRAN no longer see the physical plant as the final end-product or output of the project but merely a means to an end, which is the improvement of the living standards of the Nigerien peasant. As an example, researchers in the soils laboratory have expressed preferences for sturdy, functional equipment over the more sophisticated pieces which were requested in 1976.

Nigerien researchers openly express a desire to do team research instead of individual investigations. There is no recorded evidence that experiments are designed by interdisciplinary groups among Nigeriens, but the desire is there, and the time is ripe to profit from it.

There has been a definite trend towards the purification and improvement of local strains of millet, sorghum and cowpeas, since country-wide trials by CID were able to support the view that local varieties are well adapted to the environment.

Another idea which has changed during the last five years is that a definite link has been established between INRAN's research unit and the extension unit of the Ministry of Agriculture. There used to be an abrupt boundary between these two units. Now, INRAN has created a new section called research/extension liaison and, though its functions are not detailed, it is intended to be the vehicle by which applicable research results from INRAN are transmitted to the extension unit of the Ministry of Agriculture and then translated into a form usable by the peasant farmer.

There are definite, even if only moderate signs of improvement in research at INRAN between 1976 and 1981. The 1978 evaluation summed up the situation quite adequately when it noted "the problem appears not that so little has been done, but rather that too much was expected in too short a time".

## B. Analysis of Institutional Needs

As a basis for both planning and implementing an institution building project it is useful to analyze INRAN to identify its high priority needs. The project strategy should be guided by such an analysis, and project evaluation and future replanning should refer to it. The institution building model has proven useful in other AID projects and its elements are referred to in the following analysis of those significant INRAN needs which should be addressed by the NCR Project.

Doctrine - INRAN has a rather clearly stated sense of responsibility to do that research which will benefit farmers, particularly small farmers. Like all other governmental objectives, in the current five year plan, INRAN must strive towards attaining food self-sufficiency, institution of a "development society" and economic independence for the country.

As INRAN attempts to develop and describe its doctrine, in harmony with

that expressed by other government agencies, certain conflicts and confusion are inevitable. Confusion occurs in part because of lack of specificity and clarity in overall goals. In many cases, priorities have not been clearly set, either outside of or inside of INRAN, making decisions difficult. The objective of maintaining long-term soil fertility of agricultural lands and reducing erosion can be seen as in potential conflict with the objectives of increasing production in the short-term, and using animal traction to permit cultivation of larger areas. The goal of economic independence is somewhat at odds with expressed needs for greater fertilizer use, for example, and may also be used as justification for reducing the reliance on other countries and international institutions for production of basic scientific knowledge. The latter leads to a desire to conduct rather fundamental studies in Niger, and also to repeat and confirm basic studies carried out abroad so as to establish a "national" basis for science. Such efforts are costly and consume scarce resources. INRAN's doctrine is not yet sufficiently developed to facilitate the decision making and overall program direction required to resolve such confusion and conflicts. The existing doctrine is not yet easily transferred into setting internal priorities, administrative guidelines, development of structure, and other forms of strategy by which it should guide program development and execution.

Leadership - INRAN clearly has a few very capable leaders and has recently gone through a change in leadership at the Director General level. This change appears to have occurred smoothly without overly disrupting programs. Consequently, other beneficial changes in the organization appear to be possible. The leadership appears to be sufficiently self-confident to permit it to embrace the kind of overall institutional change that this project embodies.

The shortage of leadership within INRAN is evident. There is little if any backstopping for people in leadership capacity. There are individual research programs or areas where little if any leadership is evident. Leaders tend to be given responsibility which translates into greater administrative loads. As problems which must be resolved are numerous, and procedures and support inadequate, it appears that leadership capacity is so occupied with such problems that little if any time is devoted to directing research programs per se. INRAN is critically short of scientific manpower and thus of staff who can be expected to mature into leadership roles. Thus development of strong leadership capacity will be a slow process.

Resources - Real limitations on INRAN's development are occurring as a result of insufficient resources of several types. Chief among these is the manpower limitation. There has been some regular increase in salary funding, but allocated funds were not enough to enable INRAN to add to its staff the number of researchers or higher level technicians that are required to effectively conduct the expected research. Several departments and a number of sections do not have the critical mass required to sustain programs. Many of the staff qualified to organize and direct research are heads of sections (often the only professional in a section) or other administrative units and must spend considerable time in administrative affairs.

The capacity or capability of staff is highly variable. A number of the professionals do not yet have the methodological training or scientific background necessary to analyse problems and create innovative solutions, which is a critical process in a good research program. They are therefore relegated to repetition of classical kinds of studies. The need to expand both numbers and overall capability of research staff must be addressed in this project.

Operational fund availability constitutes another serious limitation on

INRAN's development. Investment funds from the National Investment Fund have varied substantially and have often been tied to particular infrastructure development. Flexible funds available to programs within INRAN have not kept pace with the program growth and demands of inflation. Thus, INRAN has had severe problems related to need for consumables such as gasoline, repairs and maintenance of facilities, equipment, research supplies, and vehicles. Further, staff are also handicapped in planning and programming research activities, as the availability of funds, supplies for labor, and travel cannot be assured on a timely basis. Researchers may thus lose a season of work because of non-availability of a crucial, often small, resource at a particular time. Suggestions for better management of research funds are made under Management.

There apparently are also some problems of researcher morale related to the need for clearer assignment of responsibilities and clarification of the legal status of researchers as a professional class.

Scientific and technical information is another form of resource which warrants expansion in INRAN. Document collections exist in Niamey and Tarna and, to a lesser extent, at other locations. Literature does not seem, however, to be treated in a systematic fashion as part of a total library. There appears to be no literature search service, it is difficult for researchers to find documents, and thus literature use is minimal. Individual departments or sections may have small specialized libraries, however, and researchers are encouraged to request publications. A documentalist is in training. Nevertheless, generation and circulation of internal documents is slow and difficult. Routine exchange of information with similar or related research programs in other countries is inadequate, and there is not sufficient routine support for information needs required if researchers are to be most productive.

INRAN seems to have sufficient land area in a number of strategic locations to adequately provide for agricultural research needs. In fact, other limitations appear to make it difficult to use the land resource fully. Some locations such as Ouallam, and apparently some support points (points d'appui), are substantially under-utilized. INRAN needs to conduct trials in a wider range of ecological/soil conditions than is currently possible. It would be unwise, however, given manpower and operational fund limitations, to expand the station and substation network at this time. Land and labor resources potentially available through the productivity projects, at farmer training centers and other locations should be utilized by research programs whenever possible.

Equipment resources are highly variable. Large quantities of materials and sophisticated equipment are available in some locations while basic tools and equipment are lacking in others. Maintenance of laboratory and farm equipment is a crucial problem. Many of these difficulties result from policies and practices of donor agencies and seem to be out of INRAN's control. Other problems would clearly respond to management. Hence, project success will require attention to various resource needs, and must address the need for achieving higher GON commitment to INRAN, as well as the need to ensure use of project resources.

Program - INRAN's research portfolio contains valuable research programs in each of the areas of its responsibility. Its overall institutional development will, however, require growth and modification in each major area. This paper deals only with the research programs that impinge directly on the problems of cereal production under rainfed conditions. On the other hand, the project will strengthen certain support and administrative functions which will affect

the overall institutions and thus all research work. The main thrust of INRAN's agricultural research program is concerned with the principal crops of millet, sorghum and cowpeas, and the emphasis is on breeding, especially screening and improvement of local varieties. There are also country-wide trials (essais multi-locaux) in which variety x fertilizer experiments are conducted in several parts of Niger.

Only minimal emphasis has been placed on research related to cultural practices - rotation, intercropping alternatives and practically none on research related to the costs and benefits of production system variations, nor to the effect of rainfall differences on the appropriateness of various cultural practices. While cooperation between researchers is common, interdisciplinary team effort focused on specific research objectives is just barely beginning. Programs in soil mapping are well developed, with FAO assistance. Development of soil classifications and analyses in association with research plots, as a guide to interpreting the results and their applicability, has not been done routinely, and a program for such work is in the planning stage.

The extension program of INRAN is expressed principally through an annual meeting with high level extension personnel at which research reports are presented. Some interaction with staff of the Maradi productivity project occurs at the research station at Tarna. INRAN has recently created a research/extension liaison position, but it is not yet clear what programs or activities will be forthcoming.

It does not appear that formal processes are used to determine priorities among the research options available to INRAN. Changes in direction occur largely by the process of requesting new staff for projected positions. As such requests occur before students begin their professional studies, the process of change is slow.

As indicated previously, the stated doctrine of INRAN is to provide an integrated extension package that will improve rural living, but, this does not translate clearly into the program executed. Researchers, in most cases, continue to maintain research efforts by discipline, especially at the national research station at Tarna. It appears that INRAN does not yet have the kind of management and/or organizational system which can direct its research towards the crucial problems, and which can allocate resources according to priorities and still provide researchers the kind of freedom of approach which fosters creativity and productivity.

Structure and Management - As indicated in a 1980 INRAN seminar, there are certain deficiencies in the current organizational structure of INRAN. One of the principal ones relates to a lack of definition as to the means by which stations, substations, and similar facilities are attached to the organizational framework. There is a tendency to allocate physical facilities to individual research programs. Such arrangements would seem to lead to less than optimum utilization of facilities and less effective administration, and would indicate the need for more careful study.

Structure should allow some segment of INRAN to be focused more directly on several regions, and/or integrated farming systems, parallel with the governmental administrative functions so as to facilitate cooperation with and development of direct working linkages with productivity projects and the extension service. Such a structural change will be moving away from the specific discipline research and moving towards inter-disciplinary programs.

It is clear, nevertheless, that any such arrangement must ensure that the program per se is coordinated across the regions and that INRAN does not lose responsibility and authority for research functions to the powerful

administration (Prefet authority) at the Department level.

An additional management problem relates to potential conflict between some of the service and research functions. In several instances, particularly in soils, analytical service functions for other programs are recognized as part of a specific departmental activity, but not specifically budgeted for in time or money. Thus, researchers are faced with potential conflict between their research responsibility and the need to provide services. As long as support functions are minimal, the conflict may not be great. On the other hand, with limited funds there is little or no incentive to be responsive to the needs for improved services provided.

Management of budget is a concern raised by researchers. In particular, they have requested to be advised of what budgets will actually be forthcoming for given research efforts, so that adjustments in programs can be made on a rational basis as opposed to simply not having funds available part way through a given effort. While centralization of funds may be essential with an inadequate budget, researchers believe that the availability of small amounts of funds at locations outside of Niamey would be well compensated for in terms of reduced time spent by researchers in getting payments arranged and by improved productivity in general.

Linkages - Analysis indicates several areas related to INRAN's linkage to its environment which warrant some attention. INRAN has recently been transferred from the Ministry of Rural Development (MDR) to the Ministry of Higher Education and Research (MESR). Thus, its principal enabling linkage has been shifted. Despite this, it appears clear that considerable direction continues to be provided INRAN by the MDR. This may be most desirable from a functional point of view, and certainly the relationship and coordination between these two ministries must be strong if agriculture is to be well served by research. However, it is not clear who is in fact taking responsibility for INRAN's needs and requirements as a developing institution. For example, who will allocate new staff to INRAN from among those completing schooling in the next few years?

In 1981 INRAN requested a specific authorization for beginning students to be assigned for eventual placement in 3 to 5 years in INRAN, through the MESR. Previous requests were included within the MDR and competition between various MDR services for those entering employment has been high. It is not clear whether MDR will allocate new staff for INRAN in the next several years. Other similar questions exist.

The important functional linkage with extension is clearly not as strong as needed. This is recognized and suggestions have been made to create formal liaison offices and activities at the national level. Considerably greater interaction at the operational level will be required to ensure INRAN the benefits it needs from such a linkage.

INRAN has linkages with the University of Niamey, with the productivity projects and other institutions which conduct some research. These linkages appear to be weak. It is important that the linkages be made as effective as possible so that experiences are shared and duplication of efforts prevented. Linkages with research organizations outside Niger are not yet strong, although some trials provided by IITA and ICRISAT are being used. In the immediate future ICRISAT will develop a major regional research center in Niger. This should facilitate strengthening of that linkage. Many other regional and international organizations and programs represent potential value to Niger, and thus considerable effort on INRAN's part is warranted to promote effective linkage with them.

## V. RESEARCH STATIONS AND PERSONNEL

### A. The Centre National de Recherches Agronomiques (CNRA) at Tarna

1. Location, Buildings, Senior Staff - CNRA is the principal and largest agricultural research station in Niger. It was established by the French as a member of the IRAT chain of research stations in francophone Africa but was nationalized as part of the INRAN organization in 1975. It is located next to the village of Tarna, five kilometers south of the town of Maradi. CNRA is sited on two locations (1) the main block of 260 hectares, 250 of which are on sandy soils and 10 on heavy soils adjacent to the Goulbi de Maradi and (2) another 10 hectares of heavy soils at the Station Experimentale de Hydrologique Agricole (SEHA) about five kilometers further south.

There are several older buildings on the station - six residences, a machine shop garage, equipment and grain storage rooms, drying sheds and offices for the sections of plant breeding, general agronomy, plant protection, hydrology, country-wide trials (essais multilocaux), animal husbandry, agricultural mechanics, market garden crops, and a separate section for peanuts. This last section is still controlled by French overseas specialists who do all research on peanuts in Niger. The plant protection section which is subdivided into entomology and plant pathology is partially staffed by Canadians, and there is also a recently added unit of integrated pest management funded by other donor assistance as part of a regional program. A millet breeder from ICRISAT is stationed at CNRA. All the buildings are in relatively good condition, but each could be improved by minor repairs and painting. There are four new buildings - a plant protection laboratory, an office at SEHA, the administration/conference room/library complex (all built by NCP with AID funds in Phase I), and a plant quarantine building.

The list of staff is shown in Tables I and II, Local and Expatriate Staff. Anyone below an ingenieur has less than an equivalent of a B.S., but all of the expatriate staff have B.S. or higher qualifications. Thus we find that the senior research staff at Tarna is 33% Nigerien, 24% French, 14% American, 10% Canadian, 10% Egyptian, 5% Voltaic and 5% Indian (with ICRISAT). Two-thirds of the senior research staff is expatriate.

2. Support Staff - There are 16 technical assistants at various levels of training and competence.

The labor force on the station averages 30 during the dry period and 120 during the growing season, but for the entire year of 1980 the number of laborers was limited to 30. The project provides for hiring supplemental labor to address this problem.

3. Organization - The attached organograms, Figures III and IV, indicate the linkages with Koïo, the only other agricultural research stations, substations and points d'appui (research test sites under the sole direction of INRAN). The organograms are unclear as to the relation between CNRA and the other research locations. Although the organograms show a substation at Tarna, it does not exist. In addition, they pointed out that there are many other sites at which tests are carried out which are under the direction of the Ministry of Agriculture. These sites change from year to year.

4. Equipment and Supplies - The following are spot checks of equipment made by observation and do not give the precise numbers or quantities, but they present a general picture of the situation at Tarna. No estimate of supplies were taken, but it was noted that there were no chemical supplies in the Agronomy or Plant Breeding Sections. Plant Protection, Entomology and

TABLE I

LOCAL STAFF LIST AT CNRASENIOR STAFF

<u>NAMES</u>	<u>QUALIFICATION</u>	<u>POSITION</u>	<u>GRADE</u>
OUENDEBA BOTOROU	Ingenieur d'Agriculture	Millet Breeder	
		Head of Section	A1
NEINO JIKA	" "	Millet Breeder	A1
JADA GONDA	" "	Millet Breeder	A1
MAHAMADOU ISSAKA MAGAH	" Agronome	Peanut Breeder	A1
SEINI DIAMBREIDOU MAIGA	" d'Agriculture	Entomologist	A1
OUSMANE BAKO	" "	Entomologist	A1
HAMMA HASSANE	" Technique	Plant Pathologist	A1

SUPPORT STAFF (TECHNICIANS)

FARSANTHE MAGAGI	Conducteur d'Agriculture	Ag. Engineer	B2
ABDOULAYE IBRAH	" "	Plant Protection	B2
SIRADJI MOUMOUNI	" "	Millet	B2
OUSMANE KANTA	" "	Millet	B2
MAMANE YOUMA	Assisiant d'Elevage	A. Husbandry	B2
ADAMOU HABOU (student)	Agent Technique d'Agricul.		C2
MOUNIMOUNI ELHADJI (s)	" "	Agronomy	C2
ILLIA HABOU	" "	Cowpea	C1

HADIZA BOUKARY (student)	"	"	Sorghum	C1
HAMBALY GAYADE	"	"	Millet	C1
MOUNTARY MAMANE	"	"	Millet	C1
LAOULI IRO	"	"	Millet	C1
GARBA NIANDOU	Agent d'Administration		Accountancy	C1
IDI DAN YAYA	Moniteur d'Agriculture		Agronomy	D2
HASSANE YACOUBA	"	"	Plant Protection	D2

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TABLE II

LIST OF EXPATRIATE STAFF AT CNRA

<u>NAME</u>	<u>NATIONALITY</u>	<u>SECTION</u>
ROESCH, MARCK	French	Agronomy
ABRAMS, MARY	American	Agronomy
BOUCHARD, PAUL	Canadian	Entomology
MAYEUX, ALAIN	French	Peanut
PICKETT, WALTER	American	Market Gardening
SINGH, BIR BAHADIR	Indian	Millet (1)
BRYAN, CARL	American	See Multiplication (2)
GUEVREMONT, HELENNE	Canadian	Entomology
DELATE, JEAN JACQUES	French	Animal Husbandry
NAGUI MACHED ABDEL MALAK	Egyptian	IPM (3)
SAMIR SAAD EL-DIN AKL	Egyptian	IPM
YONLI TALADIDIA	Voltaic	IPM
DHERY	French	Peanuts (4)
FAYETTE	French	Ag. Engineer (4)

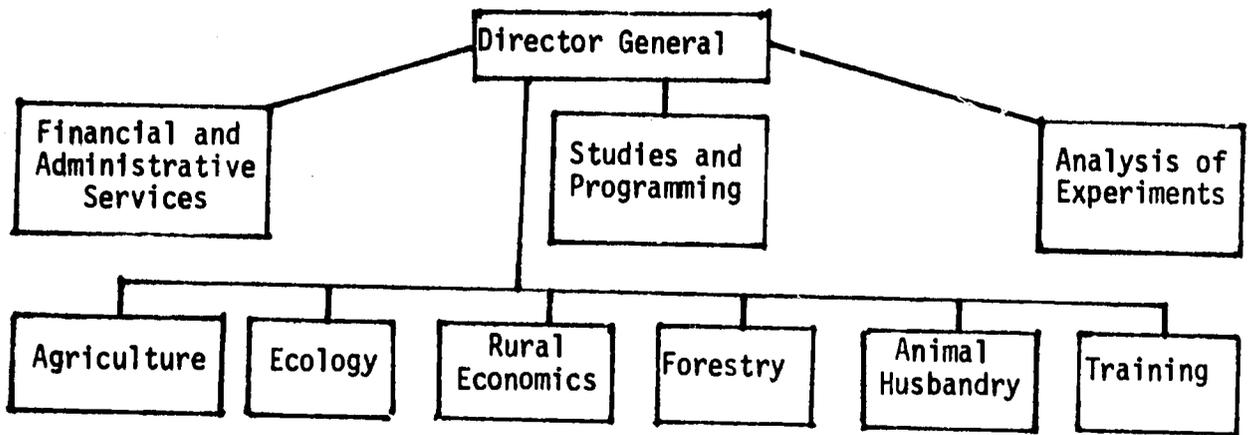
(1) CRISAT

(2) Assigned to Lossa 1981

(3) Integrated

(4) Stationed in Niamey 1981

## Technical Analysis



b. **Research Facilities:** INRAN's research facilities include seven stations, one substation, seven field stations and eleven research laboratories as follows:

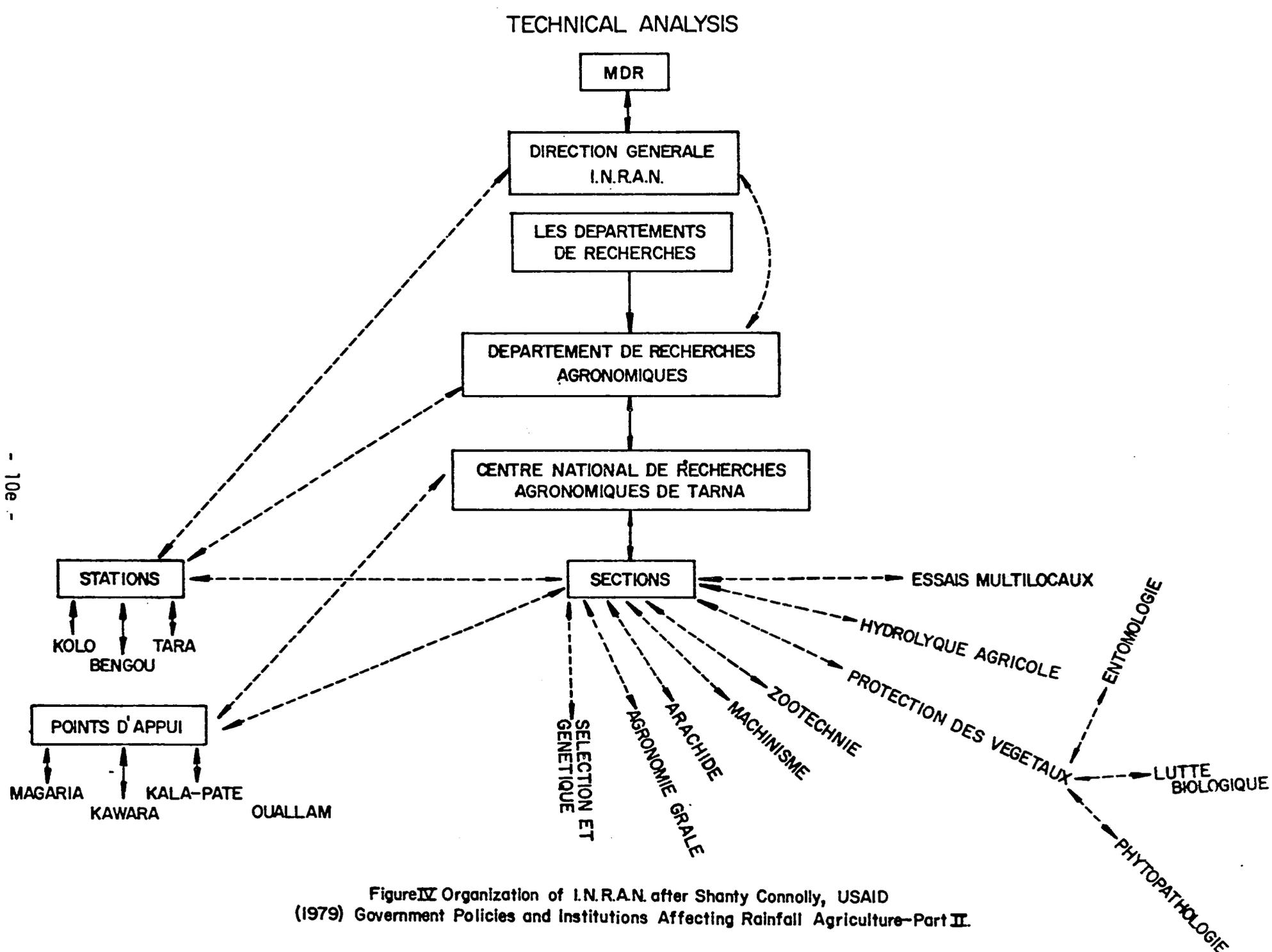
	<u>Agronomy</u>	<u>Forestry</u>	<u>Rice</u>
Research Stations:	Tarna* Kolo Bonkougou Bengau Tillabery M'Dounga**	Karma M'Dounga**	
Substation:	Oullam		
Field Support:	Magaria Kawara Kalapate Tara	Naimy - Aviation	Libore Daikaina
Research Laboratories:***	<u>MARADI</u> Plant Genetics Plant Pathology Crop Protection Agronomy Biological Control	<u>NIAMEY</u> Soil Physics Soil Chemistry Oils Seed Irrigation & Drainage	

\* National Center for Agronomic Research, CNRA

\*\* Joint station for agronomy/forestry

\*\*\*Laboratory for Plant Physiology not established

Figure III. Organization chart from Ag Sector Analysis (1979)



- 10e -

Figure IV Organization of I.N.R.A.N. after Shanty Connolly, USAID (1979) Government Policies and Institutions Affecting Rainfall Agriculture-Part II.

Pathology, had few chemical supplies. At the time of the visit of the Project Design Team in April, 1981, the Entomology Section was receiving a supply of equipment from Canada, mainly for taxonomic work.

In the Agronomy Department there was an oven, a plastic sealer and a Mettler K7 balance which worked well. The refrigerator, four other heavy duty balances and a photocopier were in need of repairs.

There were eleven vehicles on the premises which were not in working order: three Citroens, three Land Rovers, one Scout, one Range Rover and four Toyotas. Some of these may only need minor repairs. Four tractors were counted, two of which did not work, and there are many pieces of farm machinery and equipment which are in various stages of disrepair; plows, threshers, seeders, etc. One of the recommendations for short-term assistance is for the services of a farm machinery specialist to upgrade the maintenance capability at CNRA and other locations.

5. Research Library and Documentation - The library building is in good condition, but there is urgent need for internal furnishings plus a trained librarian and support staff to manage the facility. There are some 3500 publications in the library.

## B. Research Sections at CNRA

1. Animal Husbandry Section - The section has a 150 head herd of cattle, the only livestock. Because there is no permanent reserved pasture for the herd nor a research budget, no research work on feeding or management has been possible. The only source of revenue for the section comes from the sale of milk which just meets the cost of feeding the herd. The only professional member of the section is a French expatriate who is responsible for managing the herd but who has no authority to sell any of the animals.

There will not be any direct impact by the project on this section during the initial five year period. However, long-term training for a Nigerien in this field might be considered under the project, well into the future. Plans should also be developed during the first five years of the project for the integration of crop and livestock systems in a followup phase.

2. Breeding and Genetics Section - This section is the best staffed on the station, with four Nigerien plant breeders (three for millet, including the station director, and one cowpea breeder).

The objectives of the millet breeding program have been identified as:

- study and improvement of local varieties,
- introduction and study of exotic materials,
- genetic studies of local and exotic varieties,
- development of new varieties, and
- experimentation at substations.

Specifically, the breeders are selecting for drought resistance, earliness, grain quality, and yields. It has been recognized that most exotics do not have acceptable food quality and are less tolerant of indigenous insect and disease pests than the local varieties. The approach to breeding new varieties of millet has been the development of synthetic composites which express heterosis (hybrid vigor) for yield.

The major constraint in the breeding program has been identified by one breeder as the lack of cold storage for storage of the collection. Air-conditioning and humidity control of the seed storage room would permit storage of seed for four to five years. A large refrigerator should be adequate for cold storage of more permanent collections.

Because the breeders are all conducting similar operations - the collection

and purification of local varieties - another constraint would appear to be the need for isolation plots for each of the varieties under purification. Given three Nigerian CNRA breeders, plus one ICRISAT millet breeder, satisfactory isolation must be difficult to achieve. The transfer of a Nigerian breeder to the Kolo area would lessen this constraint in addition to upgrading the research program at Kolo.

The cowpea breeder has similar objectives of developing high yielding varieties of good grain quality which are resistant to insects and drought. Earliness and large seed size are also selection criteria. To date, 300 local varieties have been collected.

In addition, 400 varieties from IITA have been introduced and tested. The cowpea breeder has participated in a SAFGRAD variety trial and also tests seed from IRAT in Senegal. He maintains cooperative efforts with the entomologists for plant protection and with the soils lab for soil fertility.

Both breeding programs (millet and cowpea) suffer from lack of field and laboratory supplies/equipment and lack of trained field personnel. The addition of commodities and training under the project will correct this constraint. Greater emphasis is also needed on a multi-disciplinary approach to crop improvement. Purdue project staff will provide guidance and leadership in this area.

3. General Agronomy and Essais Multilocaux (country-wide trials) - The Essais multilocaux section is headed by a U.S. Peace Corps Volunteer, under the supervision of the research agronomist, who is French. The research staff is therefore entirely expatriate. There are no professional level Nigerian agronomists in INRAN.

The General Agronomy Section once pursued major lines of research in: (1) fertilizer levels, (2) soils improvement, (3) cultural practices, including animal traction, (4) special studies on potassium, (5) special studies of local phosphate, and (6) economic studies of one farming system on CNRA fields (paysan pilot). In 1978, the agronomist entered into a loose relationship with the Maradi Department Productivity Project to conduct economic studies in the villages. There is a difference of opinion between the section of rural economy in Niamey and the agronomy section concerning the approach to the study of farming systems. The agricultural economist specialist of the Purdue team will have as one of his main responsibilities to work with both sections so that they will eventually determine an appropriate pattern of study. Guidance from Purdue's farming systems project in Upper Volta may be useful. Annex H. describes several approaches to farming systems studies.

The country-wide trials are conducted in various ecological zones across Niger. Pilot experiments on millet, sorghum and cowpeas are initiated at CNRA, Tarna, and then tests of varieties with some fertilizer variation experiments are made in various ecological zones in the country.

Ecological zones were not well defined by any of the scientists contacted by the design team. The major dividing lines were isohyets. Map II, Annex B. shows one ecological classification by rainfall zones. The current Five Year Development Plan of Niger presents a map of the ecological zones (Map III, Annex B.) but the design team feels that further definition is necessary for future use. Short-term staff assignments under the NCR project might contribute to an assessment of the effect of climatic factors on agricultural production in this country, joining INRAN, AGRHYMET<sup>8</sup> and the Nigerian Department of Meteorology.

4. Plant Protection - The Plant Protection Section consists of taxonomy to identify all insects which are of economic importance in Niger. There are also special efforts on millet and sorghum. Tests are also made on methods of

Insect control with pesticides and on host plant resistance in varieties. An inventory of pathogens which attack cowpeas and peanuts is being prepared; and a screening test for striga resistance on 20 varieties is part of the 1981 program. Experiments are being done on treatment of seeds to test effectiveness of different chemicals.

The analysis of this section by design team members showed that while researchers spoke of team research, there was really no clear evidence to indicate that there was in fact collaborative research. There appears to be a duplication of effort on the study of insects. The design team strongly recommends that Niger participate in the proposed AID regional research program on striga control. This project can be the vehicle through which requests for a physiologist, a virologist, and a pesticide chemist can be initiated.

5. Vegetable Culture - This section is headed by a U.S. Peace Corps Volunteer (PCV) who does breeding of okra, onions and tomatoes, plus seed multiplication of broccoli, sunflower, sweet corn and eggplant. The PCV does not have a counterpart or any technical Nigerien assistants, although he is provided sufficient labor. Given continued Peace Corps support to this section, it should play an important role in farming systems research.

6. The National Soils Laboratory in Niamey - The National Soils laboratory is a large facility in Niamey, with several aspects of its construction unsuitable for a laboratory, e.g. one functional exit to each laboratory, all exits opening into a central courtyard, ventilator hoods which freely allow gases to return to the laboratory, and other problems.

The operations of the laboratory are divided into five sections: (1) soil physics, (2) soil chemistry, (3) soil fertility, (4) soil mapping, (5) oil seed studies, and a support unit called cellule d'instrumentation. In this last section are an atomic absorption spectrometer (AA), a gas chromatograph, a flame photometer and an amino acid analyzer. Only the flame photometer, on loan from another project, and the AA are operative. The AA is reported to be down several times during the year.

The programs of the sections include studies on regeneration of impoverished soils, on the analyses of several local phosphates, and on water movement in soils. Each researcher writes and conducts his own experiments without any input from others although they do discuss their work. The studies undertaken fit within the aims of GON overall policy as expressed in the five year plan, and would be continued. The Design Team sees need for some modifications.

Greater use of team efforts in research would be beneficial, particularly joint effort involving soils laboratory staff with research station and other field staff. The detailed analysis of phosphate deposits in Niger could be done by a commercial laboratory thereby relieving more staff for work on agronomic problems of phosphate utilization.

Chemicals were adequate for regular analyses undertaken by the laboratory. There were lots of equipment and supplies but some of the common pieces, for example, beakers and Kjeldahl flasks, were in short supply. There are several delicate Mettler and Sartorius balances which are in need of repair. It was recommended by the design team, and scientists at the laboratory agreed, that chain or similar balances will be more functional for the conditions in Niger.

There is need for a short-term staff person to be assigned to this department to help it plan and execute its programs. This specialist will also conduct in-service training of technicians. The services of a short-term advisor with scheduled regular visits to Niger will meet the needs of the soils laboratory.

### C. Summary of Recommendations for CNRA and the Soils Laboratory

- 1) That an Interdisciplinary INRAN-Purdue committee be formed which will study all protocols (research plans), decide and recommend as to their suitability for the NCR project funding.
- 2) That the Director General of INRAN be recommended for training to Ph.D. level with a special program designed to give a major in research administration.
- 3) That the "chef de personnel" at Tarna be upgraded to an Executive Office with his duties so defined that he will relieve the Technical Director of the station from routine administrative duties.
- 4) That the Director of the station be sent to the U.S. for training and that a special program be designed that he may attain the Ph.D. qualification with a minor in research administration.
- 5) That NCR send a research agronomist to CNRA who will work with the other researchers. There are no Nigerien agronomists at CNRA.
- 6) That very early in the program, GON identify two Nigeriens to be trained in agronomy at the B.S. level.
- 7) That the library building at CNRA be supplied with the necessary furniture, proper lighting and literature to support the researchers.
- 8) That a library consultant be sent out to aid in the setting up of the library at CNRA, Niamey, and to do in-service training of sub-professional library staff. (Also applies to Kolo.)
- 9) That two of this sub-professional staff be eventually sent on short-term training to improve their efficiency.
- 10) That the chief of the Soils Laboratory be trained as (2) above.
- 11) That the agricultural chemist in the Soils Laboratory be trained to the Ph.D. level with a major in agricultural chemistry.
- 12) That the Farm Machinery Specialist be brought to CNRA to repair existing equipment, to order spare parts and to train Nigerien mechanics in maintenance and repair. (Also applies to Kolo.)

### VI. SUBSTATIONS VISITED

#### A. Kolo (Kolo/N'Dounga)

1. Facilities and Programs - The Kolo Research Station is located along the Niger River next to the Kolo Agricultural School (IPDR), approximately 30 km southwest of Niamey. The station has easy access to Niamey, a 30 minute drive on paved road. There are 41 ha. of arable land at Kolo, 31 ha. valley soil, 5 ha. of flooded river soil and 5 ha. of dune soil. There is an additional 6 ha. of dune soil, 10 km in the direction of Niamey at N'Dounga, also attached to the station, for a total of 47 ha. of arable land.

The station is essentially operated by a single Director/Sorghum Breeder, trained to the M.S. degree level. Kolo is the only independent crop research station in Niger outside of Tarna. Administratively, Kolo is independent of Tarna, and develops its own research plans. The Director of Kolo reports directly to the head of the agricultural research section of INRAN. Sorghum breeding is the main research activity, with a few cropping trials for millet, maize, cowpeas, peanuts, rice and vegetables in this 500-600 mm rainfall area of western Niger. The Kolo Director is also responsible for the supervision of three points d'appui (outstations) and the Ouallam substation and the administration of the zootechnie (animal husbandry) personnel at Kolo. To

accomplish this administrative and research assignment, the Director has one secretary, one foreman/technician, four junior technicians and approximately 40 unskilled laborers. He is also able to hire seasonal labor from the villages when required. The administrative burden of his own work force detracts from his ability to conduct research.

Facilities at the Kolo Station consist of one office/laboratory building with two small offices, two warehouse buildings, two researcher houses and five technician houses. All the buildings appear to be structurally sound and the warehouse storage space is adequate only for the existing supplies/equipment. Additional office and laboratory space, and housing, would be required for any additional staffing at the professional level.

Office, field, and laboratory supplies are at the barest minimum. Although farm machines (plot threshers, tractor, roto-tiller, etc.) are on the site, none of the machinery is operational. All field work is done with animal drawn equipment or with hand tools. Breeding supplies (pollinating bags, aprons, field books, etc.) are non-existent. Laboratory and seed testing equipment is incomplete and in disrepair. Seed storage is in cloth bags piled in one warehouse without temperature or humidity control. Fertilizers and assorted agricultural chemicals are stored directly on the cement floors of the second warehouse.

## B. Ouallam Substation

1. Facilities and Programs - The Ouallam substation is located 90 km north of Niamey. It was established in 1978 as a research substation and is under the direction of the Kolo Station. However, the major activity is now millet and cowpea multiplication, not a research function at all. Ouallam could be an important testing and breeding site for the drier crop production regions (350-400mm rainfall).

The Ouallam station consists of 60 ha. of land, an office building, generator shed, warehouse, cowshed, open farm machine shed and two staff houses. The buildings were all constructed in 1978. The station is well supplied with field equipment and supplies including the following: urea and triple super-P fertilizer, row markers (rayonneurs), axes, rakes, hoes, pitch forks, wheel barrows, push planter, back-pack sprayers, and ox-drawn plows/cultivators. Station staff consists of one technician and some twenty laborers.

## C. Summary and Analysis of Kolo Sorghum Breeding Program

1. Sorghum Breeding (1979 Program) - The sorghum breeding program consists of four main elements: the study and improvement of local varieties; the study and selection of exotic varieties; the development and selection of new lines; and yield testing. A lesser component involves the maintenance and purification of improved varieties and inbred lines. Approximately 25 panicles of representative plants of each variety or line are self-pollinated each year to maintain them.

2. Study and Selection of Local Varieties - A collection of 110 local cultivars were grown on both the valley and dune soils for observation, but the dune soil results were not usable due to prolonged drought stress. Plant characters recorded included days to 50% anthesis, plant height, compactness of panicle, and grain color. All 110 varieties contained anthocyanin (i.e., all were either purple or red plant color, none were tan plant color). It was noted that local varieties were generally more resistant to insects (sorghum

shoot fly) than the improved varieties which were practically destroyed. The difference between the productivity of sorghum on dune and valley soils was obvious. Some varieties yielded more than two tons per ha. in spite of insect attack and flooding.

3. Study and Selection of Exotic Varieties - No new introductions were made because the researcher was not able to visit neighboring country programs or the International Institutes. A maintenance collection of 28 exotic varieties previously introduced was planted. A collection of 21 exotic varieties from Tarna was grown out for observation on dune soil. The varieties which did best at Tarna in 1978 did not perform well at Kolo.

4. Development and Selection of New Lines - The new crossing program consisted of 24 reciprocal crosses and four one-way crosses. The main objective was to improve six existing varieties or lines, especially by transferring the tan plant color characteristic. Because crossing was accomplished by the plastic bag technique, some self-pollinations were intermixed with crossed seed.

- F<sub>2</sub> Selection

F<sub>2</sub> selection was conducted on crosses made in 1978. The crosses involved were six improved lines x a good grain quality line (Safrari 63). The objective was to transfer the yellow grain characteristic to the improved lines. The F<sub>2</sub> segregants were selected for both grain color and earliness on either dune or valley soils. In addition four F<sub>2</sub> populations were planted at Lossa and harvested in bulk for future planting at Lossa and Kolo.

- F<sub>3</sub> Selection

There were 61 F<sub>3</sub> line selections (36 red or purple plant color from Texas crosses and 25 tan plant color from crosses at Tarna (planted on dune soil at Tarna and Kolo. Eight lines (two purple or red and six tan plants) were retained for continued selection in the off season. Sixteen F<sub>3</sub> lines were also observed on valley soil, only at Kolo. Unfortunately, the lines did not reach maturity due to stress from shoot fly attack. The object of selection for these latter selections was to have been for large grain, absence of anthocyanin, and potential for high, stable yield.

- F<sub>5</sub> Selection

There were 109 lines from five crosses observed on dune soil at Kolo and Tarna. Of the 59 lines retained, 17 were selected for both locations, 18 for Tarna only and 24 for Kolo. The selected lines will be planted at Kolo in the off season for reharvest and promotion of a testing collection at Kolo, Tarna and eventually Bengou.

- F<sub>6</sub> and F<sub>7</sub> Selections

Observations on F<sub>6</sub> and F<sub>7</sub> lines were done only at Kolo. A total of 27 dune F<sub>7</sub>'s and 73 valley F<sub>6</sub> and F<sub>7</sub>'s were observed. Based on length of cycle, yield, quality of grain, and homogeneity, seven lines each were selected for valley and dune soils. All retained lines will be planted to form of testing collection.

5. Yield Tests - A collection of 28 lines was tested at Kolo, Tarna and Ouallam on dune soils. Experimental design was a randomized block with two replications, three rows of 12 m per entry. Yields were obtained only for Kolo and Tarna. No yields were possible at Ouallam because of insufficient rainfall.

Variety yield tests were conducted at four INRAN centers (Kolo, Tarna, Bengou, and Lossa) with six replications at each site. Results at Kolo were very poor because of shoot fly damage. At Lossa yields were low due to

prolonged drought. Analysis of variance of the results was conducted by Mr. Aboulaye Adam. CV's were higher at Kolo and Bongou than at Tarna.

Experimental hybrid yield tests were also conducted. Twenty-four hybrids using four local and improved varieties as males and six introduced female lines were tested on valley soils at Kolo and Tarna. There were no notable differences between the hybrids and a check local variety (L.30, Temoin).

Fertilizer x variety tests were also conducted. Optimum N level was 45 units/ha.

Cooperative trials of entries from ICRISAT (ISPYT - 1 and ISPYT - 2) were also conducted.

#### D. Overview of Kolo Breeding Program

The 1980 program was essentially a continuation of the 1979 crop year. Considering the added supervisory/administrative work and the lack of trained technical help or field equipment, the size of the breeding program is testimony to the initiative and industriousness of the Nigerien breeder. The main elements of the program, collection, introduction, selection and testing are appropriate for a young breeding program. The emphasis on selection for local adaptation, grain quality, and earliness is also rational. The use of tan plant color is a sound, basic approach to improving grain quality.

However, the need for reciprocal crosses is not evident. The same results could be achieved with half the number of crosses (one-way only). The selection of the parents with the desired traits (tan plant color, earliness, yellow grain) is very important because of the pedigree method used; these parents should have been selected also on the basis of superior yield potential as well. Otherwise, a back-crossing program would have been more in order for a simple transfer of traits.

A modest effort at producing and evaluating hybrids is also in order. This provides some indication of the combining ability of local varieties which may be used in future crossing programs where improved varieties are the objective.

Hybrids should also be considered as the ultimate goal in a development program. Almost without exception, where farmers accept and have the resources to plant hybrids, adapted hybrids outyielded the best variety. Hybrids are also the best indicators of highest yields possible under optimum growing conditions.

#### E. Future Kolo Breeding Program

The direction of the future program should not be changed drastically. The objective should remain pest resistant, drought resistant, good grain quality, high yielding varieties. However, the study and collection of local varieties should begin to diminish as it nears completion. Continued studies should address their food quality and what characteristics make varieties preferred for certain food products. The local varieties should also be classified as to R (restorer) or B (non-restorer) reaction for possible future use as parents in a hybrid.

The introduction program should be continued with discretion used as to the type of materials to be screened. Each new introduction should have some previously identified trait to commend it, i.e., drought resistance, grain quality, pest resistance, etc. Excellent sources for these traits are available from ICRISAT, Purdue University, Texas A & M University, and others, and should be explored.

Given additional technical and administrative help and adequate field

supplies, the sorghum breeder should be able to increase the emphasis on the development of new lines, refining the selection and evaluation procedure, and finally the release of new improved varieties.

F. Recommendations for Upgrading the Kolo Station and Subordinate Stations

- 1) That INRAN provide the station with an administrative or executive officer to handle all administrative and personnel matters, thus allowing the Director to concentrate on his supervisory and research tasks.
- 2) That the Director be sent to the U.S. for Ph.D. training in Plant Breeding with a minor in Research Administration as soon as arrangements are made for his temporary replacement.
- 3) That a millet breeder be transferred from Tarna to Kolo to assist with the management of the general research program while continuing his millet improvement effort. This move would ease the problem of millet isolation plots at Tarna while providing additional professional management at Kolo. The addition of the millet breeder will also enhance the establishment of a millet research program for the Ouallam substation. It may also be desirable to transfer the sorghum entomologist from Tarna to Kolo for closer cooperation with the sorghum breeding program.
- 4) That additional office, laboratory, storage and housing facilities be constructed to accommodate the new staff. Also that existing staff offices and houses be remodeled and refurnished. (See Engineering Analysis).
- 5) That a seed storage facility be constructed with steel and wood seed-flat racks and that temperature and humidity control be provided. Also that a small, long-term cold storage be provided for seed collections.
- 6) That all bulk storage of fertilizer, seed, etc., be on wood pallets and that all agricultural chemicals past their shelf-life be safely destroyed.
- 7) That the Kolo Station be resupplied with office, laboratory and field supplies and equipment necessary to conduct the research program. (See attached Partial List of Supplies/Equipment Needed).
- 8) That the electrical generating capacity of the station be upgraded to meet the needs of additional electrical equipment (air conditioners, refrigeration, threshers, etc.).
- 9) That a Farm Machinery Specialist consultant be brought to Kolo to repair existing equipment, order spare parts and to train Nigerian mechanics in maintenance and repair. (Also applies to CNRA - Tarna.)

VII. PRELIMINARY COMMODITY LIST

A. Tarna Estimated Cost

Commodities

Office

Furniture	\$ 5,000
Typewriters	-
Miscellaneous	5,000

Laboratories at Tarna

Seed counter	5,000
Refrigerators (2)	1,500
Wissecting microscope & attachments	1,000
Seed Sersens	400
Standard laboratory microscopes	2,000
Projector & carousels	-
Fungicide seed treatment	-
Single-head thresher	-
Balances	-
Oven	1,000
Oven thermolyne	700
Supplies & model equipment	-
PH meters Orion 601 with nitrate and ammonium electrodes	2,500
Alcohol lamps	-
Cameras	-

Texas Instrument Calculators

Soils laboratory (Niamey)	-
Cereal chemistry	10,000
Microwave	3,000
Udy cyclone mill	2,000
Microtome	3,000
Wiley grinding mill #4	3,500
Photomicrographic unit	-

Weather Station at Tarna

Equipment	2,500
Supplies	<u>\$ 500</u>

TOTAL (estimated)	\$125,000
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48,1

B. Kolo Estimated Cost

Office

Furniture	\$ 5,000
Miscellaneous	2,000

Laboratory

Photo-electric seed counter	5,000
Convection drying oven	1,000
Test weight apparatus (metric)	700
Moisture meter	300
Hand screen sieves set	200
Standard laboratory microscope	1,500
35 mm camera	300
Slide projector screen, carousels	1,000
Dissecting microscope	1,000
Refrigerator/freezer (20 cu.ft.)	1,500
Miscellaneous supplies	2,500

Field Supplies/Equipment

Pollinating bags - plain (100,000)	1,500
Pollinating bags - red stripe (25,000)	750
Pollinating bags - green stripe (25,000)	750
Pollinating aprons (10)	50
Folding pruning knives (10)	100
Coin envelopes - #6 (200,000)	1,800
Coin envelopes - #3 (200,000)	1,400
Wired tags - assorted colors (20,000)	300

Weather Station at Kolo

Equipment	2,500
Supplies	500
Plastic bags (10,000)	50
Hand emasculation kits (5)	50
Wooden seed flats (100)	250
Picking bags (10)	150
Harvest bags, jute - 90 kg. (500)	100
Color flagging (10 ctn.)	100
Captan seed treatment (5 gal.)	50
Bag holder (2)	150
Clipper staplers (10)	100
Garden stakes - 12" (50,000)	500
Crop measuring tape (metric)	250
Milk scale, 30 x 100 kg.	100
Corn sheller	150
Mechanical fog generator	150
Single-head thresher	1,000
Other supplies/equipment to be purchased specified in years 3, 4, and 5.	17,300

## Field Machinery/Equipment

Tractor (65 h.p.) and Spare parts and tools	(estimated total) \$ 20,000
TOTAL	\$ 75,000

## VIII. ANALYSIS OF AGRICULTURAL ECONOMICS DEPARTMENT AND PROPOSAL FOR FARMING SYSTEMS RESEARCH

The design team is convinced after its investigations that there are no effective farming systems research operating in Niger under the auspices of INRAN. The section on Rural Economy is in the early stages of a study which, in the opinion of the design team economist, needs certain changes in direction. There has been some rudimentary-farming system study at Tarna--paysan pilot--in which a farmer is brought on to the research station to work under the supervision of the research agronomist, and certain economic measurements are made. The Maradi Productivity Project is also in the process of making farm systems studies and this unit will be assisted by the CNRA agronomist in 1981. None of these systems adequately meet the criteria for farming systems research. (See Annex H. on approaches to farming systems.) And so, the NCR project will place major emphasis in the area of farming systems research.

The project will assist INRAN in development of farming systems research from bases at Tarna and either Kolo or Niamey, each with 12 villages in one of three ecological zones, building on limited efforts already underway. In the Niamey Department sample, both Zarma and Hausa will be represented. These studies will include labor and other inputs, areas and yields, consumption and sales, non-farm and off-farm activities and family budgets. The prices of a limited number of commodities on the local market will be reported on a regular basis. A marketing study in the sample village areas and several major urban markets will be made, reporting prices and estimating quantities presented. Collaboration will be sought with institutions in Nigeria to estimate the flow of cereals across the border.

The results of the trials on the stations and the CPT's and the trials on farmers fields will be analyzed economically to try to develop generalizable production functions for the different soils and fertility levels in different zones. If there are gaps in the data, an attempt will be made in collaboration with the production systems research group to complete the data.

Using the model of the "Yield Constraints" research by IRRI, an attempt will be made to develop realistic estimates of the economics of the various themes applied separately and together by farmers with different levels of resources (land, labor, management, and capital). Where appropriate the Sahel Farm Model (linear programming) already developed at Purdue may be used to identify the constraints and to predict the effect of the proposed changes on the results of the whole farm. The volume of business in the private input markets will be estimated in collaboration with the productivity projects.

The key to the agricultural economics research program is to develop reliable means of gathering and validating data and of analyzing it sufficiently rapidly for the data to be of use to other research workers and to the development projects. This means that the data of the socioeconomic studies of one crop season should be reported before the next crop season, just

like the agronomic data. This requires a controllable research program. Survey workers, at least initially, should work in areas easily accessible for supervision and with the minimum amount of time required for travel. As the workers at all levels become better trained and their reliability better known, it will become possible to do research in the more remote zones.

It is proposed that the present head of INRAN's Agricultural Economics Department (DECOR) be the leader of the Farming Systems Research Program using the facilities presently provided to DECOR. Presumably, a new vehicle and an operating budget will be required. Initially this researcher will also constitute a data analysis section for Farming Systems Research until a Nigerian with training specific to this area (Ph.D. in Ag. Economics with quantitative and systems emphasis) becomes available.

At Tarna, an agricultural economist will be needed with experience in farming systems research to assist in further development of Farming Systems Research in the Maradi Department. The research agronomist of the NCR commodity research team and Mr. Ogler of the Maradi Productivity Project are expected to collaborate with the agricultural economist in farming systems research.

A small analysis group will be required and must be situated at Tarna or Maradi. It should consist of a trained micro-computer programmer (BEPC and mathematical skills needed), a computer operator and the necessary micro-computer equipment. This unit should be in place, working on the analysis of the existing data and the field demonstrations and trials before the farming systems research gets started. Experience has proven that this is essential if the analysis is to be done in a timely manner. The Purdue University Agricultural Economics Department has the capability to train French-speaking micro-computer programmers who do not speak English. The department also currently has a French-speaking Agricultural Economist who can help to install the micro-computers and start the analytical work on the existing data and the production systems surveys.

Another farming systems research group would be based at Niamey or Kolo.

#### A. Agricultural Economics Staff

1. A Level - One senior staff member is currently at Texas Tech. University studying in the Agricultural Economics Department.

A second senior member has recently returned from the USSR with the equivalent of an Ingenieur d'Agriculture (four years, post-BAC) or an A2 level. He needs further training in agricultural economics. To complete an M.S. degree, assuming his Russian credentials are accepted, would require two-and-one-half to three years including one year for thesis research. He is proposed for U.S. training under the NCR project.

Over the course of the project it would be desirable to send one student with a BAC each year for training in agricultural economics in one of the three main options: farm management and production economics, marketing of agricultural crops, and agribusiness management.

This training could be satisfactorily obtained in Nigeria; Ahmadu Bello University at Zaria is particularly suitable because of its academic quality and its geographic location. However, if there is a possibility of study in the U.S., a B.S. in Nigeria may not attract the students.

It might be possible to identify an A1 or A2 economist, a statistician and/or a sociologist who could join INRAN, work some time in DECOR and then go for M.S. training. Otherwise apart from Mr. Ly and Mr. Abba, the start of M.S. training is at least six years away (four years B.S. and two years of

experience). The staffing for INRAN calls for two A1 agronomists, (all trained at Niamey) and one A1 statistician trained in the U.S., all requested for 1981-82.

2. B Level - Much of the field work supervision could be done by B level cadre. There would be an immediate need for B level cadre to act as counterparts to the proposed two PCVs and to the Junior Agricultural Economist (the last for lack of A level) and for Mr. Abba and Mr. Numa. These five people could be expected to be made available over two or three years. It is not thought to be generally desirable to take a B level cadre for training to an A level. In fact, the B level cadres do not have a high school graduation certificate.

Of the 14 B2's requested for INRAN in 1981-82 it is not clear how many are for DECOR.

3. C Level - Seventeen C1s (ATA's) are requested for INRAN in 1981-82. It is not clear how many are for DECOR.

### IX. SOCIOECONOMIC RESEARCH

The intended function of DECOR is to provide the leadership and major services in agricultural economics research in Niger to serve the needs of research and of development organizations. DECOR receives and makes many suggestions on research that it might do but with its past cadre and level of funding, it has generally been unable to undertake any work other than to start its UPEA (Farming Systems Research) program, and it is unclear whether the funding is available to continue this.

In part, due to the lack of research capacity in DECOR, other agencies are becoming involved in socio-economic and agricultural economic aspects of research. For example, the AID Range and Livestock Project has a very substantial socioeconomic research phase; the UCSEP (Central Unit for Project Evaluation) of the MDR, is proposing to do what amounts to a farming systems study to provide an understanding of how farmers with access to irrigated land divide their time between irrigated farming and the traditional forms of dry land, flood recession and bas fonds farming. There are several projects which are studying the effects of different pesticides, with apparently little or no effort to consider the economic aspects such as the threshold at which it becomes profitable to spray.

Projects have to proceed towards their goals and if one service is incapable of playing its role or the institution asks too high a price for its collaboration, some other way is found to provide the service. However, it is clear that there is a considerable demand for agricultural economic and socioeconomic research that can be efficiently performed at a reasonable cost.

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17. Lamborn, R. E., Krieg, D., Johnson, D. A. and Dewey, D. R. 1978. Report on Laboratory and Library Requirements for INRAN. CID. Utah State University.

18. Maga, I., Adamou, M. and Brown, C. B. . 1979. Synthese de Resultats. 1978.  
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## FOOTNOTES - ANNEX C.

1. Quoted from INRAN document No. 1358, Tarna. *Developpement d'une Recherche Agronomique Nationale*, (Peanuts and Cowpeas).
2. Extent of human suffering:
  - a. Bernus, E. 1977. *Etude de cas sur la desertification: Region d'Eghazer et Azaouak: Niger*. U.N. conf. on Desertification, Nairobi, Kenya.
  - b. Dalby, D., Harrison Church, R.J., and Bezzaz, Fatima. 1977. *Drought in Africa 2: Secherresse en Afrique*. Int. African Inst.
  - c. Dubois, V.E. 1974. *The Drought in Africa*. Part I. The physical and economic consequences. Part III. The flight of the Malien Taureg. Am. Universities Field Staff, W. Africa series.
  - d. Xerox films. 1980. *African drought in the Sahel--Changing nomadi cultures*.
3. There were three evaluations:
  - a. 1976, Dec. 12: Dr. John Fisher, CID executive director team leader, Dr. William Bennett and Mr. Calvin Raulerson, CID.
  - b. 1978, Feb. 10: Dr. Francis LeBeau, Aid consultant team leader, Dr. Dan R. Aronson, Aid Anthropologist, Dr. Abderrazak Daaloul, Seed Specialist, Tunisia; Dr. John Fisher and Mr. Calvin Raulerson, CID; and Dr. Harold Dregne, Center for Arid and Semi-Arid Land Studies (ICASALS).
  - c. 1979, March 13: Dr. Tridib Mukherjee, REDSO, regional agricultural economist team leader; Mr. George Coleman, American Technical Assistance Center; Mr. Gado Kaka, Mr. Tanko Ibrahim, GON; Mr. Mouldi Ghanni, and Mr. Abdelhamid Touati, Cereals Project, Government of Tunisia; and Dr. Marvin Miracle, University of Wisconsin.

There was also an assessment by Mr. H. Dickherber, an Aid officer in December 1980.
4. Consortium for International Development. A group of eight universities--Colorado State, New Mexico State, Oregon State, Texas Technical, University of California-Davis and Riverside, University of Arizona, and Utah State with executive offices at Utah State.
5. These studies were begun in the days of IRAT and continued by INRAN.
6. Goulbi: A river which overflows and floods for extended periods during the rainy season, but is totally dry the rest of the year.
7. INRAN document No. 1350, Tarna. *Documentation scientifiques et techniques*.
8. AGRHYMET. Donor funded agency conducting research in agriculture, hydrology, and meteorology in the Sahel.

**ANNEX D**

**Social Soundness Analysis**

## ANNEX D. SOCIAL SOUNDNESS ANALYSIS

### I. INTRODUCTION

The Niger Cereals Research portion of the NCP - Phase II is explicitly designed as an institution building project intended to strengthen INRAN as an institution capable of contributing to Niger's national development through agricultural research. Long-term improvement in INRAN's research capabilities is expected to contribute to the high priority GON goal of food self-sufficiency.

Progress in agricultural research beneficial both to the Nigerien small farmer and to the urban consumer ultimately may result from successful implementation of this project. However, such benefits are: (1) indirect, (2) long-term rather than immediate outputs of the project, and (3) partially dependent on whether more effective research/extension linkages become functional during Phase II of the NCP. Hence, this social soundness analysis focuses on the social feasibility of inducing positive changes in INRAN's effectiveness as a research organization by means of the proposed project. It is not a typical analysis of project impact on farmers.

The anticipated direct beneficiaries of the Niger Cereals Research Project include: (1) INRAN as an institution; (2) INRAN staff, in particular professional and technical staff; (3) recipients of the long-term and short-term training to be provided under this program. The NCR Project will also affect a number of other institutions involved in agriculture and/or research in Niger. These include, at minimum, the national agricultural services, particularly extension services; the various productivity projects; international research efforts; and the Agricultural Production Support Project.

Detailed discussions of the impact of various agricultural development projects on Nigerien small farmers are found in a number of recent sources (e.g., Stier 1980, Sutter 1979, Raynaud 1980, and other reports of Universite de Bordeaux studies, annual reports of the productivity projects, etc.). Interested readers are referred to these sources. Few negative impacts of the Niger Cereals Research Project on small farmers appear likely. To the contrary, research resulting in improved technical packages better suited to specific ecological zones and to the diverse types of farming units found in Niger would clearly be beneficial.

As required by Handbook 3 guidelines (including the revised draft), the social analysis discusses: (1) INRAN as a social system (the "participant/beneficiary system"); (2) interventions proposed in the Niger Cereals Research Project (the "project system"); and (3) the anticipated interaction between the two systems (the sociocultural feasibility of the project). Beneficiary participation and potential project impacts regarding equity, sustainability, and spread effects are also discussed.

### II. BENEFICIARY PARTICIPATION

Established by GON action in 1975 (ordinance no. 75-1/PCMS du 7/7/75), INRAN inherited its initial physical facilities (such as the stations at Tarna and Kolo) and certain research directions from IRAT and other metropolitan research organisms (Plan Quin., 217 and Ferguson 1979; 28-29). Nigerien staff were provided on loan from other services; and INRAN also received expatriate technical assistants (French cooperants, U.S. PCV's and others under specific projects).

Creating a coherent national agricultural research institution from the assortment of available resources is a long-term process. Defining viable research programs related to national needs, creating a workable internal structure, and identifying priority needs for future institutional development were urgent tasks facing the new institution.

INRAN's participation in Phase I of the Niger Cereals Project (NCP) (1976-1981) must be viewed against this background. INRAN was asked to fill essentially a service role in Phase I of the NCP; first, to produce specific research outputs needed by the NCP (improved varieties of sorghum and millet), and, second, to assist in seed production and multiplication (Fischer et al. 1976:7). Expatriate staff posted to INRAN under the NCP contributed to specific research programs at CNRA (the Centre National de Recherche Agronomique, at Tarna just outside Maradi) and at the newly created INRAN soils laboratory in Niamey. Throughout Phase I, the emphasis so far as INRAN was concerned was on the need for INRAN research to contribute to the overall objectives of the NCP.

With several years of experience behind it, INRAN was in a position to be more actively involved in the development of Phase II of the NCP projected for 1982-1986. Nigerien participation also benefited from the planning efforts which went into the preparation of the GON Plan Quinquennal (1979-1983). INRAN has been directly involved in the planning process resulting in the proposed Niger Cereals Research Project at several points:

- 1) INRAN input into the GON Avant-Projet for a Phase II of the NCP.
- 2) Following the USAID decision to divide Phase II into two separate pieces (the NCR Project and the Agricultural Production Support Project), both INRAN and other GON agencies were fully involved in the selection process which named the contractor for preparing the project paper for the NCR Project. A team of three Nigeriens, representing the Ministry of Rural Development (MDR), the Niger Cereals Project (NCP), and INRAN, plus representatives of AID/Washington and AID/Niamey, visited two university campuses in January 1981 as the final step in the selection process.
- 3) Three Nigerien counterparts were named from INRAN staff to work with the members of the project design team. Team members spent significant amounts of time working with each counterpart, who included:
  - the head of Department des Programmes et Etudes of INRAN;
  - the new head of the Department des Recherches en Economie Rurale (one of five research departments);
  - the director of the principle INRAN research station, CNRA at Tarna.
- 4) Team members spent additional time with as many members of the INRAN professional staff as possible, including visits to Kolo, Ouallam, and Tarna facilities; the Soils Laboratory, the Niamey Document Center, and the central offices in Niamey.
- 5) Preliminary plans for the project paper were discussed in detail with the Director General of INRAN and other senior INRAN staff prior to writing the project paper. It should be noted that the appointment of a new Director General in March 1981 has had no negative impact on project preparation to date.

In sum, INRAN has directly participated in the planning for the NCR project. A representative of the MDR, the "Ministere tutelle" of the Niger Cereals Project, also participated in many design team meetings including the visit to Tarna. Finally the Nigerien coordinator of the Phase I project has participated in design team efforts at several points, including crucial meetings with the INRAN Director General.

As an institution building activity, the NCR project inevitably involves a high level of Nigerian participation from policy levels in the MESR and the MDR to senior administrative and research staff in INRAN to specific research programs within INRAN. Project design calls for very close interaction between the expatriate implementation team and INRAN staff. The INRAN administration (the DG and other senior staff) will have a strong voice in the implementation of project activities.

In the long run, the most significant evaluation of this project will be the degree of success INRAN experiences in demonstrating the value of an agronomic research institution to the GON. GON's willingness to commit scarce resources such as personnel and finances to support an active INRAN research program offers one potential measure of this success, although one affected by the overall strength of the Nigerian economy.

### III. SOCIAL ANALYSIS OF THE NCR PROJECT

#### A. The "Participant/Beneficiary System:" INRAN

Like all formal organizations, INRAN has an array of characteristics which reflect its official status. These include its organizational structure, its research programs, its resources, an explicit or implicit philosophy of operation or "doctrine", and its pattern of leadership at any given time. As a corporate body with decision-making powers, INRAN also has various relationships with other institutions in its social environment. Values and behavior patterns demonstrated by INRAN personnel in the performance of their duties also affect the institution. These include the social networks linking INRAN personnel as individuals and as groups (such as research departments) within INRAN and with the larger community.

INRAN's resources are discussed in detail in other project analyses. Here they may be taken as given except as they relate to the social feasibility of the project. Organizational structure, resource management, and decision-making processes are discussed in this section, with social feasibility issues in a later section.

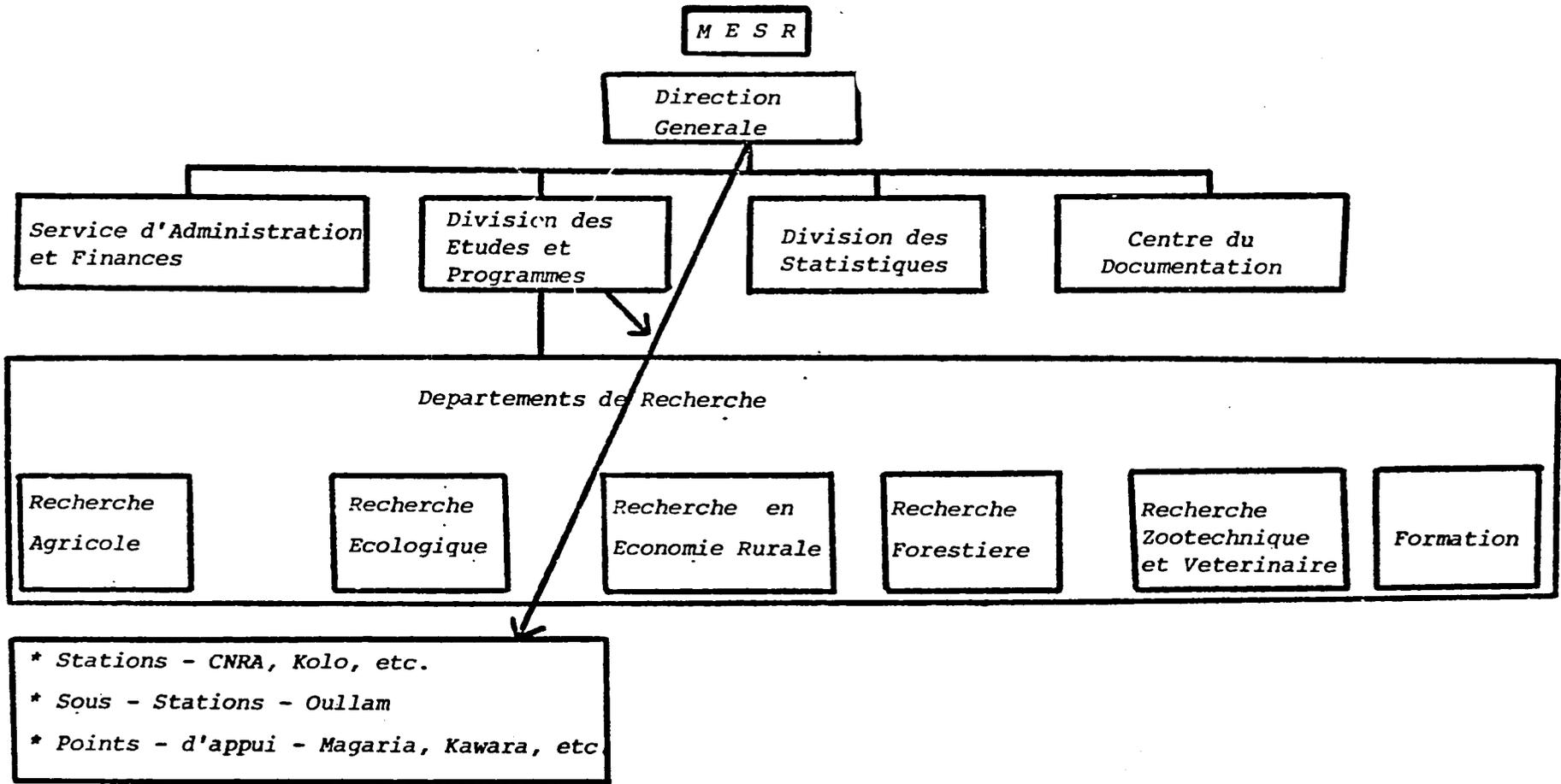
1. Internal Structure - Figure 1. outlines the current official structure of INRAN. Originally located in the Ministry of Rural Development (MDR), since 1979 it has been under the Ministry of Higher Education and Research (MESR) along with the Université de Niamey and the Institut de Recherche en Sciences Humaines (IRSH). The MDR, however, is the proposed "ministère tuteur" supervising Phase II of the NCP (i.e., the APS project and the NCR project combined).

Figure 1. shows a three-tiered hierarchy in INRAN:

- (1) The Director General, located in Niamey, reports directly to the MESR. He carries administrative responsibility for all INRAN activities and is hence in a key leadership position.
- (2) A group of centralized administrative and support services also located in Niamey. These include:
  - (a) Service d'Administration et Finance (SAF),
  - (b) Division des Etudes et Programmes (DEP), which oversees the various research programs,
  - (c) Division des Statistiques (formerly the Section Methodologie), which provides assistance in statistical analysis to research departments,
  - (d) Centre du Documentation, which oversees INRAN library resources at the Centre du Documentation in Niamey. The

Figure 1.

ORGANOGRAM OF INRAN (MAY, 1981)



- 3a -

\* Relations to research departments are not formally determined,

- head of the Economie Rurale research department also heads the documentation service at present.
- (e) INRAN has suggested that the training function (Formation), now located at the next lower level, be moved to this level. Such a move seems desirable for coordinating overall INRAN training activities. The formation department currently exists only on paper; it has no separate head and training activities are supervised jointly by the heads of the SAF and the DEP.
- (3) Finally, the five research departments (plus, on paper, the formation department just mentioned). These departments have direct links with the Director General, but principally with the DEP (Division des Etudes et Programmes).
- (a) Departement de la Recherche Agricole
  - (b) Departement de la Recherche Ecologique
  - (c) Departement de la Recherche en Economie Rurale (DECOR)
  - (d) Departement de la Recherche Forestiere
  - (e) Departement de la Recherche Zootechnique et Veterinaire.

Although structurally equal, the departments vary widely in resource endowment (e.g., Economie Rurale has only two professional staff members while Recherche Agricole operates numerous subprograms with a number of researchers and numerous technicians). Figure 2 shows the distribution of national staff as of September 1980.

Research/extension links are the concern of a sub-section of the DEP, the Souddivision de Recherche et Vulgarisation, created in 1981. Since the DEP is the administrative unit which supervises the total INRAN research program (above the individual department level), this seems to be a suitable location for efforts to improve the flow of information between research and extension.

The structural position of INRAN's research facilities, in particular the six stations, one substation, and eight "support units" (see Ferguson 1979:30), has never been officially determined. Inherited from a number of previously unrelated agencies, the stations, etc., need to be incorporated in a way which will allow all of the research departments access to them as their research programs demand (allowing for future research developments) and still provide for rational program planning.

At present one station controls a significant share of research resources. In 1975 the former IRAT station at Tarna was named the Centre Nationale de la Recherche Agronomique (CNRA). Treated as a major INRAN research station, CNRA has been relatively well-endowed with personnel and other resources. It has served as a central research location for several INRAN Programs (e.g., Agriculture with such sub-divisions as breeding programs and general agronomy), as well as cooperative programs with other agencies such as ICRISAT. No other station includes more than one or two A level professional staff.

2. Management - The overall planning efforts of the INRAN administration (and the PCR team leader) face a number of problems, as inadequate personnel resources and financial resources must be allocated among a large array of programs and research facilities.

Geographically scattered physical facilities are clustered in the Niamey area (Niamey and Kolo) and the Maradi area (CNRA at Tarna), nearly 700 kilometers apart. Full utilization of the existing physical plant is currently handicapped by (1) personnel shortages; (2) shortages of vehicles and fuel to allow research staff to supervise work at several sites (e.g., field trials of selected seeds in various ecological zones); (3) inadequate telephone and postal links between research stations and central offices (e.g., communication

FIGURE 2. INRAN PERSONNEL, 30TH SEPTEMBER 1980 (NIGERIENS ONLY)

Category	Docteur	Ingénieur d'Agriculture	Tech- niciens	Adminis- tratif	Auxiliaire permanent	Total
Scientific Unit						
Siège	1	3	-	4	64	72
CNRA	-	6	17	2	105	130
Section Fruitière	-	-	2	-	39	41
Kolo	-	1	6	-	66	73
Bengou	-	-	1	-	23	24
Section Riz	-	-	5	-	28	33
Tillabery & Lossa	-	-	2	-	45	47
Ouallam	-	-	1	-	19	20
D.R.E	-	4	7	-	51	62
D.R.V.Z.	3	1	8	-	59	71
D.R.F.	-	-	4	-	30	34
DECOR	-	-	1	-	3	4
Agades	-	-	1	-	8	9
Centre Doc.	-	-	-	-	7	7

Category	Docteur	Ingenieur d'Agriculture	Tech- niciens	Adminis- tratif	Auxiliare permanent	Total
P.T.V.		1	-	-	3	4
TOTAL	4	16	55	6	550	631*

\* Total including expatriates - 664

CNRA - Centre *National* de Recherche Agronomique  
DRE - Dept. de Recherche Ecologique  
DRVZ - " " Veterinaire et Zootechnique  
DRF - " " Forestiere  
DECOR- " " en Economic Rurale  
P.T.V. - Projet Tapis Vert

Source: draft version of INRAN annual report 1979/80

between the Kolo station and Niamey administrative offices requires a 60 km round trip for lack of working telephone links); (4) inadequate operating budgets and poor timing of budget decisions.

INRAN's budget is discussed in detail in other sections of the project paper. An adequate operating budget is crucial for rational planning and resource management. New capital investments risk outstripping INRAN's capacity to support current research programs and utilize existing facilities (e.g., the Ouallam substation) at the level necessary for efficient use of human and physical resources. Budgets for each program also need to be known further in advance than is now the case.

Social aspects of the present and short-term future INRAN personnel situation will be discussed as a project feasibility issue below, as a training issue. Two major personnel problems exist: the small number of trained Nigeriens to fill administrative, research, and technical positions (A and B level cadres); and the relatively low level of training of senior research staff (mostly M.S. level). Hence relatively young and inexperienced staff members carry the responsibility of planning research programs, conducting the work, and analyzing research results.

3. Decision-making - Developing a fruitful research policy is of course a long-term process, shaped by national goals and overall research philosophy as well as by scientific issues. GON hopes for INRAN are stated in the current Plan-Quinquennal as follows:

"L'INRAN a été ainsi créé avec pour rôle essentiel d'apporter son concours technique et scientifique à la solution des problèmes du développement rural, d'organiser et développer la recherche dans tous les domaines agronomiques: écologie, agriculture, forêts, économie rurale et élevage."

"Par conséquent, les axes prioritaires des activités de cette recherche se portent sur des programmes d'étude du milieu et d'amélioration des facteurs de production (animale et végétale)."  
(PQ:217)

[Translation:

"INRAN was thus created with its essential role being to bring it technical and scientific cooperation to the solution of problems of rural development, to organize and develop research in all agronomic fields: ecology, agriculture, forestry, the rural economy and animal husbandry."

Consequently, the priority axes of research activity are concerned with programs of study of the environment and of improving the factors of production (animal and vegetable)." (Plan Quinq, p. 217)]

Putting this general philosophy to work in actual research programs calls for thoughtful long-range planning.

At present research programs for each INRAN department are proposed by the individual researcher at the annual INRAN research meeting usually held in March. Each researcher presents a brief proposal or protocol, including a budget, for each research activity the researcher proposes to undertake. Proposals are in principle accepted or rejected at this time, but lack of the necessary funds or other resources may still prevent completion of the research.

Acceptable proposals must be compatible with general GON goals such as the current thrust for food self-sufficiency. Some activities are also geared to meet the requirements of on-going projects, as with Phase I of the Niger Cereals Project and the current "Lutte Integre" program.

Simply getting five research departments operating has been a major task in INRAN's first six years. The INRAN administration now needs to give more attention to coordinating the overall research program and to encouraging

cooperative links between research departments and/or individual researchers. Planning at this level must also balance applied research seeking results immediately useful to Nigerian farmers with long-term research programs which may produce long-term but not immediate practical results.

## B. Project Organization and Interventions

1. Project Organization - The GON proposed Phase II of the Niger Cereals Project as a single broad project overseen by a Permanent Interministerial Executive Committee involving the MDR, MESR, the MP (Ministere du Plan), and USAID (for details see the GON Avant-Projet). USAID split Phase II into two parts for project planning (PID and PP), the Niger Cereals Research Project and the Agricultural Production Support Project. The APS project may in turn be divided into smaller pieces for implementation. Hence the overall coordination of Phase II project segments risks being somewhat unwieldy. Both project design teams (NCR and APS) were in-country at the same time and efforts have been made to assure that the two sections of Phase II are compatible. In particular, the creation of adequate research extension links has been discussed in detail.

The Niger Cereals Research Project will provide commodity inputs, technical assistance (including planning/administrative) inputs, and training inputs, plus a plan for using these inputs to increase INRAN's long-range effectiveness as a research organization. While project planners and the INRAN administration must be in overall agreement, some institutional resistance is normal. Hence the leverage obtained by maintaining project control over project inputs will enhance the likelihood of project success.

Of the five technical assistants, the team leader will be located in Niamey for direct coordination with INRAN administration. Two will be posted at Tarna, and the final two at Kolo or Niamey. These persons will work closely with INRAN scientists in developing three research programs: (1) interdisciplinary team research for millet, sorghum, cowpeas (and eventually maize) involving interaction and joint research among members of different INRAN research departments or sub-sections; (2) farming systems research intended to survey and analyze current farmer practices, design interventions, and ultimately do on-farm testing (in several geographic areas); (3) cereals production systems research in a number of ecological zones in two administrative departements. Mutually beneficial feedback among these major programs will be encouraged. In addition, research results will be more directly communicated to extension programs than in the past, through the regional productivity projects as well as through the national extension services. Several U.S. graduate students may also serve as INRAN research associates and conduct thesis research in Niger.

2. Training Programs - INRAN's personnel needs have been discussed in several portions of the project paper. While recruitment of new professional personnel must be resolved between INRAN, the MESR, and the MDR, the NCR project includes three formal training elements: (1) academic training programs for INRAN staff in the U.S. (most or all at Ph.D. and M.S. levels), (2) short-term training programs in the U.S. or third world countries, and (3) in-service training programs for current INRAN staff. In addition Nigerian counterparts are expected to work closely with the long-term technical assistance staff resulting in informal learning opportunities.

The GON is committed in principle to providing specified numbers of trainees. Selection of candidates for training will be done in close collaboration with the INRAN administration, to assure that the trainees return

to INRAN positions at the completion of their programs. It is anticipated that a number of current INRAN staff members will benefit from long-term opportunities provided by the project. Suitable programs of study will be agreed upon by INRAN and project staff. Social feasibility issues related to training are discussed below.

### C. Sociocultural Feasibility

1. Introduction - Over the past six years INRAN has made significant efforts to assess its needs for personnel, buildings, equipment and other resources and to devise an internal organization conducive to its research goals. Examples are found in the report of the February 1980 INRAN Seminaire de Reflexion and in the various planning documents INRAN has prepared concerning personnel, library resources and other needs.

INRAN has recognized the need for a certain amount of internal reorganization, in particular, the need for incorporating the various stations, laboratories, and "support units" into INRAN's formal structure. (One proposal was discussed at the 1980 seminar but has not been adopted. INRAN 1980:54-59.)

INRAN also proposed the creation of "chercheur" as a separate category in the civil service hierarchy (Ibid: 58). INRAN has also recognized the need for more effective research/extension liaison and recently created a position for that task (in 1981).

As an institution building project, the Niger Cereals Research Project is expected to have direct or indirect effects on virtually all aspects of INRAN. This includes numerous possible conflicts as project interventions encourage changes in the status quo. The position of the team leader/project coordinator is critical. This person must work closely with the INRAN administration in bringing about changes in sensitive areas of policy such as setting research priorities and possible changes in internal organization.

This section explores the following problem areas:

- 1) the role of the research stations,
- 2) interdisciplinary research,
- 3) personnel and training issues,
- 4) organization of library services, and
- 5) research/extension links.

2. Role of the Research Stations - Certain aspects of the INRAN research program, such as breeding for several millet varieties suitable for Niger's varying rainfall conditions, would benefit from access to land and other research facilities in several distinct ecological zones. There is also a certain amount of political pressure for the GON to distribute various resources equitably among all the administrative regions of the country.

In the short run, however, INRAN needs to concentrate its limited resources on fuller use of existing sites (e.g., Kolo, Ouallam, and the "support units") and resist pressure for substantial further expansion. Maximum use of existing facilities will already require the transfer of some staff and program activities currently located at Tarna to other sites. The CNRA may well oppose more than minimal transfers which would enhance other stations at CNRA expense.

One possible approach is for INRAN to develop a Kolo/Niamoy/Ouallam research axis and a similar research axis north and south from Maradi with CNRA remaining the central base for that axis.

Rather than adding new sub-stations, INRAN should explore the possibilities for cooperation with other organizations, such as the regional productivity projects. It may be possible to conduct some field trials of improved varieties through the farmer training centers (CPT's, CPR's, CFJA's) of the

productivity projects, for example. The Maradi productivity project, with its centralized project management, may offer a favorable situation for this kind of cooperative arrangement.

The need to formally incorporate the stations into INRAN structure was mentioned above. Multiple use of existing INRAN facilities by more than one research department is preferable for several reasons. (1) It will allow for more efficient use of scarce resources if any given facility is used to its capacity. (2) Sharing a work site by several programs will help to generate the "critical mass" of researchers needed to stimulate scientific productivity at the smaller stations. Given INRAN's serious transportation and communication problems, scientific isolation is a problem for researchers at almost any locations except Niamey and Tarna. Opportunities for everyday interaction with other researchers improve research quality as staff learn from each other, and morale as well. (3) Certain kinds of research problems require an interdisciplinary approach (e.g., linking cereal breeding programs to insect and disease resistance). Opportunities for such interdisciplinary research are enhanced when researchers are already sharing research facilities.

Since this decision is within the scope of the INRAN administration, the administrative decision is socially feasible. Resistance to relocation from researchers and technicians now at more central locations may be expected. Moving staff to Kolo, near Niamey, will be relatively easy. For more distant locations (e.g., Ouallam), it would be desirable to plan a collaborative research program and move several staff members simultaneously.

3. Interdisciplinary Research - Bringing about a program of interdisciplinary research is more difficult than simply moving personnel. Present INRAN structure offers few incentives for working across disciplinary and commodity lines. The direct impact of the NCR Project technical assistants will be quite important in not only initiating some major interdisciplinary research efforts but giving INRAN staff time to master the kind of planning needed for effective cooperation. Interdisciplinary research requires collaborative planning of research programs and resolution of funding issues (since the INRAN research budget is organized by department). Both of these can be enhanced or hindered by the INRAN administration as well as NCR Project personnel. Hence the Director General and other senior staff need to understand the anticipated benefits of specific lines of interdisciplinary research and be prepared to support these efforts financially and logistically. INRAN scientists need to participate in the research planning process as well.

Interdisciplinary research must not be built up as a cure-all that can guarantee rapid research results, but rather seen as a useful strategy for certain kinds of research problems.

4. Personnel and Training Issues - The two major personnel problems facing INRAN are the small number of trained Nigeriens available to fill administrative, research, and technical positions, and the relatively low level of training of research staff.

In 1979, the Niger Agricultural Sector Assessment reported an INRAN staff of only 45 professionals at the A1 level (requiring minimum training roughly equivalent to the U.S. Masters). Of these, 15 were foreigners (Ferguson 1979:31). A and B civil service categories include researchers, administrations and technicians, while C and D levels are support staff (e.g., secretaries). The "auxiliary" category includes laborers for field trials, etc.

In the past INRAN submitted requests for new researchers and technicians through the Ministry of Rural Development, which allocated graduates of the relevant training programs among competing agricultural services. This

includes the Institut Pratique du Development Rural (IPDR) at Kolo, and the Agronomy Section of the Universite de Niamey. Now that INRAN has been moved to the MESR (since 1979), a new recruitment channel through that ministry has been developed. Unfortunately the first graduates from that channel are at least two or three years away. In the meantime an effort must be made to provide INRAN some new A and B level staff each year, perhaps through the MDR.

Given the small size of INRAN professional staff and its slow rate of growth, it bears repeating that INRAN must beware of spreading itself too thin.

INRAN should aim at putting a "critical mass" of resources (personnel, budget, land, etc.) at existing stations, especially Kolo and Ouallam, before adding new stations.

Nigerien technical staff members have completed a minimum of 12 years of school (six years + four years to earn the DEPC, followed by at least two years of further training, for example, at the IPDR at Kolo). The A level personnel have earned the BAC (three years beyond the BEPC) and then completed four to five years of university training.

All have had 12 or more years in which to internalize the values and behaviour patterns typical of the modern Nigerien elite, but relatively brief exposure to scientist and technician role models. At least initially, newly recruited personnel are strongly linked to peer groups of other school graduates who do not attach any uniquely high value to scientific research as a career activity. Like their peers, young INRAN researchers and technicians in general prefer life in Niamey, Maradi, or Zinder over isolated research stations. It takes time for them to develop a research-oriented social network among INRAN colleagues and other scientists such as expatriate technical assistants.

One cannot expect B.S. level training to create the same degree of commitment to research as an intrinsically satisfying intellectual activity and highly valued career option associated with Ph.D. training and post-doctoral professional experience. Helping young scientists and technicians develop a strong self-identity as researchers is one of the institution building tasks facing INRAN over the next five years. Institutions for the long-term training to be provided under the Niger Cereals Research Project should be chosen with the need for socialization to the scientist/researcher role clearly in mind. INRAN itself recognizes the uniqueness of the researcher role (e.g., in its proposal for the creation of a "chercheur" job category).

Senior INRAN staff trained at the M.S. level may not consider the advantages of Ph.D. level training to be self-evident. Long-range benefit to INRAN in terms of greater research productivity should be stressed, and INRAN decision-makers should be made aware of the differences in content - not just duration - between M.S. and Ph.D. level programs.

Training a number (five or more) of Nigerien researchers to the Ph.D. level is recommended for several reasons. Senior INRAN staff in Niamey are preoccupied with administrative chores and can offer little day-to-day guidance for young researchers once a proposed research activity is approved and funded.

The Ph.D. provides more rigorous training in research design and overall methodology than do B.S. and M.S. programs. Researchers with the doctorate will, on the whole, be more productive in their research, in part, because they are better prepared to define research problems and promising research approaches.

The M.S. level programs vary greatly in thoroughness. Programs requiring a thesis based on field data collection and data analysis are more suitable for meeting INRAN needs for staff with sufficient research experience than less rigorous M.S. programs.

There is some evidence that overseas training at the Ph.D. level is more effective in creating long-term international information-flow networks among scientists than is lower level training (see Allen et al. 1971). Links of this sort, built out of personal social networks, are extremely important in improving INRAN's access to the international research community. For example, research results from INTSORMIL, the sorghum/millet Collaborative Research Support Program (CRSP) currently being conducted by a group of U.S. universities, are available through personal contacts with the researchers involved long before journal articles reach INRAN staff. Senior INRAN staff whose administrative responsibilities rule out long-term training overseas should be encouraged to take part in short-term overseas programs, which include opportunities to extend their own networks of scientific colleagues.

Another social issue related to graduate training programs in general is whether potential trainees are willing to leave their jobs and their homes for long periods (two to four years) overseas. The NCR Project, however, calls for most upper level trainees to conduct thesis research in Niger. The INRAN administration has also shown a strong preference for staff involved in training programs to be in Niger to supervise on-going INRAN research programs during the rainy season. Hence trainees may be absent for less than a year at a time.

For an annual return to Niger to be of maximum benefit to the training program, trainees should identify thesis topics as early in their academic programs as possible so that thesis research can be built into their INRAN research programs. Trainees will need to meet the normal INRAN research planning schedule described above. The person responsible for on-campus training coordination in the U.S. needs to be familiar with INRAN planning procedures and prepared to help trainees meet necessary paperwork deadlines.

5. Organization of Library Services - Library inputs under the NCR need further planning if substantial improvements in library services are to be achieved. Both INRAN and the project paper have addressed primarily the need for more physical resources (books, journals, supplies, etc.), yet the primary constraint on library utilization at present is the poor organization of the resources already available. Additional quantities of library materials will not achieve their potential contribution to the INRAN research program without better management as well.

INRAN's oversight of present library resources suggests that investments in on-going library operation are not yet seen as essential. The nominal head of the INRAN documentation center in Niamey is a researcher whose department happens to share the same building, who is preoccupied with his own research program. The center's "documentalist" is in Dakar for a two year training program. Meanwhile such basic operations as processing arriving journals are at a standstill. The other major INRAN collection, the CNRA library at Tanna, was reorganized during Phase I of the Niger Cereals Project thanks to the initiative of the CID team posted to CNRA. CNRA library operations are now supervised by a Peace Corps volunteer; INRAN has not yet committed itself to adding a trained Nigerian librarian for this position.

In the long run, scientists whose overseas training has included experience with well organized research libraries, reference services, basic bibliographic tools, etc., will generate an internal demand for improved library services. In the short run, the Niger Cereals Research Project must take the initiative if library investments are to have any early impact on the INRAN research program, and address the organization problem.

6. Research/Extension Links - Weaknesses in Niger's extension services have been widely recognized in recent years (for one critique see Charlick

1976). As one result, each of the regional productivity projects includes a substantial extension effort. In addition, the Agricultural Production support Project, companion project of the NCR Project, includes a major extension support component.

Both the APS project and the NCR Project call for the creation of more effective links between INRAN's agricultural research programs and agricultural extension programs in Niger. Both APS and NCR project papers call for research to be made more responsive to the needs of farmers, with a two-way exchange between farmer and researcher taking place in part via extension personnel.

Stronger links between INRAN (and its individual researchers) and extension efforts are called for in the NCR not only at the national level but also at the local level. Three mechanisms have been proposed in the description of NCR project activity for creating lower level linkages:

- 1) involvement of applied research staff members from the appropriate productivity projects in INRAN research on cereal production systems,
- 2) conducting some stages of INRAN cereal production systems research jointly with the productivity projects at the productivity project farmer training centers (CPT's, CPR's, or CFJA's),
- 3) encouraging feedback of results to INRAN as extension personnel run demonstrations of new techniques, seeds, etc., based on recent research.

In addition, the INRAN farming systems research program will be collecting and analyzing survey data on current farmer practices and ultimately recommending specific changes in practices, drawing on recent agricultural research at INRAN and elsewhere.

While some of these changes can certainly be brought about, others will be much more difficult to accomplish. Historically agricultural research in Niger has been strongly oriented to work done on research stations, not on farmer's fields. There have been few research efforts devoted to understanding current farming practices as an essential step in arriving at recommendations for changes in farming methods. Meanwhile poorly trained extension agents have pushed for adoption of a technical package which is only appropriate for some farmers and some ecological zones. They have not been able to translate farmers' resistance to a maladapted technical package into problems for further research efforts back at INRAN or other institutions.

INRAN leadership has demonstrated a concern for research/extension linkages in creating a new INRAN position for that purpose in 1981. Increased formal cooperation at the national level, through the new liaison mechanisms to be created under the APS and NCR projects, seems likely to be accepted by INRAN, and can be brought about by administrative action. Unfortunately cooperation at this level has little direct impact on village-level extension agents.

Working with the technical assistants to be provided under the NCR project, INRAN will be able to bring about some significant changes in its research program, as discussed above. The three new research programs clearly represent a greater focus on activities on farmers' fields. Hence INRAN may produce results more directly useful for extension efforts than in the past. Once again, however, there is no mechanisms for making sure that local-level extension agents promptly incorporate the new information into their extension activities, as the agents follow programs designed at national and departmental levels.

INRAN is a national institution with no official territorial organization. While it has research facilities in a number of locations, their formal ties are with the central INRAN administration in Niamey. There are few incentives for researchers to seek contacts with local, arrondissement (county), or

departement level extension personnel, and formal channels for doing so go through two separate ministries - the MESR and the MDR - back in Niamey. In Maradi, personal contacts have led to some interaction between INRAN staff at the CNRA and personnel of the Maradi Departement Productivity Project, but this remains at the level of informal cooperation.

Hence the proposal that INRAN researchers do some work directly with the Niamey and Maradi Productivity projects and other extension personnel during the NCR project represents a new approach to research/extension relationships which may be difficult to put into practice. The consent of the MESR, the MDR, INRAN, and the administrations of the productivity projects is necessary but not sufficient for establishing the desired ties. One still faces the hurdle of creating incentives for INRAN researchers, productivity project researchers, and extension agents to work with each other. Conducting some INRAN research on the farmer training centers operated by the productivity projects will provide some incentives, as the researchers and the productivity project personnel thus share some mutual concerns for at least the duration of the trials. Creating permanent incentives will require further effort during the life of the project.

Despite the obvious difficulties of creating new institutional ties at this level, the potential benefits of a direct two-way exchange between the extension people who work directly with farmers and agricultural researchers justify a serious effort to establish these links.

#### IV. ANTICIPATED PROJECT IMPACT

##### A. Equity

One equity issue which arises under the Niger Cereals Research Project is that of equal access to training opportunities provided under the project. Recent women-in-development literature strongly emphasizes the importance of making professional and technical training available for women as well as men, for example (Tinker 1979). Young women now make up a significant proportion of the elementary and secondary student body in Niger (36% of primary students and 26% of CEG students in 1978-79. Plan Quin: 354-355). Admission to post-CEG training is by competitive examinations open to both sexes and some women are now following science programs at the lycee level. Hence women are gradually coming into the pool from which INRAN will draw future additions to its research staff. While the operation of the Nigerien Fonction Publique does not allow for direct efforts to recruit women, indirect actions such as media coverage of women in scientific pursuits as role models can be encouraged (e.g., Le Sahel, widely read by Nigerien students). The INRAN professional staff currently includes one woman presently in Hyderabad for an ICRISAT training program.

Other equity issues arise at the level of the INRAN research focus as it relates to Nigerien farmers, the intended beneficiaries of new varieties, extension themes, or total technical packages, all of which are expected to result from INRAN's research. Previous studies of Nigerien agriculture have documented that farmers differ substantially in size of holdings, labor availability, livestock holdings, and other traits which affect their production capabilities (e.g., Raynaut 1980, Stier 1980, Sutter, 1979).

Because of such differences in resource endowments, farming units also differ in their ability to profit from the adoption of specific improved practices. Some practices such as use of improved varieties, correct plant density and enhanced soil fertility (whether from crop rotations, manuring, or

using fertilizer) may be profitable to farming units of all sizes and types. On the other hand, animal traction seems to be profitable only for farms with a minimum surface area on the order of four to six hectares (e.g., five hectares in the Maradi Productivity Project Zone. Interview with Mr. Bawa, 28 April, 1981).

Hence an agronomy research program focusing on animal traction is likely to benefit only a portion of Nigerien farmers, excluding those whose farms are too small to profitably adopt the practice. On the other hand, research on mixed cropping of cereals with nitrogen-fixing legumes and on cereals/legume rotations offers good prospects of helping farmers improve yields with no purchased inputs at all, regardless of farm size.

This is not to criticize animal traction research per se, but rather to emphasize that INRAN's research program as a whole should respond to the needs of the full range of Nigerien farmers. The interdisciplinary research on systems of cereals production and on total farming systems to be initiated under the NCR project should help to identify appropriate areas for further INRAN efforts responsive to differences in the resources of farming units.

### B. Sustainability

The project activities proposed in the Niger Cereals Research Project approach INRAN institution building needs from several directions simultaneously. Hence the NCR has an excellent chance of initiating some long-term, self-sustaining changes in INRAN even under the worst conditions. This is not to say that the general long-term project purpose of helping INRAN become "an innovating organization providing the fundamental and applied research services which will generate and support development within the agricultural sector of Niger" will be fully achieved in five years time. However, the project will make a significant start, especially where INRAN's cereals research programs are concerned.

Whether all areas of project activity become self-sustaining clearly depends on GON's ability and willingness to commit adequate resources (e.g., operating funds, personnel). While the strength of the overall Nigerien economy is one factor in GON's future support for research, INRAN's ability to demonstrate the value of scientific research with concrete results which contribute to GON goals is also important.

Some of the long-term benefits expected from the NCR project are not dependent on increased GON funding. Improved research management capacity and better training for researchers should result in greater research productivity, even at current levels of GON support, for example. The project has also been expressly designed to increase the probability that changes in the INRAN research program initiated under the NCR will continue after the project ends. In particular, project technical assistants will be in a position to give a strong impetus to team research programs involving Nigerien colleagues from several INRAN research departments. Library resources provided under the project ultimately should also provide long-term benefits.

### C. Spread Effects

At the institution building level, the Niger Cereals Research Project should achieve two sets of spread effects: (1) spread to parts of the INRAN program not directly included in the project (e.g., animal science, ecology, and forestry research programs); and (2) spread to other Nigerien institutions.

All of INRAN's programs will benefit from improvements in the planning and

administration of research programs, better library services, mini-computer capabilities for statistical analysis, and more effective links to regional and international research networks. INRAN scientists in turn will have opportunities to share their growing expertise with other Nigerien programs. These may include, among others, faculty of the agronomy section of the University of Niamey and of the IPDR at Kolo, and research aspects of the regional productivity projects.

A productive agricultural research institution also has great potential value for large numbers of indirect beneficiaries: farmers and herders who increase their production and incomes by adopting new products or practices developed through research, and the consumers who benefit from improved nutrition thanks to more adequate food supplies. While the current project focuses to some degree on research related to cereals production, it holds promise for strengthening the overall INRAN program encompassing all aspects of agricultural production and contributing to Nigerien rural development.

**ANNEX E**

**List of International Research Program Linkages**

ANNEX E. LIST OF INTERNATIONAL RESEARCH PROGRAM LINKAGES

<u>Organization</u>	<u>Area of Cooperation</u>
<u>USINTSOR/LIL</u> (1) (2)	Sorghum, millet production
Peanut CRSP (2)	Peanut research
Beans/Cowpeas CRSP (2)	Bean and Cowpea research
Soils management CRSP (2)	Soils research
<u>Regional</u>	
IPM (1) (2)	Plant protection
SAFGRAD (2)	Cereals production/farming systems
IRAT (1) (2)	Cereals production research
<u>International</u>	
FAO (1)	Soil management/cartography
ICRISAT (1) (2)	Sorghum and millet research
IITA (1)	Cowpea production/farming systems
IGN (1)	Geology
CIMMYT	Maize production
AVDRC	Vegetable production
IRRI	Rice production
ORSTOM (1) (2)	Soils
AGRHYMET (1) (2)	Climatology

(1) Established linkage in Niger, 1981.

(2) The Design Team has already made direct contacts on behalf of Niger with these organizations.

**ANNEX F**

**Purdue and Alabama A & M - Capacity to  
Conduct the Project**

## ANNEX F

### PURDUE AND ALABAMA A & M - CAPACITY TO CONDUCT THE PROJECT

#### I. Purdue

##### (1) Recognition in the U.S.

Purdue University is the state supported land-grant college in Indiana. It was one of the first to be established after the passing of the 1862 Morrill Act. From its very beginning to the present, one of its outstanding schools has been the School of Agriculture. Currently there are more than 32,000 students in twelve schools on the Lafayette Campus alone. The School of Agriculture has 3,180 students--the second largest agriculture enrollment among all the land-grant institutions--and it carries very large and outstanding programs in graduate education, research and extension. In addition, the University operates a number of regional campuses around the state. The School of Agriculture is recognized as one of the leading agricultural institutions within the United States.

##### (2) Purdue Historical Tradition of Work Overseas

Overseas the University has collaborated with some 30 institutions in Brazil, Argentina, Chile and other Latin American nations in a variety of activities involving such fields as agriculture, engineering and industrial management. Contributions have been made through research efforts, training activities and direct involvement in the strengthening of indigenous research, teaching, extension and other essential public institutions. The School of Agriculture has been extensively involved in such activities and has substantial experience and capability for contributing to a wide variety of development activities. The School of Agriculture is committed to continuing its effort in development related activities abroad. It is well-prepared to carry out the project of assistance to the government of Niger (GON) and in particular the national institute of agricultural research of Niger (INRAN) with its institutional development, and to establish long-term relationships between INRAN and U.S. international research institutions.

##### (3) Purdue's Division of International Programs in Agriculture

For more than a quarter of a century, the University has engaged in a number of large, long-term technical assistance programs. These activities have provided a strong institutional base for working in, understanding and making contributions to the development of other nations.

During the last 20 years Purdue has maintained a specialized administrative structure to service and back-stop the kind of program envisioned in the Niger Cereals Research Project. The Division of International Programs in Agriculture has a staff of 12 persons with substantial experience in conducting and administering research and technical assistance programs abroad, and this division will provide logistical support, training programs, administration, commodity purchases and other services required for the Niger Cereals Research Project.

##### (4) Projects with Relevance to Niger Cereals Project

Brief reference is made to Purdue's involvement in a number of activities which are particularly pertinent to both the planning and the conduct of the Niger Cereals Project. A detailed statement on this subject can be found in Purdue's response to the expression of interest for this project.

a. Aid to EMBRAPA. Purdue has arranged for, administered, and in many cases, conducted academic training programs for over 150 scientists and

administrators of EMBAPA, the Brazilian national agriculture research service. In addition, short-term, non-academic training programs were developed to meet specialized needs of many staff of EMBRAPA and other research and extension institutions from Brazil and elsewhere. Purdue assisted in creating the National Center for Corn Sorghum Research and the National Center for Bean and Rice Research. Indeed Purdue was the channel by which Brazil developed its Institution building effort and which resulted in reorganization of the National Agricultural Research Program. Purdue is particularly confident that it can develop the knowledge of Nigerian agriculture and Nigerian needs because of its Brazilian experience which is required to assist the development of relevant training program and execute them effectively on behalf of both the government of Niger and the National Institute of Agricultural Research of Niger (INRAN).

b. Sahel Experience. Closely related to the proposed course of action for the Niger Cereals Research Project is Purdue's established presence in the Sahel, both at the national level and at the International level. A list of projects and a roster of personnel with Sahelian commitments are given at the end of this Annex, (a) and (b).

(5) Foreign Students In the Purdue Campus

a. All Foreign Students. Purdue has long been a university of international stature for students from non-English speaking countries. Programs are readily available for language training and improvement. The University has a Department of Foreign Languages and Literatures, within which is a Division of French. As a first alternative, the Division of French can be made responsible for a language training school for any of the staff of the Niger Cereals Research Project (NCRP) who needs to become competent in French and also to teach English to Nigerian students when they come to Purdue for undergraduate or graduate training. As a second alternative, an innovative system recently introduced by the Division of International Programs in Agriculture can be used. This program will allow the Division of International Programs in Agriculture to arrange special tutorial classes for its trainees in French or English. The program which best suits the needs of the individual or group will be used.

b. African Foreign Students. There are currently around 1,200 international students on the Lafayette campus. African students specifically find comfort in the International Center, and the University just celebrated the tenth anniversary of the University's Black Cultural Center. This is a house especially dedicated to persons with African ties. It has an African oriented library, reading room, browsing area, study rooms, a cinema and museum with a collection of African art, literature and music. It is expected that Nigeriens coming to Purdue will use the facilities of the Center, and also that they will be disposed to making cultural contributions to its operation.

## II. Alabama A&M University

Alabama A&M University is a state supported 1890 Black land-grant university located in Huntsville, Alabama. It offers B.S. and M.S. degrees in Soil and Plant Science, Agribusiness, Education and Food Science in the School of Agriculture.

Faculty of the University is composed of well qualified capable and experienced individuals, many of whom have lived and worked in Africa or other developing countries. Many other faculty members have short and long-term experiences in international work. Faculty members have taken part in Peanut CRSP (University of Georgia) and Bean/Cowpea CRSP (Michigan State University)

and have visited and made contributions in agriculture to African and Asian countries. Alabama A&M which has had a collaborative relationship with Purdue or several years will share responsibility for project planning, implementation, administration, decision making and evaluation of the Niger Cereals Project.

### III. Commitment of Purdue and Alabama A&M

The two institutions are prepared to make a firm commitment to the successful planning and implementation of the Niger Cereals Research Project.

### IV. List of Purdue's Projects in the Sahel

- a. The economics of sorghum and millet production in Mali, Mauritania and Senegal (USAID, 1976-1980).
- b. The cost of benefits of small irrigated parimeters and supplementary irrigation in Mali, Mauritania, Senegal, Upper Volta, Niger and the Sahelian region (USAID, 1976-1980).
- c. Socio-economic Constraints to Millet and Sorghum Production and Utilization: Risk, Government Policy, Marketing System and Consumer Preference, in three countries in francophone West Africa under the INTSORMIL Sorghum/Millet CRSP
- d. Studies on Mechanism of Disease Resistance and Susceptibility Using Pathotoxins and Screening Utilizing Fungi Known to Cause Sorghum Disease of Worldwide Significance in LDC's, in cooperation with ICRISAT and workers in the Sudan.
- e. Collaborative Assistance Program between Purdue and AID's Regional Economic Development Services Organization (REDSO) of West Africa; Purdue University is providing technical support organization for USAID's programs in the region (1979 - present).
- f. The Farming Systems Research Program in Upper Volta under AID contract (1978 - present).
- g. The sorghum/millet Collaborative Research Support Program -- sorghum/millet CRSP with host country contacts or test sites planned for India, Niger, Upper Volta, Sudan, Egypt and Mali as well as Sudan, Haiti, Guatemala, Honduras, Brazil, Tanzania, Botswana, Cameroon, and Mexico, (USAID 1979 - present). Purdue recognizes its association with the sorghum/millet CRSP through INTSORMIL as a significant asset which will add materially to its capability to undertake the Niger Cereals Project. There is an agro-climatic zone which runs East-West across the Sahel from Egypt to Senegal including the Sudan, Northern Nigeria, Niger and Upper Volta. Purdue has one or more current or former graduate students associated with millet and/or sorghum in everyone of these countries except Niger. These workers collaborate with Dr. John D. Axtell, Professor of Agronomy at Purdue, in his capacity as co-principal investigator on INTSORMIL. As a result, Niger would be in a position to develop linkages with and be helped by INTSORMIL.

### V. A Roster of Purdue's Faculty with Sahelian Experience

- a. Dr. John D. Axtell, Professor of Agronomy and Principal Investigator of the Purdue component of Sorghum-Millet CRSP with several test sites across the Sahel.
  - b. Dr. Roy D. Bronson, Professor of Agronomy and Senior Consulting Agronomist for REDSO, West Africa, with his headquarters in Abidjan, Ivory Coast.
  - c. Dr. Cyril B. Brown, Professor of Agronomy, who was until March 1980 stationed in Niger as an advisor to INRAN.
  - d. Dr. Paul Christensen, Agronomist with Purdue's Farming Systems Project in Upper Volta.
  - e. Dr. Allen W. Kirleis, Assistant Professor of Agronomy and Seed Specialist with Sorghum-Millet CRSP.
  - f. Dr. Wilford H. Morris, Professor of Agricultural Economics and Principal Investigator of the Farming Systems Project in Upper Volta.
  - g. Dr. Ram Singh, Agricultural Economist of the Farming Systems Unit Project in Upper Volta.
  - h. Dr. Lee F. Schrader, Professor of Agricultural Economics on the Purdue Sorghum/Millet CRSP.
  - i. Dr. Mahlon G. Lang, Assistant Professor of Agricultural Economics on the Purdue Sorghum/Millet CRSP.
  - j. Dr. Larry D. Dunkle, Associate Professor of Plant Pathology, and Pathologist on the Sorghum-Millet CRSP.
  - k. Dr. Richard Swanson, Anthropologist, Purdue's Farming System Project in Upper Volta.
  - l. Dr. Frances Stier, Staff Anthropologist for REDSO, West Africa.
  - m. Dr. James Collom, Associate Director for International Programs in Agriculture, Purdue.
  - n. Dr. Herman Warren, Associate Professor of Plant Pathology, and Pathologist with Sorghum/Millet CRSP.
- Of the several Purdue graduates stationed in Africa the following two will be expected to have close association with NCRP.
- (1) Dr. Gebisa Ejeta, Sorghum Breeder, ICRISAT, WAD Medani Sudan, Purdue graduate.
  - (2) Dr. Christian Mwasike, in charge of millet breeding in Kano, Nigeria, Purdue graduate.

**ANNEX G**

**Financial Tables**

ANNEX G. Financial Tables

GON CONTRIBUTION TO THE PROJECT

BY ACTIVITY AND YEAR

ACTIVITY		1	2	3	4	5	Total
<b>I. Research Program Development</b>							
<u>Professional Staff</u>							
Existing Plant Breeders	5x50%	12,250	12,250	12,250	12,250	12,250	61,250
Existing Plant Protection	2x20%	1,960	1,960	1,960	1,960	1,960	9,800
New Plant Protection	2x75%				7,350	7,350	14,700
New Agronomists 13 myr at	75%	3,675	3,675	11,025	11,025	18,375	47,775
Existing Ag Economist 5 myr							
at	100%	4,900	4,900	4,900	4,900	4,900	24,500
New Ag Economist 12 myr at	100%		9,800	9,800	19,600	19,600	58,800
Existing Technician 25 myr							
at	100%	15,000	15,000	15,000	15,000	15,000	75,000
New Technicians 15 myr at	100%			15,000	15,000	15,000	45,000
Labor		2,000	4,000	6,000	6,000	6,000	24,000
Research Funding for Supplies, Material & Equipment - Support of Substation "point d' appui" Maintenance at Tarna Station & Rebuilding Irrigation system at Kolo		176,000	194,000	213,000	234,000	257,000	1,074,000
		--	10,000	10,000	10,000	10,000	40,000
Sub Total		215,785	255,585	298,935	337,085	367,435	1,474,825
<b>2. Research Extension Linkage</b>							
1 Professional Staff	50%	2,500	2,500	2,500	2,500	2,500	12,500
1 Technician	100%	3,000	3,000	3,000	3,000	3,000	15,000
Sub Total		5,500	5,500	5,500	5,500	5,500	27,500
<b>3. Strengthen Administrative Capacity</b>							
2 Professional Staff	50%	5,000	5,000	5,000	5,000	5,000	25,000
Station Administrators 2 @	100%		6,400	6,400	6,400	6,400	25,600
Sub Total		5,000	11,400	11,400	11,400	11,400	50,600
<b>4. Strengthen Support Functions</b>							
6 Professionals at	25%	7,350	7,350	7,350	7,350	7,350	36,750
12 Technicians at	50%	15,000	15,000	15,000	15,000	15,000	75,000
Materials including Library		6,000	10,000	15,000	15,000	18,000	66,000
Sub Total		30,350	32,350	37,350	37,350	40,350	177,750
<b>5. Project Administration</b>							
In kind contribution of office space & utilities \$1,000/m		14,400	14,400	14,400	14,400	14,400	72,000
<b>5. Training</b>							
Staff in training support		8,000	25,000	42,000	65,000	100,000	240,000
TOTAL		279,035	344,235	409,735	470,735	539,085	2,042,675
Contingency	10%	27,904	34,434	40,959	47,073	53,908	204,268
Inflation	10%	--	34,434	86,012	155,813	250,100	526,149
		306,939	413,083	536,556	673,621	843,093	2,773,000

Annex G. Financial Tables

PROJECT ADMINISTRATION COSTS

In Niger Office Operation

1	Admin. Assistant	\$ 5,000
2	Secretaries Niamey	7,000
1	Secretary Tarn	2,500
2	Drivers Niamey	4,000
1	Driver Tarn	<u>2,000</u>
	Salaries & F B	\$ 20,500
	Communications	\$ 5,000
	Office Supplies & Exp.	5,000
	Air Travel - Niger	5,000
	Int. Project Prof. Travel	<u>7,500</u>
		\$ 43,000 x 5 years - \$215,000
	Costs of initial renovation air conditions, office equipment	<u>35,000</u>
		\$250,000

Purdue Campus Operations

1	1/2 campus coordinator salary x F B	\$ 30,000
1	1/4 Training Coordinator S x F B	4,200
1	1/2 Admin. Assist. S x F B	8,400
1	Full time secretary S X F B	13,200
	Communication Supplies Office Expenses - Travel to Washington Predeparture expenses	<u>5,000</u>
		\$ 60,800 x 5 years - \$300,000

RESEARCH FUND BUDGET

ITEM	Commodity Research (A1)	Production Systems (A2)	Farming Systems (A3)
Local Salaries (m/y)	\$100,000	\$ 75,000	\$ 91,000
Technicians	(25) 50,000	(20) 40,000	(10) 20,000
Controlleurs	-----	-----	(10) 20,000
Observaterus	(30) 45,000	(20) 30,000	(24) 36,000
Programmer	-----	-----	( 5) 10,000
Clerical	( 5) 5,000	( 5) 5,000	( 5) 5,000
 In-Country Travel and Subsistence (to substations, text centers and villages)	 \$ 10,000	 \$ 10,000	 \$ 25,000
 Local Supplies (seed, fertilizer, tools, other farm inputs)	 \$ 20,000	 \$ 25,000	 \$ 40,000
 Seasonal Labor	 \$ 25,000	 \$ 20,000	 \$ 5,000
 Misc. Operational Costs	 \$ 5,000	 \$ 5,000	 \$ 14,000
 TOTAL (\$470,000)	 \$ 60,000	 \$135,000	 \$175,000

ANNEX G. - FINANCIAL TABLES

Program Activity	\$ Cost in ,000s					\$ Research Associates	\$ Short-Term Staff	\$ Academic Training **	\$ Theses in Niger	\$ Short-Term Training	\$ Library	\$ Research and Extension Communication	\$ Commodities	\$ Computer Purchase and Maintenance	\$ Research Operations in Niger	\$ Research Contracts with CRSPs	\$ Remodeling and Expansion 1910	Number	\$ Vehicle Purchase	\$ Vehicle Operation	\$ Project Operation in Niger	\$ Project Operation in U.S.	\$ Evaluation	Total Direct \$ All Categories	\$ Contingency 10%	\$ Indirect Cost	Inflationary Increase Personnel + Indirect \$ x 7% ALL OTHER x 12*	\$ Total Cost
	Yr.	M-Yr.	Long-Term Staff * \$	M-Yr.	M-M																							
Research Program Development	1	3.2	404.	.5	10	2	27	15	-	2	17	5	40	9	66	100	98	23	-	-	-	207						
	2	3.7	353.5	-	10	4	40	52.5	11	4	24	10	60	1.5	86	150	79	39	-	-	-	258.5						
	3	3.7	353.5	-	10	4	40	50	11	4	24	10	70	1.5	106	150	79	34	-	-	-	916						
	4	3.2	320.5	-	10	4	40	50	55	2	2	10	69	1.5	106	150	79	37	-	-	-	935.5						
	5	3.2	320.5	-	10	4	40	50	44	2	2	15	50	1.5	106	150	79	39	-	-	-	935.5						
Research Extension Linkage	1	-	13	-	-	2	20	7.5	-	-	-	-	-	-	-	-	14	5	-	-	-	69.5						
	2	-	10.5	-	-	2	20	15	-	2	12	10	-	-	-	-	14	5	-	-	-	62.5						
	3	-	10.5	-	-	2	20	15	-	-	-	20	-	-	-	-	14	6	-	-	-	65.5						
	4	-	10.5	-	-	-	-	7.5	-	-	-	25	-	-	-	-	-	6	-	-	-	69						
	5	-	10.5	-	-	-	-	-	-	-	-	25	-	-	-	-	-	6	-	-	-	69						
International Research Linkage	1	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13						
	2	-	10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.5						
	3	-	10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.5						
	4	-	10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.5						
	5	-	10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.5						
Strengthen Administrative Capacity	1	.5	65	-	-	2	20	-	-	-	-	5	-	-	-	-	13	4	-	-	-	107						
	2	.5	52.5	-	-	2	20	7.5	-	2	12	7	-	-	-	-	13	5	-	-	-	124						
	3	.5	52.5	-	-	2	20	22.5	-	-	-	4	-	-	-	-	13	6	-	-	-	118						
	4	.5	52.5	-	-	-	2	37.5	-	2	12	2	-	-	-	-	13	6	-	-	-	119						
	5	.5	52.5	-	-	-	2	57.5	-	2	12	2	-	-	-	-	13	6	-	-	-	119						
Strengthen Support Functions	1	4	57	-	6	60	-	-	2	12	10	20	-	4	-	-	-	-	-	-	-	153						
	2	4	42	-	6	60	7.5	-	2	12	30	40	6	4	-	-	-	-	-	-	-	211.5						
	3	4	42	-	6	60	22.5	-	2	12	25	40	3	4	-	-	-	-	-	-	-	228.5						
	4	4	42	-	6	60	30	-	4	21	20	30	3	4	-	-	-	-	-	-	-	193						
	5	4	42	-	6	60	30	-	2	12	15	20	3	4	-	-	-	-	-	-	-	186						
Project Administration	1	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	5	78	60	60	183						
	2	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	5	43	60	60	129						
	3	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	6	43	60	60	184						
	4	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	6	43	60	60	183						
	5	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	6	43	60	60	173						
Direct Cost Totals	1	573	.5	10	12	120	1.5	22.5	-	4	24	10	15	9	70	-	160	10	139	42	78	60	1,327.5	133.75	167.6	-	1,628.85	
	2	490	-	40	14	140	5.25	82.5	11	10	60	30	107	27.5	90	30	10	45	43	60	60	1,436	143.6	199.6	150	1,929.2		
	3	490	-	40	16	160	11	165	22	6	36	25	33	4.5	110	30	6	52	43	60	60	1,572.5	157.25	223.6	346.5	2,299.85		
	4	430	-	40	7	70	15	225	55	8	48	20	35	92	4.5	110	30	55	43	60	60	1,417.5	141.75	193.6	492.5	2,245.35		
	5	357	-	30	4	40	27	135	44	2	12	15	40	72	4.5	110	30	56	43	60	60	1,456.5	145.65	177.6	738.8	2,520.75		
* Sr. = 130 Yr. 1; 195 Yr. 2-5		Jr. = 90 Yr. 1; 70 Yr. 2-5																										
** Training not completed totaled in Yr. 5																												

N.B. Preliminary, subsequently revised

## ANNEX H

### Approaches to Farming Systems

## ANNEX H. APPROACHES TO FARMING SYSTEMS

There are several distinct approaches to farming systems research (see Gilbert, Norman and Winch 1980\* for an overview). The farming systems research program of the NCR Project will begin with surveys and analysis of current practices, at the farmer level with the ultimate goal of improving the fit between farmer needs and INRAN research.

Farm families in developing countries may be seen as managing their resources (mainly family labor, land seed, and capital, which may be used to obtain more labor) to maximize their income subject to a risk constraint (provision of sufficient food for their own use). Often the total land available to the farm family is not operated as a single unit by a single decision-maker. Instead one often finds two kinds of farming units within a single household: joint cultivation of a set of common household fields to meet the basic needs of all household members, and individual cultivation of private fields or plots for personal profit. As in developed countries, farmers differ in managerial ability as well as in the resources available to them.

To date, Nigerien extension services have proposed a single basic technical package across the board, for all geographic areas and all types of farming units. It is clearly not possible for a single package to be optimal for the full range of farming units found in Niger. With a suitable typology of farms (land, labor and capital resources), farmers (i.e., farm decision-makers), and ecological zones, however, it should be possible to develop sets of recommended practices which correspond to the specific needs of different groups of farmers.

\*Farming Systems Research: a critical appraisal. MSU Rural Development Paper No. 6, 1980.

For example the evidence on the effectiveness of mechanization is complicated. In Senegal, where the early part of the season is more critical than in the rest of the Sahel, in areas averaging over 500mm rainfall, almost every family has a seeder or has access to one. In Mali elite farmers in the cotton zone may have 3-5 sets of farm equipment and 2 pairs of oxen per set. The machinery in this case is clearly profitable and essential in their farming operation. Some of these farmers are now buying 25 hp tractors. They also use heavy doses of fertilizer, having managed to cross the intensification barrier successfully.

On the other hand, the research of Josette Murphy and Leendert Sprey\* on the AVV in Upper Volta showed no gain in profitability from the use of animal traction. Niang\* in his PHD thesis on linear programming of elite Malian farmers and Senegalese Peanut Basin farmers, showed that ox traction was profitable in South Mali but not in the peanut basin. Barret, Lassiter, Wilcock, Baker and Crawford in a report on "Animal Traction in Eastern Upper Volta (preliminary draft, Michigan State University Ag. Economics Department January 1981) show that

A. Animal traction farms are approximately 50% larger than hoe farms (6.89 ha. vs. 3.89 for oxen and 5.34 ha. vs. 4.26 for donkey/traction)

B. The area cultivated per worker showed much less difference (1.34 ha. vs. 1.29 ha. for oxen and 1.44 vs. 1.22 for donkeys). The difference for ox traction is almost certainly not significant statistically.

C. Use of animal traction weeding equipment was associated with less area per worker for donkeys (1.36 vs. 1.41 ha/worker, probably not significant) and

\*See Proceedings of the Second Workshop on Sahelian Agriculture, Purdue University, Ag. Econ Dept. May 1980.

with a greater area per worker with oxen (1.60 vs. 1.31 ha/worker) part of which was due to a bias between the zones in which the farmers were located.

D. Yields of millet and sorghum were unchanged by ox traction and peanut date are doubtful, but yields of maize, cotton and rice were 50%, 114% and 91% greater. Yields with donkey traction were unchanged for millet and sorghum but less for maize, cotton and rice, presumably due to inability to plow with donkeys.

In experiments on farmers' fields, plowing increased the yield of sorghum, millet and peanuts both with and without phosphate (150 kg/ha of rock) over the control.

E. In spite of these results animal traction reduced the time spent per hectare for all crops together including planting, tillage and harvesting, 26% for ox traction and 12% for donkeys. However, there was a shift in the distribution of the labor with the results that in the two months in which cultivation for weed control is prominent (late June, July and August) the man hours used per hectare are almost the same (2.3% difference). Thus animal traction did not relieve this bottleneck, although it reduced the time for land preparation and planting.

F. The farm income of farms with animal traction was greater because of the difference in farm size. However, the farm income both per worker and per hectare was generally higher than for traditional farmers with oxen and lower with donkeys. The difference with oxen was, however, reversed, when considering the net household income.

	OX ZONES				DONKEY ZONES			
	Hoe		Traction		Hoe		Traction	
Net crop prod'n revenue*/ worker/ha	25	863	27	745	19	084	17	124
	19	857	20	508	19	287	11	771
Net farm income*/worker /ha	25	446	29	450	20	968	17	632
	19	534	21	804	12	894	12	085
Net household income*/worker /ha	37	406	31	879	21	095	22	473
	28	716	23	563	18	003	15	404

\*In FCFA

G. There was no allowance made for any estimate of managerial ability.

The conclusion of this study is that it was not possible to show definite advantages in sorghum, millet and probably peanut production with ox traction although in rice, maize and cotton production it might be profitable.

Raynaut has proposed a typology of farms from his study of Serkin Haoussa, which he also applied in Gouraje. The typology is mainly based on two factors:-

A. The proportion of the Farming Unit's land that is over 1 km from the village, (farms with less than 80% 1 km or more from the village and farms with more than 80% at this distance).-

B. Area available per family worker/greater than 4 hectares worker or less than 4 hectares worker. The four types of Farming Units fall into place as below:-

Type B 4.9 ha/worker Fields close	Type C 5.6 ha/worker Fields Remote
Type A 2.7 ha/worker Fields close	Type D 2.6 ha/worker Fields remote

**Type A:** A large part of the fields in the center of the village land; area available per worker is small (2.7 ha); total area close to the average (9.1 ha); average proportion of fallow very low (10%); more than half the

Farming Units using organic manure on some of their fields; number of head of cattle owned is high; cereal yields per hectare slightly above the average; producing a surplus of cereals per person.

Type B: An important part of the fields in the center of the village land; area per worker is high (4.9 ha); total area higher than average (13.8 ha); average proportion in fallow 25%; more than half of the units using organic manure; the number of head of cattle very high; cereal yields appreciably higher than the average; production per person provides a large surplus.

Type C: Little land in the center of the village land; area per worker very high (5.6 ha); total area much higher than average (15.8 ha); average manure; average proportion in fallow 30%; slightly less than half of the units using organic manure; average number of cattle owned; cereal yields very low; production per person provides a surplus.

Type D: Small proportion of land in the center of the village land; area per worker low (2.5 ha); total area considerably below the average (7.9 ha); percent of fallow low (13%); less than a quarter of the units using organic manure; small number of head of cattle; cereal yields average; slight surplus of production per person.

The farm typology is related to social behavior as well. Types A and B include members of the lineage of the chieftancy and most are families who have been established in the village for a long time. Individuals who are not in the lineage of the chief and more recent arrivals (e.g., whose families have been there less than 20-30 years) are more numerous in type C. Most of the employers of paid farm workers are in types B and C, while type D includes most of the individuals who sell their labor.

Figures 1 and 2 show that the millet yields per hectare, and the millet production both per worker and per head (and so the food self-sufficiency and

the quantity for sale) differ among the four farm types, with type D being the worst off.

Purdue research and research done at IDS, the University of Nairobi (Diana Hunt) indicate clearly that farmers in similar position to type D (which formed 46% of Raynaut's sample) are on or below the subsistence level and are unlikely to adopt new technology. This suggests that without a somewhat detailed socio-economic study it will not be possible to explain the comparative behaviour of farmers, to define constraints and to recommend solutions.

It also follows that among the most capable farmers and those better endowed with resources it is useful to observe how the technical package proposed by research and extension has been adapted to fit into the farming system. This assumes that some members of this class of farmers, as in developed countries, have the capability to innovate if they can acquire a regular supply of inputs.

Thus, it is possible to feedback innovations or adaptations of the technology made by farmers as they use it to research and extension services. Furthermore, the reasons why some of the themes proposed by extension services are not permanently adopted may be determined by this type of approach.

Figure

Typology of Farms at Serkin Haoussa

1000 Meters

TYPE B	TYPE C
<p>Number of units = 14            Average population/unit = 5.9            Workers/unit = 2.8            Average area/worker = 4.9 ha            Average total area/unit = 13.8 ha            SDA Percent in fallow = 25%            Units applying manure % = 57%            Average head of cattle/unit = 1.7            Average head of small ruminants/              unit = 10.7            Production/worker, kg = 1.042 kg            Production/head, kg = 495 kg            Yield/ha, kg = 316 kg.</p>	<ul style="list-style-type: none"> <li>- Number of units = 21</li> <li>- Average population/unit = 5.4</li> <li>- Workers/unit = 2.8</li> <li>- Average area/worker = 5.6 ha.</li> <li>- Average total area/unit = 15.8 ha</li> <li>- SDA Percent in fallow = 30%</li> <li>- Units applying manure % = 42%</li> <li>- Average head of cattle/unit = 1.2</li> <li>- Average head of small ruminants/   unit = 7.4</li> <li>- Production/worker, kg = 778 kg.</li> <li>- Production/head, kg = 409 kg.</li> <li>- Yield/ha, kg = 200 kg</li> </ul>
TYPE A	TYPE D
<p>Number of units = 14            Average population/unit = 6.5            Workers/unit = 3.3            Average area/worker = 2.7 ha            Average total area/unit = 9.1 ha            SDA Percent in fallow = 10%            Units applying manure, % = 58%            Average head of cattle/unit = 1.6            Average head of small ruminants/              unit = 8.7            Production/worker, kg = 674 kg            Production/head, kg = 345 kg            Yield/ha = 307</p>	<ul style="list-style-type: none"> <li>- Number of Units = 41</li> <li>- Average population/unit = 5.6</li> <li>- Workers/unit = 3</li> <li>- Average area/worker = 2.6 ha</li> <li>- Average total area/unit = 7.9 ha</li> <li>- SDA Percent in fallow = 13%</li> <li>- Units applying manure, % = 24%</li> <li>- Average head of cattle/unit = 0.9</li> <li>- Average head of small ruminants/   unit = 6.8</li> <li>- Production/worker, kg = 557</li> <li>- Production/head, kg = 299 kg</li> <li>- Yield/ha, kg = 274</li> </ul>

Distance from Village

Source: Raynaut, C. In Proceedings of Second Workshop on Sahelian Agricultural Agricultural Economics Department, Purdue University, May 1980

Figure 2

Typology of Farms at Gouraje

1200m

<u>TYPE B</u>		<u>TYPE C</u>	
4 farms (12.5%)		7 farms (22%)	
(SEA)	Avg area available/wkr 3.95 ha	SEA	Avg. area available/wkr 4.30
(SCA)	Avg area cultivated/wrk 3.25 ha	SCA	Avg. area cultivated/wkr 3.60
	Area in fallow 18%		Area in fallow 17%
	Area manured 35%		Area manured 11%
	Recent arrivals 0%		Recent arrivals 28.5%
	Production/worker 615 kg		Production/worker 439 kg
	Production/head 307 k		Production/head 220 kg
	Millet yield 182 kg/ha		Millet yield 73 kg/ha
	Cattle 0		Cattle 0.71
	Small ruminants 16		Small ruminants 12
	Transport animals 0.75		Transport animals
<u>TYPE A</u>		<u>TYPE D</u>	
6 farms (18.5%)		15 farms (47%)	
SEA	2.00 ha	SEA	2.00 ha
SCA	1.80 ha	SCA	1.80 ha
	Area in fallow 10%		Area in fallow 11%
	Area manured 57%		Area manured 27%
	Recent arrivals 0%		Recent arrivals 13.5%
	Production/worker 458 kg		Production/worker 271 kg
	Production/head 218 kg		Production/head 161 kg
	Millet yield 242 kg/ha		Millet yield 143 kg/ha
	Cattle 2.5		Cattle 0.13
	Small ruminants 21.5		Small ruminants 6.5
	Transport animals 2.66		Transport animals 0.13

1978 data from Gregoire, E. Etude Socio-economique du Village de Gouraje,  
 Universite de Bordeaux II - DGRST. Oct, 1980

## ANNEX I. JOB DESCRIPTIONS\* .

### A. Position: Team Leader

(Niamey - INRAN)

Qualifications: Ph.D. in an agricultural science with knowledge of the management of research projects, and at least 4 years of experience in a developing country. Fluency in French is essential and the candidate may be required to undergo language training prior to the overseas assignment

Duties: to be responsible for the management of all the resources of the Niger Cereals Research Project in Niger, and to be the in-country representative for Purdue.

The candidate will be required to be familiar with the conditions of the NCRP contract and to cooperate with GON and AID Niamey in the day-to-day operation of the contract.

The team leader will work in close cooperation with the Director General of INRAN, the National Agriculture Research of Niger, and will be required to undertake any responsible duties as agreed by INRAN and Purdue.

The Team Leader can be required to make use of his specialization for the benefit of the project.

### B. Position: Plant Breeder/Geneticist

(Niamey)

Qualifications: A Ph.D. in plant genetics or breeding is required. Experience in a developing country is desirable. Experience in the administration of agricultural development projects is also desirable. Fluency in the French language is essential.

#### Duties:

1. To assist in the development and management of the Niger sorghum breeding program at Kolo and to continue the program should the Nigerien sorghum breeder depart for long-term training;
2. To advise the Kolo Director on the overall research program at Kolo, Ouallam and other subordinate substations;
3. To provide technical guidance to all plant breeding programs at Kolo and Tarna;
4. To provide breeder supervision to Seed Multiplication Centers in the production of foundation and certified seed;
5. To establish linkages between commodity research programs, cereals productivity systems and farming systems research;
6. To develop and maintain international contracts with the commodity research programs;
7. To assist in the application of project inputs to the research support services, in particular guiding the development of a Cereal Quality Section;
8. To assist in the development of commodity improvement research protocols to ensure a multi-discipline approach;
9. To develop all specifications and scopes of work for commodities and consultant services relating to breeding research;
10. To supervise and serve on the graduate committees of Nigerien and U.S.

\* One of the five long-term technical assistance team members should have a social science background in addition to the other required technical skills.

- trainees doing in-country research in breeding and genetics;
11. To develop and conduct in-country training programs for INRAN staff in crop breeding and genetics; and
  12. Other duties as agreed to by INRAN and Purdue.

C. Position: Senior Agricultural Economist (Niamey, DECOR)

Qualifications: Ph.D and at least 4 years of work in developing agricultural economics. Must have strong training or experience in production economics. Experience in the execution and analysis of Farming systems research useful but not essential. Fluent French required - speaking and reading at level 3.

Duties:

1. To lead the development of farming systems research programs in the Maradi and Niamey-Kolo areas in concert with other project staff and the Rural Economy Section;
2. To supervise the implementation of farming systems research operations at the village level;
3. To provide leadership and coordination for all farming systems activities in Niger, including those of the departmental productivity projects and those of other donors;
4. To advise INRAN on all policy matters relating to the agricultural economy;
5. To initiate commodity orders and requests for technical assistance relating to farming systems;
6. To develop and conduct in-country training in agricultural economics;
7. Other duties as agreed upon by INRAN and Purdue.

D. Position: Agronomist-Cereals Production Systems Research (CNRA, Tarna)

Qualifications: Ph.D. in agronomy or related field with emphasis on field experimentation is required. Experience in a developing country is desirable. Fluency in French is essential; and the candidate may be required to undergo language training prior to the overseas assignment.

Duties: The scientist will be stationed at a research station in Niger. He will be responsible for the direction of agronomic research in Niger.

1. To direct agronomic research programs in a team effort with other related disciplines;
2. To determine the best cultural practices and farming systems suitable for millet, sorghum, cowpeas and peanuts in the country;
3. To provide technical guidance to the agronomic sections in the National Institute of Agricultural (INRAN) Research in Niger, and to develop or strengthen linkages between this institute and international research organizations;
4. To develop and conduct in-country training in agronomy for INRAN staff;
5. To undertake other responsible duties as agreed by INRAN and Purdue.

E. Position: Junior Agricultural Economist

(Tarna, CNRA)

Qualifications: M.S. in economics, agricultural economics, or economic anthropology. Prefer experience in Farming systems type research in developing countries and proficiency in micro-computer programming, OR one or more years experience in computer/microcomputer programming and survey analysis. French required (speaking and reading at level 2+), spoken Hausa an asset.

Duties:

1. To participate in the design of farming systems projects;
2. To assist in the selection and evaluation of participating villages;
3. He will be responsible for the day-to-day operations of farming systems research projects in the Maradi area under the supervision of the Senior Agricultural Economist;
4. Other duties as agreed to by INRAN and Purdue.

**ANNEX J**

**List of Persons Contacted by NCR Design Team**

ANNEX J. LIST OF PERSONS CONTACTED BY NCR DESIGN TEAM

I. LIST OF PERSONS CONTACTED BY NCR DESIGN TEAM

A. USAID

Jay Johnson	Mission Director
John Lovaas	Ass't Mission Director
Wilbur Thomas	Agriculture Development Officer
Cameron Pippitt	Project Design and Evaluation Officer
Dan Stillman	Acting Project Liaison Officer, Niger Cereals Project (Production)
Myron Golden	Program Officer
Winfield Collins	Mission Engineer
Harry Shropshire	Mission Controller
Sid Bliss	Project Manager for Regional Projects
Terry Barker	Ass't Program Officer
Bill Meeks	Head, Project Management Support Unit
Willie Russell	Niger Cereals Project, Staff Assistant
Pat McQuitle	Project Manager, Human Resources Project
Mark Wentling	Project Manager, Niamey Dept. Productivity Project
John Mullenax	Agronomist, Niamey Dept. Productivity Project
James Taylor	General Services Officer
Tshindi Cooper	General Services Officer
Cao Quan	Team Leader, Human Resources Development Project, IPDR, Kolo
Bob Brandstetter	Instructor in Rural Sociology, IPDR, Kolo
Josue Dione	Instruction in Agricultural Economics, IPDR, Kolo

Roger Poulin	Design Team, Agricultural Production Support (APS) Project
Fran Le Beau	Design Team, Agricultural Production Support (APS) Project
Frances Stier	Design Team, Agricultural Production Support (APS) Project
Tridib Mukherjee	Design Team, Agricultural Production Support (APS) Project
Mike Chilton	Design Team, Agricultural Production Support (APS) Project
Bob Alger	Design Team, Agricultural Production Support (APS) Project

**B. GON CONTACTS OTHER THAN INRAN**

Silimane Gafewa	Secretary General, Ministry of Rural Development
Mahamane Salifou	Project Coordinator, Niger Cereals Project
Souleymane Dan Lady	MDR - INRAN Liaison Officer
Aboubakar Sidi	Head, Doukou-doukou Seed Multiplication Center
Bawa Sahadou	Director General, Maradi Dept., Productivity Project
Mr. Landrau	Head of Training Programs (Including CRP's and CFJA's) of Maradi Productivity Project

**C. INRAN**

Moussa Saley	Director General of INRAN
Harouna Abdou	Responsable - Service d'Administration et Finances (S.A.F.)
Toukoua Daouda	Responsable - Division des Etudes et Programms (DEP) (ancien Section Etudes et Programations)
Abdoulaye Adam	Responsable-Division des Statistiques (ancien Section Methodologie)
Ly Samba	Responsable-Division de Documentation

**RESEARCH DEPARTMENTS**

Moussa Oumarou	Responsable - Agriculture
Ouattara Mamadou	Responsable - Ecologie
Ly Samba	Responsable - Economie Rurale
Lamine Attaou	Responsable - Recherche Forestiere
Tahirou Abdou	Responsable - Recherche Zootechnique et Veterinaire

#### RESEARCH STATIONS

Ouendeba Bottorou	Millet Breeder and head of CNRA, Tarna
Moussa Goah Goube	Head, Soil Chemistry Section, Laboratoire des Sols, Niamey
Issaka Maman	Assistant, Soil Chemistry Section Laboratoire des Sols, Niamey
Annou Garba	Head, Soil Mapping and Classification Section, Laboratoire des Sols, Niamey
Gandah Mahamadou	Head, Soil Physics Section, Laboratoire des Sols, Niamey
Farmo Amadou	Cellule de l'Instrumentation, Laboratoire des Sols, Niamey
Moussa Adamou	Head of the Kolo Station
Siraji Moumouni	Head of the Ouallam Station
Jern Jacques Delate	Section Zootechnique, CNRA
Nieno Jika	Millet Breeder, CNRA
Jad Ganda	Millet Breeder, CNRA
Issaka Maiga	Cowpea Breeder, CNRA
Mare Roesch	General Agronomy Section, CNRA
Hamma Hassane	Pathologist, CNRA
Paul Brouchard	Entomologist, CNRA
Helen Guebremont	Entomologist, CNRA
Dusmane Baku	Entomologist, CNRA

Arsanti Magagi	Mechanist, CNRA
Nagui Nached Abdel Malak	IPM, CNRA
Samir Saad El Din Akl	IPM, CNRA
Yonei Taladisha	IPM, CNRA
Gilbert Gilles Numa	Agricultural Economist, DECOR
Moumouni Ousseini	Sous-division de Recherche Vulgarisation, DEP
Mr. Feuillette	Mechanisme Agricole

D. PEACE CORPS ADMINISTRATION

Bill Carruth	Peace Corps Director for Niger
Russ Nylan	Associated Peace Corps Director, Agriculture

PEACE CORPS VOLUNTEERS IN INRAN

Mary Abrams	Agronomist with INRAN's Tarna Station, the CNRA
Jude Andreason	Protection des Vegetaux, Niamey
Dan Downs	Centre de Perfectionnement Technique (CPT) of Simiri (Niamey Dept., Productivity Project)
Ann McPhall	Centre de Perfectionnement Technique (CPT) of Simiri (Niamey Dept., Productivity Project)
Walter Pickett	Market Gardening Research Program, INRAN's Tarna Station (CNRA)
Becky Pickett	CNRA Library, Tarna

E. OTHER DONORS/RESEARCH PROGRAMS

L. D. Swindale	Director General, ICRISAT
Jon McIntyre	Economist, ICRISAT/West Africa
Fred Eberhart	Lutheran World Relief, Niamey
Mr. Rouanet	FAC
Mr. Bella	Delegation Generale du FED, Niamey
Mr. Sandro Cerrato	FED, Projet "3M" (Zinder Dept.) Productivity Project)
Mr. Franco Tranquilli	FED, Projet "3M"

Mr. et Mme Monyagne	Volontaires du Progres, Projet "3M"
Gerald D. Mills	Africare Representative, Niamey
William Ames	Coordinator, English Language Training Programs American Cultural Center Niamey
Frederick H. Weldon	Program Technical Expert, Sahel AGRHYMET Program Computer Hardware)
Mr. Mishra	AGRHYMET (Computer Software)

IMPLEMENTATION PLAN

The Niger Cereals Research Project has as its long term objective to ensure the institutional development of INRAN as an innovative organization which provides the fundamental and applied research services required to generate and sustain productivity and output growth within Niger's agricultural sector.

The NCR project will consist of a collaborative effort in which INRAN is assisted in working toward this objective through the efforts of Purdue University assisted by Alabama A&M University. Purdue, under the terms of a contract with the GON, will provide those professional, technical and administrative services necessary to ensure that effective use is made of the resources available to the project in achieving INRAN's goal for institutional development.

As a first phase of the institutional development process, the project will, during the first five years, assist INRAN in achieving rapid development of research programs for major cereals. The project will thus develop further information, technology, methods and germplasm which are easily disseminated to farmers and which will stimulate productivity growth especially in sorghum, millet, and cowpeas.

During the initial five years of the project, activity will focus on three major areas:

1. Growth and development of INRAN's capacity to administer and manage its research program, its resources and its linkages to other institutions especially linkage to the extension activities of the productivity projects and the National Extension Service.
2. Growth and development of INRAN's capacity to support its researchers' efforts through services in the areas of library and information, soil and plant analysis, food quality of grain analysis, in-service training, statistical consulting and data processing, farm machinery availability, etc.
3. Growth and development of research programs underway concentrating on three principal research programs each of which is substantially interrelated with the other including:
  - (a) An Interdisciplinary Team Research Program of Crop Improvement for each major cereal crop (millet and sorghum) and cowpeas which will involve breeders, plant protection specialists, agronomists, and cereal quality specialists and which will identify the major constraints to expanding productivity in each crop, and develop knowledge and plant materials designed to meet these constraints. These efforts will be concentrated at the Tarna station near Maradi and at the Kolo station near Niamey.
  - (b) A Farming Systems Research Program which will comprise initially farmer surveys designed to more clearly characterize the farm enterprise, including its resources and their use, the practices employed, and the constraints to expanding production. Subsequently, this research will include on-farm testing of specific interventions and technologies to determine their acceptability and impact upon the farm. This research will be carried out in several villages in several different ecological zones within the administrative regions of Niamey and Maradi.
  - (c) A Production Systems Research Program which will develop systems of cultural practices appropriate for production of cereals in the

various ecological regions and by the various kinds of farm enterprises. Work will include focus on understanding and development of recommendations on intercropping, fertilizer use, time of planting, density and spacing, weeding and pest control and similar concerns including cost/return and related management analysis. Work will be originated at the Tarna and Kolo stations, but will also be conducted, including both research and demonstration efforts, at a number of sites in several ecological zones in the administrative regions of Niamey and Maradi.

The project will provide to INRAN over a five year period, 24 man-years of technical assistance and institution building efforts by U.S. contractor staff, and 12 man-years of field research effort by research associates provided by the contractor. Short-term inputs by U.S. staff for a total of 53 man-months will be utilized in the development of research programs as well as in the enhancement of administrative and support functions. Training will be provided to Nigerien staff with 20 academic programs and 30 man-months of short-term training scheduled. These project inputs will be administered by the U.S. contractor so as to achieve effective contribution to the institutional development objectives.

During implementation, the Niger Cereals Research Project will be managed by the Project Director who is expected to be the Director-General of INRAN. The Purdue University five-person team will be headed by a Team Leader who will advise the Project Director on matters related to attaining the objectives of this project. The U.S. staff will work within and support the improvement of the research efforts of the various research departments and sections of INRAN. They will work with INRAN staff in more than one department and frequently in more than one location. Initially, Purdue University will assign to INRAN five individuals on long term assignment: a team leader, a plant breeder, a production agronomist, a senior agricultural economist and a junior agricultural economist. Job descriptions for these positions are provided as an attachment to this plan. Figure 1 indicates the interrelated nature of the initial long term staff assignments of the U.S. team. All U.S. team members will be staff members at Purdue University or at Alabama A&M University. The Team Leader will serve as the principal advisor to the Project Director in all phases of the project and also has an overall administrative responsibility for in-country U.S. personnel within the parameters of Purdue's obligations under the host country contract.

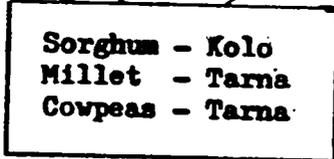
#### Role of U.S. Project Staff in INRAN

Because the primary focus of the project is institutional development, the principal role of the U.S. staff will be in an advisory capacity. The U.S. project staff will advise senior INRAN officials on overall research policy, research objectives and systems for allocation of project resources to accomplish those objectives. The senior INRAN officials are those station directors, section members and researchers who have responsibility for research programs and projects. The U.S. Team Leader will serve as advisor to the Project Director (Director General of INRAN). The remaining team leaders will be administratively responsible to the U.S. Team Leader. The U.S. staff will perform this advisory role on an individual basis with Nigerien co-workers and at the group level by serving as members on working groups and research committees. The U.S. staff will work within and support the research efforts of the various research departments and sections of INRAN. They will be expected to work with INRAN staff as counterparts in more than one department and more than one location.

Figure 1.

LONG-TERM STAFF ASSIGNMENTS

Positions:	Team Leader Research Organization and Development	Plant Breeder and Agronomist	Production System Research Agronomist	Junior Agricultural Economist	Senior Agricultural Economist
Principal Location:	NIAMEY	KOLO	TARNA	TARNA	NIAMEY
Principal Responsibility:	Research Priorities and Program Studies  Human Resource Development  Support Functions  Extension Communications  Linkages to Research Network  Administration	Interdisci- plinary Program on Crop Improvement	Cereal Production Systems Research Program	Farming Systems Research Program	Farming Systems Research Program
Secondary Responsibility:	Research programs in area of tech- nical special- ization	Cereal Pro- duction Systems Re- search in Niamey district	Inter- disciplinary Program on Crop Improve- ment in Tarna district	Cereal Pro- duction Systems Re- search Program in Maradi district	Cereal Production System Research Program in Niamey district



The secondary function of U.S. project staff will be to conduct actual research operations. The role of the U.S. staff as principal investigators or co-team leaders of specific research projects should be limited in order to allow U.S. researchers to interact across numerous research disciplines and projects. No research activities shall be conducted by U.S. staff without the approval of the appropriate INRAN committees, nor without the active support and participation of Nigerian research staff.

Each U.S. staff member assigned to Niger will, after consultation with INRAN, submit a detailed work plan for approval by INRAN within 90 days of arrival in country. The work plan will include, in general terms, proposed objectives and activities and estimated requirements for staff and logistical support. Upon approval of the general work plan, each U.S. staff will submit, with the appropriate INRAN counterparts, specific research protocols for any proposed research activities according to regular INRAN procedures.

U.S. staff in Niger will thus work collaboratively with INRAN colleagues in activities related to:

1. Development of plans for execution of research projects in the area of NCR project emphasis.
2. Enhancement of INRAN's capability to administer its research program and manage its facilities and resources.
3. Development of linkages with others relevant research institutions and programs in Niger, and internationally.
4. Transfer of technology to INRAN researchers in the form of information techniques and approaches important in agricultural research.
5. Development of internal training programs for INRAN staff.
6. Strengthening of linkages with extension workers and programs to ensure full and ready dissemination of technology and rapid feedback to research.

### Counterpart Relationships

Each U.S. staff member will interact with a number of INRAN staff counterparts according to technical discipline and also according to mutual participation in multi-disciplinary research activities. For example, the U.S. agronomist and U.S. plant breeder will work as counterparts with INRAN agronomists and breeders, as well as those entomologists, plant pathologists and agriculture economists involved in commodity improvement or farming systems research. These counterpart relationships will operate under an assumption of co-equal status, notwithstanding that a U.S. staff member may serve on the graduate committee of a counterpart engaged in long-term training. It is understood that the Nigerian counterparts shall exercise administrative control over INRAN personnel, and should a U.S. staff member assume the primary responsibility for an INRAN research project while the principal Nigerian researchers is overseas for long-term training, INRAN should appoint a Nigerian staff member to assume responsibility for administrative personnel involved in the activity.

### Joint Project Operations

Nomination and appointment of long and short term U.S. staff - For each individual proposed by the contractor for assignment to work with the project in Niger, INRAN will be provided a letter of nomination indicating the nature of the assignment, the terms of appointment and qualifications of the individual. Notification of approval of that nomination must be obtained by

the contractor prior to initiating travel to Niger for such individuals.

Certain staff members designated for long term assignment to the project will be considered approved by INRAN by virtue of their designation during and participation in the design and pre-implementation mobilization phase of collaborative assistance preceding signature of the implementation contract.

Travel - The contractor will provide INRAN prior notice of arrival and departure times for all international travel occurring under the Project whether by U.S. staff or INRAN staff. INRAN approval for international travel of long or short term staff will be inferred by approval of appointment as described above.

Specific INRAN approval will be sought prior to international travel to the U.S. by INRAN trainees, and prior to international travel by U.S. staff to participate in conferences. The Purdue Team Leader will specifically approve and advise INRAN of required emergency travel, medical or other evacuation.

The contractor may send senior administrative staff and the project on-campus coordinator to Niger on up to two occasions per year and will provide prior notice of such travel to INRAN, coordinating scheduling for such visits with INRAN administration.

Allocation of Project Resources - In general terms, the Project Director and the Project Team Leader will develop agreement on use of project resources. The overall plan for and discussion of project strategy provides the general framework for such allocation. Several specific areas of project activity will require development of particular approaches to ensuring unified planning and implementation between INRAN and the contractor. These include:

- a. Short term staff use - The Project Director and the Team Leader will develop an annual plan for use of short term U.S. staff based on recommendation and requests from INRAN and U.S. project staff. The plan will be reviewed and modified, if necessary, periodically during the year. The contractor Team Leader will develop, based upon the agreed upon plan, a description of each such assignment for transmission to the contractor campus.
- b. Research support - The Project Director and contractor Team Leader will develop a procedure for periodic allocation of and management of project resources in support of INRAN's research program in the areas emphasized by the project. The procedure to be developed should respect the normal research planning process within INRAN, should ensure that project funds are additive to those furnished by normal GON allocations, should ensure reasonable division of support between the several areas emphasized in the project description, and should ensure that a consensus is reached between the Project Director and contractor Team Leader on the annual allocations or modifications thereof. Once the system for such allocation and management has been developed, project funds will be disbursed to INRAN to finance approved research using INRAN's normal fiscal procedures.
- c. Vehicle Operation and Maintenance - The Project Director and contractor Team Leader will develop, within 120 days after contract signing, a procedure for allocation of project provided vehicles and funds for their use and maintenance. This procedure should respect the INRAN operational procedure for vehicle operations and maintenance, should contribute to enhancement of INRAN's long term capacity to administer its resources, should ensure that vehicle's use supports the various project purposes as effectively as possible, and should ensure that the contractor team is assumed full use of at least one vehicle for each long term regular staff member present in Niger.

## Organizing General Project Activities

An important contribution to joint project operation will be made by the use of "work groups" to facilitate organization of certain project activities. Such work groups would be made up of appropriate INRAN staff and one or more of the U.S. project staff. Working under the general direction of the Director of INRAN, these groups may conduct studies of specific problems or concerns of INRAN, develop detailed plans for use of specified project inputs and propose to INRAN actions required to further project activity.

Some of the work groups which might be established are partially described below. These work groups may only be required for short periods of time or they may become longer assignments depending upon their assigned tasks. They will function much as such work groups currently do in INRAN.

Initial work groups which might be established include:

- a. Documentation and libraries. This work group might be responsible for development of recommendations for purchase of library related equipment and supplies, for determination of need for short term staff assignments in this area and analysis of INRAN staff need for expanded bibliographic needs. The work group might, over time, develop an inventory of library resources of INRAN, and develop a system for ensuring greater availability to and use by researchers of INRAN's expanding collection of scientific literature.
- b. Purchase of equipment and supplies. This work group might be assigned the task of recommending use of project resources for purchase of certain kinds of commodities and equipment. The work group could develop mechanisms for receiving requests for equipment and supplies from these research programs and support areas being assisted by the project, and for screening and prioritizing them. This work group would be able to ensure that specifications for items recommended are sufficiently accurate and detailed to ensure compatibility with INRAN needs and environment. The work group might, over time, develop a system for improving INRAN's inventory of information on equipment, and analyze means of increasing the multiple or shared use of high value equipment. This work group could also be assigned the task of recommending means of improving maintenance of INRAN equipment. It could also develop plans for use of one or more short term staff assignments related to careful evaluation of existing farm machinery, repair of repairable items, development of parts supply and repair capability for farm machinery, as part of preparation for any additional purchases.
- c. Training in the U.S. and third countries. A work group in this area could be responsible for developing an updated plan related to staff training at the A and B levels, which describes over a period of years ahead the clearly anticipated needs for training outside Niger including information on the likely candidate(s), their prior training/training needed, expected date of departure and duration of stay. This plan should result in clear recommendations for use of project resources. Careful forward planning of this type is essential if training resources are to be well utilized and especially to ensure preparation for the conduct of thesis research in Niger as foreseen in this project.

While the work groups described above would meet the most immediate needs, others which might be warranted include in-service training program development, linkage development with U.S. and other international research

Institutions, etc. By the second year of the project activity, it is anticipated that a work group could be developed to plan for project supported seminars with extension personnel and to develop planning for an expansion of INRAN publication efforts. The development of an ongoing series of research publications is an important element in INRAN development. Publication and other extension-oriented communication efforts should also be expanded through cooperation with the APS project.

#### Local Hire Project Staff

In order to provide essential administrative and logistical in-country support, Purdue will hire the following full-time local employees:

- 1) Administrative assistant/accountant (Niamey);
- 2) Secretary (Niamey);
- 3) Driver (Niamey) - unless directly provided by INRAN on a permanent basis;
- 4) Secretary (Maradi);
- 5) Driver (Maradi) - unless directly provided by INRAN on a permanent basis;

In addition, Purdue will hire as needed on a part-time basis supplementary secretarial, interpreter/translator, or driver service.

Such local hire employees will be hired under the terms of Niger labor laws, will be hired on a non-permanent basis, and will not constitute permanent employee obligations for either INRAN or the contractor.

#### In-Country Logistical Support

The contractor will provide for the development of in-country logistical support for certain needs of the U.S. staff. As indicated above, several local-hire staff will be hired for use in support activities. The contractor will develop long term leases for housing of U.S. project staff, three in Niamey and two in Maradi. Housing will be equivalent to that provided by AID for its direct-hire personnel. Smaller houses and/or apartments will be leased by the contractor for research associate use. Consideration will be given to developing a long term resolution of the need to house the continuing flow of short term U.S. staff. The contractor will ensure that furniture is purchased and provided for such housing and that utility and related housing maintenance costs are provided for.

The contractor will provide and/or reimburse U.S. staff for the costs of travel incurred in project activity within Niger. Staff will be provided air travel as required between Maradi and Niamey. Periodic surface travel for staff assigned to Maradi to Niamey and return will be provided by the project.

In-country logistical support will also include various office operating functions including communication.

Language training in French in Niger will continue to be provided to U.S. staff on a basis of at least several hours per week, work loads permitting.

As indicated above in the discussion of vehicle allocation, the contractor in-country staff will be assigned project vehicles for work related use. The contractor will be responsible for maintenance and operations of those vehicles.

## In-U.S. Management Support

Purdue will develop an on-campus capacity to coordinate and manage the training and other services to be provided in the U.S. and to provide scientific and logistical backstopping to the project. The on-campus coordination effort will be a part of Purdue's existing International Programs in Agriculture office. This office will ensure access to and support from other divisions of the University for both technical and logistical purposes. Purdue staff for the project will be drawn from the departments of the School of Agriculture provided suitable staff can be identified. Where necessary, Purdue will seek qualified staff outside, preferably through appropriate arrangements with other institutions especially Alabama A&M. In any case, assignment of staff to this project will not change their long term employment status. Staff positions will be part of the overall work load of the appropriate departments so that, for example, the agricultural economist will continue to be a member of the Purdue Department of Agricultural Economics and will receive technical backstopping and support from that department. Coordination activities on the campus will require a half-time coordinator, a part-time training coordinator, a part-time administrative assistant, and a secretary. The coordinator and/or other members of Purdue's administration are expected to be in Niger several times during the first year and at least once per year thereafter. Additional details on management activities in the U.S. will be found in the following section on procurement of commodities and participant training.

In a manner analogous to Purdue, Alabama A&M University will also participate in the project management functions in the U.S. Alabama A&M is expected to provide at least one long term staff member and a number of short term staff members. They will share in responsibility for training.

Purdue and Alabama A&M will work together to support the project and in development of project strategy.

A. Commodities purchased abroad - Purdue University will make arrangements for all commodity procurement for import into Niger under the NCR project. Evaluations of Phase I have identified inappropriate and late commodity purchases and delivery as a particular constraint to implementation. Particular attention will be given to future procurement to see that such is not the case in Phase II. In-country Purdue staff and INRAN staff will prepare jointly detailed commodity lists and descriptions to ensure the appropriateness of commodities. Certain commodity lists may be prepared by INRAN and Purdue during the pre-implementation or post-design mobilization phase to ensure early delivery of priority items. Air freight for all items possible will also be used. Purdue will draw upon the experiences and capacity of its Accounting and Purchasing Departments for procurement, using standard bid solicitation procedures and complying with other AID procurement and shipping regulations. Purdue's technical departments, Agronomy, Agricultural Economics, Computer Science, etc., will review the commodity specifications and make recommendations regarding technical specifications as requested by the project. Particular attention will be given to electrical equipment to ensure it is compatible with the electrical system of Niger. In-country staff will inspect commodities upon delivery to ensure compliance with specifications and initiate damage claims where necessary. Continuing responsibility and in-country accountability for all purchases will rest with in-country staff.

B. Administration of Participant Training - Purdue University will, with

assistance from Alabama A&M, take responsibility for all facets of administration of training programs to be provided outside Niger for INRAN staff under the project. Purdue staff in-country will assist INRAN in identifying training needs and development of training plans as previously described. The Purdue staff will assist INRAN trainees in development of training documents including applications and PI0/Ps. Purdue on-campus staff will seek appropriate placement of academic trainees and develop detailed programs for non-academic trainees. Purdue and/or Alabama A&M will furnish the training for a substantial portion of the programs. In other cases, the University will be responsible for communication of training objectives, project background, INRAN needs and relationship of training in progress, providing support for students and ensuring communication between the project, INRAN, and trainees.

Purdue will periodically develop and provide for academic trainees in the U.S. special extra-academic programs designed to help ensure that project and INRAN objectives are met; special activities related to experiment station management or research/extension interaction provide good examples. Purdue will work with academic departments and major professors of trainees engaged in graduate study to ensure that thesis research topics contribute to INRAN research objectives. Communication with and involvement of in-country Purdue staff in this process will be essential. Purdue will seek, in this process, opportunities for several students in the same university to develop a joint interdisciplinary thesis research topic, in keeping with such emphasis in the overall project.

#### Statement of Project Requirements on Space and Physical Facilities

The long term technical staff will consist of: a team leader and a senior agricultural economist with offices at INRAN headquarters, Niamey; a production agronomist and a junior economist with offices and laboratories at CNRA, Maradi; and a plant breeder with office and laboratories at Kolo. The staff will have their residences in Maradi and Kolo, because suitable housing accommodations are unavailable at the research stations.

At the INRAN sites, however, the following arrangements have been made:

- 1) INRAN will supply appropriate office space for the Team Leader, the senior economist, an administrative assistant and at INRAN headquarters in Niamey. Later in the project, a research associate will need at minimum desk space in the Department of Economics at Niamey. The project will renovate an already identified building within the INRAN compound on the Niger River Road, and will supply the necessary furnishings and equipment for proper performance of duties. Renovations will include air conditioning equipment and service.
- 2) Similar arrangements will be made for the long term staff at CNRA, Maradi, with respect to office, laboratory, and other equipment and furnishings. A research associate will also be stationed here, thereby necessitating desk space. It is presumed that the staff at Maradi may have an English/French/Hausa speaking secretary or administrative assistant.
- 3) The situation at Kolo is different. To house the plant breeder, a research associate and a secretary, the project will be responsible for the construction of suitable office and work space.
- 4) It is also agreed that INRAN will make it reasonably easy for project staff to find temporary office accommodations when they make official

visits to the several sub-stations throughout the country, such as Ouallam and Bengou.

These are some of the arrangements which will lead to the development of strong collaborative movements between INRAN and Purdue, benefiting INRAN as an ongoing progressive research organization for the country of Niger.

#### The Cooperative Role of Alabama A&M University

It is stated in the project paper that INRAN will also be assisted by Alabama A&M University through a subcontract with Purdue. These two educational institutions have made certain arrangements in order to ensure that the maximum benefit can be obtained by GON from the NCR project. Alabama A&M has accepted certain specific responsibilities under the project.

Alabama A&M, although a subcontractor, will have full involvement in program management and administration with Purdue. The two institutions will use similar uniform operational and administrative systems and the Team Leader in Niger will be responsible for long-term staff from both Purdue and Alabama A&M. This role affords Alabama A&M the opportunity to take part at all levels of implementation of the plan so that this institution can develop skills and abilities which will allow it to manage, on its own, similar projects in the future. This is merely an extension of its cooperation in the writing of the design plan.

Alabama will supply at least one long term staff member, and approximately one-quarter of the short term staff and the training program. A coordination function for these and other responsibilities will be set up in the division of International Programs at Alabama A&M. In support of this enhancement of Alabama A&M's role to carry a project on its own, the institution will be responsible for the transfer of its own faculty from the U.S. to Niger using systems identical with those in operation at Purdue.

#### Personal Vehicle Allowance

Project staff will find that arrangement for suitable, appropriate and timely means of transportation in Niger is very difficult if importation of U.S. vehicles is made. The transfer of personal cars to land-locked Niger will be very expensive and further, if these personal cars are American-made, there will be lack of support capability for both parts and maintenance. The Contractor will therefore use a modification of a plan which was used by other institutions to overcome the problems of personal transportation.

The Contractor will develop a personal vehicle allowance in lieu of cost of shipping vehicles to and from Niger. These funds will be used as a nucleus - the Purdue Vehicle Fund - to purchase vehicles for the private use of the staff members, instead of shipping a vehicle from the U.S. to Niger. These vehicles will be leased to the staff member at a nominal fee, paid monthly into the Purdue Vehicle Fund. The Contractor will be responsible, for repairs, maintenance, and collision and liability insurance but the staff member will pay for his own gasoline and oil expenses. Cars may be passed on from one staff member at the end of tour to a new incoming member.

If the cars have been paid for by the end of the project, Purdue may opt to donate the vehicles to GON. If, on the other hand, the cars are in any way encumbered, Purdue may opt to sell the cars in Niger in order to reduce the deficit. In selling cars, all the legal conditions for sale of foreign cars will be met.

This system is recommended because it is simple to operate and to monitor, and an almost identical system worked efficiently for CID in Niger. It also

Improves the quality of private life of the staff member and his family, and therefore has a positive effect in the performance of his official duties.

#### Conditions of Assignment of U.S. staff

U.S. staff to be assigned to the NCR project will be employees of either Purdue University or Alabama A&M University, or will be employees of other U.S. Institutions whose services are obtained for the project by inter-institutional agreements. In a limited number of cases, individuals may be contracted directly on a personal services or consulting type agreement for short term assignments to the project. U.S. staff will be accorded access to and use of INRAN facilities on an equal basis with INRAN staff. They will participate in INRAN functions, as required for progress of the project, in a manner equivalent to INRAN staff.

U.S. staff will, under the terms of the implementation contract, be provided by the contractor those benefits and allowances which are standard within direct AID/University contracts. Such allowances will be subject to the periodic adjustments provided for in the standard University/AID programs of collaboration.

Annex L

5C(1) - COUNTRY CHECKLIST

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

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights?  
Affirmative. This project and the USAID/Niger development assistance program in general directly benefit the needy. (See CDSS 1982, PES 80-5, PES 80-6). Furthermore, the GON has not violated internationally recognized human rights on a consistent basis (See Niamey 4498 of 09/25/80).
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the United States unlawfully?  
Negative.
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?  
Affirmative.
4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?  
Negative.
5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?  
Negative.

A.

6. FAA Sec. 620(a), 620(f); FY 79 App. Act, Sec. 108, 114 and 606. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Uganda, Mozambique, or Angola? Negative.
7. FAA Sec. 620(1). Is recipient country in any way involved in (a) subversion or, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? Negative.
8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? Negative. The GON has consistently taken adequate measures to insure the protection of U.S.G. personnel and properties.
9. FAA Sec. 620(1). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, convertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? Negative. GON investment guaranty program covers all three categories and has no outstanding disputes with American interests. (See Investment Climate Statement - Niamey 2889 of 06/30/80).
10. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters:  
a. has any deduction required by the Fishermen's Protective Act been made?  
b. has complete denial of assistance been considered by AID Administrator? Negative.
11. FAA Sec. 620; FY 79 App. Act, Sec. 603.  
(a) Is the government of the recipient country in default for more than 6 months on interest or principal of any AID loan to the country?  
(b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds? Negative.
12. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the Negative. Contemplated assistance is economic development assistance is provided by the U.S.G. on a grant basis.

A.12.

amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, as reported in annual report on implementation of Sec. 620(s). This report is prepared at time of approval by the Administrator of the Operational Year Budget and can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

Negative. **Bilateral Assistance Agreement signed on 05/26/61 remains in effect. (See: Treaties and Other International Acts Series 4786).**

14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

The GON is not in arrears in its obligations to the United Nations.

15. FAA Sec. 620A, FY 79 App. Act, Sec. 607. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?

Negative.

16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?

Negative.

17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the nonproliferation treaty?

Negative.

B. FUNDING CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy?

Criteria for such an assessment have been established and referenced below are reporting cables containing the mission's assessment in accordance with the specified criteria.  
(A) Niamey 4980 of 10/15/79.  
(B) ToAID A-2 of 01/27/79.  
Also see Niger CDSS FY-82.

B.1.

b. FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban poor?

USAID/Niger's development assistance program seeks to raise rural incomes, promote the utilization of appropriate agricultural production technologies, improve rural health and increase the educational opportunities of Nigeriens. All of these program objectives offer the potential motivation to decrease Niger's current population growth rate. In addition to project activities, USAID/Niger has begun a dialogue with GON officials on population concerns which hopefully will result in the GON taking a positive public stance in favor of voluntary family planning. (See (A) Population Impact Analysis USAID/Niger Program ToAID A-36 of 11/28/78 and (B) Niger CDSS FY-82).

5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FAA Sec. 653 (b); Sec. 634A. (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure)?
  - a) This project was included in the FY 1980 Congressional Presentation.
  - b) Yes.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?
  - a) Yes.
  - b) Yes.
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

Further legislative action is not required.
4. FAA Sec. 611(b); FY 79 App. Act Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

This project is not for water or water related construction.
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and a U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

Yes.
6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

No.

A.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

12. FY 79 App. Act Sec. 608. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained

9. 21% of total costs. GON budgeting constraints will require that a portion of the grant funds be used to meet some local currency costs.

This project is specifically designed to improve the technical efficiency of agriculture through the development of appropriate agronomic research.

This project will neither encourage nor discourage private U.S. trade and investment except to the extent that the project requires U.S. goods and services to implement it. The GON will pay personnel costs for Nigeriens associated with the project plus much of the local support costs for project activities amounting to at least (cont'd below)

The U.S. owns no excess foreign currency in Niger

Yes.

No.

a. This project is focussed upon involving the rural poor in development by increasing their access to appropriate agricultural research and resources and by increasing the yields from labor intensive food production.

B.1.a.

basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

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

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

(i) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development organizations;

(ii) to help alleviate energy problems;

(iii) research into, and evaluation of, economic development processes and techniques;

(iv) reconstruction after natural or manmade disaster;

- b) A long run aim of the overall Niger Cereals Program activity to which this project contributes, is to establish rural cooperative organizations on a solid basis throughout Niger.
- c) Although this activity concerns agronomic research, it is contributing to an overall program of food grains production orientated around a self-help model of rural development.
- d) The Niger Cereals Program encourages women to participate in rural development activities through the productivity projects at the local level particularly via their participation in cooperatives.
- e) The project will help to focus attention on national agricultural pricing and supply policies within a regional context of trade and development.

\* See Below  
N/A

N/A

N/A

- \*b. (1) (103) This project is directly aimed at increasing productivity and income of small farmers through the development of an effective and appropriate system of agronomic research.

B.1.b.(4).

(v) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(v.) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

c. [107] Is appropriate effort placed on use of appropriate technology?

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to the Congress been made, and effort for other financing, or is the recipient country "relatively least developed"?

f. FAA Sec. 201(h). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental and political processes essential to self-government.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

Yes. Research will be oriented toward farming and production systems appropriate to the small farmer.

Niger, considered to be a relatively least developed country, is providing some 21% of project costs.

Yes. Niger is considered to be a "relatively least developed country".

The project is designed to help satisfy Niger's expressed need for self-sufficiency in food production on a self-sustaining basis. It utilizes a self-help rural development model based on individual and community effort and emphasizes farmer training, literacy and access to production resources.

Yes.

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed? **Yes, through AID's normal procurement practices.**
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him? **Yes.**
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the United States on commodities financed? **Niger does not discriminate against U.S. Marine Insurance companies.**
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? **Yes.**
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? **Yes.**
6. FAA Sec. 603. (a) Compliance with requirement in section 901(b) of the Merchant Marine Act of 1920, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. **Yes.**
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the **Yes.**

A.7.

facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes.

9. FY 79 App. Act Sec. 105. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?

Yes.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

This is not a capital project.

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Yes.

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the United States not exceed \$100 million?

This is not a project for the construction of a productive enterprise.

C. Other Restrictions

1. FAA Sec. 122(e). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

N/A

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

N/A

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-bloc countries, contrary to the best interests of the United States?

N/A

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or guaranty of such transaction?

N/A

Will arrangements preclude use of financing:

- a. FAA Sec. 104(f). To pay for performance of abortions or to motivate or coerce persons to practice abortions, to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to undergo sterilization? **Yes.**
- b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property? **Yes.**
- c. FAA Sec. 660. To finance police training or other law enforcement assistance, except for narcotics programs? **Yes.**
- d. FAA Sec. 662. For CIA activities? **Yes.**
- e. FY 79 App. Act Sec. 104. To pay pension, etc., for military personnel? **Yes.**
- f. FY 79 App. Act Sec. 106. To pay U.N. assessments? **Yes.**
- g. FY 79 App. Act Sec. 107. To carry out provisions of FAA sections 209(d) and 251(h)? (Transfer of FAA funds to multilateral organizations for lending.) **Yes.**
- h. FY 79 App. Act Sec. 112. To finance the export of nuclear equipment, fuel, or technology or to train foreign nations in nuclear fields? **Yes.**
- i. FY 79 App. Act Sec. 601. To be used for publicity or propaganda purposes within United States not authorized by the Congress? **Yes.**

APPENDIX M

Initial Environmental Examination

(IEE)

Project Country: Republic of Niger

Project Title: Niger Cereals Research Project 683-0225

Funding: Sahel Development Program FY 80-84 LOP: \$7245 (AID)

Period of Project: Five Years September 1980 - December 1984

IEE Prepared by: *Harry Decker* Harry Decker, USAID/Niger

Environmental Action Recommended: Negative Determination

Concurrence: *Jay P. Johnson* Jay P. Johnson, Mission Director  
USAID/Niger

DATE: 4/24/80

Bureau Environmental Officer's Decision:

Approved James S. Aester

Disapproved \_\_\_\_\_

Date 18 January 1982

Clearance  
GC/AFR:L.DeSoto

*L. DeSoto*  
1/14/82

## 1. EXAMINATION OF NATURE, SCOPE AND MAGNITUDE OF ENVIRONMENTAL IMPACTS

### A. Description of Project

#### 1. Environmental Setting

The national territory of Niger is located at 12-23°N latitude, although project activities will focus primarily on the pastoral zone (12-16°N) and the cultivated zone (12-14°N). These zones are of dry and subhumid tropical climates where rainfall totals 200-400 mm and 400-800 mm respectively although only a very small area on the southern fringe of Niger has a mean annual rainfall over 800 mm. The summer rainy season is from June to October with maximum rainfall in August. Rainfall decreases both in quantity and in regularity as one moves northward.

#### Landforms

In the cultivated zone where the human population is concentrated there is a succession of basins and low laterite plateaus with sandy deposits over limestone and sandstone layers. Average elevation is 300 m; ranging from 200-500 m. Slopes generally are less than 10%.

#### Soils

Roughly 20% of Niger's total land is more or less arable, although large areas of this land are marginal for farming and have been cleared and cultivated only in recent years. The subhumid zone is dominated by ferruginous soils (alfisols) with some shallow soils of alluvial and colluvial origin (entisols), often over layers of cemented laterite (plinthite). The ferruginous soils are characterized by kaolinitic clays, low CEC, moderate base saturation and stable aggregate structure; principal limitations on use are shallow depth droughtiness, and erodibility of fertile surface horizons. The drier zones are dominated by arid brown soils (aridisols). These soils are characterized by non-kaolinitic cracking clays with higher CEC, high base saturation and poor structure (loose, light, sandy). Agricultural use is limited by aridity and susceptibility to erosion and compaction.

### Vegetation

The southern zone is open woodland and sudan savanna type with principal genera being Adansonia, Sclerocaraya, Combretum, and Terminalia. The more northern zone is thorn shrub and grass steppe sahel savanna type, with principal genera being Acacia, Comiphora, Balanites, Aristida, Cenchrus, and Schoenfeldia.

### Land Use

In the pastoral zone: There is extensive grazing of cattle, sheep, goats, camels and donkeys. In the cultivated zone: the crops are millet, sorghum, cowpeas, peanuts, with some cotton, corn and rice.

Woodlands and pasture are subjected to over-cutting, over-grazing and clearing for cultivation. Cultivated land is subject to irregular but intense, concentrated rainfall and erosion.

### Socio-economic Characteristics

Niger has approximately 5 million people with an annual increase of 2.7 percent. 90% of the population is rural, divided between nomadic (15%) and sedentary farmers (75%). Only 4 cities have a population greater than 25,000. Over 43% of the population is under 15 years of age. Average per capita income was \$156 in 1977. There are five major ethnic groups: Hausa (45%); Djerma/Songhai (21%); Fulani (14%); Tuareg (11%); and Beri-Beri (8%). The remaining one percent is composed of Arab, Tubu and Gourmantche.

None of the activities listed above will have a significant immediate environmental impact. To the extent that the activities will succeed in identifying improved practices that will enable Nigerien farmers to increase production, the environmental impact will be positive. Better methods of improving and maintaining soil fertility and increased production per unit area will enable Niger to maintain self-sufficiency in food production with less pressure on marginal lands. This will result in less soil erosion and range and wooded land destruction than would result if the increasing population pressure forces more marginal lands into cultivation.

With regard to pesticides all USAID assistance under this project for the procurement, use, or both of pesticides will be for research. As such Section 216.3 (b) (2) (iii) of AID's Environmental Regulations apply and except this project from section 216.3 (b) (1) and a risk/benefit analysis is therefore not required. It should be noted however, that this project will be closely coordinated with 2 other projects dealing with pest management in Niger. The Canadian financed Crop Protection Project is providing assistance for the training of Extension Agents and Crop Protection Specialists in the safe and effective use of pesticides and is conducting research to identify more effective and safer chemicals for use under Nigerien conditions. As a result of these efforts to-date there is an increased awareness and attention to safety precautions on the part of GON agents using pesticides and increased use of chemicals judged less harmful to the environment (such as, Fenitrothion, Propoxur, Diazinon) as replacements for chemicals such as Parathin, BHC, Dinethrate, and DDT that had been used previously. Research continues under this project in the possible use of synthetic Pyrethroids and other chemicals that have minimal user hazards and that break down quickly causing little or no long term environmental impact. The basic aim of the research will be to determine the safest and most appropriate EPA approved pesticides and incorporate them into an Integrated Pest Management scheme.

In addition Niger is participating in the AID funded Sahel Regional Integrated Pest Management Project. This project will assist the GON in determining more precisely the extent of pest infestation in cultivated crops, the level of infestation at which control measures are to be recommended, the various biological and mechanical control practices that might be used and as a last resort, the most effective chemicals to control pest outbreaks that have both minimal user hazards and environmental impact.

## 2. Project Proposal

This project will assist the Nigerien Institute for Agricultural Research (INRAN) in the implementation of national cereals crops research. The goal of the program is to identify methods by which farmers can increase food production and income through the use of higher yielding varieties and production practices. The major activities to be included in the project include:

1. Thirty (30) long term academic training programs and sixteen (16) short term study programs for Nigerien Agricultural Scientists will be provided to improve the local research capabilities.

2. A collaborative relationship will be established between INRAN and a US Agricultural Research Institute which will provide all technical assistance required for this project. The proposed fields of collaboration will be in plant breeding, soils management, agronomy, and Agricultural Economics. (Assistance in crop protection is already being provided by Canada on a bilateral basis and USAID through the CILSS Integrated Pest Management Program.)
3. A research sub-station (40 ha) will be established in the Say Arrondissement (south of Niamey) to respond to the constraints of an increasing production in this particular area where the soils and climates differ from other regions of Niger.
4. In support of research operations, funds will be provided for the research library, research equipment, farm equipment, vehicles and miscellaneous operating costs.

**B. Identification and Evaluation of Environmental Impacts**

**Impact Areas and Sub-Areas**

**a. LAND USE**

1. Changing the character of the land through:
  - a. Increasing the population. . . . . N
  - b. Extracting natural resources. . . . . N
  - c. Land clearing. . . . . L
  - d. Changing soil character. . . . . N
2. Altering natural defenses. . . . . N
3. Foreclosing important uses. . . . . N
4. Jeopardizing man or his works. . . . . N

b. WATER QUALITY

- 1. Physical state of water. . . . . N
- 2. Chemical and biological states. . . . . N
- 3. Ecological balance. . . . . N

c. ATMOSPHERIC

- 1. Air additives. . . . . N
- 2. Air pollution. . . . . N
- 3. Noise pollution. . . . . N

d. NATURAL RESOURCES

- 1. Diversion, altered use of water. . . . . N
- 2. Irreversible, inefficient commitments. . . . . N

e. CULTURAL

- 1. Altering physical symbols. . . . . N
- 2. Dilution of cultural traditions. . . . . N

f. SOCIOECONOMIC

- 1. Changes in economic/employment patterns. . . . . N
- 2. Changes in population. . . . . N
- 3. Changes in cultural patterns. . . . . N

g. HEALTH

- 1. Changing a natural environment. . . . . N
- 2. Eliminating an ecosystem element. . . . . N

h. GENERAL

- 1. International impacts. . . . . N
- 2. Controversial impacts. . . . . N
- 3. Larger program impacts. . . . . N
- 4. Other factors. . . . . N

LEGEND

- N - No environmental impact
- L - Little environmental impact
- M - Moderate environmental impact
- H - High environmental impact
- U - Unknown environmental impact

Annex N

Certification of Section

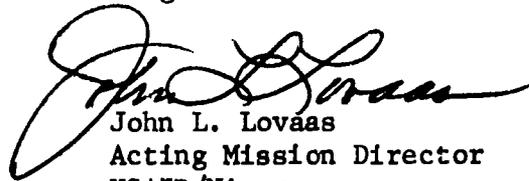
611 (e)

of the FAA of 1961

as amended

I, John L. Lovaaas, the principal officer of the Agency for International Development in Niger, do herewith certify that in my judgement, Niger has both the financial capability and human resources to maintain and utilize effectively the goods and services procured under this project entitled the Niger Cereals Research Project.

This judgement is based upon a thorough review of the GON's administrative and financial accountability procedures, the extensive consultations with the GON during the preparation of this project, and the past good record of implementation support of other AID projects carried out in Niger.

  
John L. Lovaaas  
Acting Mission Director  
USAID/Niger

October 12, 1981

# memorandum

DATE: 12 October 1981

REPLY TO  
ATTN OF: Winfield S. Collins, General Engineering Officer *WSC*

SUBJECT: Niger Cereals Research Project, 683-0225

to: John L. Lovaas, Acting Mission Director

I have reviewed the preliminary plans of the facilities to be constructed for the subject project. I have also reviewed pertinent schedules and estimates of costs. Based on these reviews, I verify that the technical planning necessary for carrying out this project has been accomplished, and that the schedules and estimates of cost are reasonable.

Drafted: CPippitt, PDE



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TO RUFHYC/AMEMBASSY NIAMEY 1374

INFO RUTAIJ/AMEMBASSY ABIDJAN 0936

RUTABO/AMEMBASSY BAMAKO 7766

BT

UNCLAS STATE 194803

**BEST AVAILABLE DOCUMENT**

683-0225

23 JUL 80  
TON: 1515  
CN: 03474  
ACTION: AID  
INFO: AMB DCM  
CHRON

AIDAC, ABIDJAN FOR REDSO, BAMAKO FOR SDPT

E.O. 12065:N/A

TAGS:

SUBJECT: NIGER CEREALS RESEARCH PID 683-0225

REF: NIGER 2762

ACTION: PROO-DM  
INFO: PROO-CH

PDS

CONT

MCP

CHRON

ACTION DUE 7-31-80

1. SUBJECT PROJECT REVIEW HAS RESULTED IN COMMITTEE RECOMMENDATION TO AA/APR TO APPROVE THE PHASE II RESEARCH PROJECT. THE AA/APR HAS SUBSEQUENTLY AUTHORIZED THE MISSION TO PROCEED WITH DEVELOPMENT OF THE PP.

**FOLLOWING GUIDANCE IS PROVIDED FOR PP DESIGN.**

(A) THE PP SHOULD SHOW HOW THE LINKAGES BETWEEN INRAN, OTHER NIGER AGRICULTURE RESEARCH PROGRAMS AND THE GOVERNMENT'S EXTENSION ACTIVITIES IN NIGER WILL BE DEVELOPED AND IMPROVED. THESE LINKAGES ARE NECESSARY TO INSURE THAT PRIORITY RESEARCH EFFORTS WILL BE UNDERTAKEN AND RESULTS TRANSMITTED ON A SYSTEMATIC BASIS TO FARMERS.

(B) THE ROLES OF THE VARIOUS AGENCIES CURRENTLY INVOLVED IN ON-FARM RESEARCH SHOULD BE CLEARLY DELINEATED SO AS TO DETERMINE WHICH AGENCY EFFORTS ARE ESSENTIAL TO A SYSTEMATIZED TESTING OF RESEARCH APPROACHES. THE PP SHOULD CLEARLY SPELL OUT WHICH OF THESE AGENCIES NEED TO BE REINFORCED AT THIS TIME, AND WHAT FUNDING RESOURCES ARE AVAILABLE FOR THIS PURPOSE. IF LEGISLATIVE OR ADMINISTRATIVE ENACTMENTS ARE REQUIRED TO EFFECT THIS REINFORCEMENT, THESE ALSO SHOULD BE STIPULATED IN THE PP.

(C) MISSION SHOULD REVIEW THE RELATIONSHIP BETWEEN THE TYPES OF TECHNICAL DESIGN EXPERTISE BEING RECRUITED FOR THE PP DESIGN AND THE SCOPE OF WORK TO BE UNDERTAKEN TO INSURE THAT THE RIGHT MIX OF DESIGN TALENT IS RECRUITED. THE AGRONOMIC, SOCIAL AND ECONOMIC CONSTRAINTS WHICH LIMIT PRODUCTION SHOULD BE EXAMINED TO INSURE THAT RESEARCH RECOMMENDATIONS CAN BE ADOPTED BY FARMERS INTO THEIR EXISTING FARMING SYSTEM.

(D) THE DESIGN TEAM SHOULD EXAMINE RELATIONSHIPS BETWEEN INRAN AND REGIONAL RESEARCH ACTIVITIES (E.G., SAYGRAD) INTERNATIONAL INSTITUTES (IITA, ICRISAT) AND RELATED U.S. RESEARCH ACTIVITIES AND IDENTIFY WAYS TO REINFORCE LINKAGES.

UNCLASSIFIED

STATE 194803

(E) THE CONSTRAINTS TO INCREASED PRODUCTION IN NIGER BE IDENTIFIED TO SHOW WHY SIGNIFICANT NEW RESOURCES SHOULD BE earmarked FOR ADDITIONAL RESEARCH RATHER THAN APPLIED TO EXTENSION, FARMER CREDIT, OR OTHER ACTIVITIES WHICH COULD CONCEIVABLY CHANNEL BENEFITS MORE DIRECTLY TO TARGET POPULATION.

(F) PROJECTED RECURRENT COSTS OF THIS PROJECT SHOULD BE EXAMINED IN LIGHT OF ANTICIPATED GON OUTLAYS FOR INRRN TO INSURE THAT PROJECT ACTIVITIES CAN BE CONTINUED AND THAT RETURNING PARTICIPANTS HAVE SUFFICIENT RESOURCES TO CARRY OUT THE RESEARCH ACTIVITIES FOR WHICH THEY ARE BEING TRAINED.

(G) ANY WAIVERS REQUIRED SHOULD BE INCLUDED IN PP.

3. THE AA/APR HAS APPROVED A NEGATIVE DETERMINATION FOR THE IEE.

4. AID/W SUGGES THAT A SOCIAL SCIENTIST BE ADDED TO THE DESIGN TEAM TO EXAMINE THE FEASIBILITY OF ADDING A FARMING SYSTEMS RESEARCH COMPONENT TO THE PROJECT AND TO ADDRESS THE CONCERNS EXPRESSED IN 2(C) ABOVE.

5. ACTION MEMORANDUM TO AA/APR FOR ONE YEAR EXTENSION OF PHASE I AND CN IN CLEARANCE PROCESS. WILL ADVISE.

6. GIVEN MISSION CONCURRENCE CONTAINED REPTTEL FOR TITLE XII COLLABORATION DESIGN, SEPTTEL TO FOLLOW GIVING MISSION GUIDANCE ON NECESSARY DOCUMENTATION TO BE PREPARED BY MISSION.

USKIE  
BT  
#4923

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BEST AVAILABLE DOCUMENT

AH/RV

Annex P: OFFICIAL GOV REQUEST FOR ASSISTANCE\*

REPUBLIQUE DU NIGER

Niamey, le

683-0221

CONSEIL MILITAIRE SUPREME

MINISTERE DES AFFAIRES ETRANGERES  
ET DE LA COOPERATION

DIRECTION DE LA COOPERATION  
INTERNATIONALE



16 DEC. 1980

ACTION: NCP  
INFO: DR  
A 10  
PROG-MC  
PROG-CS  
PROG-TB  
PROG-SB  
FIE  
CONT  
CIRON  
R'

N° 12009 MNE/C/DCI

ACTION DUE 12-31-

Le Ministère des Affaires Etrangères et de la  
Coopération de la République du Niger présente ses compliments  
à l'Ambassade des Etats-Unis d'Amérique et a l'honneur de lui  
faire parvenir cinq (5) exemplaires du dossier du projet  
céréaliier national 2ème phase pour demande de financement  
auprès de l'USAID. Ce projet est inscrit dans le plan quin-  
quennal et compte parmi les priorités de notre pays.

Le Ministère des Affaires Etrangères et de la  
Coopération saisit cette occasion pour renouveler à l'Amba-  
sade des Etats-Unis d'Amérique, les assurances de sa haute  
considération./.

AMBASSADE DES ETATS-UNIS  
D'AMERIQUE  
NIAMEY



\*Supporting documents which include the project budget are on file in  
AFR/DR/SWAP

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: AFR/DR, John W. Koehring

SUBJECT: Vehicle Procurement Waiver for Niger Cereals Research Project (683-0225)

Problem: The implementation of the subject project requires the procurement of 18 vehicles (two and four-wheel drive light trucks and sedans) of non-U.S. manufacture. In order to allow such procurement, you are requested to grant:

- (1) a source/origin waiver of Geographic Code 000 (U.S. only) to Code 935 (Special Free World); and
- (2) a waiver of provisions of section 636(1) of the FAA.

Facts:

- (a) Cooperating Entity: Government of Niger
- (b) Authorizing Document: Action Memorandum AND Project Authorization to the AA/AFR
- (c) Project: Niger Cereals Research, 683-0225
- (d) Nature of Funding: Grant
- (e) Description of Goods: 6 two-wheel drive sedans; 12 four-wheel drive light trucks
- (f) Approximate Value: \$250,000
- (g) Probable Source: Niger
- (h) Probable Origin: EEC or Japan

Discussion:

A. Source/Origin Waiver:

In accordance with AID Handbook 1B, procurement of commodities from Code 935 sources and origins under grant-financed projects requires a waiver. Handbook 1B, Chapter 5B4b(7) states a waiver may be granted if there are "such other circumstances as are determined to be critical to the success of project." The success of the Niger Cereals Research Project is dependent upon the provision of adequate transportation and for this reason the project includes a grant of 18 vehicles. In the past, the Mission imported approximately one hundred International Scout vehicles for various projects. These vehicles are no longer being manufactured and there is no longer even the limited dealer support that was available previously. American Motors recently attempted to establish a dealership in Niamey but was unsuccessful. No U.S. manufactured vehicles are represented by a dealer and, therefore, there are no available spare parts, service facilities or trained mechanics familiar with U.S. vehicles.

USAID/Niger would welcome the opportunity to show the American flag and US engineering skill by using U.S.-manufactured vehicles in the AID/GON development projects. However, to do so without a viable local dealer for essential service and parts support is not only detrimental to the achievement of the project's objectives but is contrary to the best interests of the United States.

B. Waiver of Section 636 (1)

In addition to the general source/origin limitations on the procurement of commodities, Section 636(1) of the FAA prohibits the procurement of vehicles of non-U.S. manufacture. However, the provisions of Section 636(1) may be waived when special circumstances permit it. Under Handbook 1B, Chapter 4C2d(1)(b), special circumstances are deemed to exist if there is "present or projected lack of adequate service facilities and supply of parts for U.S.-manufactured vehicles."

Since, there is an inability to provided service and parts for U.S.-manufactured vehicles and this capability now exists only for vehicles of Code 935 origin, the special circumstances criterion set forth above is satisfied.

Recommendation: For the above reasons, it is recommended that you:

- (1) Conclude that special circumstances exist which merit a waiver of the provisions of 636(1) of the Foreign Assistance Act of 1961, as amended;
- (2) Approve a vehicle procurement source/waiver from the Geographic Code 000 to Code 935; and
- (3) Certify that exclusion of procurement from free world countries other than the cooperating country and countries included in Code 941 would seriously impede the attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program.

Clearances:

PMSU, WMeeks (Draft)  
CONT, BWhipple (Draft)  
PRM, MGolden (Draft)  
A/DIR, JLoVaas (Draft)  
GC/AFR, LDeSoto (Draft)

Drafted:PDE,CPippitt:at